Introduction to Performance Management using zVPS for Linux on z

- **Barton@VelocitySoftware.com**
- **HTTP://VelocitySoftware.com**
- **HTTP://LinuxVM.com**

"If you can't Measure it,

I am Just Not Interested ™"

Topics

- **Performance Management Overview**
- **Systems Management Features**
- **zVPS Objectives (and buzwords)**
- **End to End Performance Management**
- **zVPS**
  - Data Collection
  - PDB
  - Technology
- **Applications**
- **Using zVPS: Case Studies**

“z” Performance Management Level Set

- **SHARED resource environment,**
  - z/VM Performance critical (Wells Fargo runs their ATMs on Linux on Z)
  - Any server or application can impact other servers or applications
- **Linux is not z/OS**
  - No workload manager, workload prioritization is manual
- **This is not distributed Environment**
  - We do not have cycles to waste
  - We DO have capacity planning, chargeback requirements
  - We DO expect to run at very high utilization!
  - We do need to educate the users
- **Tools are needed specific to the environment**
  - “end to end”

Performance Management "vendor" Requirements

Performance Management Business Requirements

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

Correct data (Virtual Linux CPU data wrong)

SMT CPU data difficult to understand

Capture ratios (is the data valid?)

Instrumentation can NOT be the performance problem

Infrastructure Requirements: Performance Analysis

- **Why Performance Analysis: Service Level Mgmt**
  - Diagnose problems real time
  - Manage 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
    - 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

Infrastructure Requirements: Capacity Planning

- **Why Capacity Planning: Future Service Levels**
  - How many more servers can you support with existing z15?
  - What is capacity requirements for an application?
  - Avoid crises ***in advance***
  - Consolidation Planning – Projecting requirements of the next 100 or 1000 servers
  - Impact of SMT?
- **Infrastructure Requirements**
  - Performance database (long term)
  - z/VM **AND** Linux data
  - Resource requirements by Server, Application, User
  - z/VM and z/Linux data must be usable by existing planners
  - **Interface to MICS, MXG, TUAM, TDS, IUE (BMC)**

Infrastructure Requirements: Chargeback

- **Why Chargeback?**
  - How much does an application cost IT to operate?
  - Distributed chargeback model is by server
  - Shared chargeback model is by resource utilized
  - Convincing customers to move applications to “z”
  - Encourages efficient/effective resource use
  - Align IT to your business model
- **Infrastructure Requirements**
  - Identify Resource by server
  - Identify Resource by Linux Application
  - **High capture ratio**
  - Every site does it differently, so flexible data is key

Infrastructure Requirements: Operations

- **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
    - One test server in a loop impacts all other servers
  - Fast problem detection
  - Requires active performance management
  - Requires AUTOMATION! (zALERT!)
- **Infrastructure Requirements**
  - Interface to SNMP management console (NETCOOL, HPOpenView)
  - User tailored alerts
  - Web based alerts

zVPS does “End to End” Performance Management

- **Management wants**
  - “single pane of glass” - One tool that does all
- **Complete performance management includes:**
  - z/VM System Level: CEC, LPAR data, ALL SubSystems
  - Linux – Storage, CPU, file system, network
  - Process – applications, performance data
  - VSE – partitions, CPU, I/O
  - z/OS
- **Network analysis**
- **Application subsystem analysis**
  - Java, WAS, Oracle, MQ, DB2, postgres, gpfs
- **Outside “z” server analysis**
  - Linux on “x”, VMWare, KVM
  - Microsoft servers
  - VPN, gateways, utilities

zVPS Data Sources

- **Standard Interfaces mean less work**
  - Agentless
- **CP Monitor – z/VM**
  - LPAR data, CPU data
  - Disk, storage, paging data
  - Virtual machine data
  - Seeks data
- **SNMP – Standard (requires zTCP collector)**
  - Network data, microsoft servers, many appliances
  - VSE data
  - Linux “UCD” mib – high level ram, CPU
- **SNMP – Velocity Software mib**
  - Process details, applications, Java, WAS, Oracle

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

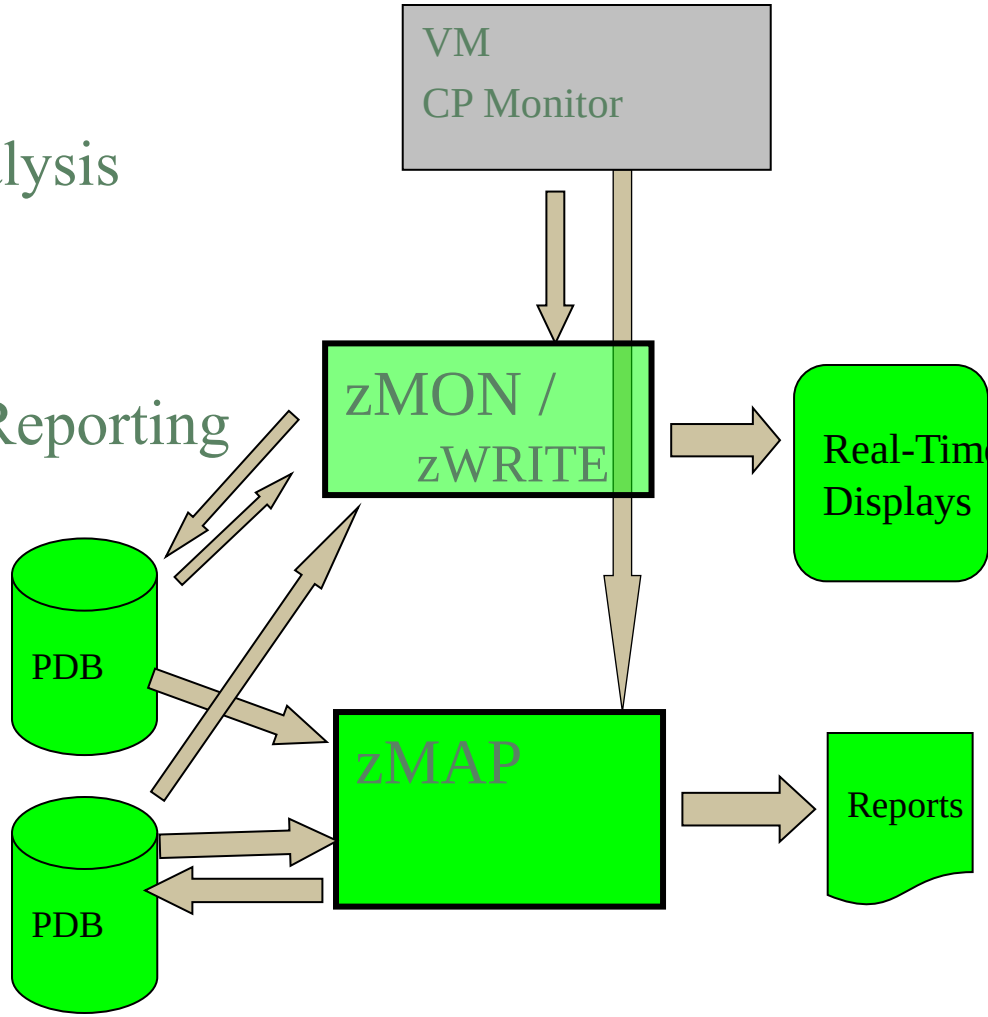
PDB or monwrite data input

PDB (Performance DataBase)

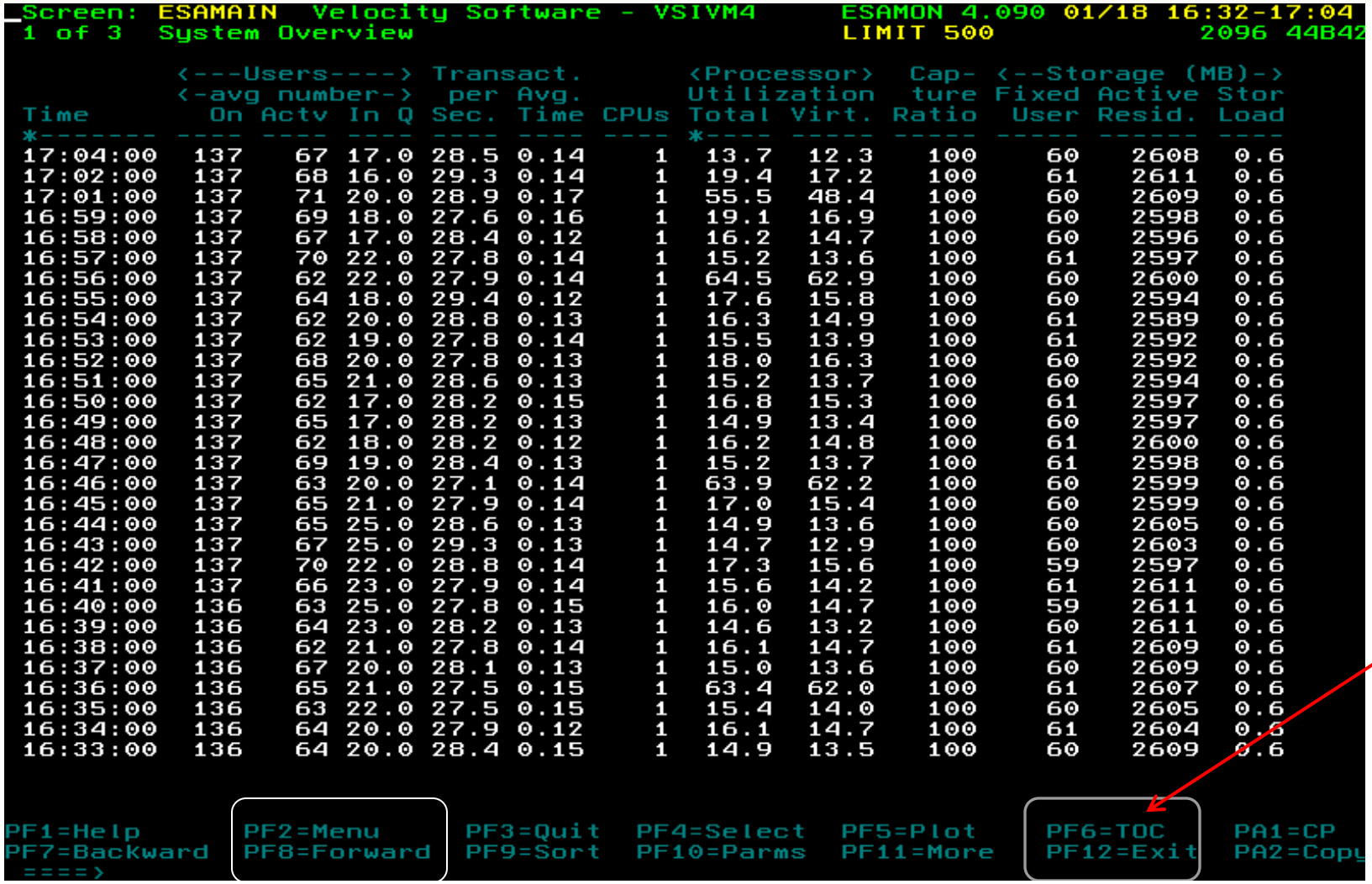
Complete data

By Minute, hour, day

Monthly/Yearly Archive



zMON 3270 Overview

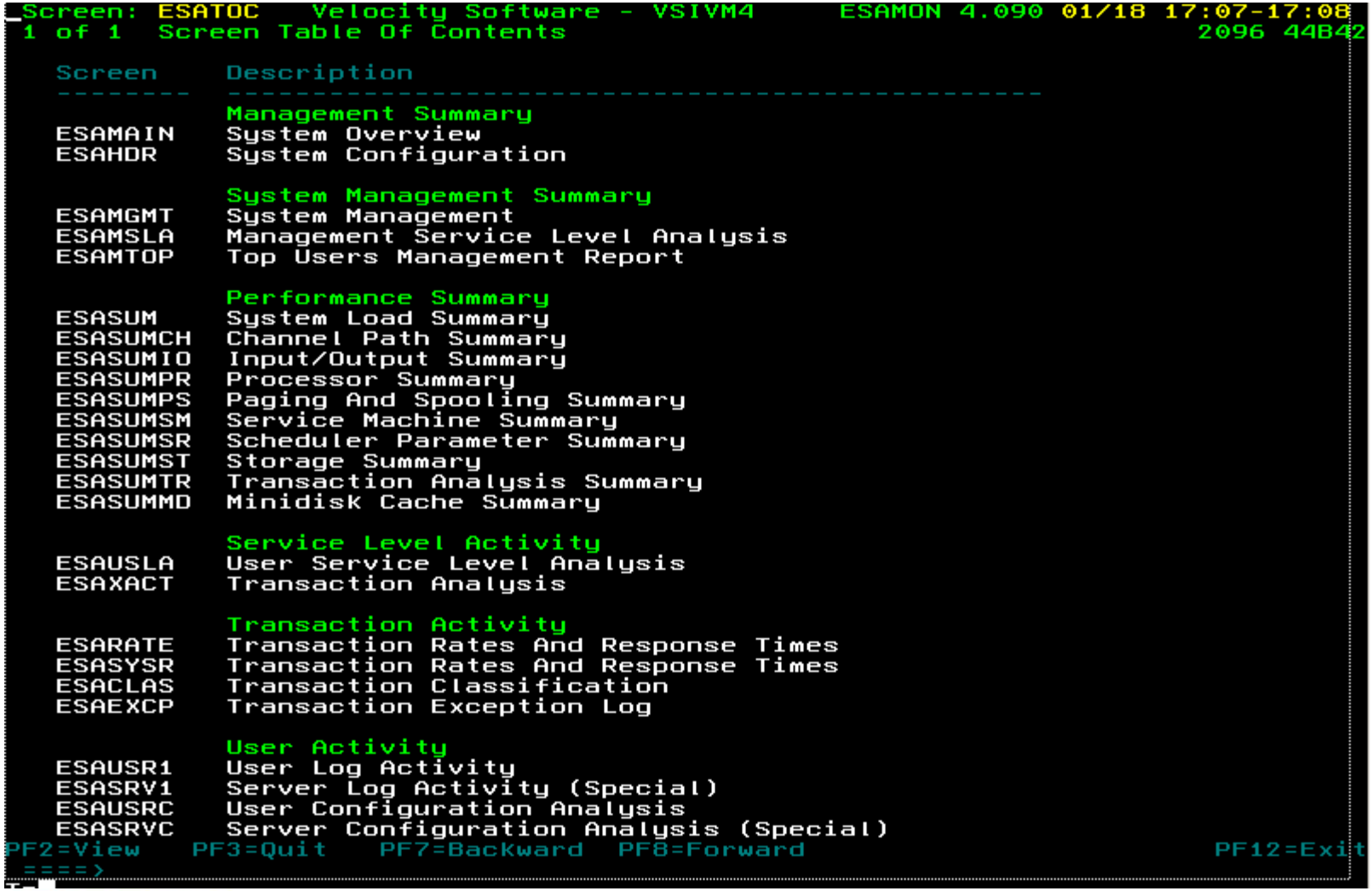


```
Screen: ESAMAIN  Velocity Software - VSIVM4      ESAMON 4.090 01/18 16:32-17:04
1 of 3  System Overview                          LIMIT 500              2096 44B42

          <---Users----> Transact.          <Processor>  Cap-  <--Storage (MB)->
          <-avg number->  per Avg.          Utilization  ture Fixed Active Stor
Time        On Actv In Q Sec. Time CPUs Total Virt. Ratio  User Resid. Load
*-------- ---- ---- ---- ---- ---- ---- *---- ----- ----- ----- ------ ----
17:04:00  137   67 17.0 28.5 0.14    1  13.7  12.3   100    60   2608  0.6
17:02:00  137   68 16.0 29.3 0.14    1  19.4  17.2   100    61   2611  0.6
17:01:00  137   71 20.0 28.9 0.17    1  55.5  48.4   100    60   2609  0.6
16:59:00  137   69 18.0 27.6 0.16    1  19.1  16.9   100    60   2598  0.6
16:58:00  137   67 17.0 28.4 0.12    1  16.2  14.7   100    60   2596  0.6
16:57:00  137   70 22.0 27.8 0.14    1  15.2  13.6   100    61   2597  0.6
16:56:00  137   62 22.0 27.9 0.14    1  64.5  62.9   100    60   2600  0.6
16:55:00  137   64 18.0 29.4 0.12    1  17.6  15.8   100    60   2594  0.6
16:54:00  137   62 20.0 28.8 0.13    1  16.3  14.9   100    61   2589  0.6
16:53:00  137   62 19.0 27.8 0.14    1  15.5  13.9   100    61   2592  0.6
16:52:00  137   68 20.0 27.8 0.13    1  18.0  16.3   100    60   2592  0.6
16:51:00  137   65 21.0 28.6 0.13    1  15.2  13.7   100    60   2594  0.6
16:50:00  137   62 17.0 28.2 0.15    1  16.8  15.3   100    61   2597  0.6
16:49:00  137   65 17.0 28.2 0.13    1  14.9  13.4   100    60   2597  0.6
16:48:00  137   62 18.0 28.2 0.12    1  16.2  14.8   100    61   2600  0.6
16:47:00  137   69 19.0 28.4 0.13    1  15.2  13.7   100    61   2598  0.6
16:46:00  137   63 20.0 27.1 0.14    1  63.9  62.2   100    60   2599  0.6
16:45:00  137   65 21.0 27.9 0.14    1  17.0  15.4   100    60   2599  0.6
16:44:00  137   65 25.0 28.6 0.13    1  14.9  13.6   100    60   2605  0.6
16:43:00  137   67 25.0 29.3 0.13    1  14.7  12.9   100    60   2603  0.6
16:42:00  137   70 22.0 28.8 0.14    1  17.3  15.6   100    59   2597  0.6
16:41:00  137   66 23.0 27.9 0.14    1  15.6  14.2   100    61   2611  0.6
16:40:00  136   63 25.0 27.8 0.15    1  16.0  14.7   100    59   2611  0.6
16:39:00  136   64 23.0 28.2 0.13    1  14.6  13.2   100    60   2611  0.6
16:38:00  136   62 21.0 27.8 0.14    1  16.1  14.7   100    61   2609  0.6
16:37:00  136   67 20.0 28.1 0.13    1  15.0  13.6   100    60   2609  0.6
16:36:00  136   65 21.0 27.5 0.15    1  63.4  62.0   100    61   2607  0.6
16:35:00  136   63 22.0 27.5 0.15    1  15.4  14.0   100    60   2605  0.6
16:34:00  136   64 20.0 27.9 0.12    1  16.1  14.7   100    61   2604  0.6
16:33:00  136   64 20.0 28.4 0.15    1  14.9  13.5   100    60   2609  0.6

PF1=Help      PF2=Menu      PF3=Quit   PF4=Select  PF5=Plot    PF6=TOC     PA1=CP
PF7=Backward  PF8=Forward   PF9=Sort   PF10=Parms  PF11=More   PF12=Exit   PA2=Copy
 ====>
```

zMON 3270 TOC



zMON 3270 zoom – User classification important

```
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
```

zMAP listings and zMON displays SAME names

```
Report: ESATOC        Table Of Contents
Monitor initialized: 12/23/14 at 13:55:
Monitor period:           660 seconds (
---------------------------------------
```

zMAP Performance Data Base

History data format – long term

- All history in “daily” files, yyyymmdd

ESAEXTR extracts data from history

- User designed reports, CSV files

Command Formats

- ESAMAP yyyymmdd
- ESAMAP yyyymm*
- ESAMAP (WEEK 51
- ESAMAP (MONTH 12
- Same for ESAEXTR

Performance Database "EXTRACT"

- **Performance database language:**
  - ESAEXTR – ZMAP feature
  - HISTORY KEYWORDS – describes variable names (~4000 metrics)
- **ESAEXTR Functions**
  - ESAEXTR filetype* (PARM ucdsys CSV
  - Filetype is history type, as in 201706* for "june, 2017"
  - CSV produces CSV format vs column aligned
- **ESAEXTR Statements**
  - EXTRACT:
  - x = 'NODE'
  - y = 'UCDSYS.REALSIZE'
  - y = 'UCDSYS.BUFFER'
  - y = 'UCDSYS.CACHE'
  - y = 'UCDSYS.REALSIZE-UCDSYS.REALAVAIL-UCDSYS.BUFFER-UCDSYS.CACHE' ; anonymous
  - y = 'UCDSYS.SWAPSIZE-UCDSYS.SWAPAVAIL'
  - y = 'UCDSYS.CMM'
  - **criteria = NODE = LNXD01*'** ; wild card
  - TITLE = 'Linux Storage Analysis'
  - TITLE = '*Label Available Buffer Cache Anonymous'
- **or: ESAMAP filetype* (reportusr = 'LNXD01'**

Performance Database

- **Requirement to go beyond z/VM and Linux metrics**
- **z/VPS provides over 4,000 unique metrics**
  - z/VM System, storage, paging, dasd metrics (3,000)
  - z/VM Virtual machine metrics (~400)
  - Network metrics (~100)
  - Linux System metrics (~250 VSI, 80 HST, 80 UCD)
  - Linux Process metrics (~40)
- **Application subsystem users:**
  - **Oracle (70 metrics), supports (10G, 11G, 12C)**
  - **Websphere (30 metrics)**

zMAP Capacity Charts

Daily/Weekly/Monthly CSV files created, zview exposed….

```
; Chart Syntax: type days strt stop extr parm
;  Where type is DAILY/WEEK/MONTH
;   "days" is the previous "n" days
;   TimesT is called with these parms

;       type    days  strttime stop   extractname  parm
CHART   DAILY     1    00:00    24:00   CPULPAR
CHART   DAILY     1    00:00    24:00   USERCPU

CHART   MONTHLY   31   00:00    24:00   CPULPAR
CHART   MONTHLY   31   07:00    17:00   USERCPU
CHART   MONTHLY   31   *        *       USERWAIT    SUSELNX1

CHART   WEEKLY    7    07:00    17:00   USERCPU
CHART   WEEKLY    7    00:00    24:00   CPULPAR

; Charts will be kept up to 12 months,52 weeks, 31  days
; format of chartcnt is "chartcnt mm ww dd"
CHARTCNT 2 2 2
```

```
ESAMAP   FILELIST A0  V 1
  Filename Filetype Fm
  TOTAL    CSVDC348 A1
  TOTAL    CSVDU348 A1
  TOTAL    CSVWC049 A1
  TOTAL    CSVWU049 A1
  TOTAL    CSVDC347 A1
  TOTAL    CSVDU347 A1
  TOTAL    CSVDC346 A1
  TOTAL    CSVDU346 A1
```

```
;LPAR Utilization over time
"STARTTIME","STOPTIME","LPARNAME","CPUUTIL"
"2010/12/13","02:00:00","Totals:","79.64"
"2010/12/13","02:00:00","VSIVM4","34.72"
"2010/12/13","02:00:00","VSIVM1","3.87"
"2010/12/13","02:00:00","VSIVM2","0.41"
```

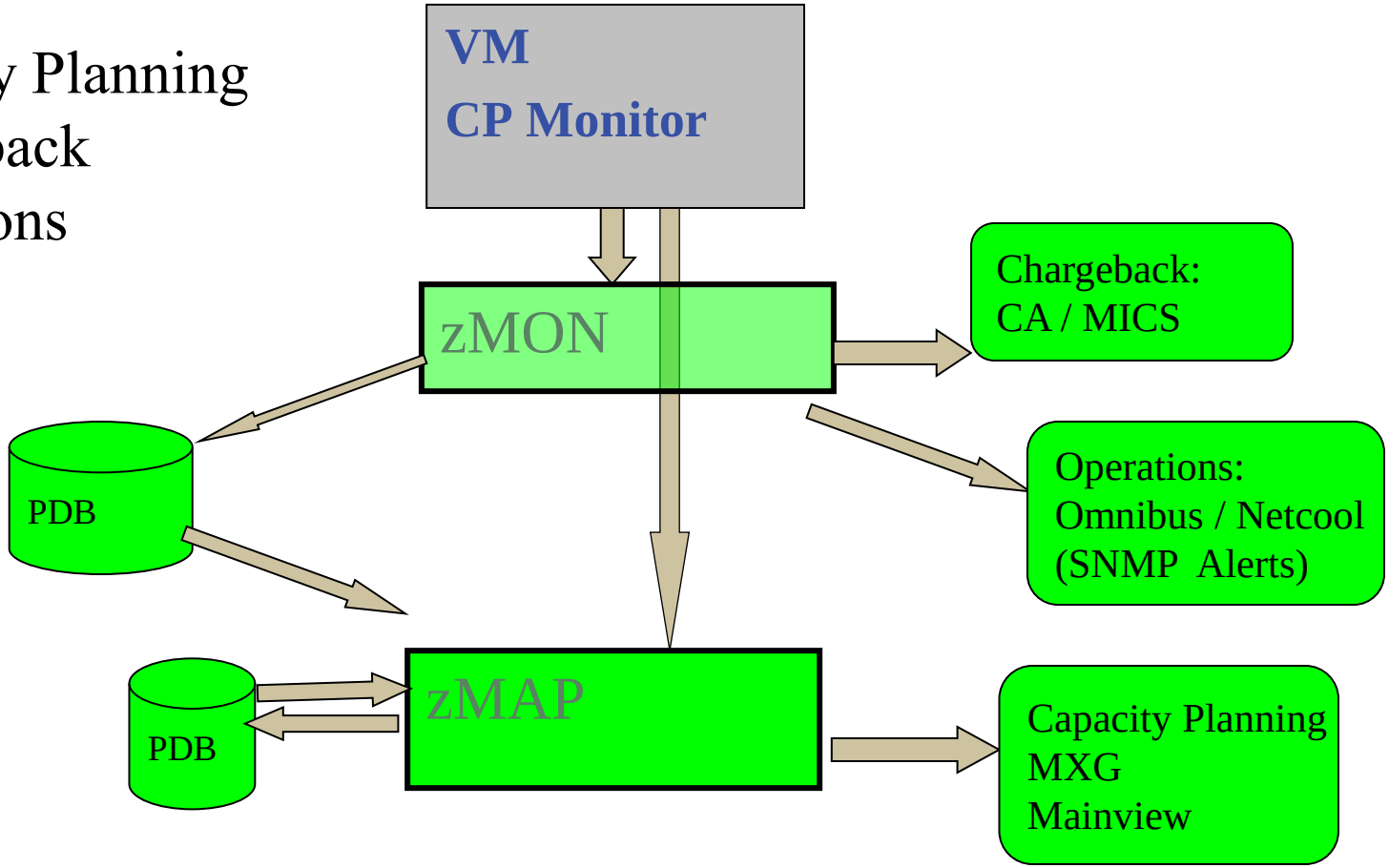
Capacity Planning “planning”

- **Monitor data very large**
  - Process it real time, extract information, discard the data
  - All classification and collection done before discard
- **Classification functions**
  - User classes – defined by installation, some predefined
  - “Key users”, class 0 is special
  - DASD and non-DASD Control Units
- **USERCLASS statements**
  - nuserclass = 20
  - class_size = 140
  - nclasses = 1

  - Userclass(03,000) = 'ZVPS '
  - Userclass(03,007) = 'ZMAP'
  - Userclass(03,008) = 'ZMON'
  - Userclass(03,009) = 'ZWRITE'
  - Userclass(03,010) = 'ZSERVE'
  - Userclass(03,011) = 'ZTCP'
  - Userclass(03,016) = 'ZTCP'
  - Userclass(03,017) = 'ZWEB*'

Add “Enterprise” Support: No silos

Capacity Planning
Chargeback
Operations



Linux Management Requirements

- **Linux (and networks) adds requirement**
  - **Correct data (bad assumption)**
  - **Complete data (very difficult)**
  - **Low cost data (extremely difficult)**
- **Support requirements:**
  - SLES 7,8,9,10, 11, 12 (Installations still have 7 and 8)
  - RHEL 3,4,5, 6,7
  - UBUNTU, KVM
  - Other platforms (VSE, VMWare, SUN, P, MicroSoft)
- **Must support:**
  - Performance tuning (one minute granularity)
  - Capacity planning (15 minute granularity)
  - Operational alerts (one minute granularity)
  - Chargeback/Accounting (15 minute granularity)

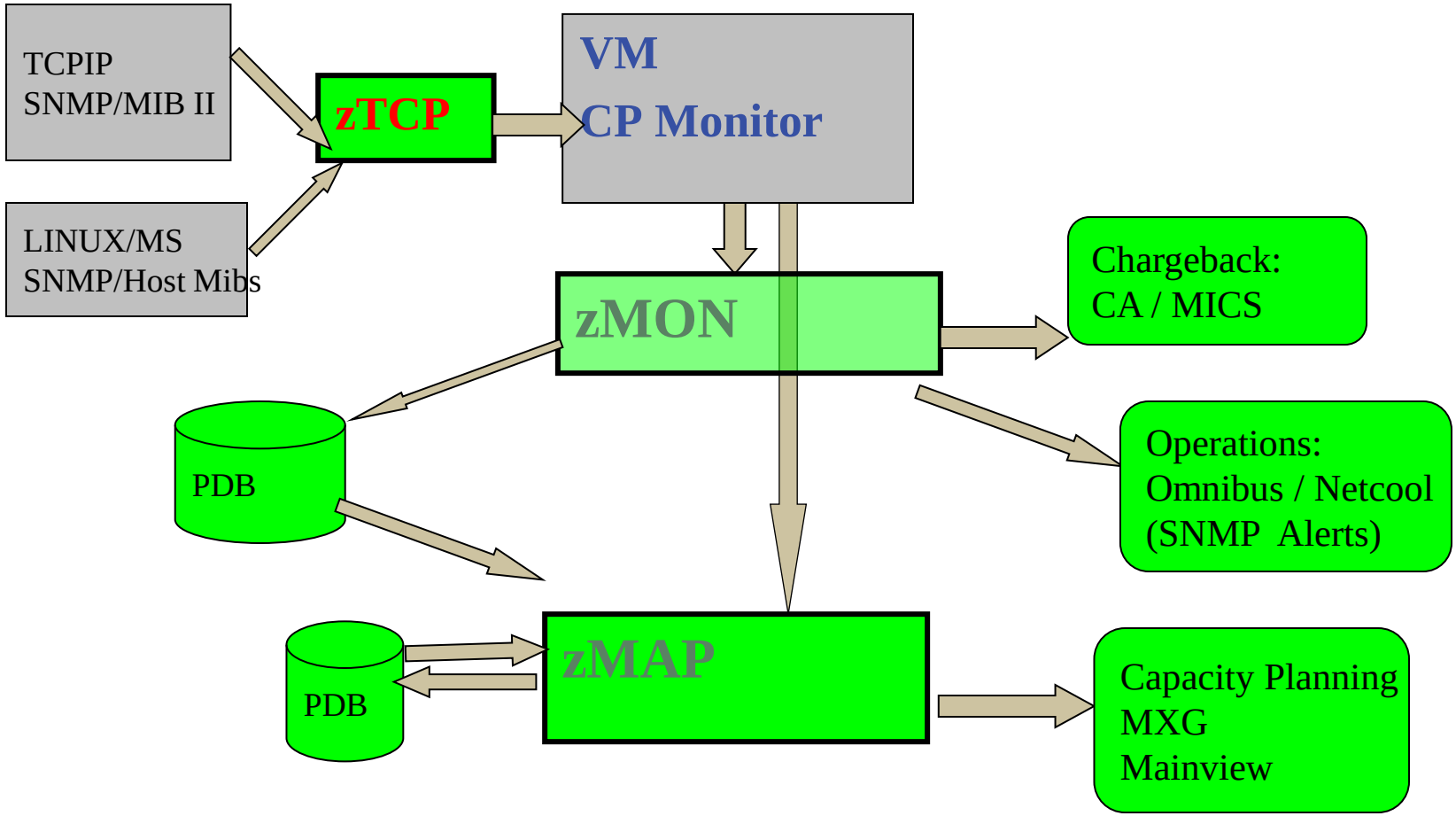
Instrumentation Considerations

- **Operational cost of agents**
  - Does your agent use 2%? 5%? 95%? of a processor per Linux server?
  - Does this matter on distributed servers where agents were created?
  - Will local data collection fill up your file system?
  - Does turning off performance monitoring solve the performance problem?
  - Do you only turn on your agent when you have a problem???
    - Diagnostics vs Performance Management?
  - **Customer quote: an agent that costs 1% of a processor will cost me 10 IFLs**
  - **(standard snmp host mib, about 1%, VSI mib .1%)**
- **Agents must provide correct data**
  - Is your data correct? Or wrong by order of magnitude?
  - Prior to SLES10/RHEL5, all “Virtual” agents provide wrong data
  - **Why collect bad data?**

Network, Linux Instrumentation

- **Performance Data infrastructure existed (zMON/zMAP)**
  - PDB already existed for performance analysis and Capacity Planning
  - Data presentation tools existed
- **Data source needed for Linux and Network:**
  - ~~Passive agent (do not measure idle servers)~~
  - **Low overhead (want to monitor 100 / 1000 servers under z/VM)**
    - **Agents developed for Intel and Distributed servers did not care about overhead**
  - Open Source (fast development time), instrumentation MUST be part of the platform
  - Standard interface
- **SNMP: Standard interface for network and host data**
  - Provided by TCPIP Vendor
  - **Not proprietary agent! – Can't charge for it….**
  - Used to collect network, host data from NT, SUN, HP
  - NETSNMP available for Linux - Meets all requirements
    - (Distributed with RHEL 3,4,5 SLES 7,8,9,10,11)
  - Platform independent (Intel, P-series, Microsoft, Linux)
  - **.03% of ONE IFL (z10,sles9) per server, ONE MINUTE COLLECTION**

Add “Network” and “host” Support – Pre Linux



Full Network Monitor (snmp data)

MibII: Transport layer (ESATCP1), IP layer(ESATCP2), hardware layer (ESATCP4), icmp (ESATCP3)

- 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

Analyzing “distributed” Disks (snmp data)

HOST MIB data:
Provides disk data
Percent full
Supports WinNT,Unix
Alerts by disk full

Standard data!!!

```
Report: ESAHST2      LINUX HOST Storage Analysis Report
Monitor initialized: 02/05/07 at 10:41:41 on 2084 serial 55BAF
-------------------------------------------------------------------
NODE/              <-Utilization->          <------Storage------>
Time/              <MegaByte>  Pct          Alloc
Date       Index   Size  Used  Full  Errors  Units  Description
-------- -------  ----  ----  ----  ------  -----  ---------------
10:43:00
acme
                1   495  14.2   2.9       0   1024  Memory Buffers
                2   495   487  98.4       0   1024  Real Memory
                3  2031  12.8   0.6       0   1024  Swap Space
                4  2310   775  33.6       0   4096  /
                6  2310  1293  56.0       0   4096  /usr
dominoz1
                1  2002  38.5   1.9       0   1024  Memory Buffers
                2  2002  1994   100       0   1024  Real Memory
                3  2031  97.4   4.8       0   1024  Swap Space
                4  2310  1556  67.4       0   4096  /
                6  2310  1398  60.5       0   4096  /usr
                7  984K  238K  24.2       0   4096  /notesdata
ebiz1
                1   997   9.0   0.9       0   1024  Memory Buffers
                2   997   992  99.5       0   1024  Real Memory
                3  2031   514  25.3       0   1024  Swap Space
                4  2310  1607  69.6       0   4096  /
                6  2310  1451  62.8       0   4096  /usr
                7  101K   10K  10.3       0   4096  /notesdata
```

Distributed Systems Process data Windows NT

Screen: ESAHST1 NT Data ESAMON V3.2 07/30 14:56-14:57
1 of 1 LINUX HOST Software Analysis Report NODE * LIMIT 500

		<--Software Program--------->				<CPU Seconds>		CPU	Storage(K)
Time	Node	Name	ID	Type	Status	Total	Intrval	Pct	Current
14:57:00	ENTWDB	NetTime.	2648	4	1	4259	0.68	1.12	1320
		NetTime.	2452	4	1	982	0.57	0.94	1040
		sqlagent	2408	4	1	100	0.03	0.05	3724
		snmp.exe	2268	4	1	73	0.07	0.12	3888
		taskmgr.	2224	4	1	21076	0.28	0.46	2524
		sqlservr	2136	4	1	50038	9.53	15.72	511624
		NetTime.	1808	4	1	10481	1.47	2.42	1092
		sqlmangr	1660	4	1	189	0.01	0.02	3664
		DLLHOST.	1648	4	1	102	0.02	0.03	4684
		liccheck	1352	4	1	1272	0.04	0.07	1584
		DLLHOST.	1284	4	1	2158	0.09	0.15	6660
		inetinfo	1208	4	1	3063	0.10	0.16	9708
		WinVNC.e	1160	4	1	20742	0.56	0.92	3536
		explorer	788	4	1	2252	0.14	0.23	5336
		SERVICES	272	4	1	6892	1.50	2.47	7480
		msdtc.ex	164	4	1	71	0.02	0.03	5108

Linux user cpu by process name

```
Report: ESAHSTA       LINUX HOST Application Report
Monitor initialized: 21/01/11 at 07:03:00 on
-------------------------------------------------------------------------
Node/     Process/    <Application Status Counts> <-----Processor---->
Date      Application             Run-  Res  Load  <---Utilization---->
Time      name        Total Actv ning  Wait  -ed  Percent seconds Avg
--------  ----------- ----- ---- ----  ---- ----  ------- ------- ----
07:04:00
***Node Groups***
TheUsers  *Totals*    840.0  138 11.0   829    0    88.0    52.7  0.1
          automoun      1.0  1.0    0   1.0    0     0.0     0.0  0.0
          events/0      1.0  1.0    0   1.0    0     0.0     0.0  0.0
          httpd       277.0  106  1.0   276    0    86.0    51.5  0.3
          java          2.0  2.0    0   2.0    0     0.0     0.0  0.0
          ksoftirq      3.0  1.0    0   3.0    0     0.0     0.0  0.0
          rotatelo     72.0 14.0    0  72.0    0     1.0     0.6  0.0
          sendmail      6.0  3.0    0   6.0    0     0.0     0.0  0.0
          sidd          1.0  1.0    0   1.0    0     0.2     0.1  0.2
          snmpd         9.0  9.0  9.0     0    0     0.7     0.4  0.1
```

Standard Linux ucd mib: Managing Storage (RAM)

Linux data shows
- Real storage
- Swap storage
- "cache"

Swapping is "good"

If not swapping,
- reduce vm size
- Dynamic add stg if needed

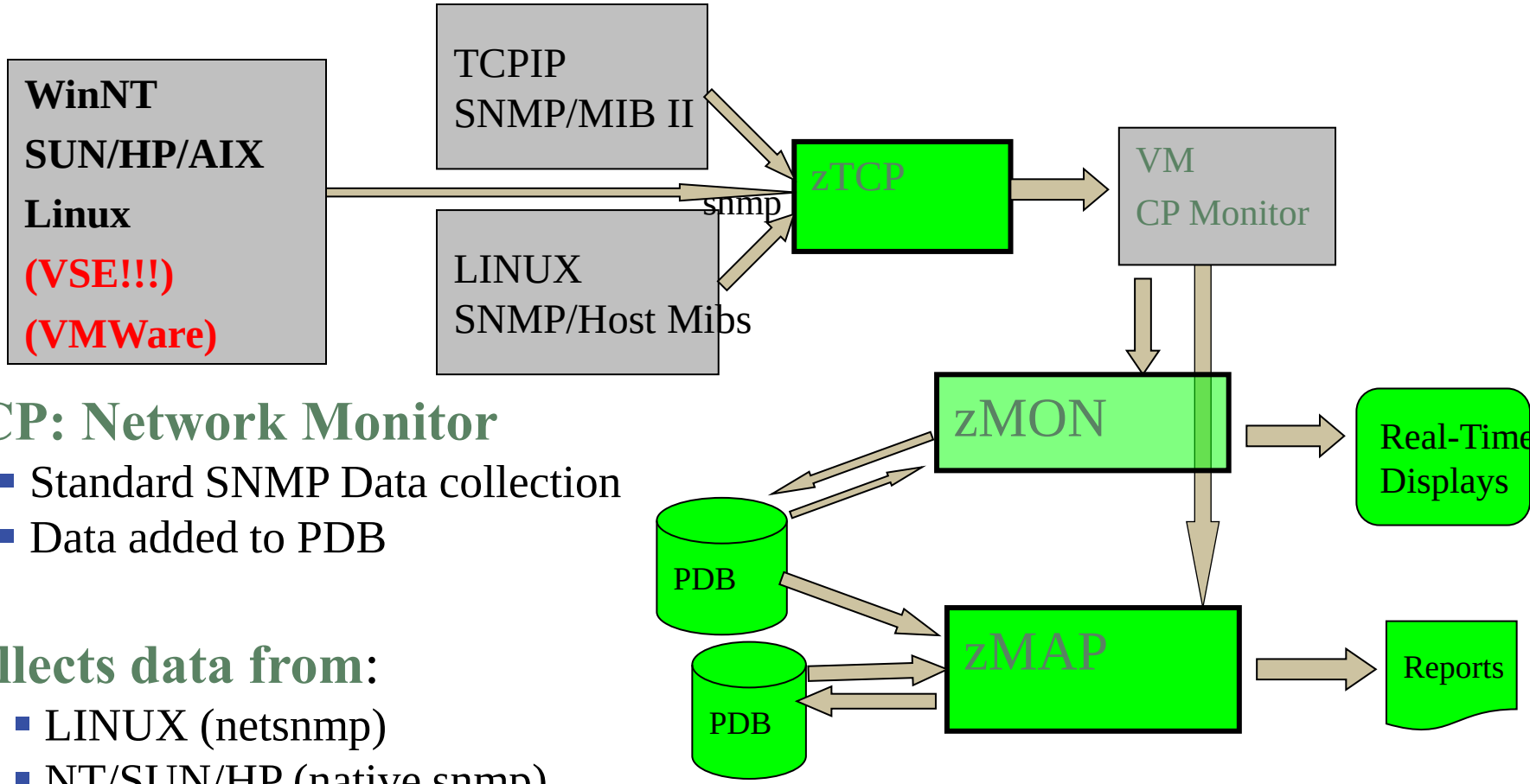
```
Report: ESAUCD2      LINUX UCD Memory Analysis Report                Linux Test
Monitor initialized: 02/05/07 at 10:41:41 on 2084 serial 55BAF     First recor
-------------------------------------------------------------------------------
Node/    <-------------------------Storage Sizes (in MegaBytes)---------------
Time/    <--Real Storage--> <-----SWAP Storage----> Total <----Storage in Use-
Date     Total  Avail Used  Total Avail Used  MIN   Avail Shared Buffer Cache
-------- ------ ----- ----- ----- ----- ----- ----- ----- ------ ------ -----
10:43:00
acme      494.7   7.7 487.0  2031  2018  12.8  15.6  2026      0   14.2  39.1
dominoz1 2002.1   8.0  1994  2031  1934  97.4  15.6  1942      0   38.6  1417
ebiz1     997.1   5.7 991.4  2031  1517 513.7  15.6  1523      0    8.9 635.8
ebiz2     997.1  13.0 984.2  2031  1878 152.8  15.6  1891      0   26.9 607.8
ibmds1   2002.1  11.6  1990  2031  2029   2.0  15.6  2041      0   84.0  1484
ebizdev2  997.1   6.8 990.4  2031  1980  51.3  15.6  1986      0   63.3 530.9
ebizdev1  997.1   8.0 989.2  2031  1754 277.3  15.6  1762      0   43.8 521.2
ibmedge1 1007.3 497.1 510.2  2031  2031     0  15.6  2528      0  174.9 165.4
ibmds3   8031.8  81.5  7950  2031  2031     0  15.6  2112      0  320.3  6494
ibmedge2 1007.3 492.7 514.6  2031  2031     0  15.6  2524      0  175.3 167.4
ibmred2   997.1   4.5 992.6  2031  2026   4.6  15.6  2031      0   98.4 586.4
ibmred1   997.1   9.7 987.4  2031  2026   4.6  15.6  2036      0   98.7 578.5
tdirdb2  4012.0  31.9  3980  2031  1613 418.1  15.6  1645      0  250.1  3017
tdirtam  4012.0  1294  2718  2031  2031     0  15.6  3325      0  235.1  2106
tdirtds  4012.0  1061  2951  2031  2031     0  15.6  3092      0  324.8  2259
tdirtim  4012.0  1007  3005  2031  2031     0  15.6  3038      0  239.7  1981
tdsds-a1  997.1 124.0 873.1  2031  2031     0  15.6  2155      0   87.1 569.0
ibmds2   8031.8  78.0  7954  2031  2031   0.4  15.6  2109      0  251.7  6546
```

Snmp, Velocity Software mib

- **Standard mib**
  - MIB II: 1.3.6.1.2.1 (Network)
  - HOST 1.3.6.1.2.1.25 (process, file system device, memory)
- **Private mibs:**
  - Private: 1.3.6.1.4
  - **ucd-snmp 1.3.6.1.4.1.2021.**
  - **Velocity 1.3.6.1.4.1.F971**
  - **VeloJava 1.3.6.1.4.1.F971.100.**
  - **VeloOracle 1.3.6.1.4.1.F971.11**
  - **VeloVSE 1.3.6.1.4.1.F971.10.1**

  - **IBM 1.3.6.1.4.1.2**
  - **IBMVSE 1.3.6.1.4.1.2.6.81FD**
- **Why Velocity mib?**
  - Performance management

Snmp today….



zTCP: Network Monitor

- Standard SNMP Data collection
- Data added to PDB

Collects data from:

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

Operational Support - SNMP Alerts

Support enterprise operations console

Issue with SNMP alerts

- 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

```
* 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
```

Benefits of Architecture – z/VM day one support

- **z/VM new releases supported day 1** (Note stg size)

Report: ESASTR1 Velocity Software Corporate

	Users	<------Pages					<-AddSpace>		VDISK	Commit	Capt-
Time	Loggd On	System Storage	<Available> <2gb	>2gb	Systm ExSpc	User Resdnt	Systm	User	Rsdnt	Ratio	Ratio
15:29:00	69	138412K	84	1258K	10296	134M	1641K	0	0	1.915	1.000
15:30:02	69	138412K	109	1649K	10194	134M	1699K	0	0	1.915	1.000
15:31:00	69	138412K	178	1540K	10059	134M	1732K	0	7	1.915	1.000
15:32:00	67	138412K	838	2974K	9869	89040K	1764K	0	21	1.915	0.686
15:33:03	66	138412K	200K	46M	9717	58977K	1064K	0	26	1.915	0.776
15:34:08	66	138412K	390K	77M	9277	23615K	707K	0	22	1.915	0.743
15:36:01	65	138412K	486K	136M	8669	204895	81839	0	10	1.915	0.995
15:37:00	65	138412K	486K	136M	8426	205722	78891	0	10	1.915	0.996
15:38:00	62	138412K	486K	137M	8333	206309	14582	0	0	1.915	1.000
**********		Summary	**********								
Average:	66	138412K	250K	65M	9392	57454K	912K	0	16	1.915	0.903

Benefit of using standard (snmp) interface?

- z/VM new releases supported day 1 (Note stg size)

Report: ESAUCD2 LINUX UCD Memory Analysis Report Veloc

Node/	<-------------------------Storage Sizes (in MegaBytes)---------									
Time/	<--Real Storage-->			<-----SWAP Storage---->			Total	<----Storage i		
Date	Total	Avail	Used	Total	Avail	Used	MIN	Avail	CMM	Buffer
15:29:00										
ZLNXT030	994.8	407.7	587.1	256.1	256.1	0	15.6	663.8	0	21.8
ZLNXT006	494.7	388.8	105.9	511.5	511.5	0	15.6	900.3	0	19.3
ZLNXT017	3008.7	2612	396.9	1279	1279	0	15.6	3891	0	29.5
ZLNXT002	2001.3	902.4	1099	512.0	512.0	0	15.6	1414	0	53.9
ZLNXT007	201192	96151	103K	1023	1023	0	15.6	97174	0	18.1
ZLNXT009	201192	165K	32356	640.1	640.1	0	15.6	166K	0	19.9
ZLNXT013	201192	171K	26563	7.9	7.9	0	15.6	171K	0	22.2
ZLNXT010	201192	181K	15917	1535	1535	0	15.6	182K	0	24.3
ZLNXT011	201192	194K	2280	128.9	128.9	0	15.6	194K	0	28.4

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

Correct Linux Performance Data?

- **Valid and Correct?**
  - **Process data from "virtualized" Linux was wrong**
    - Compare VERY accurate VM performance data to Linux data, easy to see
    - All process accounting based on timer ticks
  - Sample wrong by factor of 10-100 prior to SLES10
    - Known issue since 2001
    - HTTP://velocitysoftware.com/present/CaseAFS
    - Mostly corrected in SLES10, RHEL5 (now underreports) by "steal timer"
- **Leads to solving performance problems?**
  - z/VM owns the shared resources
  - **"Native" tools will not detect many problems**
  - **Native "tools" are mostly for after the fact diagnostics**

Analyzing Linux CPU by process

Velocity MIB data:
Provides process data
Parent/Child relationship

Note ALL application processes are owned by "24445".

```
Report: ESALNXP      LINUX HOST Process Statistics Report
Monitor initialized: 02/05/07 at 10:41:41 on 2084 serial 5
-------------------------------------------------------------
node/     <-Process Ident-> Nice <------CPU Percents---->
 Name      ID    PPID   GRP  Valu  Tot  sys user syst usrt
--------- ----- ----- ----- ---- ---- ---- ---- ---- ----
10:43:00
dominoz1      0     0     0    0  9.9 3.20 6.69    0    0
 ksoftirq     5     1     0   19 0.03 0.03    0    0    0
 ksoftirq     7     1     0   19 0.05 0.05    0    0    0
 kswapd0    134     1     1    0 0.05 0.05    0    0    0
 kjournal  1140     1     1    0 0.08 0.08    0    0    0
 snmpd     1775     1  1774  -10 0.27 0.16 0.11    0    0
 scontrol 24521 24445 24414    0 0.03    0 0.03    0    0
 server   24539 24521 24414    0 1.46 0.41 1.06    0    0
 logasio  24553 24539 24414    0 0.14 0.11 0.03    0    0
 event    28636 24539 24414    0 0.16 0.03 0.14    0    0
 replica  28663 24539 24414    0 1.76 0.27 1.49    0    0
 update   28665 24539 24414    0 5.36 1.92 3.44    0    0
 amgr     28667 24539 24414    0 0.03    0 0.03    0    0
 adminp   28670 24539 24414    0 0.19 0.08 0.11    0    0
 sched    28676 24539 24414    0 0.03    0 0.03    0    0
 rnrmgr   28686 24539 24414    0 0.03    0 0.03    0    0
 clrepl   28920 24539 24414    0 0.22    0 0.22    0    0
```

Analyzing Linux CPU by Application

Velocity MIB data:

- Provides process data
- Parent/Child relationship
- Allows combining into "applications"
- Note the "bash/24445" "application"

Define alerts based on application

```
Report: ESALNXA      LINUX HOST Application Report
Monitor initialized: 02/05/07 at 10:41:41 on 2084 ser
-----------------------------------------------------
Node/     Process/     ID    <---Processor Percent--->
Date      Application              <Process><Children>
Time      name               Total sys  user syst usrt
--------  -----------  -----  ----- ---- ---- ---- ----
10:43:00
dominoz1  *Totals*         0   9.9  3.2  6.7    0    0
          bash         24445   9.4  2.8  6.6    0    0
          kernel           1   0.2  0.2    0    0    0
          snmpd         1775   0.3  0.2  0.1    0    0
```

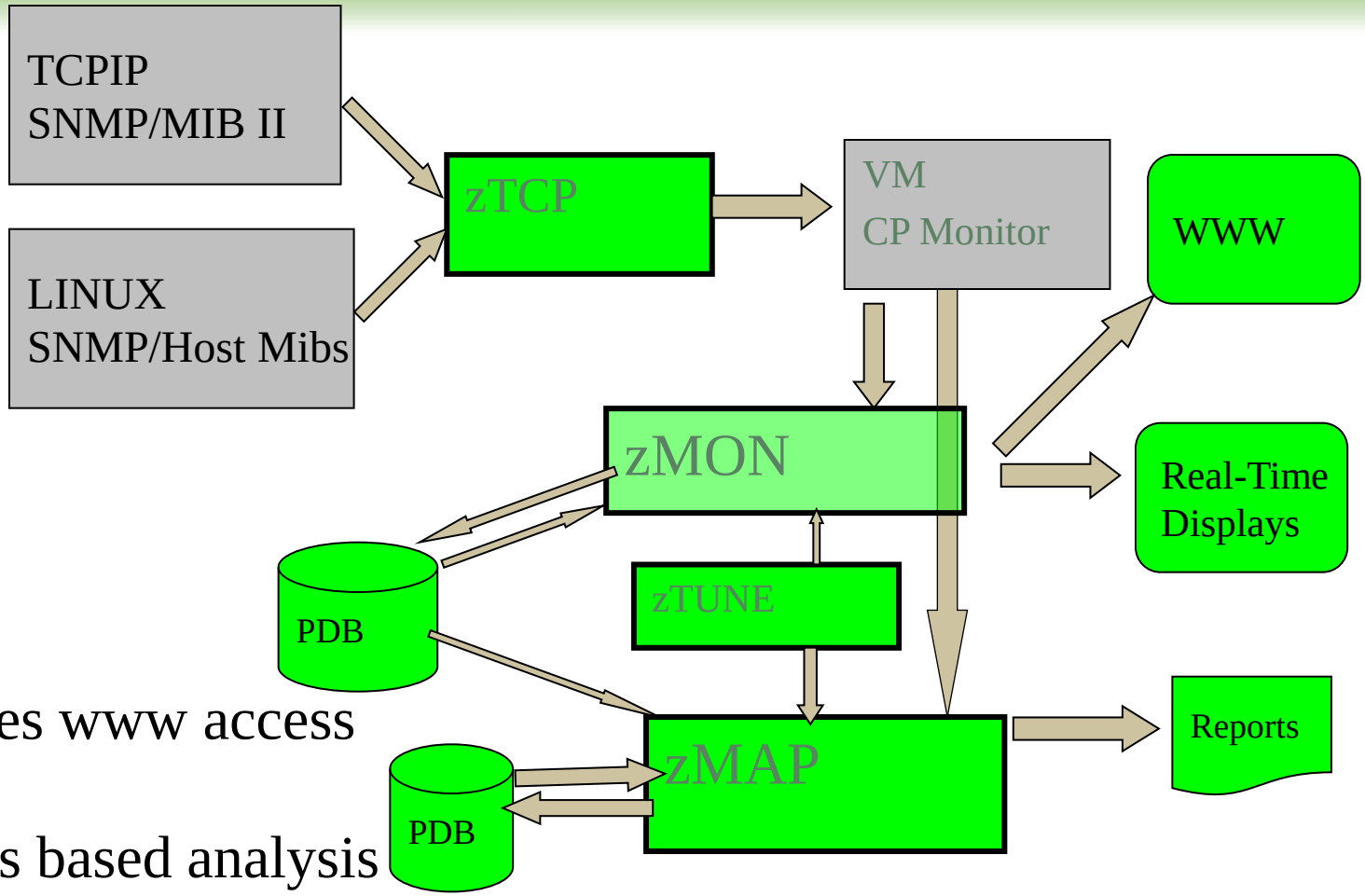
Analyzing Linux CPU by Userid

Velocity MIB data:

- Provides process data
- Parent/Child relationship
- And reporting by Linux userid
- Allows alerts by userid

```
Report: ESALNXU       LINUX USER Analysis Report
Monitor initialized: 02/05/07 at 10:41:41
-------------------------------------------------------------------------
Node/                                                <---Processor Percent--->
Date      <---------User and Group Identity------>      <Process><Children>
Time      Userid        GroupID       usrpid grppid Total sys  user syst usrt
--------  ------------  ------------  ------ ------ ----- ---- ---- ---- ----
10:43:00
dominoz1  bin           root               1      0     0    0    0    0    0
          daemon        daemon             2      2     0    0    0    0    0
          lp            lp                 4      7     0    0    0    0    0
          notes         notes           1001   1001   9.4  2.8  6.6    0    0
          root          root               0      0   0.5  0.4  0.1    0    0
```

Modernize: Webserving



ZVWS Provides www access

zTUNE: Rules based analysis

zTUNE

- Many 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 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
```

Continous Development, Release 4.1 (January 2012)

- **Performance Management**
  - VMWare (node grouping)
  - Mixed mode capacity planning (IFL vs CP)
  - Linux DISK reporting (ESAUCDD)
  - Granularity in virtual cpu reporting (ESAUSCP, ESALNXS)
  - VSE Initial support (ESAVSES, ESAVSEC)
  - LGR support
  - zVIEW V2
  - zALERT
- **Operational support**
  - Global Installer
  - Portal
- **Other**
  - z/VM 5.4 support, up to 96 CPUs per LPAR, 200 physical CPUs / CEC
  - Framework for future products and enhancements
  - Customer enhancement requests - MANY

zVPS Version 4, Release 2 (January 2015)

- **Performance Management**
  - **Application support** (JAVA, Oracle)
  - VSE partition support, job support (ESAVSEP)
  - Linux process metrics for RAM, I/O, Swap (ESALNXP, ESALNXI)
  - Linux system metrics for ram (ESALNXR)
  - **MFC Support** for z114, z196, EC12/BC12, Z13/Z13S
  - CP Pooling support
  - LINMON support
  - APPLE sever support (decimal process ID up to 99,999)
- **Operational support**
  - Recognize lpar, vmid for linux servers, LGR support
  - Peer to peer support
  - SNMP V3
- **Other**
  - z/VM 6.2, z/VM 6.3 Support

zVPS Version 4, Release 3 (January 2017)

- **Performance Management**
  - Java Thread support (ESAJVMT)
  - HiperPav Support (ESAHPP)
  - SMT Support (ESASMT, ESAUSR5)
  - Diagnose support (ESADIAG)
  - OSA Support (ESAOSA)
- **Operational support**
  - Move linux nodes to correct LPAR (requires VSI mib) (ESALNXV)
  - DNS Support for zTCP
- **Other**
  - z/VM 6.4 support
  - Many “small” Customer enhancement requests

zVPS Version 4, Release 3.3 (April 2018)

- **Performance Management**
  - User Diagnose support (ESAUSRD)
- **Operational support**
  - Enterprise server inventory
  - UBUNTU Support with snmpv3
  - Class C subnet node discovery
- **Other**
  - Z14 Support (model numbers, MFC)
  - Specter apar / status recognition

ZTCP Parameters

- **Added DNS Names capability**

```
community = 'velocity'  TCPIP='TCPIP'   nodegrp = 'VSILPARs'

dnsport = 53
dnsIPADDR = '64.105.172.26'

node = 'VSIVM1' domain='vsivm1.VelocitySoftware.com'
node = 'VSIVM2' domain='vsivm2.VelocitySoftware.com'
node = 'VSIVM3' domain='vsivm3.VelocitySoftware.com'
node = 'VSIVM4' domain='demo.VelocitySoftware.com'
```

- **Added SSI Support – monitor where operating**

```
TCPIP='TCPIP'   peerport = 1998

peeraddr ='67.218.99.132' peerport = 1998   ;vsivm2
peeraddr ='67.218.99.134' peerport = 1998   ;vsivm4
peeraddr ='67.218.99.135' peerport = 1998   ;vsivm5

Ssiflag = '1'b
Node = 'lnxssi1' domain='prod.mylinux.mycompany.com"
```

ZTCP Parameters

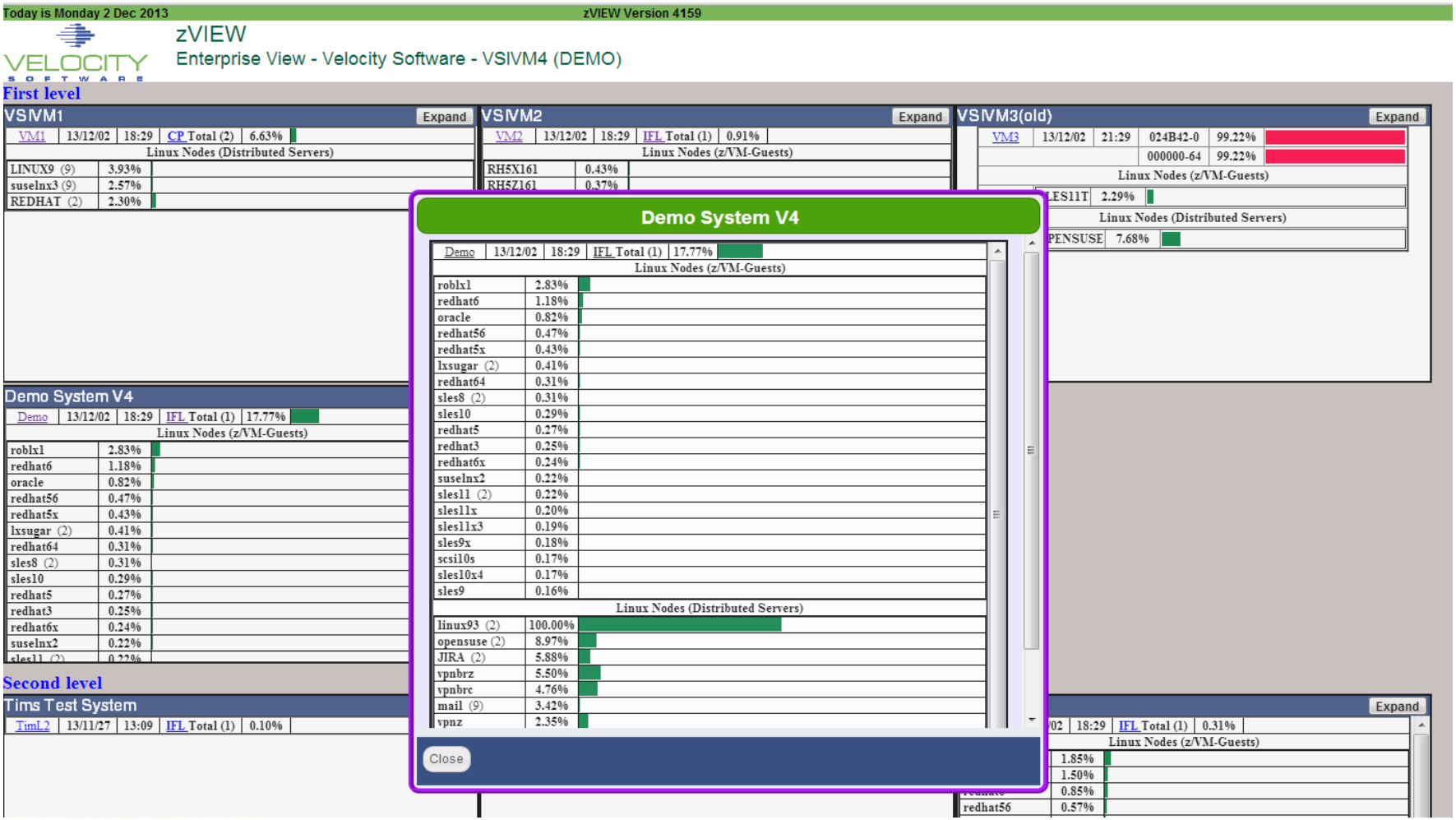
```
smsg ztcp query peers
Ready; T=0.01/0.01 18:14:46
         ,TCPIP    184.105.60.11   1998,  0:00:00  .
 VSIVM2  ,TCPIP    184.105.60.12   1998, 18:14:00 Y. 5131
 VSIVM4  ,TCPIP    184.105.60.14   1998, 18:14:00 Y. 5130
 VSIVM1  ,TCPIP2   192.168.5.41    1998, 18:14:00 N. 5126
 VSIVM2  ,TCPIP2   192.168.5.42    1998, 18:14:00 Y. 5131
 VSIVM4  ,TCPIP2   192.168.5.44    1998, 18:14:00 Y. 5130
 VSIVM5  ,TCPIP2   192.168.5.45    1998, 18:14:00 N. 5130
         ,TCPIP2   192.168.5.46    1998,  0:00:00 N.
 VSIVM3  ,TCPIP2   192.168.5.43    1998, 18:14:00 N. 5123
 End Display
```

Node “manager” keeps track of all nodes

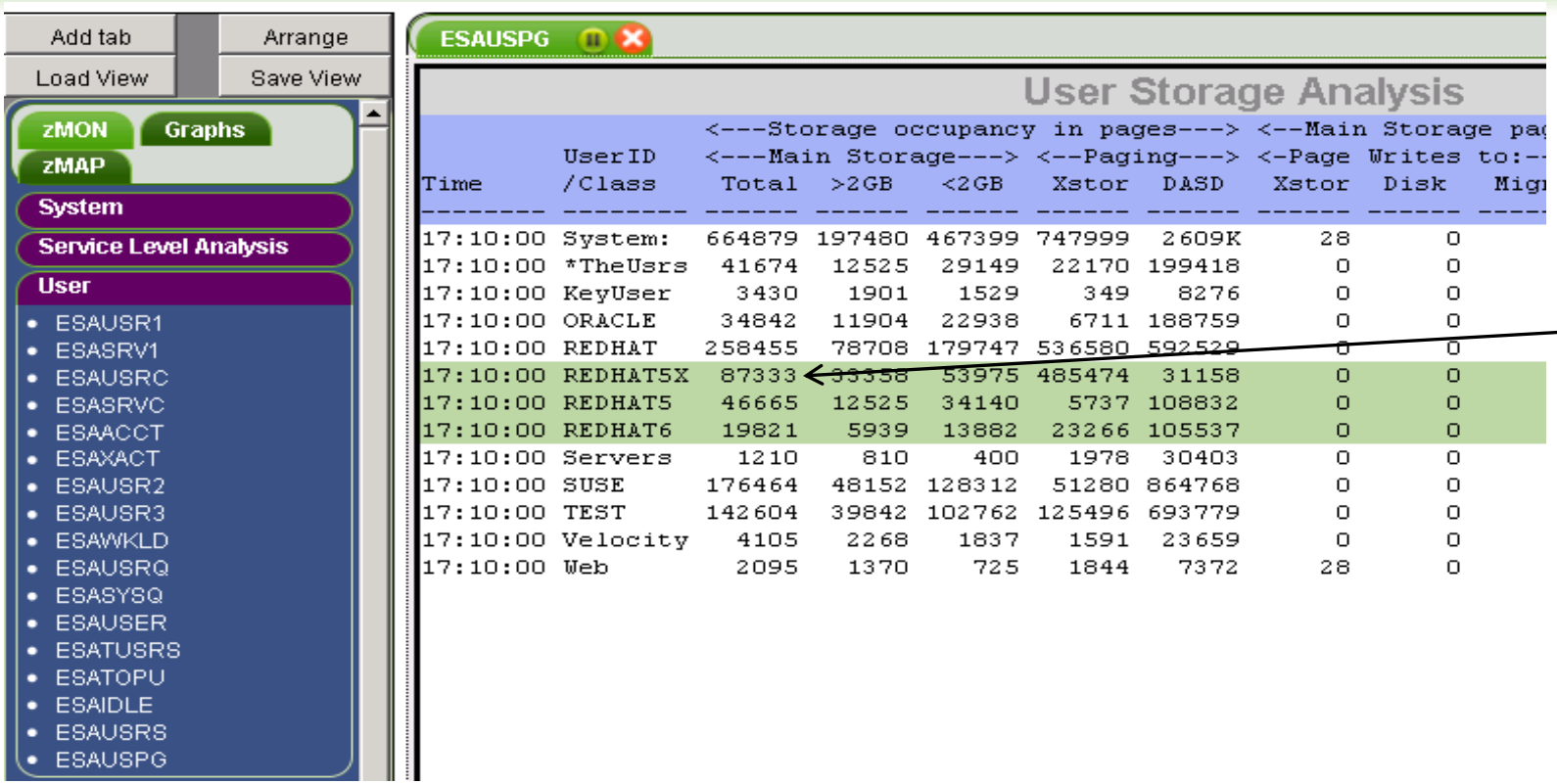
- “Smsg ztcp query zpro” shows where nodes run

zVPS Enterprise View

Tailorable, expandable, zoomable



ZMON Drill down Options

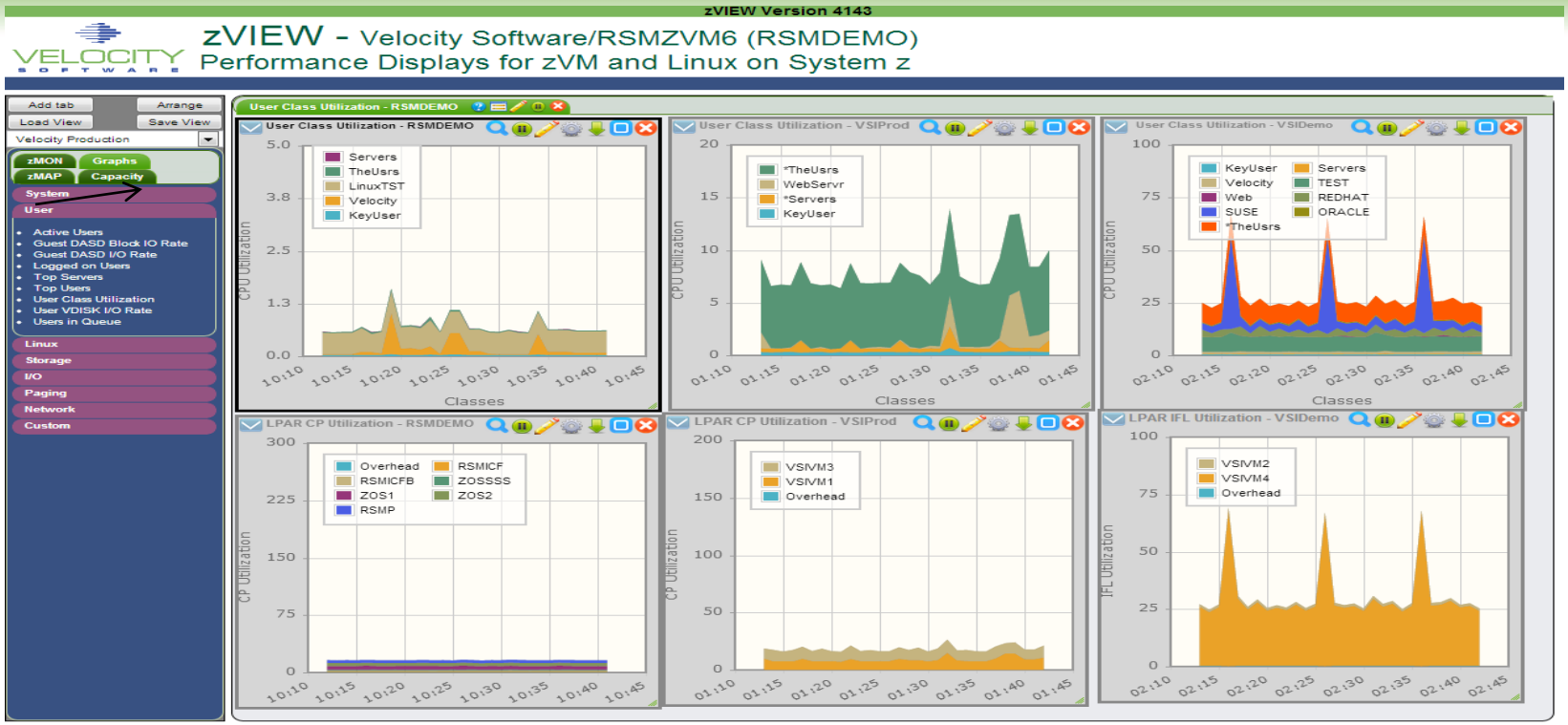


Click on “user” to see user screens

Click on “redhat” class to see “redhat users”

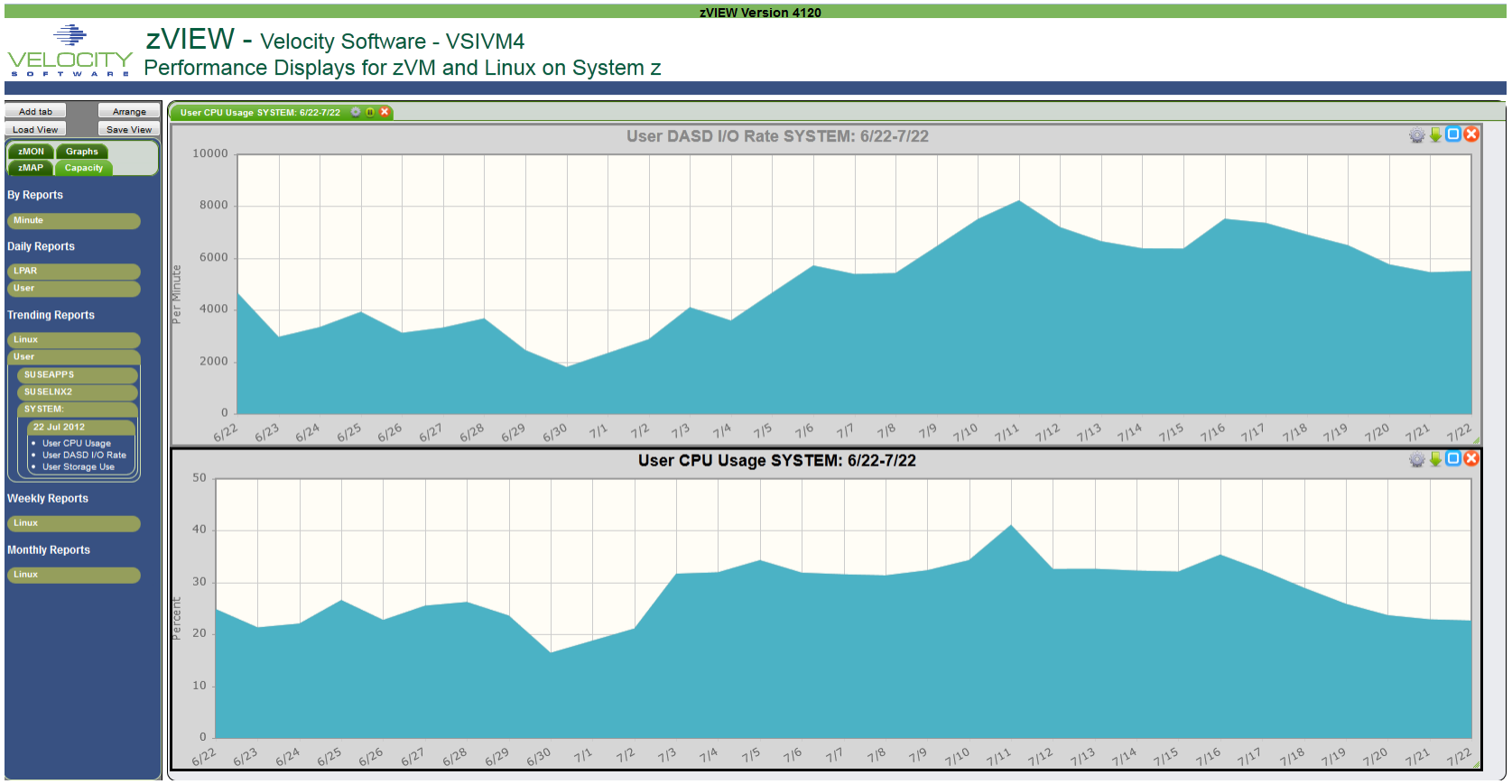
Oracle data available 4.2

Multiple System View (3 LPARs - 2012)



Oracle data from multiple lpars visible on one tab

zMAP Capacity/Trend Graphs



zALERT - Operational Support

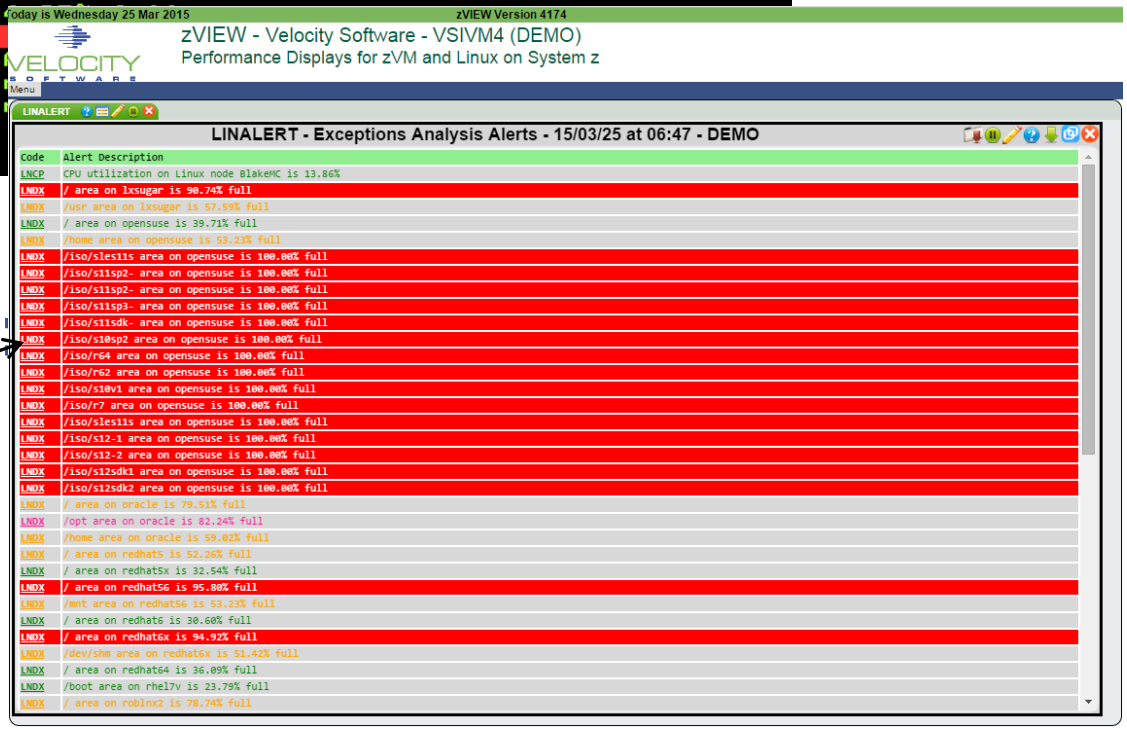
- **Alerts**
  - User tailorable
  - 3270 based, web based, and / or SNMP
  - Alerts can be set on any variable or calculated variable
- **Linux alert examples:**
  - Disk full
  - Missing processes (requires complete data)
  - **Looping processes (requires correct data)**
- **z/VM alert examples**
  - Page/spool space full (avoid abends)
  - Looping servers
  - DASD service times
- **Network alert examples**
  - Transport errors
  - ICMP rates
  - Bandwidth thresholds

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 Browser based Click Thru or SMS, email…

zOPERATOR

Several requests to extend ESAOPER screen

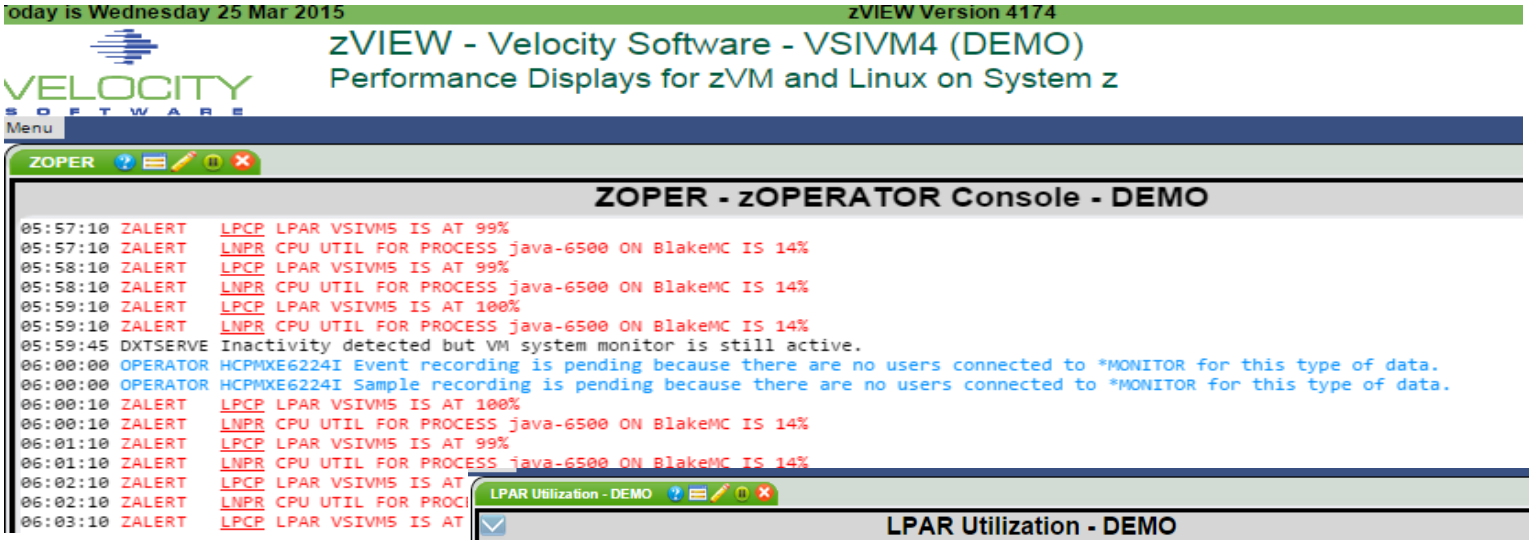
zOPERATOR:

- Optional **no-charge** application component of zMON
- Uses standard zMON 3270 screen driver, existing function
- Scrollable 3270 console
- Messages can be searched by text, date or time
- All messages logged in daily files
- Actions can be set based on messages received
- Can be viewed from DIALed terminal or **zVIEW (WEB!)**

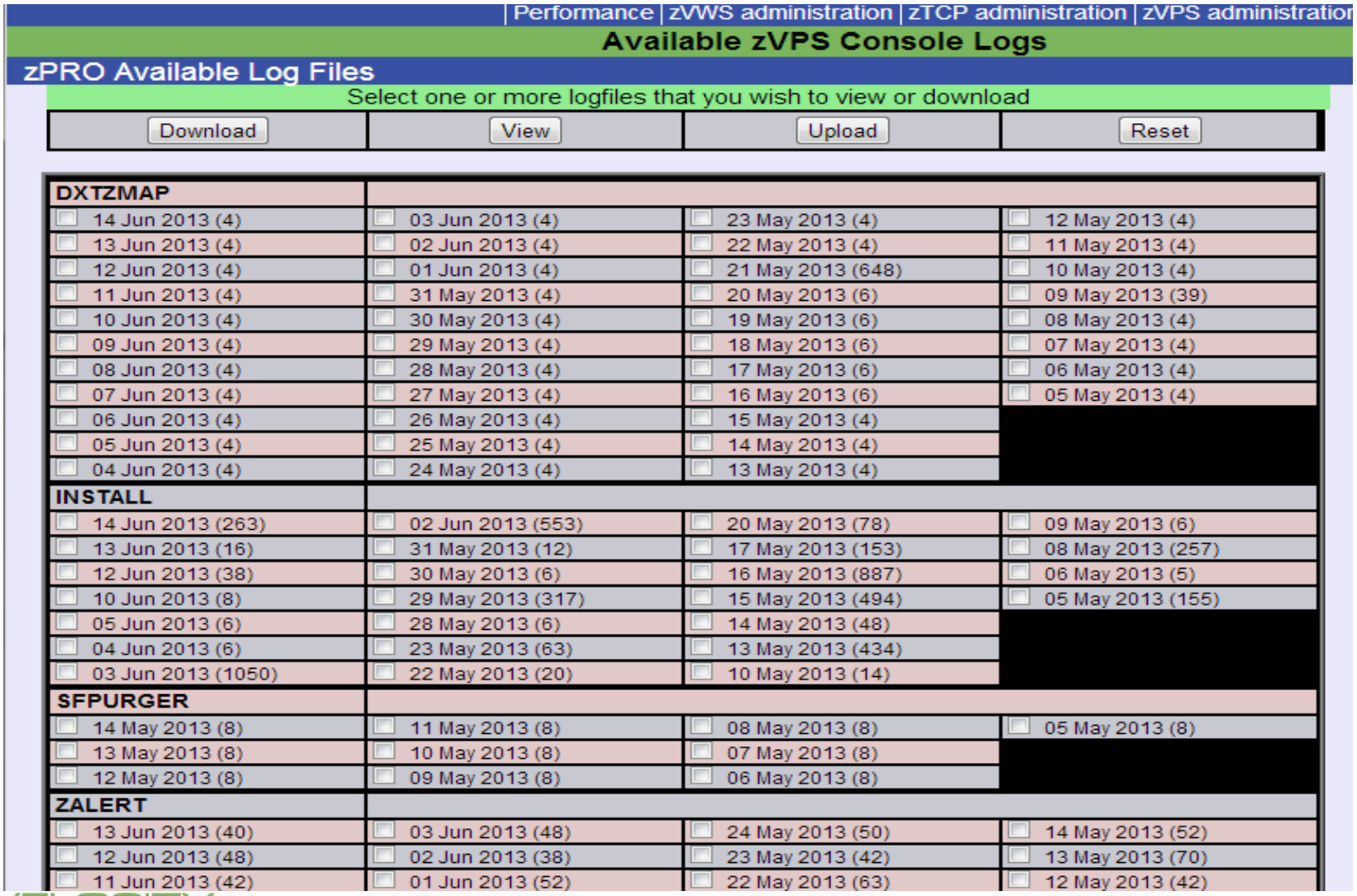
zOPERATOR – Management Console

Operator Function browser based

- Click Thru for problem analysis – LPCP example



Console Management View



Performance | zVWS administration | zTCP administration | zVPS administration

Available zVPS Console Logs

zPRO Available Log Files

Select one or more logfiles that you wish to view or download

Download | View | Upload | Reset

DXTZMAP			
14 Jun 2013 (4)	03 Jun 2013 (4)	23 May 2013 (4)	12 May 2013 (4)
13 Jun 2013 (4)	02 Jun 2013 (4)	22 May 2013 (4)	11 May 2013 (4)
12 Jun 2013 (4)	01 Jun 2013 (4)	21 May 2013 (648)	10 May 2013 (4)
11 Jun 2013 (4)	31 May 2013 (4)	20 May 2013 (6)	09 May 2013 (39)
10 Jun 2013 (4)	30 May 2013 (4)	19 May 2013 (6)	08 May 2013 (4)
09 Jun 2013 (4)	29 May 2013 (4)	18 May 2013 (6)	07 May 2013 (4)
08 Jun 2013 (4)	28 May 2013 (4)	17 May 2013 (6)	06 May 2013 (4)
07 Jun 2013 (4)	27 May 2013 (4)	16 May 2013 (6)	05 May 2013 (4)
06 Jun 2013 (4)	26 May 2013 (4)	15 May 2013 (4)	
05 Jun 2013 (4)	25 May 2013 (4)	14 May 2013 (4)	
04 Jun 2013 (4)	24 May 2013 (4)	13 May 2013 (4)	
INSTALL			
14 Jun 2013 (263)	02 Jun 2013 (553)	20 May 2013 (78)	09 May 2013 (6)
13 Jun 2013 (16)	31 May 2013 (12)	17 May 2013 (153)	08 May 2013 (257)
12 Jun 2013 (38)	30 May 2013 (6)	16 May 2013 (887)	06 May 2013 (5)
10 Jun 2013 (8)	29 May 2013 (317)	15 May 2013 (494)	05 May 2013 (155)
05 Jun 2013 (6)	28 May 2013 (6)	14 May 2013 (48)	
04 Jun 2013 (6)	23 May 2013 (63)	13 May 2013 (434)	
03 Jun 2013 (1050)	22 May 2013 (20)	10 May 2013 (14)	
SFPURGER			
14 May 2013 (8)	11 May 2013 (8)	08 May 2013 (8)	05 May 2013 (8)
13 May 2013 (8)	10 May 2013 (8)	07 May 2013 (8)	
12 May 2013 (8)	09 May 2013 (8)	06 May 2013 (8)	
ZALERT			
13 Jun 2013 (40)	03 Jun 2013 (48)	24 May 2013 (50)	14 May 2013 (52)
12 Jun 2013 (48)	02 Jun 2013 (38)	23 May 2013 (42)	13 May 2013 (70)
11 Jun 2013 (42)	01 Jun 2013 (52)	22 May 2013 (63)	12 May 2013 (42)

VSE 4.3 adds SNMP Interface plus some mibs:

- IBMVSE "vse mib" – system data

```
Report: ESAVSES       VSE System Configuration Report
-------------------------------------------------------------
NODE      <---z/VM---> <LogicalPart> <--------CPU model-------
/Time     VirtID    Lvl  Name      Nbr <IBM/<model>/CPs/ serial
-------- -------- --- --------  --- -------------------------
06:26:00
vse2      ZVSE       1  VSIVM3     0  IBM 2096-A02 02 (14B4202)
-------------------------------------------------------------
06:27:00
vse2      ZVSE       1  VSIVM3     0  IBM 2096-A02 02 (14B4202)
```

```
-------------------------------------------------------------
NODE      <---z/VM---> <--Partitions--> <----CPU Counts---->
/Time     VirtID    Lvl Max Cur Stat Dyn Tot Actv Quies Inact
-------- -------- --- --- --- ---- --- --- ---- ----- -----
06:26:00
vse2      ZVSE       1  120  20   12   8   2    2     0     0
-------------------------------------------------------------
06:27:00
vse2      ZVSE       1  120  20   12   8   2    2     0     0
```

VSE 4.3 adds SNMP Interface plus some mibs:

•IBMVSE “vse mib” adds CPU data for system, and by virtual cpu

```
Report: ESAVSEC      VSE System Performance Report                  VSIVM3
-------------------------------------------------------------------------
NODE       Pages/Sec <Rate/Sec> <CPU Utilization>   All       Pct  Seconds
/Time      In    Out   SVC  DSP  Total  Mstr  Spin   Bound      NP  OfData
--------   ---- ---- ---- ----  -----  -----  -----   -----    ----  ------
06:26:00
vse2          0    0  196  428   83.6   4.0   0.0        0     4.8    64.6
 CPU- 0                    270   40.5   2.7     0        0     6.6    64.6
 CPU- 1                    160   43.7   1.4   0.0        0     3.2    64.6
-------------------------------------------------------------------------
06:27:00
vse2          0    0  295  597   82.5   4.2   0.0        0     5.1    56.0
 CPU- 0                    359   36.6   3.2   0.0        0     8.8    56.0
 CPU- 1                    238   45.3   1.0     0        0     2.2    56.0
```

VSE Support

Velocity Software proof of concept for "Plug in"

- SNMP Support is "extensible"

What do customers want?

- TCPIP?
- VSAM?
- CICS?
- DB2
- High Capture ratio?

```
Report: ESAVSEP      VSE Partition Performance
-------------------------------------------------
NODE       Part   Job       Phase      <-CPU Time->
/Time      ID     Name      Name       CPU   Overhd
--------   ----   --------  --------   -----  ------
06:26:00
vse2            Totals                52.0    1.5
            FB  SECSERV   BSTPSTS       0      0
            F7  TCPIP00   IPNET       0.3    0.0
            F6  TCPIP01   IPNET       0.0    0.0
            F3  VTAMSTRT  ISTINCVT    0.0    0.0
            F2  CICSICCF  DFHSIP      0.6    0.0
            F1  POWSTART  IPWPOWER    0.0    0.0
            R2  STARTMAS  IESMASNM    0.6    0.0
            R3  STRTMAS1  IESMASNM      0      0
            S1  STGPLAY5  STGPLAY     6.6    0.4
            S2  STGPLAY2  STGPLAY     0.6    0.1
            S3  STGPLAY4  STGPLAY    11.6    0.3
            S4  STGPLAY1  STGPLAY    17.3    0.3
            R1  STARTVCS  IESVCSRV    0.0    0.0
            S5  STGPLAY3  STGPLAY    14.3    0.3
```

Linux VCPU Analysis

ESAUSCP – VCPU Analysis, linux needs new mib

- DB2 workload has very strange overhead….

Report: ESAUSCP **Virtual Machine** VCPU Analysis

UserID CPUvadd	Cnt	<---CPU time--> <-Percent-> TOT	Virt	<-SHARE--> Type	Value	CPU TYPE	<-Samples-> Total	In Q	<---Percent Run	Sim	CPU
07:17:00	0	57.73	35.96	.	.	.	4307	1045	3.2	1.1	1.4
TSTDB2	2	22.88	2.85	ABS	4.0	IFL	118	117	6.0	7.7	1.7
CPU-00		2.21	2.16	ABS	0	IFL	59	59	5.1	0	1.7
CPU-01		20.68	0.69	ABS	0	IFL	59	58	6.9	16	1.7

Report: ESALNXS **LINUX VSI** System Analysis Report

Node/ Time	<---Load Numbers--> Users	Procs	MaxProc	CPU NBR	<Processor Pct Util> Total	Syst	User	Idle	NICE Time	<CPU Overhead%> Krnl	IRQ	Steal	IO Wait
01/16/17													
TSTDB2	0	346	0	Tot	0	0	0	0	0	0	0	0	0
				1	0	0	0	0	0	0	0	0	0
				2	0	0	0	0	0	0	0	0	0

Linux Storage Analysis

ESAUCD2 – The most useful storage report available

- Note, page tables are “anonymous / overhead”

```
Report: ESAUCD2      LINUX UCD Memory Analysis Report          Velocity Softwar
Monitor initialized: 05/13/14 at 00:00:00 on 2828 serial 414C7     First recordana
-------------------------------------------------------------------------------
Node/    <-------------------------Storage Sizes (in MegaBytes)------------------->
Time/    <--Real Storage--> <-----SWAP Storage----> Total <----Storage in Use----->
Date      Total  Avail Used  Total Avail Used  MIN   Avail CMM    Buffer Cache Ovrhd
-------- ------ ----- ----- ----- ----- ----- ----- ----- ------ ------ ----- -----
00:15:00
oracle    994.8  18.1 976.7 123.9  74.0  49.9  15.6  92.1      0  240.6 581.4 154.7
redhat5   499.2  17.9 481.3  4095  4095   0.0  15.6  4113      0  140.5 206.6 134.2
redhat5x  497.1  19.8 477.3  4095  4095   0.0  15.6  4114      0  150.0 170.6 156.7
redhat56  497.0  24.3 472.7  1051  1051   0.0  15.6  1075      0  170.1 174.6 128.0
redhat6   492.7   7.8 484.9  4095  4090   5.2  15.6  4098      0  167.9 182.6 134.4
redhat6x  994.8  10.7 984.1 495.8 404.0  91.9  15.6 414.7      0   29.7 785.4 169.0
rhel64v   996.4  70.0 926.4  2047  2047     0  15.6  2117      0  152.0 601.8 172.6
roblx2    241.7  11.1 230.6     0     0     0  15.6  11.1      0   44.2 107.6  78.8
sles10    493.0  19.8 473.2  4219  4219     0  15.6  4238      0  140.9 281.1  51.2
sles11    494.7 172.8 322.0  4087  4087     0  15.6  4260      0  139.3 122.7  59.9
sles11v2 2006.7  85.9  1921  1542 699.6 842.4  15.6 785.5      0    3.0 894.9  1023
sles11v3  868.8  91.2 777.6  2046  1759 287.2  15.6  1850      0    4.2  65.8 707.6
suselnx2  247.3 158.6  88.6 255.8 255.8     0  15.6 414.5      0   29.0  37.3  22.4
s11s2ora  996.5  23.7 972.8 743.8 598.2 145.5  15.6 621.9      0   41.2 777.9 153.7
```

Process Storage metrics (zVPS version 4.2)

New metrics

- RSS, Size - Same
- Locked: Locked memory size (mlock)
- Peak: peak RSS (high water mark)
- Data: size of data, stack
- **PTBL: page table entries (linux 2.6.10) - Use to evaluate LARGE PAGES**
- EXEC: size of executable (text)
- Lib: shared library code size
- Swap: Swapped out
- Stack: size of stack

```
Report: ESALNXP      LINUX HOST Process Statistics Report       Velocity Software Corporate   ZMAP 4.2.0
-------------------------------------------------------------------------------------------------------
node/     <-Process Ident-> PRTY <------CPU Percents----> <---------------Storage Metrics (MB)---------->
 Name      ID    PPID   GRP  Valu  Tot  sys user syst usrt  Size RSS Peak Swap Data Stk  EXEC Lib Lck PTbl
--------- ----- ----- ----- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- --- --- ----
00:15:00
 oracle       0     0     0    0 1.87 0.11 1.05 0.16 0.55 7345  845 108K    0 1997 62.8  28K  6K   0  130
 init         1     1     0   16 0.60    0    0 0.12 0.48    1    0 12.5    0 2.17  1.2  8.9   0   0 0.12
 oracle   21131     1 21131   16 0.88 0.00 0.87    0    0  403   52 3585    0 18.4  1.4  965 139   0 5.98
redhat6x      0     0     0    0 1.66 0.38 0.67 0.22 0.38  19K 1216 275K  462  15K  103  74K 18K   0  219
 init         1     1     1   20 0.59 0.00    0 0.21 0.38    3    1 46.6 0.53 3.11  1.3  2.2  38   0 0.21
sles11v2      0     0     0    0 5.96 3.54 1.83 0.19 0.40 105K 4321 1.5M 6958  21K  517 347K 34K   0 1498
 init         1     1     1   20 0.58 0.00 0.00 0.19 0.38   11    0  135 1.27 2.34  1.7  0.5  25   0 0.51
 ora_vktm  5963     1  5963   -2 1.65 1.65    0    0    0 1137    2  17K 28.2 46.3  2.1 3546 285   0 7.03
 ora_vktm 10254     1 10254   -2 1.62 1.33 0.29    0    0  926    2  14K 27.8 46.3  2.1 3546 285   0 7.27
s11s2ora      0     0     0    0 1.86 0.42 0.68 0.26 0.50  16K 1063 238K  830 2353  141  70K  9K   0  207
 init         1     1     1   20 0.75    0    0 0.26 0.50    2    0 34.0 1.31 2.57  1.9  0.5  28   0 0.14
```

Process Storage metrics (zVPS version 4.2)

Benchmark process analysis (2G SGA, oversized)

```
Report: ESALNXP       Velocity Software Corporate   ZMAP 4.2.0
-------------------------------------------------------------
node/      <-Proc <----------------Storage Metrics (MB)---------->
 Name      ID       Size RSS Peak Swap Data Stk  EXEC Lib Lck PTbl

--------- -----  ---- ---- ---- ---- ---- ---- ---- --- --- ----
NO HUGE PAGES
 oracle   43146  2303  265 2249    0 3.07  0.1  181  13   0 0.96
 oracle   43148  2310   81 2256    0 8.95  0.1  181  13   0 1.06
 oracle   43152  2303   57 2249    0 3.07  0.1  181  13   0 0.69
 oracle   43158  2308  141 2254    0 3.20  0.3  181  14   0 1.21
 oracle   43160  2303  101 2249    0 3.07  0.1  181  13   0 0.84

HUGE PAGES
 oracle   51439  2304   18 2250    0 4.26  0.1  181  14   0 0.31
 oracle   51451  2303   22 2250    0 3.07  0.1  181  14   0 0.32
 oracle   51453  2314   23 2259    0 3.07  0.1  181  13   0 0.32
 oracle   51455  2303   16 2249    0 3.07  0.1  181  13   0 0.31
 oracle   51457  2310   23 2256    0 8.95  0.1  181  13   0 0.31
 oracle   51459  2318   17 2263    0 3.07  0.1  181  13   0 0.32
```

Java/Websphere Metrics (Management vs diagnostics)

```
Report: ESAJVM       Java Subsystem Analysis Report                  Velocity Sof
-------------------------------------------------------------------------------
Node/                                  <JavaClass> Memory  <------Heap data------->
Date      <------Application------> <--Loaded-> pending <------sizes----------->
Time      Name                  Type Curr  /Sec  Final   Init  Used  Commit Max
--------- -------------------- ---- ----- ----- ------- ----- ----- ------ -----
13:06:00
S11R20RA WAS Server1          JVM   15287     0       0 52.4M  100M 107.5M  268M
         WAS Server2longerna JVM   15312     0       0 52.4M 85.4M 103.3M  268M


Report: ESAJVM       Java Velocity Software Corporate   ESAMAP 4.2.0 06/19/13
-------------------------------------------------------------------------------
Node/                          <---Non Heap Data----> <--Thread Count data->
Date      <------Application-  <-----sizes----------> Curr Daemon Peak start
Time      Name                 Init Used  Commit Max  Live Count  thrds /sec
--------- ------------------- ---- ----- ------ ---- ---- ------ ----- ----
13:06:00
S11R20RA WAS Server1             0  101M 184.7M    0 58.0   55.0  55.0    0
         WAS Server2longerna     0  101M 171.9M    0 58.0   55.0  55.0    0
```

VELOCITY SOFTWARE

PROVEN PERFORMANCE

Java Threads

- **The Velocity Software mib extracts threads**

```
Report: ESAJVMT      Java Subsystem Analysis Report                  Velocity Sof
Monitor initialized: 12/05/16 at 14:35:40 on 2828 serial 0314C7    First record
-------------------------------------------------------------------------------

Node/
Date     <-----------Thread ID----------->  <--Blocks--> <Thread Waits>  CPU
Time     Name                          nbr  /Second Time   /Sec  Time    (ms)
-------- ----------------------------  ----  ------- ----  -----  -----  -----
14:37:00
lxora12  Totals: AppSrv01-server1         0     0.2     0   73.1      0  170.8
         CommunicatorServer               7       0     0      0      0    7.8
         Thread-11                       17       0     0    0.0      0    1.1
         Deferred Alarm Manager          30       0     0    2.2      0    4.0
         Non-Deferred Alarm Manager      31       0     0    2.0      0    2.9
         Deferrable Alarm : 0            43       0     0    1.0      0    3.1
         LT=0:P=315710:O=0:port=9100     49       0     0      0      0    1.4
         LT=1:P=315710:O=0:port=9403     50       0     0      0      0    1.8
         ThreadService-0                 90     0.0     0    1.6      0   19.2
         Deferrable Alarm : 1            99       0     0    1.0      0    3.9
         Deferrable Alarm : 2           135       0     0    1.0      0    3.8
         Thread-79                      140       0     0    0.3      0    1.1
         ThreadService-1                148     0.0     0    1.8      0   16.7
         Deferrable Alarm : 3           149       0     0    1.0      0    3.4
         ThreadService-2                150     0.0     0    1.7      0   11.7
         ThreadService-3                151     0.0     0    1.6      0   14.5
         ThreadService-4                153     0.1     0    1.5      0   16.1
         ThreadService-5                154     0.0     0    1.5      0   25.8
         AIO Timer Thread 1             183       0     0    1.0      0    1.7
         WebContainer : 2               186       0     0    1.0      0    1.5
         WebContainer : 15              226       0     0    1.0      0    1.0
         WebContainer : 17              228       0     0    1.0      0    1.6
```

Oracle Database Configuration (management vs diagnostics)

ESAORAC: Oracle Configuration, SGA, PGA High Level information

Report: ESAORAC Oracle Database Configuration Report

Node/ Date Time	<---Database Description---> DatabaseName	Instance	Version	<---Database---> <---Start---> Date	Time	Status
PAZXXT10	soedb	soedb	12.1.0.1.0	2014/01/27	10:15	OPEN
redhat6x	db01	db01	11.2.0.2.0	2013/12/19	14:42	OPEN
sles11v2	db01	db01	12.1.0.1.0	2013/11/08	13:20	OPEN

Node/ Date Time	<--- Database	<---Storage Overview (MB)---> <---SGA---> Max	Fixed	Free	<---PGA---> Size	Max	MaxMan
PAZXXT10	soedb	1598	2.3	557K	557.1	293.7	1040.0
redhat6x	db01	399.6	2.2	139K	139.3	164.8	529.0
sles11v2	db01	334.4	2.2	32768	106.5	355.2	12950

Measuring Oracle – Linux Process Perspective

Report: ESALNXA LINUX HOST Application Report Velocity Software ZMAP 4.2.0

Node/ Date Time	Process/ Application name	<---Processor Percent---> Total	sys	user	<Process><Children> syst	usrt	<Process-> <-Counts-> Total	Actv	<---Percent Process Status--> Run- ing	Sleep -ing	Zom bie	Disk Wait	Page Wait	Stop
08:30:00														
PAZXXT10	*Totals*	6.6	2.0	2.6	0.7	1.3	149.0	24.5	0.7	99.3	0	0	0	0
	init	1.9	0.0	0.0	0.6	1.3	1.0	0.3	0	100	0	0	0	0
	ora_vktm	1.9	1.0	0.8	0	0	1.0	1.0	0	100	0	0	0	0
08:45:00														
PAZXXT10	*Totals*	55.9	7.5	46.1	0.8	1.6	164.9	42.5	1.9	94.7	0	3.4	0	0
	init	2.3	0.0	0	0.7	1.6	1.0	0.2	0	100	0	0	0	0
	ora_vktm	1.3	0.7	0.6	0	0	1.0	1.0	0	100	0	0	0	0
	oracle_1	19.8	2.9	16.8	0	0	12.0	12.0	15.0	48.3	0	36.7	0	0
	xterm	27.8	1.7	26.1	0	0	3.3	1.0	0	100	0	0	0	0
09:00:00														
PAZXXT10	*Totals*	69.4	11.1	56.9	0.5	0.9	181.6	57.7	1.8	95.1	0	3.1	0	0
	init	1.3	0.0	0.0	0.5	0.8	1.0	0.3	0	100	0	0	0	0
	ora_dbw0	2.2	1.5	0.7	0	0	1.0	1.0	6.7	0	0	93.3	0	0
	ora_lg00	0.7	0.4	0.2	0	0	1.0	1.0	0	46.7	0	53.3	0	0
	ora_vktm	1.2	0.7	0.5	0	0	1.0	1.0	0	100	0	0	0	0
	oracle_1	43.5	5.0	38.5	0	0	20.0	20.0	8.0	73.7	0	18.3	0	0
	xterm	15.7	1.6	14.2	0	0	5.0	1.3	0	100	0	0	0	0
	Xvnc	1.3	0.5	0.8	0	0	1.0	1.0	6.7	93.3	0	0	0	0

Measuring Oracle Database Storage

ESAORAG: General Storage Areas – SGA, no changes

```
Report: ESAORAG    SGA/PGA Analysis Report                    Velocity Software
Monitor initializ/14 at 08:00:00 on 2094 serial 53E5D     First record anal
-------------------------------------------------------------------------------
Node/                <------------Shared Global Area (SGA) in Megabytes----->
Date      <--Data    Max    Fixed Redo Buffer      <------Pool sizes---------->
Time      Name       Size   Size Buffr Cache Free Shrd Large Java Stream ShrIO
-------- --------  ------ ---- ----- ----- ---- ---- ----- ---- ------ -----
08:30:00
PAZXXT10 soedb      1598  2.3   6.9 655.4 557K  295  32.8 16.4   32.8   49.2
-------------------------------------------------------------------------------
08:45:00
PAZXXT10 soedb      1598  2.3   6.9 658.6 557K  295  32.8 16.4   29.5   49.2
-------------------------------------------------------------------------------
09:00:00
PAZXXT10 soedb      1598  2.3   6.9 671.7 557K  295  32.8 16.4   16.4   49.2
```

Measuring Oracle PGA

ESAORAG: General Storage Areas – PGA Grows with workload

```
Report: ESAORAG
-------------------------------------------------------
Node/                <--PGA Data (in Megabytes)-->
Date      <--Data    <-Target-> InUse Alloc Free
Time      Name       Parm Auto                -able
--------  --------   ---- ---- ----- -----   -----
01/28/14
08:30:00
PAZXXT10 soedb        557  451  56.8  84.1    17.5
-------------------------------------------------------
08:45:00
PAZXXT10 soedb        557  426  84.2 128.9    30.4
-------------------------------------------------------
09:00:00
PAZXXT10 soedb        557  404 109.4 170.3    43.6
```

Measuring Oracle Workloads

ESAORAS: User Committs/Rollbacks, Session CPU, Recursive CPU

```
Report: ESAORAS Oracle Subsystem Analysis Report
-------------------------------------------------------------
Node/    <---Database----> <-User Activity-> <--CPU--->
Date                       <Rate per second>  Sess  Re-
Time     Name      Instance Calls Comm Rollbk  -ion  Cur
-------- -------- -------- ----- ----- ----- ----- -----
08:30:00
PAZXXT10 soedb     soedb     0.2   2.3   3.8   0.0     0
-------------------------------------------------------------
08:45:00
PAZXXT10 soedb     soedb     0.2 241.2  73.1  22.0   0.0
-------------------------------------------------------------
09:00:00
PAZXXT10 soedb     soedb     0.2 569.5 168.2  52.4  0.11
```

ESAORAS: Oracle Subsystem

```
Report: ESAORAS          Velocity Software Corporate ZMAP 4.2.0 12/21/13
-------------------------------------------------------------------------
Node/           <----Physical Reads Activty---> <-Physical Write Activity-->
Date            <------Rate per second--------> <----Rate per second------->
Time       Name   Rds Hits Direct   I/O  Bytes  Writs  CHits  Dirct  I/O  Bytes
-------- ----- ----- ----- ----- -----  -----  -----  ----- ------ ----- ----
08:30:00
PAZXXT10 soedb   0.8   0.2   0.2   0.2      0    0.1   1415    0.3   0.2  0.1
-------------------------------------------------------------------------
08:45:00
PAZXXT10 soedb  18.1   8.3 172.8 172.8      0  172.2   715K   42.8  42.3  0.5
-------------------------------------------------------------- ----------
09:00:00
PAZXXT10 soedb  36.5  13.8 279.9 279.9      0  276.6  9733K  178.6 178.6  0.1
```

Performance analysis vs “averages”

```
Report: ESAORAS      Oracle Subsystem Analysis Report              Velocity Software Corporate   ZMAP 4.2.0
Monitor initialized: 08/04/14 at 00:00:00 on 2828 serial 414C7     First record analyzed: 08/04/14 00:00:00
Node/    <---Database----> <-User Activity-> <--CPU---> <----Physical Reads Activty---> <-Physical Write Actv
Date                       <Rate per second> Sess Re-   <------Rate per second--------> <----Rate per second--
Time     Name     Instance  Calls Comm Rollbk -ion  Cur   Rds  Hits  Direct   I/O Bytes Writs CHits Dirct  I/O
-------- -------- --------  ----- ---- ------ ---- ------ ---- ------ ------ ----- ----- ----- ----- -----  -----
00:01:00
roblx1   orcl     orcl        0.3 302.3   10.9  2.0      0 10.0   4.9    6.9    6.9     0   6.7 56361   1.0    1.0
00:02:00
roblx1   orcl     orcl        0.2  26.7   10.4  0.2      0  6.9   2.0      0      0     0     0     0   1.7    1.7
00:03:00
roblx1   orcl     orcl        0.2  40.3    9.5  0.3      0  5.7   0.8      0      0     0     0     0   1.5    1.5
00:04:00
roblx1   orcl     orcl        0.2   7.6    9.6  0.2      0  5.2   0.2      0      0     0     0     0   1.9    1.9
00:05:00
roblx1   orcl     orcl        0.2  23.3    9.3  0.4      0  4.9   0.3      0      0     0     0     0   0.8    0.8
00:06:00
roblx1   orcl     orcl        0.2  16.6   10.2  0.2      0  5.8   0.6      0      0     0     0     0  43.6   43.6
00:07:00
roblx1   orcl     orcl        0.2  37.3   10.3  0.2      0  5.1   0.0      0      0     0     0     0   1.3    1.3
00:08:00
roblx1   orcl     orcl        0.5  26.7   15.0  0.9      0  6.9   0.7   4221  122.2  4099 267.7 2499K   1.6    1.6
00:09:00
roblx1   orcl     orcl        0.3  25.5   16.1  1.3      0 36.9  41.5   6781   4202  2579 333.9 60.6M   9.7    9.7
00:10:00
roblx1   orcl     orcl        0.2  26.4   14.3  1.7    0.0 45.0  18.6   6489    645    38.6 248.9 3648K   1.9    1.9
```

Setting Alerts?

Possible metrics for alerting:

- For server, by database:
- SGA size > x
- PGA allocated > x
- Users?
- I/O
- Cache hits?

Linux applications by Group

```
Report: ESALNXA      LINUX HOST Application Report
Monitor initialized: 21/01/11 at 07:03:00 on
-------------------------------------------------------
Node/    Process/    ID    <---Processor Percent--->
Date     Application             <Process><Children>
Time     name              Total sys  user syst usrt
-------- ----------- ----- ----- ---- ---- ---- ----
07:04:00
***Node Groups***
WASApps  *Totals*        0  90.8  9.4 78.6  0.5  2.2
         automoun        0   0.0    0  0.0    0    0
         httpd           0   5.4  1.8  3.6    0    0
         httpd1          0  44.4  4.0 40.5    0    0
         httpd18         0   8.8  0.2  8.6    0    0
         httpd19         0   2.8  0.2  2.6    0    0
         httpd2          0   2.5  0.2  2.3    0    0
         httpd3          0   4.1  0.7  1.3  0.3  1.8
         httpd4          0   6.0  0.9  5.1    0    0
         httpd5          0   1.1  0.1  1.1    0    0
         httpd6          0   2.7  0.2  2.5    0    0
         httpd7          0   6.4  0.3  6.1    0    0
         httpd9          0   4.3  0.0  4.2    0    0
         kernel          0   0.6  0.0    0  0.2  0.4
         snmpd           0   0.7  0.4  0.2    0    0
```

Linux Application Accounting

- **Defining applications**

```
appname = 'PIDFILE  '    appstring = 'PidFile'
appname = 'MineCrft '    appstring = 'minecraft'
appname = 'HVC      '    appstring = 'hvc'
appname = 'DESKTOP  '    appstring = 'desktop'
appname = 'oracle   '    appstring = 'oracle'
```

```
Screen: ESALNXA  Velocity Software - VSIVM4      ESAMON 4.201 02/25
1 of 3  LINUX VSI Host Application Report        CLASS * NODE BLAKEMC

                  Process/     ID     <---Processor Percent--->
                                                <Process><Children>
Time      Node/   Application                    Total  sys   user  syst  usrt
          Group   name
--------  ------  -----------  -----  -----  ----  ----  ----  ----
21:20:00  BLAKEMC *Totals*          0   15.6   0.1  15.5     0     0
                  kernel       2097K    0.0   0.0     0     0     0
                  snmpd        98934    0.1   0.1   0.0     0     0
                  MineCrft     81176   15.5   0.0  15.5     0     0
21:19:00  BLAKEMC *Totals*          0   14.5   0.1  14.4     0     0
                  snmpd        98934    0.1   0.0   0.0     0     0
                  MineCrft     81176   14.4   0.0  14.4     0     0
21:18:00  BLAKEMC *Totals*          0   14.4   0.1  14.3     0     0
                  snmpd        98934    0.1   0.0   0.0     0     0
                  MineCrft     81176   14.3   0.0  14.3     0     0
```

Linux Application Accounting

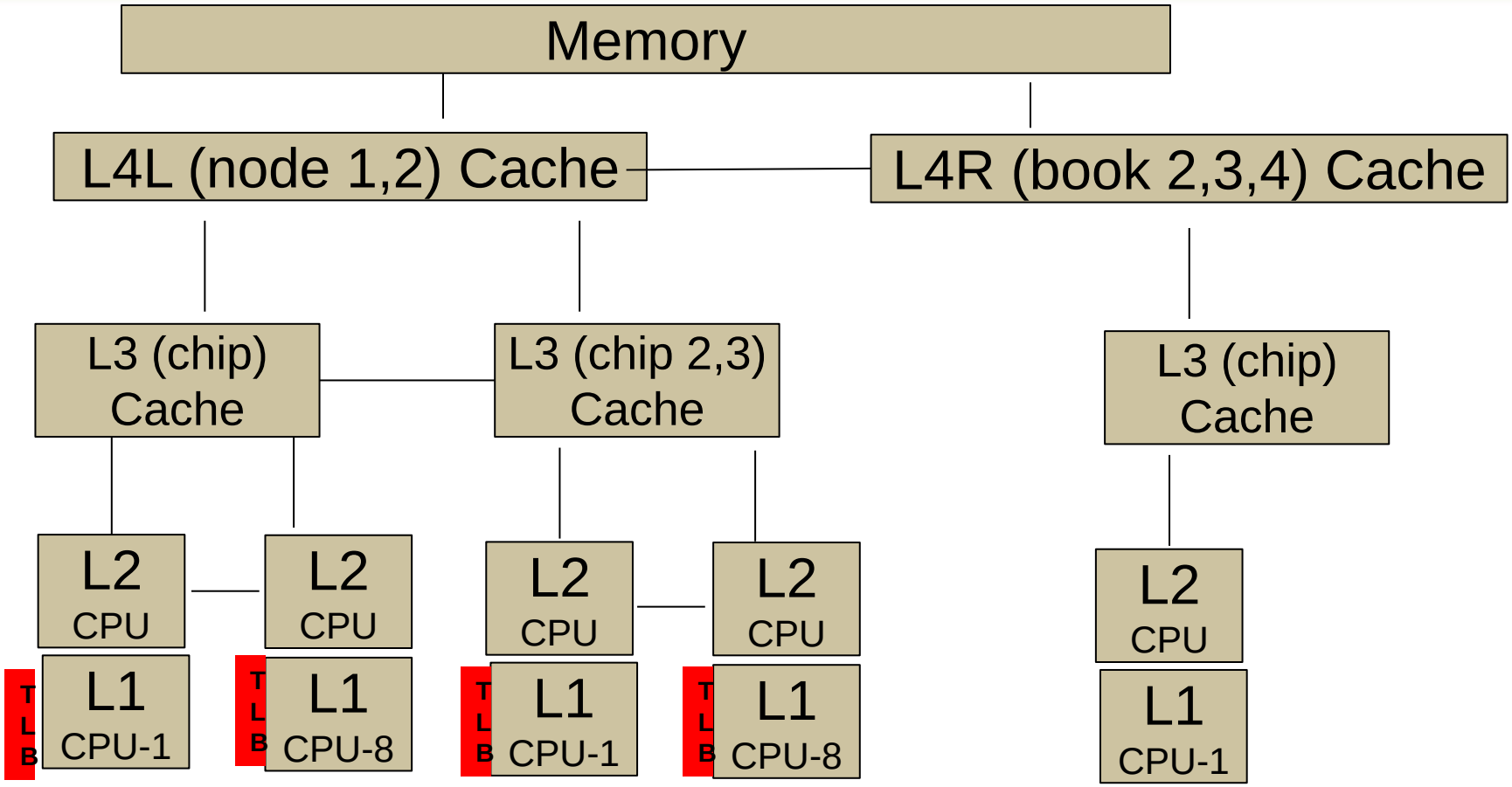
- **Websphere argument string used for accounting**

- **wasadmin 27144 6846 0 Feb06 ? 00:43:13 /u01/was61/java/bin/java -Declipse.security -Dwas.status.socket=34229 -Dosgi.install.area=/u01/was61 -Dosgi.configuration.area=/u01/was61/profiles/appsrv/configuration -Dosgi.framework.extensions=com.ibm.cds -Xshareclasses:name=webspherev61_%g,groupAccess,nonFatal -Xscmx50M -Xbootclasspath/p:/u01/was61/java/jre/lib/ext/ibmorb.jar:/u01/was61/java/jre/lib/ext/ibmext.jar:/u01/J2EEProbe/DiagnosticsAgent/classes/IBM/1.5.0/instr.jre:/u01/J2EEProbe/DiagnosticsAgent/classes/boot -classpath /u01/was61/profiles/appsrv/properties:/u01/was61/properties:/u01/was61/lib/startup.jar:/u01/was61/lib/bootstrap.jar:/u01/was61/lib/j2ee.jar:/u01/was61/lib/lmproxy.jar:/u01/was61/lib/urlprotocols.jar:/u01/was61/deploytool/itp/batchboot.jar:/u01/was61/deploytool/itp/batch2.jar:/u01/was61/java/lib/tools.jar -Dibm.websphere.internalClassAccessMode=allow -verbose:gc -Xms1024m -Xmx1200m -Dws.ext.dirs=/u01/was61/java/lib:/u01/was61/profiles/appsrv/classes:/u01/was61/classes:/u01/was61/lib:/u01/was61/installedChannels:/u01/was61/lib/ext:/u01/was61/web/help:/u01/was61/deploytool/itp/plugins/com.ibm.etools.ejbdeploy/runtime -Dderby.system.home=/u01/was61/derby -Dcom.ibm.itp.location=/u01/was61/bin -Djava.util.logging.configureByServer=true -Duser.install.root=/u01/was61/profiles/appsrv -**

Linux Capacity Planning “planning”

- **Node Classes (installation defined)**
  - By application (capacity planning)
  - By VMWare/ESX box
  - By department (chargeback)
- **Other grouping (automatic)**
  - Linux Process by user (ESALNXU)
  - Linux Process by process name (ESAHSTA)
  - Linux Process by application (ESALNXA)
    - Requires Parent/Child relationship
  - Linux Disk storage by NODE class
- **Define alerts (Operational support)**
  - Based on application
  - Based on node group
  - Based on linux user

z13 Architecture



Question, If 10,000 dispatch / second / cpu, impact?

CPU Measurement Facility

- **What is the CPU Measurement Facility (Basic)**
- **CPI: Cycles per Instruction**

```
Report: ESAMFCA       MainFrame Cache Hit Analysi
Monitor initialized: 12/10/14 at 07:44:37 on 282
-----------------------------------------------

                <CPU Busy> <-------Processor------->
                <percent>  Speed/<-Rate/Sec-> CPI
Time      CPU  Totl User   Hertz Cycles Instr Ratio
-------- --- ---- ----  ----- ------ ----- -----
07:48:35   0 20.8 18.4   5504M  1121M  193M 5.807
           1 21.6 19.6   5504M  1161M  221M 5.264
           2 24.4 22.5   5504M  1300M  319M 4.078
           3 22.4 19.7   5504M  1248M  265M 4.711
           4 19.6 17.6   5504M  1102M  194M 5.683
           5 20.4 18.6   5504M  1144M  225M 5.087
           6 23.9 22.0   5504M  1341M  341M 3.935
           7 17.6 15.4   5504M   949M  160M 5.927
           8 18.5 16.5   5504M  1005M  194M 5.195
           9 22.5 20.6   5504M  1259M  347M 3.629
             ---- ----   ----- ------ ----- -----
System:       212  191   5504M  10.8G 2457M 4.733
```

Why you should be interested – what is a MIP?

```
Report: ESAMFC          MainFrame Cache Analysis Rep
-------------------------------------------------------
                <CPU Busy> <-------Processor------>
                <percent>  Speed/<-Rate/Sec->
Time       CPU  Totl User  Hertz Cycles Instr Ratio
-------- ---  ---- ----  ----- ------ ----- -----
14:05:32   0  92.9 64.6  5000M  4642M 1818M 2.554
           1  92.7 64.5  5000M  4630M 1817M 2.548
           2  93.0 64.7  5000M  4646M 1827M 2.544
           3  93.1 64.9  5000M  4654M 1831M 2.541
           4  92.9 64.8  5000M  4641M 1836M 2.528
           5  92.6 64.6  5000M  4630M 1826M 2.536
              ---- ----  ----- ------ ----- -----
System:        557  388  5000M  25.9G 10.2G 2.542
-------------------------------------------------------
14:06:02   0  67.7 50.9  5000M  3389M 2052M 1.652
           1  67.8 51.4  5000M  3389M 2111M 1.605
           2  69.0 52.4  5000M  3450M 2150M 1.605
           3  67.2 50.6  5000M  3359M 2018M 1.664
           4  60.8 44.5  5000M  3042M 1625M 1.872
           5  70.1 53.8  5000M  3506M 2325M 1.508
              ---- ----  ----- ------ ----- -----
System:        403  304  5000M  18.8G 11.4G 1.640
```

1830 mips (at 100%)

2828 Mips (at 100%) Doing 10% more work

TLB Analysis P – z13 data SMT Enabled

Why working sets are important,

Why we need large pages?

DAT Translation consumes 30% of the cycles for both threads

Report: ESAMFC MainFrame Cache Magnitudes Report ZMAP 4.2.4

		<CPU Busy>		<---------->		<-Translation Lookaside buffer(TLB)-					
		<percent>		Speed/		<cycles/Miss>		<Writs/Sec>		CPU Cycles	
Time	CPU	Totl	User	Hertz	Ratio	Instr	Data	Instr	Data	Cost	Lost
07:45:01	0	25.9	24.4	5000M	1.704	159	742	473K	244K	19.77	257M
	1	35.9	34.7	5000M	1.491	138	731	530K	249K	14.17	255M
	2	15.8	13.9	5000M	2.868	206	826	419K	245K	36.30	289M
	3	16.6	15.4	5000M	2.508	212	825	411K	247K	34.90	291M
	23	18.1	17.0	5000M	2.144	197	815	412K	229K	29.44	268M
	24	21.4	19.9	5000M	1.865	114	533	598K	302K	21.35	229M
	25	26.2	24.9	5000M	1.742	98	503	736K	346K	18.71	246M
	26	12.9	11.6	5000M	2.050	154	631	378K	214K	29.92	194M
	27	13.1	11.9	5000M	1.987	156	630	378K	217K	29.64	195M
System:		514	476	5000M	2.257	176	724	14M	7641K	30.69	7917M

OSA MIB

- For z/VM, OSA MIB installs on a Linux Server
- Two sources, Shows configuration, totals, by LPAR
- Not sure which source is accurate or why discrepancy

```
Report: ESAOSA        OSA System Configuration Report
Monitor initialized: 05/14/16 at 06:02:00 on
-----------------------------------------------------
Collector <----------OSA Configuration--> MacAddress
Node      Idx  Name  Nbr  Type Level Shrd Active
--------- --- ------ --- ---- ----- ---- ------------
06:03:00
OSA178     2  OSA1    0 1G Eth 6.00  Yes 6CAE8B483FD4
```

```
Report: ESAOSA        OSA                 Velocity Software Corporate
Monitor initialized: 05/                First record analyzed: 05/14
-------------------------------------------------------------------
Collector <----------OSA   LPAR Bus  CPHID  KBytes/Sec Packets/sec
Node      Idx  Name  Nbr    NBR Util Util    IN   OUT    In   OUT
--------- --- ------ --- ---- ---- ---- ----- ----- ----- -----
06:03:00
OSA178     2  OSA1    0    Tot    0    0    7.0   8.2  30.1  23.2
                           2    0    .      3     1
                           4    0    .     17    17
                           5    0    .      4     4
```

Performance Management Summary

Management vs Diagnostics

- **Cost of management must be low**

Performance Management:

- **Performance Analysis**
- **Capacity Planning**
- **Operational alerting**
- **Chargeback capability**