

# Performance Analysis Flowchart

## “z” is:

- Very large,
- Very complex and
- Very well instrumented

## The challenge?

- **What challenge, it is all there!**
  - 200 zmon panels (with menus)
  - 150 zmap reports (with table of contents)
  - 3400 unique variables

**Very few companies support full time performance analysts.**

## The challenge:

- Performance problems are visible,
- “z” applications are often impacted by other applications

## My challenge

- Provide a flowchart to resolve problems quickly
- Describe the few panels/reports needed to solve any specific problem

**This flowchart is based on decades of analysis**

# The Challenge z/VM serves many functions (162 reports)

ESAHDR ESATUNE

\*Performance Summary  
ESASSUM ESASUM

\*Transaction Activity (5)  
ESAUOLA ESAXACT ESARATE  
ESACLAS ESAEXCP

\*User Activity (21)  
ESATUNA  
ESASRVC ESASRV1 **ESAUSRC** ESAUSR1  
ESAUSR2 ESAUSR3 ESAUSR4 ESAUSR5  
**ESAUSP2** **ESAUSP3** ESAUSP4 ESAUSCP  
**ESAUSTR** **ESAUSPG** ESAUSEK  
ESAWKLD ESAUSRQ ESASCED  
ESAACCT  
**ESAPOOL**

\*Multi-Tasking Users  
ESAMTSK

\*Web Serving Reports (8)  
ESAWEB1 ESAWEB2 ESAWEB3 ESAWEB4  
ESAVWS1 ESAVWS2 ESAVWS3 ESAVWS4

\*Virtual NETWORK Reporting (7)  
ESAQDIO ESAQDI2 **ESANIC**  
ESAVSWC ESAVSW ESAVSW2  
**ESAOSA**

\*TCP/IP Reporting (15)  
ESATCPC ESATCPI **ESATCP1** **ESATCP2** ESATCP3 **ESATCP4**  
ESATCP5 ESATCP6 ESATCP7 ESATCP8  
ESATCPP ESATCPS ESATCPA **ESATCPU** ESATFTP

\*LINUX Reporting (20)  
ESAUCD1 ESAUCD2 ESAUCD3 ESAUCD4 ESAUCDD ESALNXD  
ESAHST1 ESAHST2 ESAHST3 ESAHST4 ESAHSTA  
ESALNXS ESALNXR ESALNXP ESALNXA ESALNXC  
ESALNXU ESALNXV ESALNXM ESALNXUP

\*Linux Application Reporting (4)  
ESAJVM ESAORAC ESAORAG ESAORAS ESAORAW

\*VSE Reporting (4)  
ESAVSEC ESAVSES ESAVSEP ESAVSEJ

\*Shared File System (7)  
ESASFS1 ESASFS2 ESASFS3 ESASFS4  
ESASFS5 ESASFS6 ESASFS7

\*Byte File System  
ESABFS1 ESABFS2 ESABFS3

\*Processor Subsystem (24)  
ESACPUU ESACPUA ESACPUS ESASMT  
**ESADIAG** ESAINS ESALCK1 ESALCK2  
ESAMFC ESAMFCA ESAMFCC ESACPUV  
ESACPU1 ESACPU2  
ESAIUCV ESAIUC2 ESAIUER  
ESALPARC ESALPAR ESALPARS  
ESAPLDV ESAIOP ESACRYPT ESACRY2

\*Storage Subsystem (10)  
ESASTRC ESASTOR **ESASTR1** ESASTR2 ESASTR3 ESAME  
ESAFREE ESADCSS **ESAASPC** ESASXS

\*Paging Subsystem (5)  
ESAPSPC ESAPAGE ESABLKP ESAXSTO  
ESAPSDV

\*Input/Output Subsystem (23)  
ESADEV1 ESADEV2 ESADSD1 ESADSD2  
ESADSD6 ESAIOAS ESACHNC ESACHAN ESACHNH  
ESADSDC ESADSD4 ESADSD5 ESAMDC  
ESAVDSK ESATAPE ESA3495  
ESASCSI ESASCS2  
ESASEEK

\*  
ESAOPER

## Analysis starts with “is there a problem?”

- Describe the problem (what user(s), what time)

## System Configuration

- Processor model, cpu type
- Number of processors, storage size
- SMT support

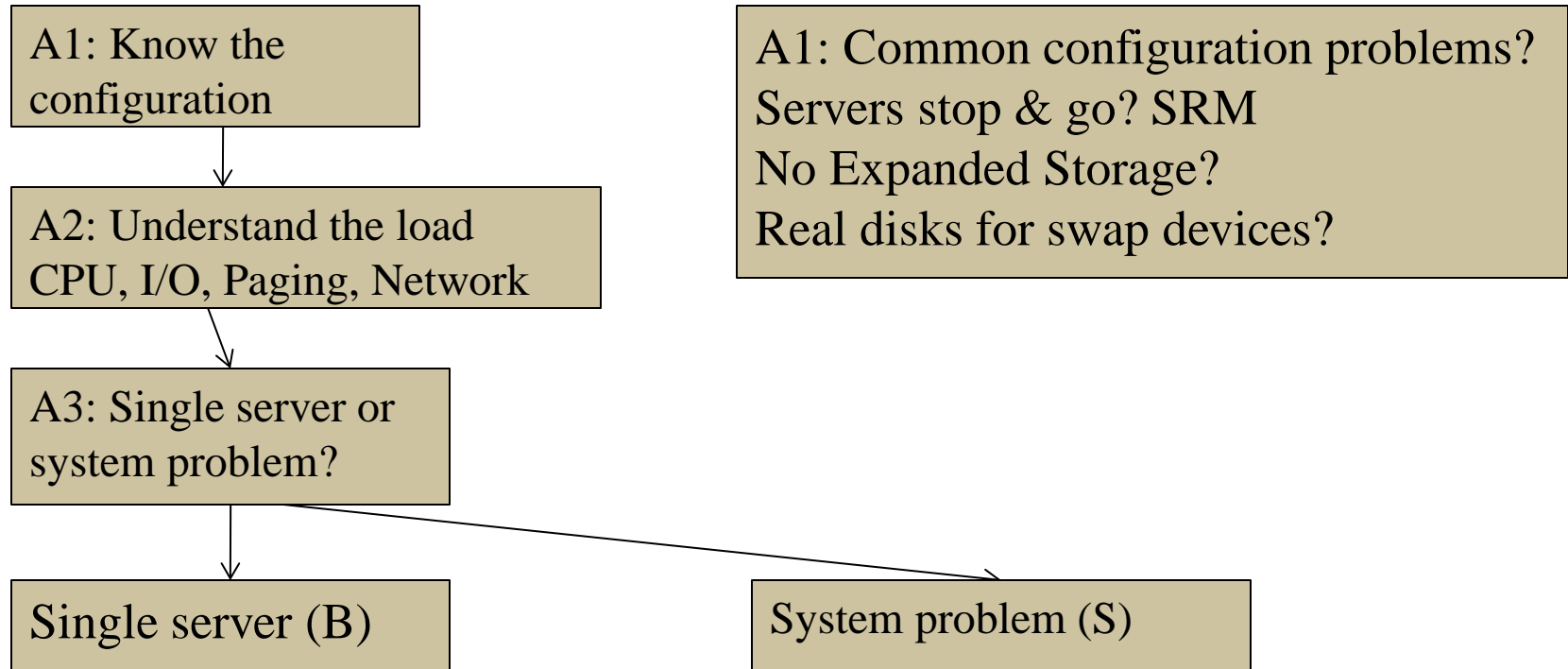
## Loads on the system subsystems

## Wait states for those impacted

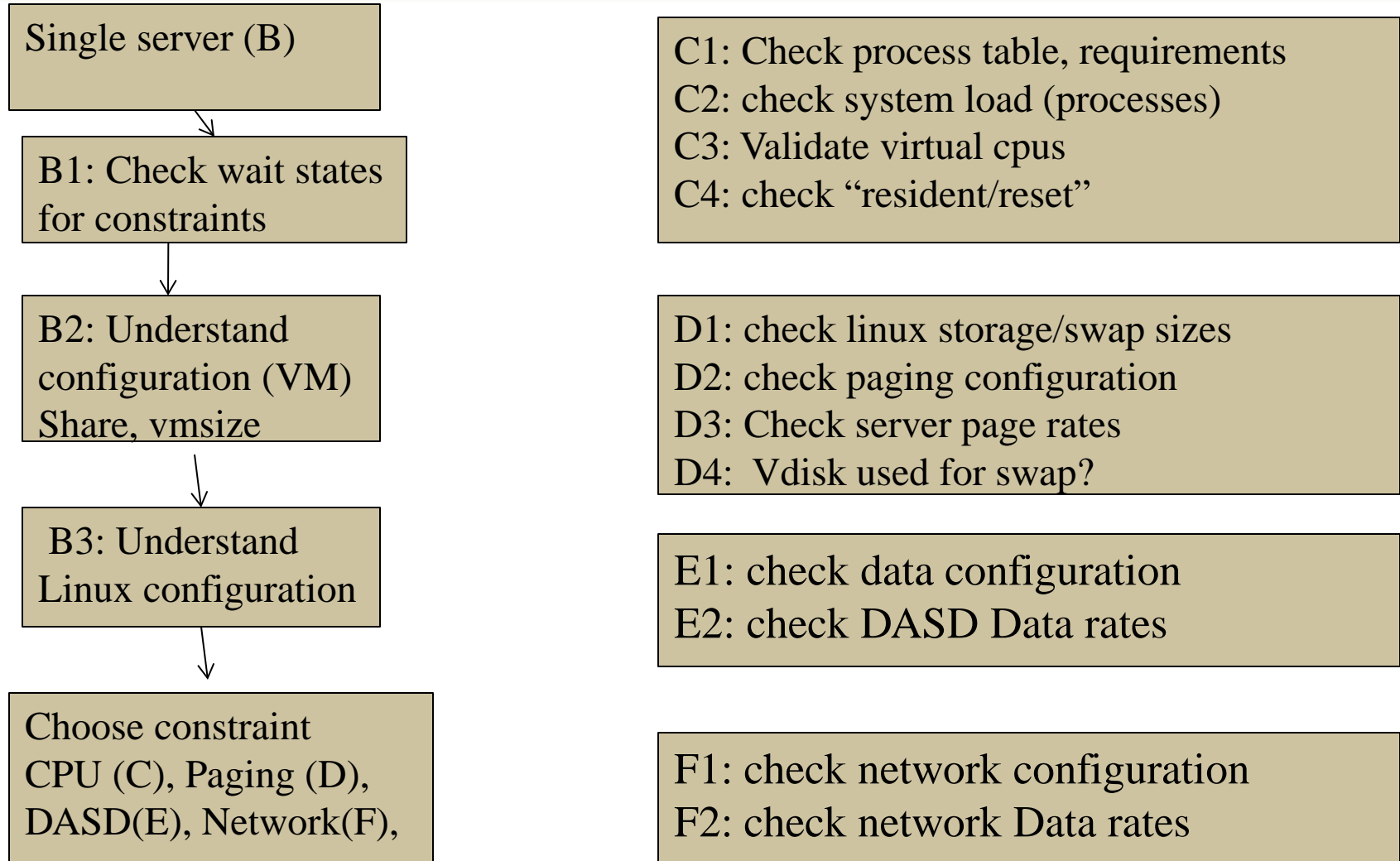
## Subsystem Analysis

- DASD, Storage, Paging, Processor, Network

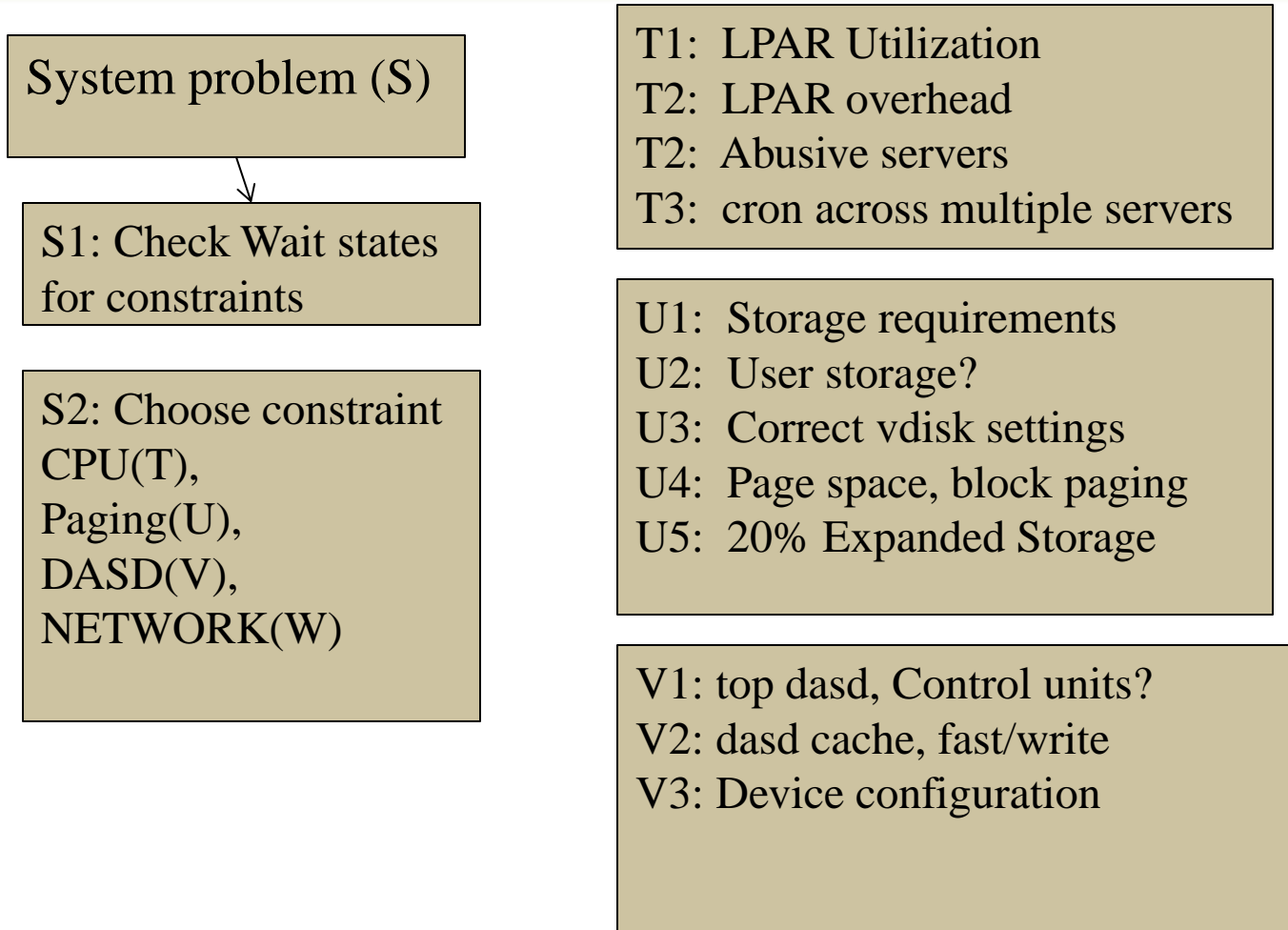
# The Analysis Flow Chart



# The Analysis Flow Chart



# The Analysis Flow Chart





# The Analysis Flow Chart

A1: Configuration: ESAHDR  
A2: System Load: ESASSUM / ESAMAIN  
B1: Check wait states: ESAXACT  
B2: Virtual machine config: ESAUSRC / ESAUSR1  
B3: Linux configuration: ESALNXS

C1: Process table: ESALNXC  
C2: Process Load: ESALNXP  
C3: Validate Virtual CPUs: ESAUSP2

D1: Linux Storage: ESAUCD2  
D2: Paging configuration: ESAPSDV  
D3: Server Paging Rate: ESAUSPG  
D4: VDISK for swap: ESAASPC

E1: Data configuration: ESAUSEK  
ESAQDIO

E2: DASD Rates: ESADSD2

F1: Network configuraiton: ESATCPI  
F2: Network data rates: ESATCP1/2/4  
F3: Vswitch users: ESANIC  
F4: Vswitch traffic: ESAVSW  
F5: OSA traffice: **ESAOSA**

# The Analysis Flow Chart

S1: Wait states: ESAXACT

T1: Lpar utilization (ESALPARS)

T2: LPAR overhead (ESALPAR)

T3: Abusive Server ESAUSP2 / ESAUSR2

T4: Cron across servers: ESALNXP

U1: Storage requirements: ESASTR1

U2 User Storage: ESAUSPG

U3 VDISK Storage : ESAVDSK / ESAASPC

U4: page configuration: ESAPSDV

U5: Page space: ESAPSDV/ESABLKP

U6: Expanded storage: ESAXSTO

V1: top dasd? Control units: ESADSD2

V2: dasd cache, fast/write: ESADSD5

V3: Device configuration: ESADSD1

# Know the configuration: ESAHDR

```
Report: ESAHDR          z/VM Monitor Analysis
Monitor period:        3600 seconds ( 1:00:00)
-----
z/VM Version:  5          Release 4.0 SLU 1002
TOD clock at termination          09:49:16
Abend code of last termination
TOD clock at last IPL:          12/26/10  09:49:40
System Operator:                OPERATOR
Time zone adjustment from GMT:   -7 hours

System Identifier                ZVM2
Checkpoint/Warmstart Volumes    V2RES1/V2RES1
Machine Model/Type              z10E:2097/710
System Sequence Code            00000000000D2655
Processor  0 model/serial       2097-710  /072655 Mast
Processor  1 model/serial       2097-710  /072655
Processor  2 model/serial       2097-710  /072655
Processor  3 model/serial       2097-710  /072655
Processor  4 model/serial       2097-710  /072655

ESAME (Memory Extension) Nucleus in use
Power of processor in terms of service Units: 32989
ESA/370 hardware installed
Operating on IFL Processor(s)
Channel Path Measurement Facility(CPMF) Extended is inst

Main Storage installed (MB):    70656
Main Storage Generated (MB):    70656
Expanded Storage installed (MB): 17152
Expanded Storage for CP (MB):   17152
Number of users in monitor file: 90
Number of DASD in monitor file: 530
Number of non-DASD in monitor file: 2
```

## Common configuration problems

- IFLs?
- Real Storage / Expanded
- Release significant
- Master processor significant

# Know the overall loads: ESASSUM / ESAMAIN

Report: ESASSUM                      Subsystem Activity                      Velocity  
Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655                      First

```
-----  
      <---Users---> Transactions <Processor> Storage (MB) <-Paging-->  
      <-avg number->   Per   Avg. Utilization Fixed Active <pages/sec>  
Time      On Actv In Q Minute   Resp Total Virt.  User Resid. XStore DASD  
-----  
10:15:00   89   63 61.3  145.1 0.613   262   254  14.4  68662   862  289  
10:30:00   89   63 61.3  140.3 0.545   270   261  14.4  68726   886  133  
10:45:00   89   63 63.3  134.1 0.563   262   253  14.0  68806  1123  281  
11:00:00   89   64 67.4  137.8 0.477   275  259  13.5  68156  2218  665  
*****Summary*****  
Average:   89   63 63.3  139.3 0.550   267   257  14.1  68587  1272  342
```

Look for Spikes, dramatic changes, what time?

- Processor
- Storage for users
- Page rates
- DASD I/O rates
- (Transactions are for traditional workloads)

## Wait states provide options for improvement

- Sample user status once per second, once per minute
- (900 samples per vcpu per 15 minute period)

## Wait state (queue) analysis -> where to focus

- Running / CPU Wait -> CPU Subsystem
- Simulation wait (master processor) -> CPU Subsystem
- Page wait -> Paging/Storage subsystems
- Asynchronous i/o, page -> DASD subsystem
- Loading – special state, loading in working set (LDUBUF)

## Normal idle wait states

- TCPIP, Linux: test idle
- Traditional servers: SVM (service machine wait)
- Traditional users: idle (not in queue)

# Wait States: ESAXACT

Report: ESAXACT Transaction Delay Analysis Veloc  
 Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655 First

```

-----
<-----Percent non-dormant (Wait states)-----
UserID  <-Samples->
/Class  Total  In Q  Run  Sim  CPU  SIO  Pag  SVM  D-  T-  Tst <Asynch>
-----  -----  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---
04/15/11
11:00:00  1335  1011  4.0  0.2  0.6   0  0.5   0   0  0.1   0  91  0.1   .   .
Hi-Freq:  116K 59208 4.2  0.0  1.9  0.0  0.3   0  7.9  0.1  0.0  89  0.4  0.1  0.2
***Key User Analysis ***
RSCS      893    1    0    0    0    0    0    0    0    0    0    0    0    0    0
RSCSDNS   893    8    0    0    0    0    0    0    0   99 100    0    0    0    0
TCPIP     893   285  0.4   0    2.5   0    0    0    0    0    0    97    0    0    0
***User Class Analysis***
*Servers 12502   822  0.7  0.1  1.0  0.2   0    0   17  4.5   0   93    0    0    0
*System  1786   1437  0.1  0.1  1.1   0  0.2   0    0    0    0   92  0.1    0  0.7
*ITM     1786   911  1.5  0.1  2.2   0  0.5   0    0    0    0   78  0.4  0.1  0.2
*SOA     35720 31695 7.0  0.0  2.2   0  0.3   0    0    0  0.1  88  0.6  0.0  0.1
*ITM     36613 23570 1.1  0.0  1.7   0  0.3   0    0    0    0   91  0.1  0.2  0.4
*TheUsrs 24111   480  0.2  0.8  1.3   0  0.6   0   26  5.2   0   91  0.2    0  0.2
***Top User Analysis***
LN XUWA01  893   893   71    0  2.8   0  0.1   0    0    0    0   24  1.7  0.4    0
LN XUWA03 1786  1786   28  0.2  5.5   0  1.2   0    0    0  0.6   57  7.2  0.1  0.1
LN XUWA02 1786  1786   27  0.1  3.6   0  0.1   0    0    0  0.4   69  0.1    0  0.1
LN XQWA01 1786  1786  4.0    0  2.2   0    0   0    0    0    0   94  0.1    0    0
LN XDWA02 1786  1786  6.0    0  2.2   0  0.2   0    0    0    0   91  0.1    0    0
LN XDWA04 1786  1786  4.1    0  2.9   0    0   0    0    0    0   93    0    0  0.1
V2TPSP02  179   179   35    0  6.1   0    0   0    0    0    0   59    0    0    0
LN XDWA03 1192  1192  2.0    0  1.8   0    0   0    0    0    0   95  0.6  0.1    0
LN XTWA04 2864  2818  1.6    0  1.6   0    0   0    0    0    0   97    0    0    0
LN XUWA15 1190  1165  2.1  0.1  1.4   0    0   0    0    0    0   96    0    0    0
  
```

# Eligible list? ESAUSRQ

Report: ESAUSRQ s TEST MAP ZMAP 4.2.3 1  
Monitor initiali7 serial 42556 First record analyzed: 01/10/14 13:00:00

```
-----  
          <----- <-----Average Number of Users in Queue-----  
UserID   Logged <-----Dispatch List-----> Limit <-----Eligible List--  
/Class   on      Q0      Q1      Q2      Q3      Ldng List      E0      E1      E2      E3  
-----  
13:15:00 48.0    0.9    0.3    0.3    18.1    0.7    0      .      0      0      0  
Hi-Freq: 48.0    0.8    0.4    0.2    17.9    0.4    0      0      0      0      0  
***Key User Analysis  
TCPIP    1.0    0.6    0      0      0      0      0      0      0      0      0  
TCPIP1   1.0    0.0    0      0      0      0      0      0      0      0      0  
***User Class Analysis  
Servers  9.0    0      0.1    0.1    0.0    0.0    0      0      0      0      0  
Velocity 9.0    0.1    0.1    0.0    0.0    0.0    0      0      0      0      0  
CATech   2.0    0      0.0    0      0      0      0      0      0      0      0  
*TheUsrs 22.0   0.0    0.1    0.0    17.9    0.4    0      0      0      0      0  
***Top User Analysis  
LNXEDM02 1.0    0      0      0      2.0    0      0      0      0      0      0  
LNXCOG1  1.0    0      0.0    0.0    7.9    0.1    0      0      0      0      0  
LNXEDM04 1.0    0      0.0    0.0    2.0    0.1    0      0      0      0      0  
LNXEDM01 1.0    0      0.0    0.0    2.0    0.0    0      0      0      0      0  
VMALERT  1.0    0.0    0      0      0      0      0      0      0      0      0  
LNXEDM03 1.0    0      0.0    0.0    2.0    0.0    0      0      0      0      0  
ZWRITE   1.0    0.1    0      0      0      0      0      0      0      0      0  
ZTCP     1.0    0.0    0.1    0.0    0.0    0      0      0      0      0      0
```

Look for “Non zero eligible”

- SRM Settings?
- Check STORBUF
- Loading is percent of paging devices busy

# Special Condition, server “stops”: ESAUSR4

Report: ESAUSR4 User Resource Utilization  
Monitor initialized: 04/15/11 at 10:00:00 on

```
-----  
UserID      Resid Frame Address Expanded Storage  
/Class     At List Spaces <-----pages----->  
           Reset Reord Avg Max  Read Write Migr  
-----  
04/15/11  
11:00:00  37M      86 975  65  823K 1120K 321K  
***User Class Analysis***  
*Servers    853      3  0  0 37047 37565  629  
*System    26044     1  0  0  3016 10025  72K  
*ITM       4757     1  0  0 67004 71769   0  
*SOA       35M     54  0  0  289K  306K 154K  
*ITM      2081K    25  0  0  307K  574K  94K  
*TheUsrs     0      1 975 65 99800  100K   48  
***Top User Analysis***  
LN XUWA01  15M   13  0  0  5390 10999   0  
LN XUWA03  11M   10  0  0  221K 21875   0  
LN XUWA02 3619K    8  0  0 22943 36427   0  
LN XQWA01 1620K    2  0  0 14094 35529   0  
LN XDWA02  633K    2  0  0   451 16314   0  
LN XDWA04  727K    2  0  0  1189 13708  63K  
LN XUWA15  164K    1  0  0   553 10556   0
```

**Prior to 6.3....**

Look for “resident at reset”

- CP Sorts pages, server stops for duration
- Option to disable reorder (sort) function



# User Configuration: ESAUSRC

Report: ESAUSRC      User Configuration      Velocity Software Corporate      ESAMAP 4  
 Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      First record analyzed: 04/15/11 10:00:  
 Monitor period:      3600 seconds ( 1:00:00)      Last record:      04/15/11 11:00

UserID	ClassID	Account Code	ACI Grp Name	CPU Type	<-----SHARE----->				CPU Cnt	<Modes>		<Status> <-MDC>				<-Storage->		
					<Normal> Rel	Abs	<--MAX--> Typ	Shre		-it	VM	STG	SVM	QDSP	FS	INS	<-VM Size-> Dflt	Max
LNXDMS2A	*ITM	27482	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	2.0G	2.0G
LNXDPA02	*System	75113	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	512M	512M
LNXDWA01	*SOA	03817	.	IFL	400	.	.	.	.	2	ESA	V=V	N	N	N	N	6.0G	6.0G
LNXDWA02	*SOA	03817	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	4.0G	4.0G
LNXDWA03	*SOA	03817	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	2.0G	2.0G
LNXDWA04	*SOA	03817	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	7.0G	7.0G
LNXDWA11	*SOA	03817	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	8.0G	8.0G
LNXQWA01	*SOA	03817	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	7.0G	7.0G
LNXQWA02	*SOA	03817	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	2.0G	2.0G
LNXQWA03	*SOA	03817	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	2.0G	2.0G
LNXQWA04	*SOA	03817	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	2.0G	2.0G
LNXTWA04	*SOA	03817	.	IFL	400	.	.	.	.	4	ESA	V=V	N	N	N	N	5.0G	5.0G
LN XUWA01	*SOA	03817	.	IFL	100	.	.	.	.	1	ESA	V=V	N	N	N	N	12G	12G

## Look for “Interesting configurations”

- Large relative shares / absolute shares
- CPU Counts, matching shares (100 Rel / vcpu)
- CPU Type (IFL, CP)
- Virtual machine storage sizes (too large?, largest?)

## Top down:

- CEC / LPAR
- LPAR / z/VM
- Virtual machine
- Linux process

**CPU Capture ratio 100% down to process**

# LPAR Configuration: ESALPARS

Report: ESALPARS      Logical Partition Summary      Velocity Software Corporate  
 Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      First record analyzed: 04/1

Time	<--Complex-->		<-----Logical Partition-->				<-Assigned Shares-->				Proce			
	Phys CPUs	Dispatch Slice	Name	Nbr CPUs	Virt %Assigned	Total	Ovhd	<---LPAR--> Weight	<VCPU Pct> Pct	/SYS	/CPU	Cap-ped	Wait Comp	Type
04/15/11														
10:15:00	18	Dynamic	Totals:	0	34	968.7	4.9	1080	88.9					
			<b>SYS4N3</b>	<b>7</b>	<b>5</b>	<b>263.5</b>	<b>1.2</b>	80	6.6	1.32	23.7	<b>No</b>	<b>No</b>	<b>IFL</b>
			SYS4P1	3	3	22.9	0.4	60	4.9	1.65	29.6	No	No	CP
			SYS4N1	1	8	323.3	1.6	590	48.6	6.07	<b>109</b>	No	No	CP
			SYS4N2	2	2	17.1	0.4	60	4.9	2.47	44.4	No	No	CP
			SYS4D1	4	7	98.3	0.8	160	13.2	1.88	33.9	No	No	CP
			SYS4D2	5	5	35.9	0.4	100	8.2	1.65	29.6	No	No	CP
			SYS4D3	6	2	9.0	0.2	30	2.5	1.23	22.2	No	No	CP
			SYS4D4	8	1	100.0	0.0	Ded	5.6	5.56	100	No	Yes	ICF
			SYS4D5	9	1	98.6	0.0	Ded	5.6	5.56	100	No	Yes	ICF

## Look for “Shared processors”

- IFLs shared between LPARs (none)
- Check weights
- Assigned pct/CPU > 100 ??? -> excess share?
- First LPAR is “us”, z/vm where data collected

# Already Know the overall loads: ESASSUM / ESAMAIN

```

Report: ESASSUM          Subsystem Activity          Velocity
Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      First
-----
      <---Users---> Transactions <Processor> Storage (MB) <-Paging-->
      <-avg number->      Per      Avg. Utilization Fixed Active <pages/sec>
Time      On Actv In Q Minute  Resp Total Virt.  User Resid. XStore DASD
-----
10:15:00  89    63 61.3  145.1 0.613   262   254  14.4  68662   862  289
10:30:00  89    63 61.3  140.3 0.545   270   261  14.4  68726   886  133
10:45:00  89    63 63.3  134.1 0.563   262   253  14.0  68806  1123  281
11:00:00  89    64 67.4  137.8 0.477   275 259 13.5 68156 2218 665
*****Summary*****
Average:   89    63 63.3  139.3 0.550   267   257  14.1  68587  1272  342
    
```

Look for Spikes, dramatic changes, what time?

- Processor (Also, ESACPUU, ESACPUA)

# LPAR Configuration - 2: ESALPARS

```

Report: ESALPARS      Logical Partition Summary      Velocity Softw
-----
      <--Complex--> <-----Logical Partition-----> <-Assigned Shares----
      Phys Dispatch      Virt CPU <%Assigned> <---LPAR--> <VCPU Pct
Time   CPUs      Slice Name      Nbr CPUs Type Total  Ovhd  Weight Pct /SYS /CPU
-----
11:20:00  17  Dynamic Totals:      0    2  CP   21.7  0.1    167  100
      Totals:      0   18 IFL  173.0  5.4    100  100
      VT4          44    7 IFL  112.4  3.2     60  60.0  8.57  94.3
      CFED2        15    1 ICF  100.0  0.0    Ded  5.9    0    0
      CFEH2        13    1 ICF   12.5  0.0     90  9.0  9.00  9.00
      CFEN2        14    1 ICF  100.0  0.0    Ded  5.9    0    0
      CFEA2        31    1 ICF   74.7  0.0    820  82.0  82.0  82.0
      CFEI2        30    1 ICF   12.5  0.0     90  9.0  9.00  9.00
      ITKP         21    1  CP    0.8  0.0     50  29.9  29.9  29.9
      VTT          47    2 IFL    3.0  0.4     2   2.0  1.00  11.0
      VT3          43    2 IFL    2.9  0.3     8   8.0  4.00  44.0
      VT8          45    7 IFL   54.7  1.6     30  30.0  4.29  47.1
      DRITE4       29    1  CP    0    0     50  29.9  29.9  29.9
      DRITE1       28    2  CP   20.9  0.0     50  29.9  15.0  15.0
      DRITNB       27    0
      IKNDC2       26    0
  
```

## Look for “Shared processors”

- IFLs shared between LPARs (4 LPARs)
- Check weights
- Assigned pct/CPU > 100 ??? -> excess share?

# LPAR Overhead - 2: ESALPARS

Report: ESALPARS      Logical Partition Summary

Totals by Processor type:

```
<-----CPU-----> <-Shared Processor busy->
Type Count Ded shared Total Logical Ovhd Mgmt
-----
CP      1   0    1   21.8    21.7  0.1  0.1
IFL    11   0   11  180.1   167.6  5.4  7.1
ICF     3   2    1  100.0    99.6  0.0  0.3
ZIIP    2   0    2    0.0     0.0  0.0  0.0
```

Look for processor type busy

- IFLs shared between LPARs (4 LPARs)
- TOTAL IFL Busy: 167% out of 1100
- Check overheads – high overhead result of too many vcpu
  - Logical overhead part of LPAR assigned
  - Physical overhead is CEC Management

# LPAR Overhead - 3: ESALPAR

Report: ESALPAR Logical Partiti  
 Monitor initialized: 04/15/11 at 10:  
 -----

Physical CPU Management time

CPU	Percent	Type
0	3.838	CP
1	4.412	CP
2	3.134	CP
3	2.222	CP
4	4.429	CP
5	3.924	CP
11	0.132	ZAP
13	0.068	ZAP
14	0.311	ZAP
15	1.070	ZIIP
17	1.391	ZIIP
18	0.945	ZIIP
19	1.298	IFL
24	0.121	ZAP
30	3.111	CP
33	0.408	ZAP
37	0.293	ZAP
40	1.903	IFL
41	1.786	IFL
42	1.687	IFL
43	1.161	IFL
44	1.176	IFL
45	1.158	IFL
46	1.178	IFL

Look for processor overhead

- CPs shared between LPARs (13 LPARs)
- TOTAL IFL Busy: 167% out of 1100
- Check overheads – high overhead result of too many vcpu
  - Total CP Utilization  $835 / 900 = 93\%$

ESALPARS

Totals by Processor type:

Type	Count	Ded	shared	Total	Logical	Ovhd	Mgmt
CP	9	0	9	835.8	779.4	12.5	31.4
ZAP	9	2	7	214.8	208.9	1.5	2.9
IFL	31	0	31	1778.5	1669.4	28.4	52.2
ICF	3	0	3	300.2	292.4	0.2	7.3
ZIIP	6	0	6	328.8	311.5	4.2	9.0

# Consumers within LPAR: ESAUSP2

Report: ESAUSP2                      User Resource Rate Report                      Velocity Software C

```

-----
      <---CPU time---> <----Main Storage (pages)-----> <-----Paging (pages)----->
UserID <(Percent)> T:V <Resident> Lock <-----WSS-----> <---Allocated---> <Pgs/Secnd>
/Class  Total  Virt  Rat  Totl Activ  -ed Totl Activ  Avg Total ExStg  Disk  Read Write
-----
11:00:00 262.6 259.3 1.0  17M   17M   234   19M   19M 213K   13M 4346K 8891K 166.3 391.8
***Key User Analysis ***
TCPIP    0.12  0.05  2.4 1286  1286   79   316   316  316   5005   736  4269   0.0   0.0
***User Class Analysis***
*Servers  0.40  0.36  1.1  957   951    3 1704  1067   76 16285  2162 14123   0.1   0.5
*SOA     239.2 236.7 1.0  15M   15M   39  17M   17M 843K 5138K 2431K 2707K  79.1 184.0
*ITM     22.47 21.83 1.0    2M 1971K    7   2M 2117K  96K 7686K 1761K 5925K  74.7 126.4
*TheUsrs  0.21  0.18  1.2 2869  2862   17 4372  3688  135  185K 82382  102K   2.5   2.1
***Top User Analysis***
LN XUWA01 67.65 67.32 1.0    3M 2889K    1   3M 3146K    3M  324K 65398  259K  15.3  0.1
LN XUWA03 54.43 53.29 1.0    4M 3848K    1   4M 3855K    4M 72353 63975  8378   7.5  0.3
LN XUWA02 50.18 49.92 1.0  685K  685K    0  855K  855K  855K  381K  296K 84613   2.2  2.7
LN XQWA01 12.23 12.11 1.0    1M 1246K    7   1M 1334K    1M  592K  541K 51075   3.1  3.0
LN XDWA02 11.73 11.64 1.0  713K  713K    6  844K  844K  844K  205K 56215  148K   2.0  0.7
LN XDWA04 10.18 10.10 1.0    1M 1152K    1   1M 1248K    1M  689K  593K 96720   1.0 70.8
  
```

Look for consumers, in percent of cpu

- By class (SOA)
- Abusive servers (LN XUWA\*)?
- Correct per expected? Not a performance question



# Linux Process Load: ESALNXP

Report: ESALNXP      LINUX HOST Process Statistics Report      Velocity Software Corporate      ESAMAP 4.1.1 0

node/ Name	<-Process Ident->			Nice Valu	<-----CPU Percents----->					<-----CPU Seconds----->					<Stg (k)>		<-Faults/Second->			
	ID	PPID	GRP		Tot	sys	user	syst	usr	Total	sys	user	syst	usr	Size	RSS	min	maj	mint	majt
LNXQWA01	0	0	0	0	11.9	1.72	7.91	1.42	0.88	107.4	15.5	71.2	12.8	7.88	11M	6M	21	0	7530	0
java	1235	1	1235	0	1.11	0.19	0.92	0	0	10.0	1.68	8.32	0	0	894K	470K	0	0	0	0
java	7124	1	7124	0	0.86	0.15	0.71	0	0	7.7	1.37	6.36	0	0	720K	415K	0	0	0	0
kcawd	8853	1	4390	0	2.24	0.01	0.02	1.38	0.83	20.1	0.10	0.14	12.4	7.49	38K	5428	2	0	7392	0
java	10522	1	10522	0	1.08	0.17	0.91	0	0	9.8	1.57	8.19	0	0	758K	437K	0	0	0	0
java	15498	1	15498	0	1.09	0.19	0.90	0	0	9.8	1.72	8.07	0	0	763K	523K	0	0	0	0
<b>LNXUWA01</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>67.0</b>	<b>5.98</b>	<b>59.0</b>	<b>1.20</b>	<b>0.81</b>	<b>601.9</b>	<b>53.8</b>	<b>531</b>	<b>10.8</b>	<b>7.29</b>	<b>13M</b>	<b>9M</b>	<b>88</b>	<b>0</b>	<b>7566</b>	<b>0</b>
java	4444	1	4444	0	1.10	0.07	1.03	0	0	9.9	0.65	9.25	0	0	1M	801K	0	0	0	0
kd4agent	5576	1	4362	0	4.71	1.68	3.03	0	0	42.4	15.1	27.3	0	0	99K	64K	0	0	0	0
kynagent	9569	1	4362	0	2.48	0.07	2.41	0	0	22.3	0.63	21.7	0	0	314K	212K	5	0	0	0
kcawd	9634	1	4362	0	1.92	0.01	0.01	1.14	0.75	16.4	0.06	0.13	10.3	6.78	37K	6936	1	0	7200	0
java	10547	1	10547	0	0.82	0.07	0.75	0	0	7.4	0.64	6.74	0	0	870K	743K	1	0	0	0
java	11751	4877	4877	0	0.57	0.07	0.50	0	0	5.2	0.67	4.49	0	0	617K	98K	6	0	0	0
java	11837	1	11837	0	3.28	0.12	3.16	0	0	29.5	1.10	28.4	0	0	3M	1M	1	0	0	0
<b>java</b>	<b>21374</b>	<b>15199</b>	<b>21374</b>	<b>0</b>	<b>46.3</b>	<b>3.07</b>	<b>43.2</b>	<b>0</b>	<b>0</b>	<b>416.9</b>	<b>27.6</b>	<b>389</b>	<b>0</b>	<b>0</b>	<b>3M</b>	<b>3M</b>	<b>34</b>	<b>0</b>	<b>0</b>	<b>0</b>
java	24567	1	24567	0	2.27	0.18	2.09	0	0	20.4	1.59	18.8	0	0	1M	831K	0	0	0	0
java	28060	1	28060	0	1.23	0.09	1.14	0	0	11.1	0.82	10.3	0	0	1M	821K	0	0	0	0
java	32428	1	32428	0	1.17	0.10	1.07	0	0	10.5	0.87	9.7	0	0	810K	538K	5	0	0	0

Look for processes within Linux, in percent of cpu

- By relevant server (LNXUWA01)
- Correct? Relevant? Cron?

## Top down:

- z/VM
- Virtual machines
- VDISK / MDC / Address Space
- Linux server
- Linux process

**CPU Capture ratio 100% down to server**

# Storage Utilization: ESASTR1

Report: ESASTR1      Main Storage Analysis      Velocity Software Corporate      ESAMAP 4.1.1 01/21/  
Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      First record analyzed: 04/15/11 10:00:00

Time	Users <-----				Pages----->										
	Loggd On	System Storage	Fixed Store	Non-Pgble	Free Stor	Frame Table	<Available> <2gb >2gb	System ExSpc	User Resdnt	NSS/DCSS Resident	<-AddSpace> System User	VDISK Rsdnt	<MDC> Rsdnt	Diag 98	
10:15:00	89	18088K	2252	3691	700	141K	79 1032	4710	17577K	4771	226K	0 26852	<b>81157</b>	1126	
10:30:00	89	18088K	2252	3683	700	141K	89 1193	4686	17594K	4769	226K	0 30182	61307	1126	
10:45:00	89	18088K	2252	3583	700	141K	78 1050	4681	17614K	4769	225K	0 46189	25812	1126	
11:00:00	89	18088K	2252	3455	700	141K	82 1062	4688	17448K	4775	223K	0 <b>237K</b>	1418	1126	

## Total storage analysis (in pages)

- MDC? 300mb? SET MDC MAX/MIN
- VDISK Spike (1gb) ? Which server?
- User resident should be large percent

# Storage Utilization (by megabyte): ESASTR1

Report: ESASTR1      Main Storage Analysis      Velocity Software Corporate      ZMAP 4.2.3  
 Monitor initialized: 01/24/14 at 00:00:00 on 2827 serial 55AB7      First record analyzed: 01/24/14 00:00:00

```

-----
Users <-----MegaBytes----->
Loggd System Fixed Non- Free Frame <Available> Systm User NSS/DCSS <-AddSpace> VDISK <MDC>
Time On Storage Store Pgble Stor Table <2gb >2gb ExSpc Resdnt Resident System User Rsdnt Rsdnt
-----
00:05:00 114 10240 11 55 1 80 1993 2656 22 4474 97 93 0 362 241
00:10:00 115 10240 11 55 1 80 1993 2649 22 4484 97 96 0 362 242
00:15:00 114 10240 11 56 1 80 1992 2644 22 4480 103 97 0 362 243
00:20:00 113 10240 11 56 1 80 1992 2658 22 4474 98 97 0 362 242
  
```

## Total storage analysis (“megabyte” option)

- uspg\_byMB = '1'b (Impacts ESASTR1, ESAUSPG)
- MDC? 240mb? SET MDC MAX/MIN
- VDISK normal?
- User resident should be large percent
- System “oversized”

# Virtual Machine Storage : ESAUSPG

Report: ESAUSPG      User Storage Analysis      Velocity Software Corporate  
 Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      First record analyzed: 04/1

UserID /Class	<---Storage occupancy in pages--->				<--Main Storage page Read/Write-->				Pages		<Address	
	<---Main Storage--->		<---Paging--->		<-Page Writes to:-->		<Page Reads:>		Moved	<pages R		
	Total	>2gb	<2GB	Xstor	DASD	Xsto	Disk	Migr	Xstor	Disk	<2GB	VirtDisk
11:00:00	17448K	16943K	504640	4346K	8891K	1120K	352582	320630	822546	149628	0	<b>237286</b>
***Top User Analysis***												
LN XUWA01	2889K	2798K	90725	65398	258675	10999	112	0	5390	13806	0	0
LN XUWA03	<b>3848K</b>	3762K	85186	63975	8378	21875	277	0	221201	6714	0	<b>223173</b>
LN XUWA02	685385	648345	37040	296256	84613	36427	2443	0	22943	1983	0	0
LN XQWA01	1246K	1218K	28190	541178	51075	35529	2727	0	14094	2787	0	1428
LN XDWA02	713091	672702	40388	56215	148406	16314	649	0	451	1828	0	0
LN XDWA04	1152K	1120K	31859	592756	96720	13708	63725	63261	1189	942	0	0
LN XDWA03	330601	324021	6581	4194	39207	3926	5601	5345	120	734	0	8
LN XTWA04	883228	860363	22865	90734	129722	7768	31	0	182	66	0	1889
LN XUWA15	693689	664995	28694	53516	137150	10556	1382	0	553	457	0	0

Total storage analysis (in pages, new “megabyte” option)

- Largest consumer(s) resident storage
- Largest consumer - which virtual disk?
- VDISK Spike (1gb) ? Which server?

# VDISK for Swap: ESA VDSK

Report: ESAVDSK

VDISK Analysis Report

Velocity Software Corporate

Owner	Space Name	-----<--Size-->	<AddSpce>	Priv	VIO	<--pages-->						
		AddSpc VDSK Cre- Del- or	Pages Blks ates etes Shrd	rate	User Resi- Lock- Sto- DASD	Links dent ed len Read						
-----<--Size-->												
10:45:00												
LNxQWA01	VDISK\$LNxQWA01\$0206\$0530	64256	512K	0	0	Shrd	0.00	1	122	0	0.7	0.0
LNxQWA01	VDISK\$LNxQWA01\$0207\$0531	64256	512K	0	0	Shrd	0.04	1	2565	0	3.5	0.2
LNXTWA04	VDISK\$LNXTWA04\$0206\$051C	131K	1049K	0	0	Shrd	1.28	1	11K	0	0	0.0
LNxUWA03	VDISK\$LNxUWA03\$0206\$051E	250K	2002K	0	0	Shrd	0.65	1	14K	0	1.6	6.7
LNxUWA03	VDISK\$LNxUWA03\$0207\$051F	375K	3002K	0	0	Shrd	0.29	1	4980	0	0.4	0.7
LNxUWA03	VDISK\$LNxUWA03\$0208\$0520	513K	4102K	0	0	Shrd	0.28	1	4751	0	0.4	0.4
-----<--Size-->												
System Totals:		7805K	125M	0	0	.	5.09	204	46K	0	7.3	8.1
-----<--Size-->												
11:00:00												
LNxQWA01	VDISK\$LNxQWA01\$0206\$0530	64256	512K	0	0	Shrd	0	1	46.9	0	0.1	0
LNxQWA01	VDISK\$LNxQWA01\$0207\$0531	64256	512K	0	0	Shrd	0	1	1381	0	0.3	0
LNXTWA04	VDISK\$LNXTWA04\$0206\$051C	131K	1049K	0	0	Shrd	0	1	3984	0	11.7	0
LNxUWA03	VDISK\$LNxUWA03\$0206\$051E	250K	2002K	0	0	Shrd	10.1	1	46K	0	12.9	58.4
LNxUWA03	VDISK\$LNxUWA03\$0207\$051F	375K	3002K	0	0	Shrd	16.2	1	88K	0	6.1	19.7
LNxUWA03	VDISK\$LNxUWA03\$0208\$0520	513K	4102K	0	0	Shrd	16.1	1	88K	0	5.8	20.2
-----<--Size-->												
System Totals:		7805K	125M	0	0	.	84.6	204	237K	0	37.2	98.3

## Virtual Disk Analysis

- Which virtual disk spiked?
- Are there multiple vdisks, and PRIORITIZED!!!

# z/VM 6.3 Invalid but Resident Storage Analysis

Report: ESAUSTR User Storage Analysis  
 Monitor initialized: 07/07/15 at 13:03:48 on 2964 serial 5C2A7 Fi

UserID /Class	<-----Virtual Server Storage (Pages)----->				<Resident> Page		<AgeList>		<Unreferd>		
	Size	Alloc	Resi- dent	UFO Activ	TOT	<2gb	>2gb	<2gb	>2gb	<2gb	>2gb
13:08:00	109M	93.1M	93M	93.0M	4405	1368	3037	316	123K	0	0
***User Class Analysis***											
Servers	186K	33583	33583	8730	568	107	461	54.0	24K	0	0
ZVPS	420K	27906	27906	27906	0	0	0	0	0	0	0
TheUsers	108M	93.0M	93M	92.9M	3530	1135	2395	241	95K	0	0
***Top User Analysis***											
LINXA195	1311K	1310K	1310K	1309K	3.0	3.0	0	3.0	1066	0	0
LINXA203	1311K	1310K	1310K	1309K	2.0	2.0	0	3.0	1072	0	0
LINXA204	1311K	1310K	1310K	1309K	3.0	1.0	2.0	3.0	1072	0	0
LINXA198	1311K	1310K	1310K	1309K	4.0	4.0	0	3.0	1072	0	0
LINXA199	1311K	1310K	1310K	1309K	4.0	4.0	0	3.0	1072	0	0
LINXA197	1311K	1310K	1310K	1309K	49.0	49.0	0	3.0	1069	0	0
LINXA155	1573K	1572K	1572K	1571K	23.0	12.0	11.0	3.0	1076	0	0
LINXA146	1573K	1572K	1572K	1571K	6.0	5.0	1.0	3.0	1073	0	0
LINXA148	1573K	1572K	1572K	1571K	17.0	3.0	14.0	3.0	1094	0	0
LINXA150	1573K	1572K	1572K	1571K	158	128	30.0	3.0	1075	0	0

## Invalid but Resident (IBR)

- Are correct servers losing pages? (Yes)

# Linux Storage - 2: ESAUCD2

Report: ESAUCD2                      LINUX UCD Memory Analysis Report                      Velocity Softwar

---

```

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
-----
*** Nodes *****
LINUXVM2      495.2    7.2 488.1   63.5   63.5    0.0   15.6   70.7         0    63.9 283.2 141.0
LNXDPOB02    493.0   52.5 440.5     0     0     0    15.6   52.5         0    89.6 278.8  72.1
V2TPSP01    1992.8   28.7 1964 269.5   84.9 184.6   16.4 113.6         0   218.3 669.7 1076
V2TPSP06    1895.4  757.1 1138 256.3 256.3     0    15.6  1013         0   126.9 901.2 110.2
V2TPSP04    1895.5  756.9 1139 256.3 256.3     0    15.6  1013         0   127.0 901.1 110.4
V2TPSP05    1895.5  756.8 1139 256.3 256.3     0    15.6  1013         0   126.6 901.3 110.8
V2TPSP03    1895.4  723.4 1172 256.3 201.8   54.5   15.6  925.2         0   109.0 655.7 407.2
V2TMSP04    1501.1    8.3 1493 256.3 256.3     0.0   15.6  264.7         0    82.0 599.3 811.5
V2TMSP05    1501.1 121.7 1379 256.3 256.3     0.0   15.6  378.0         0    84.0 269.2  1026
V2TMSP02    1501.1  65.3 1436 256.3 256.3     0.0   15.6  321.6         0   105.9 599.5 730.3
V2TMSP03    1501.1  64.2 1437 256.3 256.3     0.0   15.6  320.5         0    80.4 270.3  1086

```

## Linux Storage Map

- Opportunities?
  - High available (greater than 5%)
  - High buffer (greater than 20mb)
- Issues? Swap
- If swap used, but also large buffer, CMM?



## Top down:

- z/VM
- Configuration
- Rates
- Space full
- Device busy

## Paging rules change in 6.3

# Paging Subsystem: ESAPSDV

```

Report: ESAPSDV      Page And Spool Device Activity      Velo
Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      Firs
-----
          <-----Paging-----> <-----Spooli
Dev      <-----Slots-----> <-per sec-> <-----Slots-----
No. Serial Avail Used %Use Max Read Write Avail Used %Use
-----
04/15/11
11:00:00
E92F V2PAG1 1803K 1121K 62 1129K 25.2 35.1 . . .
E93F V2PAG2 1803K 1114K 62 1122K 24.1 35.2 . . .
E930 V2PAG3 1803K 1117K 62 1123K 22.5 31.2 . . .
E940 V2PAG4 1803K 1081K 60 1089K 21.0 35.8 . . .
E933 V2PAG5 1803K 904950 50 913775 23.2 37.2 . . .
E934 V2PAG6 1803K 894360 50 903958 23.7 39.4 . . .
E935 V2PAG7 1803K 840048 47 848995 23.8 37.2 . . .
E937 V2PAG8 1803K 709086 39 718015 24.4 37.1 . . .
E93C V2PAG9 1803K 726428 40 734888 24.8 36.1 . . .
E938 V2PA10 1803K 596028 33 604582 25.0 37.4 . . .
E93B V2PA11 1803K 594606 33 603738 26.7 38.9 . . .
EA4A V2SPL1 . . . . 0 0 5897K 546231 9 54
-----
Total: 19832K 9697K 49 9791K 264.6 400.5 5897K 546231 9 54
  
```

## Paging Configuration:

- How many devices (11)
- Equal sizes?
- How full? (50%)
- Rates reasonable? Device type dependent

# Page Device Busy: ESADSD2

Report: ESADSD2      DASD Performance Analysis      Velocity Sof

```
-----DASD Response tim
Dev          Device <--SSCH--> <%DevBusy> <SSCH/sec-> <---Service times--->
No. Serial  Type  Total  ERP  Avg  Peak  avg  peak  Resp  Serv Pend Disc Conn
-----
11:00:00
***Top DASD by Device busy***
E95C V2U019 3390-9 23344 0 10.6 44.6 26.4 116.6 4.8 4.0 0.3 1.4 2.2
E930 V2PAG3 3390-9 9170 0 6.2 19.5 10.4 29.3 5.9 5.9 0.3 0.0 5.6
E93F V2PAG2 3390-9 9759 0 5.9 15.8 11.0 31.7 5.3 5.3 0.3 0.0 5.0
E93C V2PAG9 3390-9 8101 0 5.8 17.1 9.2 29.3 6.3 6.3 0.3 0.0 6.0
E92F V2PAG1 3390-9 10137 0 5.7 15.6 11.5 31.4 5.0 5.0 0.3 0.0 4.6
E940 V2PAG4 3390-9 8869 0 5.2 14.8 10.0 29.9 5.2 5.2 0.3 0.0 4.8
E933 V2PAG5 3390-9 8418 0 5.1 12.8 9.5 28.9 5.3 5.3 0.3 0.0 5.0
E934 V2PAG6 3390-9 7858 0 5.0 13.4 8.9 26.9 5.6 5.6 0.3 0.0 5.3
E937 V2PAG8 3390-9 7568 0 5.0 13.3 8.6 28.9 5.8 5.8 0.3 0.0 5.5
E935 V2PAG7 3390-9 8284 0 4.9 13.1 9.4 30.8 5.2 5.2 0.3 0.0 4.9
***End Top DASD by Device busy***
```

## Page Device Analysis – DASD Subsystem

- Page Devices are usually in “top ten DASD”
- Device busy > 20% cause for concern
- Device busy > 50% serious
- Minute by minute analysis would show 30% “Peak”

# Paging Analysis: ESABLKP

Report: ESABLKP      Block Paging Analysis      Velocity Software Corporate  
 Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      First record analyzed: 04/15/11

Time	<----Load---->			Serv Time (ms)	<-Block->		<-Blocks Formed By->			Block Fault /sec	<--Block Exceptions/sec-->				
	<-Users-> Actv	Tran In Q	/sec		<-Reads-> /sec	Size	<-Steal-> /sec	<Migrate> /sec	Size		<Single Read> User	System	<No Refers> Migr	Steal	
10:15:00	63	61.3	2.4	45.9	19.9	7.0	0.0	31.0	10.2	13.2	9.0	8.8	0.0	0.8	50.0
10:30:00	63	61.3	2.3	47.1	10.3	7.0	0.0	25.1	3.7	13.7	4.7	5.6	0.0	0	45.1
10:45:00	63	63.3	2.2	33.0	18.8	7.0	0.0	29.4	6.0	20.9	8.4	11.1	0.0	0	57.2
11:00:00	64	67.4	2.3	57.8	27.1	7.7	1.0	33.3	<b>26.0</b>	<b>13.6</b>	<b>11.0</b>	<b>34.6</b>	<b>0.1</b>	<b>12.9</b>	<b>176.8</b>

## Block Paging Analysis

- Block page read – optimal 10 pages
- Steal should be zero prior to 6.3
- Migrate should be zero with 6.3 and beyond
- Pages stolen, unreferenced – Storage stress
- Single page read – goes up with 6.3

# Paging Analysis: ESABLKP

Report: ESABLKP		Block Paging Analysis							TEST MAP						
Time	<----Load---->	<-Users->	Tran	Serv	<-Block->	<-Blocks Formed By->	Block	<--Block Exceptions/sec-->	<Single Read>	<No Refers>					
	Actv	In	Q	Time	<-Reads->	<-Steal->	<Migrate>	Fault	User	System	Migr	Steal			
	/sec	/sec	/sec	(ms)	/sec	Size	/sec	Size	/sec	Size	/sec	Size	/sec		
07:49:00	83	262	0.7	.	65.6	<b>5.6</b>	31.4	<b>18.8</b>	0	0	25.4	<b>291.2</b>	1.7	0	0

## Block Paging Analysis for 6.3+

- Block page read – optimal 5 pages??
- Migrate should be zero (No expanded storage)
- Pages stolen, unreferenced – zero with 6.3
- Single page read – goes up with 6.3
- Faster paging devices? (new market for SSD)

## Top down:

- Configuration
- DASD I/O for system
- Rates by control unit
- Rates by device
- Rates by minidisk (by user)
- Cache

# DASD Configuration: ESADSD1

Report: ESADSD1      DASD Configuration      Velocity Software Corporate

Dev No.	Sys ID	Serial	Device Type	SHR	<CHPIDS OnLn>				MDisk Links	<----Extent---->		<--MDC St		
					01	02	03	04		Type	Start	Size	Elig	Def
E92F	1B89	V2PAG1	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E930	1B8A	V2PAG3	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E931	1B8B	540RES	3390-9	NO	7A	7B	78	79	0	.	.	.	No	On
E933	1B8D	V2PAG5	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E934	1B8E	V2PAG6	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E935	1B8F	V2PAG7	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E936	1B90	V4SPL2	3390-9	NO	7A	7B	78	79	0	.	.	.	No	On
E937	1B91	V2PAG8	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E938	1B92	V2PA10	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E939	1B93	VME939	3390-9	NO	7A	7B	78	79	0	.	.	.	No	On
E93B	1B95	V2PA11	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E93C	1B96	V2PAG9	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E93E	1B98	VME93E	3390-9	NO	7A	7B	78	79	0	.	.	.	No	On
E93F	1B99	V2PAG2	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E940	1B9A	V2PAG4	3390-9	NO	7A	7B	78	79	0	Page	1	10K	Yes	On
E958	1BB2	V2U011	3390-9	NO	7A	7B	78	79	113	.	.	.	Yes	On
E959	1BB3	V2U013	3390-9	NO	7A	7B	78	79	15	.	.	.	Yes	On
E95A	1BB4	V2U015	3390-9	NO	7A	7B	78	79	39	.	.	.	Yes	On
E95B	1BB5	V2U017	3390-9	NO	7A	7B	78	79	29	.	.	.	Yes	On

## DASD Configuration

- Multi channels to devices
- No minidisks on page devices
- MDC enabled appropriately

# Control Unit Data Rates: ESADSD2

Report: ESADSD2      DASD Performance Analysis      Velocity Sof  
 Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      First record

Dev No.	Device Serial Type	<--SSCH-->		<%DevBusy>		<SSCH/sec->		<-----DASD Response tim <--Service times-->				
		Total	ERP	Avg	Peak	avg	peak	Resp	Serv	Pend	Disc	Conn
11:00:00												
1800	Control Unit	3000	0	0.0	0.0	3.4	3.4	0.3	0.3	0.3	0	0.0
1880	Control Unit	3000	0	0.0	0.0	3.4	3.4	0.3	0.3	0.2	0	0.0
E900	Control Unit	186192	0	0.7	1.8	<b>210.4</b>	<b>530.4</b>	3.9	3.8	<b>0.3</b>	0.4	3.1
E980	Control Unit	1500	0	0.0	0.0	1.7	1.7	0.4	0.4	0.4	0	0.1
EA00	Control Unit	42722	0	0.1	0.5	48.3	93.2	2.1	2.1	0.3	0.2	1.5
EA80	Control Unit	1500	0	0.0	0.0	1.7	1.7	0.4	0.4	0.3	0	0.1
System:		237914	0	0.2	0.5	268.8	633.7	3.4	3.4	0.3	0.3	2.7

## DASD Control Units Rates, Performance ESADSD2

- By control unit shows where activity is
- Pend, indication of cache problems
- Compare control units to determine normality



# Data Rates, Device Performance: ESADSD2

Report: ESADSD2		DASD Performance Analysis						Velocity Sof					
Dev	Device	<--SSCH-->	<%DevBusy>	<SSCH/sec-->	<-----DASD Response tim								
No.	Serial	Type	Total	ERP	Avg	Peak	avg	peak	Resp	Serv	Pend	Disc	Conn
11:00:00													
***Top DASD by Device busy***													
E95C	V2U019	3390-9	23344	0	10.6	44.6	26.4	116.6	4.8	4.0	0.3	1.4	2.2
E930	V2PAG3	3390-9	9170	0	6.2	19.5	10.4	29.3	5.9	5.9	0.3	0.0	5.6
E93F	V2PAG2	3390-9	9759	0	5.9	15.8	11.0	31.7	5.3	5.3	0.3	0.0	5.0
E93C	V2PAG9	3390-9	8101	0	5.8	17.1	9.2	29.3	6.3	6.3	0.3	0.0	6.0
***End Top DASD by Device busy***													
1880	Control Unit		3000	0	0.0	0.0	3.4	3.4	0.3	0.3	0.2	0	0.0
E900	Control Unit		186192	0	0.7	1.8	210.4	530.4	3.9	3.8	0.3	0.4	3.1
E980	Control Unit		1500	0	0.0	0.0	1.7	1.7	0.4	0.4	0.4	0	0.1
EA00	Control Unit		42722	0	0.1	0.5	48.3	93.2	2.1	2.1	0.3	0.2	1.5
System:			237914	0	0.2	0.5	268.8	633.7	3.4	3.4	0.3	0.3	2.7

## DASD Rates, Performance ESADSD2

- System: rate, average service/response time
- Pend, disconnect low -> Else dasd cache
- Connect low -> Else faster channels
- Response = service, else queueing
- Peak busy for device (1 minute peak)

# V2: DASD Cache: ESADSD5

Report: ESADSD5      3990-3 Cache Analysis      Velocity Software Corporate      ES  
 Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      First record analyzed: 04/15/11

```
-----
                Pct. <-----per second-----> <-----Write activity per se
Dev            Actv <-----Total-----> <----Read----> <---Seq Read---> Total DFW DFW SEQ      NVS
No.  Serial Samp  I/O Hits Hit% Read%  I/O Hits Hit%  I/O Hits Hit%  I/O  I/O Hits  I/O Hit% Full
-----
11:00:00
***Top DASD by Device busy***
E95C V2U019  100 25.9 21.3 82.0  62.5 16.2 11.5 71.3    0  0  0  9.7  9.7  9.7    0 100    0
E930 V2PAG3  100 10.1  7.6 75.9  58.6  5.9  3.5 58.9    0  0  0  4.2  4.2  4.2    0 100    0
E93F V2PAG2  100 10.9  8.5 77.3  58.2  6.4  3.9 61.1    0  0  0  4.6  4.6  4.6    0 100    0
E93C V2PAG9  100  8.9  6.3 70.0  65.8  5.9  3.2 54.5    0  0  0  3.1  3.1  3.1    0 100    0
E92F V2PAG1  100 11.2  8.5 76.3  59.2  6.6  4.0 60.1    0  0  0  4.6  4.6  4.6    0 100    0
***End Top DASD by Device busy***

1800 CtlUnit  100  220  219 100   4.6 10.1  9.7 96.7    0  0  0 209.6 210  210    0 100    0
1880 CtlUnit  100   1.8   1.8 100 100.0  1.8  1.8 100    0  0  0   0   0   0    0  0    0
E900 CtlUnit  100  368  331 89.8  27.3 101 63.3 62.9    0  0  0 267.8 268  268    0 100    0
EA00 CtlUnit  100 73.0 72.3 99.1   6.9  5.0  4.4 86.8    0  0  0  68.0 68.0 68.0    0 100    0
-----
System:      100  663  624 94.2  17.7 118 79.2 67.4    0  0  0 545.3 545  545    0 100    0
-----
```

## DASD Cache: ESADSD5

- Hit percent (read, write)
- Low hit% -> need more cache or batch (backups)
- NVS full -> fast write stops
- Data shows activity from all lpars to device/ctl unit

# Data activity by user: ESASEEK, ESAUSEK

Report: ESAUSEK            User DASD Seeks Report            Velocity  
Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655    First re  
Monitor period:            3600 seconds (    1:00:00)            Last rec

-----  
Userid        Dev Volume <--Minidisk--> <Cylinder--> Total <---Non-zero---> Read  
/Time        No. Serial Ownerid    Addr Start Stop    Seeks Seeks Pct. Dist. Pct.  
-----

\*\*\*\*\*Summary\*\*\*\*\*

Average:

LNXUWA01	E95C	V2U019	LNXUWA01	0233	40591	40722	2389	1699	71.1	9685	0
	EA59	V2U016	LNXUWA01	0210	1	16698	14762	9854	66.8	2220	0
	E903	V2U034	LNXUWA01	021F	15207	32689	7542	4394	58.3	1578	16.6
	E903	V2U034	LNXUWA01	0220	32986	33350	63	63	100	10459	0
	E95A	V2U015	LNXUWA01	0209	1	12084	10345	4849	46.9	4981	28.4
	E95A	V2U015	LNXUWA01	020A	12085	19617	2608	2024	77.6	8521	0
	E95A	V2U015	LNXUWA01	020F	52329	53478	24	16	66.7	33363	0
	E926	V2U041	LNXUWA01	0232	6062	7598	2239	1544	69.0	4294	0
	E95B	V2U017	LNXUWA01	021E	26231	28597	42	36	85.7	10207	0
	E95E	V2U023	LNXUWA01	0204	63268	63850	675	327	48.4	21376	0
	EA58	V2U014	LNXUWA01	0205	3029	3033	3	2	66.7	31999	0

DASD activity by virtual machine: ESAUSEK

DASD activity by minidisk/volume: ESASEEK

- Correlate activity to poor performing disks
- Note read percent for Linux minidisks

## Network Activity

- Configuration
- Rates
- Errors
- Vswitch/guest lan

# Network Configuration: ESATCPI

Report: ESATCPI TCPIP Interface Configuration Report Velocity Sof  
Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655 First record  
Monitor period: 3600 seconds ( 1:00:00) Last record:

```
-----  
NODE      Idx      Speed <-Status-> Up    <-----Interface-----  
          Nbr MTU   (Est) Oper Admin Time MACAddress      Description Type  
-----
```

\*\*\*\*\*Summary\*\*\*\*\*

```
Average:  
TCPIP      1  1500 1000M      .      .      .      .      ETHERNET viETHERNET-  
VMLOCAL    1  1500 1000M      UP     UP     0 00:20:20:20:20:20 ETHERNET viETHERNET-  
LINUXVM2   2  1500 100M        UP     UP     0 02:00:00:00:00:30 eth0      ETHERNET-  
LNXDPOB02  3  1492 100M        UP     UP     0 02:00:00:00:00:04 eth0      ETHERNET-  
V2TPSP01   1 16436 10M         UP     UP     0 00:20:20:20:20:20 lo        Software  
           2  1500 100M        UP     UP     0 02:00:00:00:00:15 eth0      ETHERNET-  
V2TMSP05   1 16436 10M         UP     UP     0 00:20:20:20:20:20 lo        Software  
           2  1500 100M        UP     UP     0 02:00:00:00:00:09 eth0      ETHERNET-  
V2TMSP02   1 16436 10M         UP     UP     0 00:20:20:20:20:20 lo        Software  
           2  1500 100M        UP     UP     0 02:00:00:00:00:06 eth0      ETHERNET-  
V2TMSP03   1 16436 10M         UP     UP     0 00:20:20:20:20:20 lo        Software  
           2  1500 100M        UP     UP     0 02:00:00:00:00:07 eth0      ETHERNET-  
LN XUWA01  1 16436 10M         UP     UP     0 00:20:20:20:20:20 lo  
           4 1492 100M        UP     UP     0 02:00:00:00:00:22 eth0
```

Interface configuration

- Ethernet adapter
- Loop back
- MTU check

# Network Data Rates: ESATCP4

```

Report: ESATCP4          TCPIP Hardware Layer/Interfaces Report          Ve
-----
Date/      <Total Octets> Avg  <-Subnet packets / Sec-> <-----Pack
Time      <-Per second->   Q  <-Unicast-> <NonUnicast> <In Error>
Node      IFT  Input  Output  Len  Input Output Input Output Inpt Output
-----
11:00:00
*** Nodes *****
TCPIP     - 1 16897 6231.9      0 25.74 21.3      0      0      0      0
VMLOCAL   - 1 16859 6223.3      0 25.70 21.3      0      0      0      0
LINUXVM2  - 2  93.06 208.92      0  0.38  0.4      0      0      0      0
LNXDPA02  - 3 293.8 590.32      0  2.25  2.4      0      0      0      0
V2TPSP01  - 1 418.3 418.26      0  1.54  1.5      0      0      0      0
          - 2 188.6 666.61      0  0.95  1.2      0      0      0      0
V2TMSP05  - 1 323.6 323.61      0  6.16  6.2      0      0      0      0
          - 2  1517 2481.8      0  4.70  4.5      0      0      0      0
LNXDMS2A  - 3 103.4 299.74      0  0.47  0.6      0      0      0      0
LN XUWA01  - 1 21167 21167      0 57.81 57.8      0      0      0      0
          - 4  109K  122K      0 236.9 268.5      0      0      0      0
LN XDWA02  - 1 920.2 920.23      0  5.03  5.0      0      0      0      0
          - 4  9112 10306      0 25.84 24.3      0      0      0      0
    
```

Network activity, server, by interface  
 Understand rates  
 Check for errors

# QDIO Data Rates: ESAQDIO

Report: ESAQDIO      Queued I/O Report      Velocity Software Corpor  
 Monitor initialized: 04/15/11 at 10:00:00 on 2097 serial 72655      First record analyzed: 0

Date/ Time	Dev. Nmbr	Virt owner	QDIO DevN	Fmt	Number		<QDIO SIGA Instructions/Sec->				<-Throughput / sec->					
					Queues	In Out	<---Guest--->		<---CP--->		<Buffers>		<---Bytes-->			
							Read	Writ	"s"	Read	Writ	"s"	Sent	From	Sent	From
11:00:00	0000	Totals	0000	QDIO	0	0	0	0	0	0	693	0	1066	676	644K	422K
	F3D8	VSWCTRL2	F3D8	QDIO	1	1	0	0	0	0	573	0	895	535	527K	306K
	F3E0	VSWCTRL2	F3E0	QDIO	1	1	0	0	0	0	119	0	171	141	118K	117K
	F53E	LN XUWA02	7002	HPER	1	4	0	0	0	0	0.6	0	1	0	89	0
*****Summary*****																
Average:	0000	Totals	0000	QDIO	0	0	0	0	0	0	639	0	1040	621	615K	441K
	F3C8	VSWCTRL1	F3C8	QDIO	1	1	0	0	0	0	0	0	0	0	0	0
	F3D8	VSWCTRL2	F3D8	QDIO	1	1	0	0	0	0	530	0	891	491	529K	322K
	F3E0	VSWCTRL2	F3E0	QDIO	1	1	0	0	0	0	108	0	149	130	85716	119K
	F3F0	VSWCTRL1	F3F0	QDIO	1	1	0	0	0	0	0	0	0	0	0	0
	F515	LN XDPB02	7002	HPER	1	4	0	0	0	0	0	0	0	0	0	0
	F518	LN XDWA01	7002	HPER	1	4	0	0	0	0	0	0	0	0	0	0
	F53B	LN XUWA01	7002	HPER	1	4	0	0	0	0	0	0	0	0	0	0
	F53E	LN XUWA02	7002	HPER	1	4	0	0	0	0	0.6	0	1	0	92	0
	F542	LN XUWA03	7002	HPER	1	4	0	0	0	0	0	0	0	0	0	0
	F545	LN XUWA04	7002	HPER	1	4	0	0	0	0	0	0	0	0	0	0
	F548	LN XDMS2A	7002	HPER	1	4	0	0	0	0	0	0	0	0	0	0

**QDIO activity**

- Hipersockets
- Virtual switch

# Guest Lan / Virtual Switch Data Rates: ESANIC / ESATCP4

Screen: **ESANIC** Velocity Software - VSIVM4  
 1 of 3 Virtual NIC Activity

Time	VSWITCH/ GuestLAN	<Virtual Userid	NIC> Addr	<-- Data Th	
				<Bytes/Sec> Sent	Rcvd
15:24:00	VSIINT	TIML2	0600	4048	11059
		SLES11X3	0600	1160	628
		RKS2LV	0600	481	839
		<b>REDHAT71</b>	<b>0600</b>	<b>573</b>	<b>376</b>
		<b>REDHAT64</b>	<b>0600</b>	<b>1818</b>	<b>846</b>
		REDHAT56	0600	2415	964

F1=Help PF3=Quit PF4=S  
 PF8=Forward PF9=Sort PF10=  
 =====>

Screen: **ESATCP4** Velocity Software - VSIVM4  
 1 of 2 TCPIP Hardware Layer / Interfaces

Time	Node/ Group	Interface	<Total Octets>	
			<-Per second-> Input	Output
15:24:00	<b>redhat71</b>	<b>enccw0.0.</b>	<b>390.87</b>	<b>584.07</b>
	redhat71	lo	0	0
	<b>redhat64</b>	<b>eth0</b>	<b>918.03</b>	<b>1908</b>
	redhat64	lo	0	0
	redhat6x	eth0	818.33	1900
	redhat6x	eth1	0.47	0
	redhat6x	lo	3059	3059
	redhat6	eth0	1862	4660
	redhat6	lo	0	0

## Guest lan / virtual switch activity

- ESANIC: CP Monitor data
- ESATCP4: SNMP data
- Compare “received to input”
- Redhat7 renamed eth0



# OSA Adapter: ESAOSA

Report: ESAOSA                    OSA System Configuration Report  
Monitor initialized: 06/15/16 at 00:00:00 on 2828 seria

```
-----  
Collector <-----OSA Configuration--> MacAddress  
Node       Idx   Name   Nbr   Type Level Shrd Active  
-----  
06/15/16  
00:15:00  
OSA178       2   OSA1     0 1G Eth 6.00   Yes 6CAE8B483FD4  
  
redhat6x     3   OSA1     0 1G Eth 6.00   Yes 6CAE8B483FD4
```

## OSA data collected via snmp

- Configuration data
- Total data
- Data by LPAR if shared
- (New with 4.3)

Report: ESAOSA                    Velocity Software Corporate    Z  
Monitor initialized: 06/15/16    First record analyzed: 06/15/16

```
-----  
Collector <----- LPAR Bus    CPHID   KBytes/Sec   Packets/sec  
Node       Idx   Name   NBR Util Util       IN    OUT       In    OUT  
-----  
  
OSA178       2   OSA1   Tot    0   15    4.0   8.1   25.5   16.7  
              2    0    .     53    15  
              4    0    .    288   291  
              5    0    .     59    55  
  
redhat6x     3   OSA1   Tot    0   15   12.7   5.3   26.8   16.8  
              1    0    .     2     56  
              2    0    .     61    15  
              4    0    .    312   400  
              5    0    .     59    55
```