Performance Case Studies – Performance Analysis

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Flow chart process for Performance Analysis

State sampling and how to use it

Sample Analysis

Case Karl (is java application a problem?)

Case F (Why do I have an Eligible list?)

"z" is:

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

The challenge?

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

What challenge, it is all there!

- 200 zmon panels (with menus)
- 150 zmap reports (with table of contents)
- 5,000 unique variables

The 20 Reports you need in the order you need them

Configuration: ESAHDR
System (z/VM LPAR) Load: ESASSUM

Wait states: ESAXACT
Virtual machine Config: ESAUSRC

CPU:

- **Lpar Configuration: ESALPARS**
- **CPU Consumer: ESAUSP2**
- **Linux Consumer: ESALNXP**

Storage

- **z/VM Requirements: ESASTR1**
- **User Storage: ESAUSPG**
- **Linux Storage: ESAUCD2**
- **VDISK for swap: ESAASPC**

Paging

- **Configuration: ESAPSDV**
- **Loads by user: ESAUSPG**
- **Blocking: ESABLKP**

DASD

- **Configuration: ESADSD1**
- **Rates: ESADSD2**
- **CACHE: ESADSD5**

Network

- **Configuration: ESATCPI**
- **Network management: ESATCP1/2/4**

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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? (Increased level of complexity)
- Linux using IFLs in mixed mode LPAR?

High level Loads on the subsystems

Wait states for those impacted

Subsystem Analysis

- DASD, Storage, Paging, Processor, Network

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 Faclity(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
```

Configuration Errors just happen

Common configuration problems

- z/VM Release significant
- IFLs?
- Real Storage / Expanded
- Master processor can be significant

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Know the z/VM LPAR overall loads: ESASSUM / ESAMAIN

```
Report: ESASSUM      Subsystem Activity
-------------------------------------------------------------------------
          <---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
```

z/VM LPAR Loads

- Processor utilization
- Storage consumed by users
- Page rates to DASD, Expanded Storage
- DASD I/O rates
- (Transactions are for traditional workloads)

Any changes? Spikes? what time?

- Processor
- Storage for users
- Page rates
- DASD I/O rates

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Wait states provide direction for investigation

Wait state (queue) analysis -> "Interesting"

- Running / CPU Wait -> CPU Subsystem
- Simulation wait -> Master Processor (CPU)
- Page wait /asynchrounous -> Paging/Storage subsystems
- SIO / Asynchronous i/o -> DASD subsystem
- Eligible / Loading (LDG) -> special state, loading working set

Normal idle wait states, "not interesting"

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

Compare "running" vs "interesting"

- Anything "Interesting" more than 1% is Interesting,
- ELIGIBLE ALLWAYS Interesting

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Two types of Wait states are provided by virtual machine

- Monitor frequency: once per minute (Not interesting)
- High Frequency (Hi-Freq): once per second (Interesting)
  - (60 samples per 1 minute per virtual cpu)

Shown by:

- Summarized for all users (start here)
- Summarized for user classes (grouped by installation)
- Servers
- Top users

User class analysis -> where to focus

- Group Test vs Product
- Group application by application
- Group support servers vs production

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Wait States: ESAXACT

```
Report: ESAXACT      Transaction Delay Analysis
-------------------------------------------------------------------------
                     <-----Percent non-dormant (Wait states)------------
UserID   <-Samples->                              E-  D-  T-      Tst <Asynch>
/Class   Total  In Q Run Sim CPU SIO Pag SVM SVM SVM  CF Idl I/O Pag Ldg
-------- ----- ----- --- --- --- --- --- --- --- --- --- --- --- --- ---
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 ***
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
*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***
LNXUWA01   893   893  71   0 2.8   0 0.1   0   0   0   0  24 1.7 0.4   0
LNXUWA03  1786  1786  28 0.2 5.5   0 1.2   0   0   0 0.6  57 7.2 0.1 0.1
LNXUWA02  1786  1786  27 0.1 3.6   0 0.1   0   0   0 0.4  69 0.1   0 0.1
LNXQWA01  1786  1786 4.0   0 2.2   0   0   0   0   0   0  94 0.1   0   0
LNXDWA02  1786  1786 6.0   0 2.2   0 0.2   0   0   0   0  91 0.1   0   0
```

"HI-Freq:" - Wait states for all users

Key users – as defined by installation

User Class – as defined by installation

Top "n" users – Note two vcpu has 2 times samples

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User Configuration: ESAUSRC

Report: ESAUSRC User Configuration — Velocity Software Corporate ESAMAP 4
Monitor period: 3600 seconds (1:00:00) — Last record: 04/15/11 11:00

					<---------SHARE--------->						<Status>		<-MDC>			<-Storage->	
UserID	ClassID	Account Code	ACI Grp Name	CPU Type	<Normal> Rel	<--MAX-> Abs	Typ	Shre	Lim -it	CPU Cnt	<Modes> VM	STG	SVM	QDSP	NO FS	NO INS	<-VM Size-> Dflt	Max
LNXDMS2A	*ITM	27482	.	IFL	200	.	.	.	.	2	ESA	V=V	N	N	N	N	2.0G	2.0G
LNXDPB02	*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
LNXUWA01	*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?)

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From State Sampling (ESAXACT), If CPU Wait, or "running" is dominant state, then:

Top down:

- CEC / LPAR (ESALPARS)
- z/VM (ESACPUU)
- Virtual machine (ESAUSP2)
- Linux process (ESALNXP)

CPU Capture ratio 100% down to process

LPAR Configuration: ESALPARS

Report: ESALPARS Logical Partition Summary Velocity Software Corporate

Time	<--Complex--> Phys CPUs	Dispatch Slice	<-------Logical Partition---> Name	Nbr	Virt CPUs	<%Assigned> Total	Ovhd	<-Assigned Shares----> <---LPAR--> Weight	Pct	<VCPU Pct> /SYS	/CPU	Cap-ped	Wait Comp	Proce Type
10:15:00	18	Dynamic	Totals:	0	34	968.7	4.9	1080	88.9					
			SYS4N3	7	5	263.5	1.2	80	6.6	1.32	23.7	No	No	IFL
			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	109	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
			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”

- First LPAR is “us”, z/vm where data collected (SYS4N3)
- IFLs shared between LPARs (none)
- Check weights
- Assigned pct/CPU > 100 ??? -> excess share?

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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***
LNXUWA01 67.65 67.32 1.0   3M 2889K    1   3M 3146K   3M  324K 65398  259K  15.3   0.1
LNXUWA03 54.43 53.29 1.0   4M 3848K    1   4M 3855K   4M 72353 63975  8378   7.5   0.3
LNXUWA02 50.18 49.92 1.0 685K  685K    0 855K  855K 855K  381K  296K 84613   2.2   2.7
LNXQWA01 12.23 12.11 1.0   1M 1246K    7   1M 1334K   1M  592K  541K 51075   3.1   3.0
LNXDWA02 11.73 11.64 1.0 713K  713K    6 844K  844K 844K  205K 56215  148K   2.0   0.7
LNXDWA04 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 (LNXUWA*)?**
- Correct per expected? Not a performance question

Linux Process Load: ESALNXP

```
Report: ESALNXP          LINUX HOST Process Statistics Report
-------------------------------------------------------------------------------
node/      <-Process Ident-> <------CPU Percents----->   <Stg (k)>
 Name      ID     PPID   GRP   Tot  sys user syst usrt    Size RSS
--------- ----- ----- ----- ---- ---- ---- ---- ----   ---- ----
LNXUWA01      0     0     0 67.0 5.98 59.0 1.20 0.81    13M   9M
 java      4444     1  4444 1.10 0.07 1.03    0    0     1M 801K
 kd4agent  5576     1  4362 4.71 1.68 3.03    0    0    99K  64K
 kynagent  9569     1  4362 2.48 0.07 2.41    0    0   314K 212K
 kcawd     9634     1  4362 1.92 0.01 0.01 1.14 0.75    37K 6936
 java     10547     1 10547 0.82 0.07 0.75    0    0   870K 743K
 java     11751  4877  4877 0.57 0.07 0.50    0    0   617K  98K
 java     11837     1 11837 3.28 0.12 3.16    0    0     3M   1M
 java     21374 15199 21374 46.3 3.07 43.2    0    0     3M   3M
 java     24567     1 24567 2.27 0.18 2.09    0    0     1M 831K
 java     28060     1 28060 1.23 0.09 1.14    0    0     1M 821K
 java     32428     1 32428 1.17 0.10 1.07    0    0   810K 538K
```

Look for processes within Linux, in percent of CPU

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

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Spike in paging? Look at Storage.

Top down:

- z/VM (ESASTR1)
- Virtual machines (ESAUSPG)
- VDISK / MDC / Address Space (ESAASPC)
- Linux server (ESAUCD2)
- Linux process (ESALNXP)

Storage Utilization: ESASTR1

```
Report: ESASTR1      Main Storage Analysis              Velocity Software Corporate
-------------------------------------------------------------------------------
         Users <-----------------------------Pages------------------------------>
         Loggd System  Frame <Available>  User  NSS/DCSS  <-AddSpace> VDISK <MDC>
Time        On Storage Table <2gb  >2gb  Resdnt Resident  Systm User  Rsdnt Rsdnt
-------- ----- ------- ----- ----- ----- ------ --------  ----- ----- ----- -----
10:15:00    89  18088K  141K    79  1032 17577K     4771   226K     0 26852 81157
10:30:00    89  18088K  141K    89  1193 17594K     4769   226K     0 30182 61307
10:45:00    89  18088K  141K    78  1050 17614K     4769   225K     0 46189 25812
11:00:00    89  18088K  141K    82  1062 17448K     4775   223K     0  237K  1418
```

Total storage analysis (in pages)

- System Storage (18 Million pages, 72GB)
- MDC dropping? 81,157 pages: 300mb? SET MDC MAX/MIN
- User resident should be large percent of “System Storage”
- VDISK Spike (1gb) at 11:00 ? Which server?

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Virtual Machine Storage : ESAUSPG

```
Report: ESAUSPG      User Storage Analysis                    Velocity Software Corporate
-------------------------------------------------------------------------------------------
         <---Storage occupancy in pages---> <--Main Storage page Read/Write--> <Address
UserID   <---Main Storage---> <--Paging---> <-Page Writes to:--> <Page Reads:> <pages R
/Class    Total   >2gb   <2GB  Xstor   DASD   Xsto   Disk   Migr  Xstor  Disk   VirtDisk
-------- ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ --------
11:00:00 17448K 16943K 504640  4346K  8891K  1120K 352582 320630 822546 149628   237286
***Top User Analysis***
LNXUWA01  2889K  2798K  90725  65398 258675  10999    112      0   5390  13806        0
LNXUWA03  3848K  3762K  85186  63975   8378  21875    277      0 221201   6714   223173
LNXUWA02 685385 648345  37040 296256  84613  36427   2443      0  22943   1983        0
LNXQWA01  1246K  1218K  28190 541178  51075  35529   2727      0  14094   2787     1428
LNXDWA02 713091 672702  40388  56215 148406  16314    649      0    451   1828        0
LNXDWA04  1152K  1120K  31859 592756  96720  13708  63725  63261   1189    942        0
LNXDWA03 330601 324021   6581   4194  39207   3926   5601   5345    120    734        8
LNXTWA04 883228 860363  22865  90734 129722   7768     31      0    182     66     1889
LNXUWA15 693689 664995  28694  53516 137150  10556   1382      0    553    457        0
```

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

- **Largest consumer(s) resident storage**
- **Largest consumer - which virtual disk?**
- **VDISK Spike (1gb) ? Which server?**
- **(LNXUWA03 was in Asynchronous I/O Wait)**

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VDISK for Swap: ESAVDSK (Or ESAASPC)

```
Report: ESAVDSK      VDISK Analysis Report                          Velocity Software Corporate
-------------------------------------------------------------------------------------------------
                                    -----<--Size--->  <AddSpce>  Priv   VIO       <--pages---------
                                    AddSpc VDSK Cre-  Del-   or   rate  User Resi-  Lock-   Sto- DASD
Owner    Space Name                 Pages  Blks ates  etes Shrd /sec Links  dent     ed    len Read
-------- ---------------------- ----- ----- ---- ---- ---- ---- ----- ----- ----- ----- ----
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$0520  513K 4102K    0    0 Shrd 0.28     1 4751      0   0.4  0.4
----- ----- ---- ---- ---- ---- ----- ----- ----- ----- ----
System Totals:                    7805K  125M    0    0    . 5.09   204  46K      0   7.3  8.1
-------------------------------------------------------------------------------------------------
11:00:00
LNXQWA01 VDISK$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
                                   ----- ----- ---- ---- ---- ---- ----- ----- ----- ----- ----
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!!!**

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Paging increased

- Virtual disk resident storage increased
- Associated with one linux server. (LNXUWA03)
- 2nd largest server in terms of cpu

CPU utilization?

- Understand agents using 10% per server
- Java application

The problem???

CPU Wait?

```
         Report: ESAHDR       z/VM Monitor Analysis
Monitor initialized: 06/13/17 at 15:00:00 on 2098 ser
-----------------------------------------------------
    ZMAP Release                                4.3.1
    History Source                              4.3.0
    Monitor file created:            06/13/17  15:00:

    z/VM Version:  6              Release 3.0 SLU 16
    TOD clock at termination                   09:42:
              Abend code of last termination
    TOD clock at last IPL:           04/21/17  09:43:
    System Operator:                           OPERAT
    Time zone adjustment from GMT:             -4 hou

    System Identifier                          ONONVM07
    Checkpoint/Warmstart Volumes           VM7RES/VM7RES
    Machine Model/Type                     z10B:2098/A00
    System Sequence Code               00000000000FD045
 Processor  0 model/serial           2098-A00  /00D045 Master
    Processor  1 model/serial           2098-A00  /00D045
    Processor  2 model/serial           2098-A00  /00D045
    Processor  3 model/serial           2098-A00  /00D045

              Operating on IFL Processor(s)
Channel Path Measurement Facility(CPMF) Extended is installed

      LPAR Capability Adjustment Factor          571

                Totals by Processor type:
      <---------CPU-------> <-Shared Processor busy->
      Type Count Ded shared total assigned Ovhd Mgmt
      ---- ----- --- ------ ----- -------- ---- ----
      IFL      7   0      7 522.6    513.4  7.2  9.2
```

```
Number of logical partitions defined:          4

Main Storage installed (MB):               45056
Main Storage Generated (MB):               45056
Number of users in monitor file:             127
Number of DASD in monitor file:              492
```

Common configuration problems

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

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Know the overall loads: ESASSUM / ESAMAIN

```
Report: ESASSUM      Subsystem Activity                          locity Softwar
-------------------------------------------------------------------------------
         <---Users----> Transactions <Processor> Storage (MB) Pgng <-----I/O
         <-avg number->    Per  Avg. Utilization Fixed Active sec> <-DASD-->
Time       On Actv In Q Minute  Resp Total Virt.  User Resid. DASD Rate Resp
-------- ---- ---- ---- ------ ----- ----- ----- ----- ------ ---- ---- ----
15:01:00   40   25 14.0  339.0 0.185   325   315  25.8  31853    0   66  0.9
15:02:00   40   25 15.0  352.0 0.152   322   311  25.8  31855    0  117  0.7
15:03:00   40   28 15.0  328.0 0.213   326   318  25.8  31865    0   43  1.0
15:04:00   40   24 15.0  347.0 0.173   354   345  25.8  31852    0   59  0.7
15:05:00   40   24 16.0  349.0 0.173   312   301  25.7  31852    0   56  1.0
15:06:00   40   23 15.0  359.0 0.157   249   236  25.8  31850    0   31  0.4
15:07:00   40   24 14.0  328.0 0.177   277   265  25.9  31854    0   25  1.1
15:08:00   40   29 16.0  331.0 0.210   281   269  25.7  31867    0   95  0.7
                                                  52    0   32  0.4
                                                  50    0  100  0.7
                                                  50    0   28  0.4
                                                  56    0   26  0.4
```

Look for Spikes, dramatic changes, what time? **15:04**

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

VELOCITY SOFTWARE

Wait states provide options for improvement

- State Sampling – once per minute per user
- Hi-Frequency State Sampling – once per second per vcpu
  - (900 samples per vcpu per 15 minute period)

Waits reported by server, class, top user

- Look for what is impacting the users
- Recognize “running” to wait comparison

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, SIO -> DASD subsystem
- Loading – special state, loading in working set (LDUBUF)
  - NOT a wait state, indicates thrashing
- Eligible – SRM Settings – has no value with 6.3

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

UserID /Class	<-Samples-> Total	In Q	Run	Sim	CPU	SIO	Pag	E- SVM	D- SVM	T- SVM	CF	Tst Idl	<Asynch> I/O	Pag	Ldg	Pct Elig
					<-----Percent non-dormant (Wait states)-----------											
15:04:00	40	15	27	0	33	0	0	0	0	0	0	40	0	.	.	0
Hi-Freq:	2820	921	26	0.1	27	0	0	0	5.6	0.4	0	47	0	0	0	0
					***Key User Analysis ***											
TCPIP	60	16	6.3	0	0	0	0	0	0	0	0	94	0	0	0	0
					User Class Analysis											
Servers	600	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Velocity	660	16	19	6.3	0	0	0	0	7.7	13	0	63	0	0	0	0
ORACLE	660	660	25	0	31	0	0	0	0	0	0	44	0	0	0	0
DB2	120	120	54	0	35	0	0	0	0	0	0	11	0	0	0	0
TheUsrs	660	107	1.9	0	0.9	0	0	0	12	0.9	0	96	0	0	0	0
					CPU POOL User Analysis											
IFL3	120	120	54	0	35	0	0	0	0	0	0	11	0	0	0	0
					Top User Analysis											
PSFN	180	180	65	0	35	0	0	0	0	0	0	0	0	0	0	0
DB2PRD1	120	120	54	0	35	0	0	0	0	0	0	11	0	0	0	0
BEAST	120	120	22	0	42	0	0	0	0	0	0	37	0	0	0	0
PSCRM	120	120	7.5	0	33	0	0	0	0	0	0	59	0	0	0	0
PSHR	120	120	6.7	0	34	0	0	0	0	0	0	59	0	0	0	0
ORADBP	120	120	5.0	0	8.3	0	0	0	0	0	0	87	0	0	0	0
ZALERT	60	2	100	0	0	0	0	0	0	0	0	0	0	0	0	0
ZTC																0

Look for Dominant Wait State

- CPU Is the only wait state of significance

VELOCITY SOFTWARE

```
Report: ESALPAR Logical Partition Summary          Velocity Software Co
-------------------------------------------------------------------------
         <--------Logical Partition-------->  <-Assigned Shares---->
                        Virt CPU  <%Assigned>  <---LPAR--> <VCPU Pct>
Cap-
Time     Name      Nbr CPUs Type Total  Ovhd  Weight  Pct /SYS /CPU
-------- -------- --- ---- ---- -----  ----  ------ ---- ---- ----  ---
15:01:00 Totals:    00   11 IFL  630.9   4.3    2100  100
         VM03       00    4 IFL  326.9   0.8     900 42.9 10.7 75.0
         VMDB       03    4 IFL  178.4   2.1     600 28.6 7.14 50.0
         VM05       02    3 IFL  125.6   1.3     600 28.6  9.5 66.7
```

Look for "Shared processors" (7 IFLs)

- First LPAR is "us", z/vm where data collected (VM03)
- IFLs shared between LPARs (LINUX and VM)
- Check weights
- "pct/CPU" is how fast cpu will run when all are busy

```
Totals by Processor type:
<---------CPU-------> <-Shared Processor busy->
Type Count Ded shared  Total  Logical Ovhd Mgmt
---- ----- --- ------ ------ -------- ---- ----
IFL      7   0      7  636.1    626.6  4.3  5.2
```

Linux LPAR is using 4 virtual CPUs

IFLs running at 90%

Overhead Low

VELOCITY SOFTWARE

CASE Karl. Virtual Machine Consumption Analysis

```
 ***Top User Analysis***
PSFN      163.4 162.0 1.0
BEAST     62.81 62.33 1.0
DB2PRD1   38.02 37.55 1.0
ORADBP    30.02 28.95 1.0
PSCRM     16.37 15.66 1.0
```

One major consumer

User classification done well

```
Report: ESAUSP2       Use
Monitor initialized: 06/
------------------------
           <---CPU time-->
UserID     <(Percent)> T:V
/Class     Total  Virt Rat
-------- ------ ----- ---
15:01:00 319.7 315.1 1.0
 ***Key User Analysis **
TCPIP       0.24  0.11 2.1
 ***User Class Analysis*
Servers     0.03  0.03 1.0
Velocity    2.02  1.94 1.0
ORACLE    278.3 274.4 1.0
DB2        38.02 37.55 1.0
TheUsrs     1.18  1.15 1.0
 ***CPU POOL User Analys
IFL3       38.02 37.55 1.0
 ***Top User Analysis***
PSFN       163.4 162.0 1.0
BEAST      62.81 62.33 1.0
DB2PRD1    38.02 37.55 1.0
ORADBP     30.02 28.95 1.0
PSCRM      16.37 15.66 1.0
PSHR        5.62  5.46 1.0
```

VELOCITY SOFTWARE

CASE Karl. Virtual Machine Consumption Analysis

Server consistently close to 2 IFLs.

No other spikes

```
Report: ESAUSP2        Use
------------------------
            <---CPU time-->
UserID      <(Percent)> T:V
/Class      Total  Virt Rat
 PSFN        163.4 162.0 1.0
PSFN        197.7 196.0 1.0
PSFN        171.2 170.1 1.0
PSFN        169.4 168.2 1.0
PSFN        200.8 199.1 1.0
PSFN        162.4 160.3 1.0
PSFN        198.4 196.1 1.0
PSFN        164.2 162.0 1.0
PSFN        161.3 159.5 1.0
PSFN        174.2 172.2 1.0
PSFN        211.4 209.4 1.0
PSFN        208.6 206.8 1.0
PSFN        175.6 174.1 1.0
PSFN        152.8 150.8 1.0
```

VELOCITY SOFTWARE

CASE Karl. Linux Process consumption

```
 Report: ESALNXP      LINUX HOST Process Statistics Report
Monitor initialized: 01/13/17 at 13:00:00 on 2964 serial 06EC4
-------------------------------------------------------------
node/     <-Process Ident-> Nice PRTY <------CPU Percents---->
 Name     ID    PPID   GRP  Valu Valu  Tot  sys user syst usrt
--------- ----- ----- ----- ---- ---- ---- ---- ---- ---- ----
PSFN          0     0     0    0    0  156 27.0  101 3.57 23.8
 init         1     1     1    0   20 27.3    0    0 3.49 23.8
 ora_arc0 42146     1     0    0   20 7.02 5.05 1.97    0    0
 java     43123     1     0    0   20 0.33 0.09 0.17 0.05 0.02
 snmpd    45549     1     0  -15    5 0.48 0.26 0.22    0    0
 oracle_5 50335     1     0    0   20 14.0 1.82 12.2    0    0
 oracle_5 50517     1     0    0   20 15.9 1.75 14.1    0    0
 oracle_5 50967     1     0    0   20 14.0 2.04 11.9    0    0
 oracle_5 50991     1     0    0   20 13.1 1.30 11.8    0    0
 oracle_5 57681     1     0    0   20 3.81 1.02 2.79    0    0
 oracle_5 57694     1     0    0   20 14.6 1.92 12.6    0    0
 oracle_5 59123     1     0    0   20 7.51 1.02 6.49    0    0
 oracle_5 59215     1     0    0   20 2.22 0.42 1.80    0    0
 oracle_5 59396     1     0    0   20 1.75 0.31 1.44    0    0
 oracle_5 59443     1     0    0   20 0.29 0.07 0.23    0    0
 oracle_5 59520     1     0    0   20 0.36 0.12 0.24    0    0
 oracle_5 59528     1     0    0   20 0.82 0.12 0.69    0    0
 oracle_5 59543     1     0    0   20 0.99 0.19 0.80    0    0
 oracle_5 59800     1     0    0   20 5.79 1.20 4.60    0    0
 oracle_5 59889     1     0    0   20 1.86 0.43 1.42    0    0
 oracle_6 60430     1     0    0   20 1.79 0.26 1.53    0    0
 oracle_6 60808     1     0    0   20 5.73 2.03 3.70    0    0
```

Oracle database, nothing significant,
Nothing really specific

VELOCITY SOFTWARE

Karl Storage Utilization: ESASTR1

```
Report: ESASTR1      Ma    Velocity Software Corporate   ZMAP 4.3.1 06/20/17
Monitor initialized: 06    First record analyzed: 06/13/17 15:00:00
-------------------------------------------------------------------------------
         Users <-------------------------------------------------> Over
         Loggd System    User  NSS/DCSS  <-AddSpace> VDISK <MDC> Diag Commit
Time        On Storage  Resdnt Resident  Systm User  Rsdnt Rsdnt  98  Ratio
-------- ----- ------- ------ --------  ----- ----- ----- ----- ---- -----

06/13/17
15:01:00    40   45056  31874       33   293     0  1716   125   11 0.842
15:02:00    40   45056  31874       33   293     0  1716   124   11 0.842
15:03:00    40   45056  31873       33   293     0  1716   122   11 0.842
15:04:00    40   45056  31874       33   293     0  1716   120   11 0.842
15:05:00    40   45056  31874       33   293     0  1716   122   11 0.842
15:06:00    40   45056  31874       33   293     0  1716   113   11 0.842
15:07:00    40   45056  31874       33   293     0  1716   117   11 0.842
15:08:00    40   45056  31873       33   293     0  1716   122   11 0.842
15:09:00    40   45056  31874       33   293     0  1716   119   11 0.842
15:10:00    40   4505
```

Total storage analysis

- System Storage (45G)
- MDC perfect? Vdisk good?
- Low overcommit, no paging….

No issues

Oracle Server waits for CPU

- Could give it one more VCPU and higher share
- Server running “200 / 300” percent busy
- Is there something else can take CPU away from?

The problem.

Eligible list

Applications spikey performance

CASE F. Configuration

```
Report: ESAHDR        z/VM Monitor Analysis
-----------------------------------------------------
ZMAP Release                                  4.3.0.9
History Source                                4.3.0.9
Monitor file created:              06/15/17   00:00:00

z/VM Version:  6                Release 3.0 SLU 1601
TOD clock at termination                      13:09:04
Abend code of last termination
TOD clock at last IPL:             06/11/17   13:09:39
System Operator:                              OPERATOR
Time zone adjustment from GMT:                -4 hours

System Identifier                             DRBN005
Checkpoint/Warmstart Volumes            V5SRES/V5SRES
Machine Model/Type                      Z13S:2965/V06
System Sequence Code                 00000000000DBBA7
Processor  0 model/serial             2965-V06  /0BBBA7 Master
Processor  1 model/serial             2965-V06  /0BBBA7

  Power of processor in terms of service Units: 39603
  Operating on GP Processor(s)
  Channel Path Measurement Faclity(CPMF) Extended is installed
```

z/VM 6.3, z13
LPAR has 2 processors in LPAR

VELOCITY SOFTWARE

```
Report: ESAHDR        z/VM Monitor Analysis
Monitor initialized: 01/13/17 at 13:00:00 on 2964
Monitor period:          3600 seconds (   1:00:00)
-----------------------------------------------

Totals by Processor type:
<---------CPU-------> <-Shared Processor busy>
Type Count Ded shared total assigned Ovhd Mgmt
---- ----- --- ------ ----- -------- ---- ----
CP       6   0      6 465.2    451.8  6.7 13.4
ICF      2   1      1   4.5      0.1  0.0  4.4
ZIIP     4   0      4  18.2     17.6  0.2  0.6
```

Running on IFLs

13 IFLs, shared, 60% utilized on average

LPAR Overhead 28% on average

VELOCITY SOFTWARE

Report: ESASSUM Subsystem Activity Velocit
Monitor initialized: 06/15/17 at 03:00:00 on 2965 serial 0BBBA7 First r

	<---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
10:01:00	119	80	14.0	345.7	0.570	128	114	39.5	1384.1	98	78
10:02:00	118	80	12.0	329.0	0.557	126	114	39.2	1260.2	37	90
10:03:00	118	77	16.0	292.0	0.085	136	125	39.2	1264.2	9	41
10:04:00	118	74	6.0	328.0	0.216	127	119	39.1	1256.6	17	23
10:05:00	118	72	10.0	319.0	0.072	120	114	39.2	1263.0	2	12
10:06:00	118	74	25.0	275.0	0.239	128	119	39.4	1266.4	11	21
10:07:00	118	72	10.0	323.0	1.166	139	128	39.1	389.9	11	48
10:08:00	118	75	15.0	294.0	0.344	155	139	39.1	1268.1	16	47
10:09:00	118	78	9.0	293.0	0.356	154	138	39.1	1273.4	41	53
10:10:00	119	75	9.0	272.0	0.148	161	145	39.1	1278.3	10	26
10:11:00	119	74	9.0	302.0	0.123	65	56	39.0	404.9	16	21
10:12:00	119	74	8.0	277.0	0.375	71	59	39.3	415.1	3	50
10:13:00	119	69	5.0	249.0	0.872	40	35	39.1	406.6	3	18

CPU about 125%

Paging low, no real spikes

No real spikes, problem

VELOCITY SOFTWARE

```
Report: ESAXACT      Transaction Delay Analysis                    Veloc
------------------------------------------------------------------------
                     <-----Percent non-dormant (Wait states)------------
UserID   <-Samples->                              E-  D-  T-     Tst <Asynch>
/Class   Total  In Q Run Sim CPU SIO Pag SVM SVM SVM  CF Idl I/O Pag Ldg
-------- ----- ----- --- --- --- --- --- --- --- --- --- --- --- --- ---
10:01:00   119    14  14  14  21   0   0   0   0  29   0  21   0   .   .
Hi-Freq:  7139   772  12  14 8.0 0.5   0   0  26  22 0.4  42 0.1   0 0.1
 ***User Class Analysis***
Servers    420     2   0   0   0   0   0   0   0   0   0  50  50   0   0
Velocity   600    12   0   0   0 8.3   0   0  49  50   0  42   0   0   0
CATech     360    21   0   0   0   0   0   0   0   0 4.8  95   0   0   0
TheUsrs   5399   610  16  18 9.3 0.5   0   0  28  27 0.3  30   0   0 0.2
 ***Top User Analysis***
CDSADMIN    60    56  73   0  27   0   0   0   0   0   0   0   0   0   0
SILASVUE    60    60  20  68  12   0   0   0   0   0   0   0   0   0   0
BKWEB05     60    23  74 4.3 4.3   0   0   0  62  17   0   0   0   0   0
VIWRKS03    60    18  33  50  17   0   0   0  70   0   0   0   0   0   0
SFS0005     60    39  13   0  21   0   0   0   0  41   0  26   0   0   0
BKTRIN1     60    14  14  57 7.1   0   0   0   0   0 7.1  14   0   0   0
SFS0006     60    42 4.8 7.1  21   0   0   0   0  50   0  17   0   0   0
VIWRK069    60    12 8.3  42  17   0   0   0  80  33   0   0   0   0   0
BKMON       59    34 2.9  85 8.8 2.9   0   0   0   0   0   0   0   0   0
BKTRIN2     60     7  14  29  14   0   0   0   0   0   0  43   0   0   0
BKWEB04     60     6   0  17   0   0   0   0  90  83   0   0   0   0   0
```

Simulation wait high, cpu wait high, no page wait, low SIO wait

VELOCITY SOFTWARE

CASE F. CPU WAIT?

Report: ESALPARS Logical Partition Summary Veloc

Time	<--Complex--> Phys CPUs	Dispatch Slice	<--------Logical Partition-------> Name	Nbr	Virt CPUs	CPU Type	<%Assigned> Total	Ovhd	<-Assigned S <---LPAR--> Weight	Pct
03:01:00	12	Dynamic	Totals:	00	26	CP	579.3	5.8	1000	100
			VM5LPAR	0B	2	CP	45.9	0.7	180	18.0
			SYQ1LPAR	06	3	CP	208.7	1.1	250	25.0
			SYQ2LPAR	05	2	CP	34.9	0.2	55	5.5
			SYQ8LPAR	08	1	CP	3.1	0.0	5	0.5
			SYU1LPAR	09	3	CP	158.3	0.8	185	18.5
			SYU2LPAR	0A	2	CP	33.0	0.7	55	5.5
			VMT1LPAR	0C	1	CP	2.8	0.2	13	1.3
			VM1LPAR	04	1	CP	2.7	0.2	13	1.3
			VM2LPAR	02	2	CP	3.4	0.3	18	1.8
			VM3LPAR	03	2	CP	22.7	0.1	26	2.6
			VM4LPAR	07	2	CP	17.5	0.4	90	9.0
			VM6LPAR	0D	1	CP	4.4	0.2	30	3.0
			VM7LPAR	01	2	CP	24.1	0.2	35	3.5
			VM8LPAR	0E	2	CP	17.9	0.4	45	4.5
			CFKP	15	1	ICF	100.0	0.0	Ded	8.3
			CFKT	14	1	ICF	0.0	0.0	50	50.0
			CFKZ	11	1	ICF	0.0	0.0	50	50.0

Very high overcommit of cp 26:6

VELOCITY SOFTWARE

CASE F. CPU WAIT?

```
Totals by Processor type:
<----------CPU-------> <-Shared Processor busy->
Type Count Ded shared  Total  Logical Ovhd Mgmt
---- ----- --- ------ ------ -------- ---- ----
CP       6   0      6  593.5    573.5  5.8 14.2
ICF      2   1      1    4.1      0.1  0.0  4.0
ZIIP     4   0      4   34.5     32.8  0.4  1.4
```

CP's VERY busy,
Overhead 20%

```
Report: ESASTR1      Masis                                  Velocity SoftwAP 4.
Monitor initialized: 0600 on 2965 serial 0BBBA7    First record a03:00
-------------------------------------------------------------------------------
          Users <----------MegaBytes----------------------------------
          Loggd System   Frame <Available> Systm  User  NSS/DCSS  <MDC>
Time        On Storage  Table <2gb  >2gb  ExSpc Resdnt Resident  Rsdnt
-------- ----- -------  ----- ----- ----- ----- ------ --------  -----
10:01:00   119    4096     32    38     0    15   1391         19   2302
10:02:00   118    4096     32   187   155    15   1266         19   2121
10:03:00   118    4096     32   203     6    15   1283         19   2239
10:04:00   118    4096     32   167    50    15   1272         19   2244
10:05:00   118    4096     32   165    35    15   1280         19   2253
10:06:00   118    4096     32   126     0    15   1281         19   2325
10:07:00   118    4096     32   221    57    15   1283         19   2172
10:08:00   118    4096     32   217     0    15   1282         19   2233
10:09:00   118    4096     32    82     0    15   1285         19   2366
10:10:00   119    4096     32   167     0    15   1300         19   2262
10:11:00   119    4096     32   223    58    15   1312         20   2139
10:12:00   119    4096     32   190     0    15   1305         20   2238
```

Should MDC take more than ½ storage???

- **System not paging, so lots of stoarge**
- **Ok for now, but LIMIT SHOULD BE SET!**

VELOCITY SOFTWARE

The problem???

CPU Wait?

Know the configuration: ESAHDR

```
Report: ESAHDR       z/VM Monitor Analysis
Monitor initialized: 05/30/17 at 02:00:00 on 2827 serial 0168
Monitor period:         3600 seconds (   1:00:00)
-------------------------------------------------------------
ZMAP Release                                  4.3.0.9
History Source                                4.3.0.5
Monitor file created:              05/30/17  02:00:00         F
                                                             c
z/VM Version:  6                Release 3.0 SLU 1501         (
TOD clock at last IPL:             02/19/17  07:16:17
System Operator:                             OPERATOR
Time zone adjustment from GMT:               -4 hours

System Identifier                            VML2
Checkpoint/Warmstart Volumes              LV2RES/LV2RES
Machine Model/Type                        EC12:2827/702
System Sequence Code                    00000000000468A7
Processor  0 model/serial               2827-702  /0168A7 Master
Processor  1 model/serial               2827-702  /0168A7
Processor  2 model/serial               2827-702  /0168A7
Processor  3 model/serial               2827-702  /0168A7

 Power of processor in terms of service Units: 73394
 Operating on IFL Processor(s)

Totals by Processor type:
<---------CPU-------> <-Shared Processor busy>
Type Count Ded shared total assigned Ovhd Mgmt
---- ----- --- ------ ----- -------- ---- ----
CP       2   0      2  62.4     60.6  0.8  1.8
IFL      4   0      4 379.8    376.9  2.2  2.9
ICF      3   3      0   0.2        0    0  0.2
ZIIP     1   0      1   6.6      6.4  0.1  0.2

Main Storage installed (MB):                 200704
```

Configuration Errors just happen

Common configuration problems

- z/VM Release significant
- IFLs 4
- Real Storage 200GB
- Master processor can be significant

VELOCITY SOFTWARE

Know the z/VM LPAR overall loads: ESASSUM / ESAMAIN

```
Report: ESASSUM      Subsystem Activity
-------------------------------------------------------------------------
          <---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
-------- ---- ---- ---- ------ ----- ----- ----- ----- ------ ------ ----
02:01:00   57   40 44.0   32.0 0.339   237   214 165.6 175741      0    0
02:02:00   57   39 44.0   33.0 0.330   243   214 165.6 175739      0    0
02:03:00   57   39 44.0   29.0 0.351   249   215 165.6 175739      0    0
02:04:00   57   39 44.0   25.0 0.031   253   216 165.6 175739      0    0
```

z/VM LPAR Loads

- Processor utilization
- Storage consumed by users
- Page rates to DASD, Expanded Storage
- DASD I/O rates
- (Transactions are for traditional workloads)

Any changes? Spikes? what time?

- Processor
- Storage for users
- Page rates
- DASD I/O rates

VELOCITY SOFTWARE

Wait States: ESAXACT

```
Report: ESAXACT      Transaction Delay Analysis
-------------------------------------------------------------------------
                     <-----Percent non-dormant (Wait states)------------
UserID   <-Samples->                              E-  D-  T-      Tst <Asynch>
/Class   Total  In Q Run Sim CPU SIO Pag SVM SVM SVM  CF Idl I/O Pag Ldg
-------- ----- ----- --- --- --- --- --- --- --- --- --- --- --- --- ---
02:01:00    57    44 6.8   0  39   0   0   0   0   0   0  55   0   .   .
Hi-Freq:  4380  2688 6.1 0.4  38   0   0   0 2.1 0.0   0  55 0.1   0   0
 ***User Class Analysis***
Servers    540     1   0   0   0   0   0   0   0   0   0   0   0   0   0
Velocity   600    19 5.3   0 5.3   0   0   0   0   0   0  89   0   0   0
*Prod     2100  2067 7.1 0.5  37   0   0   0   0   0   0  56 0.1   0   0
*Util      120   120   0   0 8.3   0   0   0   0   0   0  92   0   0   0
TheUsrs    900   428 3.7 0.5  59   0   0   0  10 0.2   0  36   0   0   0
 ***Top User Analysis***
L220P      120   120  20 4.2  72   0   0   0   0   0   0 4.2   0   0   0
L21EP      120   120  19 1.7  71   0   0   0   0   0   0 7.5 0.8   0   0
L22AP      120   120 9.2   0  52   0   0   0   0   0   0  39   0   0   0
L258P       60    60  25   0  75   0   0   0   0   0   0   0   0   0   0
L218P       60    60  17   0  68   0   0   0   0   0   0  13 1.7   0   0
L23CP       60    60  20   0  67   0   0   0   0   0   0  13   0   0   0
```

"HI-Freq:" - Wait states for all users
Key users – as defined by installation
User Class – as defined by installation
Top "n" users – Note two vcpu has 2 times samples

VELOCITY SOFTWARE

User Configuration: ESAUSRC

Report: ESAUSRC User Configuration Velocity Sof

UserID	ClassID	Account Code	ACI Grp Name	<CP POOL> PoolName	CPU Type	<-------SHARE-------> <Normal> Rel	Abs	<--MAX-> Typ	Shre	Lim -it	<---CPU <Count> Def	On
L10AC	TheUsrs	L10AC			IFL	100	.	.	.	.	2	2
L10DU	*Util	L10DU			IFL	100	.	.	.	.	2	2
L20EP	*Prod	L20EP			IFL	200	.	.	.	.	2	2
L20FP	*Prod	L20FP			IFL	200	.	.	.	.	2	2
L21EP	*Prod	L21EP			IFL	200	.	.	.	.	2	2
L211P	*Prod	L211P			IFL	200	.	.	.	.	1	1
L212P	*Prod	L212P			IFL	200	.	.	.	.	1	1
L214P	*Prod	L214P			IFL	100	.	.	.	.	1	1
L217P	*Prod	L217P			IFL	100	.	.	.	.	1	1
L218P	*Prod	L218P			IFL	100	.	.	.	.	1	1
L22AP	*Prod	L22AP			IFL	200	.	.	.	.	2	2
L22CP	*Prod	L22CP			IFL	200	.	.	.	.	2	2
L220P	*Prod	L220P			IFL	200	.	.	.	.	2	2
L223P	*Prod	L223P			IFL	10	.	.	.	.	2	2
L229P	*Prod	L229P			IFL	100	.	.	.	.	1	1
L246C	TheUsrs	L246C			IFL	40	.	.	.	.	2	2
L25AP	*Prod	L25AP			IFL	100					2	2

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?)

User Configuration: ESAUSRC

```
Report: ESAUSRC      User                          Velocity SofMAP 4.3.0
-------------------------------------------------------------------------
                                  <-------SHARE-------> <---CPU <Storage>
                 Account  CPU    <Normal> <--MAX-> Lim <Count> <VM Size>
UserID   ClassID Code     Type     Rel Abs Typ Shre -it Def On   Dflt  Max
-------- -------- ------------ ---- --- --- ---- --- --- --  ---- ----
L10AC    TheUsrs  L10AC     IFL  100   .   .    .   .   2  2  4.0G 4.0G
L10DU    *Util    L10DU     IFL  100   .   .    .   .   2  2  6.0G 6.0G
L20EP    *Prod    L20EP     IFL  200   .   .    .   .   2  2  4.0G 4.0G
L20FP    *Prod    L20FP     IFL  200   .   .    .   .   2  2  4.0G 4.0G
L21EP    *Prod    L21EP     IFL  200   .   .    .   .   2  2   10G  10G
L211P    *Prod    L211P     IFL  200   .   .    .   .   1  1  4.0G 4.0G
L212P    *Prod    L212P     IFL  200   .   .    .   .   1  1  4.0G 4.0G
L214P    *Prod    L214P     IFL  100   .   .    .   .   1  1  2.0G 2.0G
L217P    *Prod    L217P     IFL  100   .   .    .   .   1  1  8.0G 8.0G
L218P    *Prod    L218P     IFL  100   .   .    .   .   1  1  7.5G 7.5G
L22AP    *Prod    L22AP     IFL  200   .   .    .   .   2  2  6.0G 6.0G
L22CP    *Prod    L22CP     IFL  200   .   .    .   .   2  2  8.0G 8.0G
L220P    *Prod    L220P     IFL  200   .   .    .   .   2  2   21G  21G
L223P    *Prod    L223P     IFL   10   .   .    .   .   2  2  2.0G 2.0G
L229P    *Prod    L229P     IFL  100   .   .    .   .   1  1  2.0G 2.0G
L23CP    *Prod    L23CP     IFL  100   .   .    .   .   1  1  6.0G 6.0G
L24BP    *Prod    L24BP     IFL  100   .   .    .   .   2  2   27G  27G
L241C    TheUsrs  L241C     IFL  100   .   .    .   .   1  1  2.0G 2.0G
```

Look for “Interesting configurations”

- Virtual machine storage sizes (too large?, largest?)

VELOCITY SOFTWARE

LPAR Configuration: ESALPARS

```
Report: ESALPARgical Partition Summary                          Velocity Software Co
Monitor initial/30/17 at 02:00:00 on 2827 serial 0168A7    First record analyze
-------------------------------------------------------------------------------
          <--Co <--------Logical Partition-------->  <-Assigned Shares---->
          Phys                Virt CPU  <%Assigned>  <---LPAR--> <VCPU Pct> Cap-
Time      CPUs  Name     Nbr CPUs Type Total  Ovhd  Weight  Pct /SYS /CPU  ped
--------  ----  -------- --- ---- ---- -----  ----  ------ ---- ---- ----  ----
02:01:00    10  Totals:   00   12  CP  117.1   1.2    1400  100
                Totals:   00    7 IFL  388.2   1.3     135  100
                VML2      01    4 IFL  237.5   0.2      75 55.6 13.9 55.6   No
                VML4      03    3 IFL  150.7   1.1      60 44.4 14.8 59.3   No
                CER1      17    2  CP    7.6   0.1      60  4.3 2.14 4.28   No
                CER1      17    1 ZIP    0.8   0.0     100  4.5 4.48 4.48   No
                CER2      18    1 ZIP      0     0     100  4.5 4.48 4.48   No
                ESN2      1A    2  CP   15.1   0.2     131  9.4 4.68 9.36   No
                ESN2      1A    1 ZIP    0.2   0.0     435 19.5 19.5 19.5   No
                ICF21     1E    1 ICF   99.9   0.0     Ded 10.0    0    0   No
                ICF22     0D    1 ICF  100.0   0.0     Ded 10.0    0    0   No
                ICF23     1F    1 ICF   99.9   0.0     Ded 10.0    0    0   No
                PRD1      11    1 ZIP      0     0     530 23.8 23.8 23.8   No
                PRD2      13    2  CP   54.9   0.4     296 21.1 10.6 21.1   No
                PRD2      13    1 ZIP    0.2   0.0     550 24.7 24.7 24.7   No
                PRD4      1C    2  CP   20.5   0.3     347 24.8 12.4 24.8   No
                PRD4      1C    1 ZIP    2.3   0.1     265 11.9 11.9 11.9   No
                SP02      16    2  CP    4.7   0.1      50  3.6 1.79 3.57  Yes
```

Look for “Shared processors”

- First LPAR is “us”, z/vm where data collected (VML2)
- Check weights (55% of the IFLs)

LPAR Configuration: ESALPARS

```
Totals by Procee:
<---------CPU---Shared Processor busy->
Type Count Ded Total  Logical Ovhd Mgmt
---- ----- --- ----- -------- ---- ----
CP       2   0 120.0    115.9  1.2  2.9
IFL      4   0 390.0    386.8  1.3  1.8
ICF      3   3   0.2        0    0  0.2
ZIIP     1   0   4.7      4.4  0.1  0.2
```

Look for “Shared processors”

- IFLs at 98%.... No significant overheads

VELOCITY SOFTWARE

Consumers within LPAR: ESAUSP2

```
Report: ESAUSP2      User Resource Rate
----------------------------------------
         <---CPU time--> <----Main Stora
UserID   <(Percent)> T:V <Resident> Lock
/Class   Total  Virt Rat Totl Activ  -ed
-------- ----- ----- --- ---- ----- ----
02:01:00 227.9 214.2 1.1  45M 45.0M  103
 ***User Class Analysis***
Servers   0.00  0.00 2.5 1096 337.0    0
Velocity  0.79  0.74 1.1 9792  5321    0
*Prod    211.0 198.4 1.1  42M 41.7M    0
*Util     0.76  0.72 1.1 210K  210K    0
TheUsrs  15.15 14.30 1.1 3.0M 3033K   95
 ***Top User Analysis***
L220P    35.30 32.08 1.1 5.5M 5499K    0
L21EP    30.37 26.46 1.1 2.6M 2616K    0
L22AP    19.67 19.19 1.0 1.6M 1572K    0
L258P    19.12 18.10 1.1 3.1M 3145K    0
L218P    17.08 16.99 1.0 2.0M 1962K    0
L23CP    13.94 13.61 1.0 1.6M 1572K    0
L212P    13.09 11.24 1.2 1.0M 1046K    0
L245P    12.46 12.11 1.0 1.0M 1046K    0
L217P     9.93  9.83 1.0 2.1M 2085K    0
L22CP     9.09  8.80 1.0 2.1M 2095K    0
```

Look for consumers, in percent of cpu

- **By class (*PROD)**
- **Abusive servers (none)?**
- Correct per expected? Not a performance question

VELOCITY SOFTWARE

Linux Process Load: ESALNXP

```
Report: ESALNXP          LINUX HOST Process Statistics Report
-------------------------------------------------------------------------------
node/      <-Process Ident-> <------CPU Percents----->   <Stg (k)>
 Name      ID    PPID   GRP   Tot  sys user syst usrt    Size RSS
--------- ----- ----- ----- ---- ---- ---- ---- ----  ---- ----
L220P         0     0     0 29.0 14.1 12.2 1.44 1.31 838K  38K
 init         1     1     1 0.44    0    0 0.31 0.13    2    1
 ksoftirq     3     2     0 0.89 0.89    0    0    0    0    0
 ksoftirq     9     2     0 0.63 0.63    0    0    0    0    0
 kswapd0     24     2     0 1.01 1.01    0    0    0    0    0
 snmpd    19039     1 19038 0.37 0.26 0.11    0    0   25    7
 oracle   25314     1 25314 0.20 0.09 0.11    0    0  10K   10
 oracle   25324     1 25324 1.42 0.08 1.34    0    0  10K  193
 oracle   25332     1 25332 0.23 0.03 0.20    0    0  10K  449
 oracle   25334     1 25334 2.62 0.12 2.49    0    0  10K 4180
 oracle   25340     1 25340 1.45 0.03 1.42    0    0  10K  326
 java     25720 25656 25656 3.14 0.43 0.51 1.05 1.15  992  256
 bpbkar   43071     1  7980 7.76 7.68 0.08    0    0   22    8
 oracle   44612     1     0 0.11 0.02 0.09    0    0  10K   31
 oracle   49955     1     0 0.31 0.12 0.19    0    0  10K  166
 oracle   50005
 oracle   50076
 oracle   50082
 oracle   50231
 oracle   50253
```

Look for processes within Linux, in percent of CPU

- **By relevant server (L220P)**
- **Correct? Relevant? Cron? Agents?**
- Oracle Workload

VELOCITY SOFTWARE

Storage Utilization: ESASTR1

```
Report: ESASTR1      Mais                    Velocity Sofware Corporate   ZMAP 4.
-------------------------------------------------------------------------------
Users <---------MegaBytes-----------------------------------------
         Loggd System  Frame <Available>  User  NSS/DCSS <-AddSpace> VDISK <MDC>
Time        On Storage Table <2gb  >2gb  Resdnt Resident Systm User  Rsdnt Rsdnt
-------- ----- ------- ----- ----- ----- ------ -------- ----- ----- ----- -----
02:01:00    57  200704  1568  1877 16238 175764       40  1526     0  3261   126
02:02:00    57  200704  1568  1877 16239 175764       40  1526     0  3261   125
02:03:00    57  200704  1568  1877 16243 175764       40  1526     0  3261   121
02:04:00    57  200704  1568  1877 16249 175764       40  1526     0  3261   115
02:05:00    57  200704  1568  1877 16236 175764       40  1526     0  3261   127
02:06:00    57  200704  1568  1877 16242 175764       40  1526     0  3261   122
```

Total storage analysis (in pages)

- System Storage (200GB)
- MDC Good
- User resident should be large percent of “System Storage”
- VDISK Good
- (no paging)

VELOCITY SOFTWARE

CPU utilization?

- Understand Oracle requirements?
- Get more IFLs….

Analysis is NOT rocket science

- **Few screens needed for most problems**

Send your problems to barton@VelocitySoftware.com