Case Study 6

Master Processor Issue

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Velocity Software solves performance problems.

- **As a valued customer, we want to pass this knowledge on to you.**
- **The following is a case study of a solved real-life performance issue.**
- **This case study will show:**
  - **The problem as reported by users**
  - **The problem observations**
  - **What was found in the Velocity Software data**
  - **What was suggested to the customer**
  - **If provided, follow up from the customer**

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The Problem:

Users were experiencing slow response times.

Problem Observations:

- None (yet).

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ESAXACT – Logical Partition Analysis showed:

```
Report: ESAXACT Transaction Analysis Velocity Software, Inc.
------------------------------------------------------------------------

                           <-------------Percent non-dormant----------------->
UserID    <-Samples->                   E-  D-  T-      Tst              Lim Pct
/Class    Total  In Q Run Sim CPU SIO Pg SVM SVM SVM CF Idl I/O Ldg Oth Lst Elig
-------- ----- ---- --- --- --- --- -- --- --- --- -- --- --- --- --- --- ----
System:   5936    149 5.4  34 8.7   0  3   0   0 6.0  2  36 4.7   .   0   .    0
Hi-Freq: 176K    7057 2.0  17 2.8   0  1   0 3.8 4.2 49  17 3.1   0   0   .    0
***Resource use by User Class
*Servers 3720     568 3.0  29 4.2   0  0   0  21 6.9  1  28 7.6   0   0   .    0
*Keys    1080     490 1.6 0.6 6.7   0  0   0  16  19  1  43  13   0   0   .    0
*TheUsrs 172K    6108 1.9  16 2.6   0  1   0 1.2 3.0 57  14 2.5   0   0   .    0
```

- Sim wait is high
- CPU wait is high

This is where the problem showed up. Sim wait always points to the Master processor.

ESASUM – Subsystem Activity showed:

```
Report: ESASSUM Subsystem Activity Velocity Software, Inc.
-----------------------------------------------------------------------------------
          <---Users----> Transactions <Processor> Storage (MB) <-Paging--> <-----I/O-----> <MiniDisk> Spool
          <-avg number->      Per   Avg. Utilization Fixed Active <pages/sec> <-DASD--> Other <-Cache--> Page
Time         On Actv In Q Minute  Resp Total Virt.  User Resid. XStore DASD Rate Resp  Rate  Rate %Hit Rate
          -------- ---- ---- ---- ------ ----- ----- ----- ------ ------ ------ ---- ---- ---- ----- ----- -----
08:00:08 1479   244 34.3 1310.1 0.603   124    87  36.9 192.0     888   451  641 15.4   40 687.9 49.3    36
08:01:08 1500   248 46.0 1260.9 0.543   147   110  37.3 192.7     904   494  732 20.1   37 881.6 53.9    32
*********************************************Summary*****************************************************
Average: 1483  245 37.3 1297.8 0.589   130    93  37.0 192.1     892   461  664 16.7   39 736.4 50.7    35
```

At first glance, there is no problem with CPU capacity. The system is running less than 50% busy (130 out of 300% average or 147 at its peak – there are 3 CPUs on this LPAR for 300%).

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ESAHDR – System Configuration showed:

```
Report: ESAHDR         z/VM Monitor Analysis      Velocity Software Corporate

System Sequence Code                  0000000000040F78
Processor   0 model/serial            8562-A02   /040F78  Master
Processor   1 model/serial            8562-A02   /040F78
Processor   2 model/serial            8562-A02   /040F78
```

Looking at the configuration report, the Master processor is on CPU 0.

ESACPUU – CPU Utilization Analysis:

```
Report: ESACPUU CPU Interval Analysis Velocity Software, Inc.
---------------------------------------------------------------------------------
          <----Load----->    <-----CPU (percentages)-----> <---Internal (per second)---->
          <-Users-> Tran      Total  Emul  User   Sys Idle  Diag- Inst.  SIE  Fast Page
Time      Actv In Q /sec CPU   util   time ovrhd ovrhd time  nose  sim. intrcp path fault
--------  ---- ---- ---- -    -----  ----- ----- ----- ----- ----- ----- ------ ----- -----
08:00:08  244 34.3 24.6   0    48.5   27.3  16.7   4.5   9.9  1449  1478  1753     0    18
                          1    35.9   28.8   5.2   1.9  11.8   818   599   716     0     9
                          2    39.5   31.4   5.9   2.2  13.5   902   682   815     0    11
                             -----  ----- ----- ----- ----- ----- ----- ------ ----- -----
System:                      124.0   87.4  27.9   8.7  35.3  3170  2758  3284     0    37
---------------------------------------------------------------------------------
08:01:08  248 46.0 24.0   0    53.6   32.5  16.7   4.4   7.1  1557  1588  1806     0    24
                          1    44.6   37.2   5.4   1.9   6.5   843   594   685     0    11
                          2    48.8   40.2   6.4   2.2   7.4   903   704   817     0    12
                             -----  ----- ----- ----- ----- ----- ----- ------ ----- -----
System:                      147.0  109.9  28.5   8.6  21.0  3303  2886  3308     0    48
```

- The Master processor (0) has higher utilization

- The other two processors are less busy

- Total utilization for all three processors doesn't look bad.

Looking at the data, it doesn't seem like there should be a CPU wait issue.

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ESALPAR – Logical Partition Analysis showed:

```
Report: ESALPAR Logical Partition Analysis Velocity Software, Inc.
-----------------------------------------------------------------------
        <----Load----> <--Complex--> <--Logical-> <---------Logical Processor----->
        <-Users-> Tran Phys Dispatch <-Partition> VCPU <%Assigned>          Cap-  Wait
                           Slice      Name    No. Addr Total Ovhd Weight   ped  Comp
-------- ---- ---- ---- ----- -------- -------- --- ---- ----- ---- ------ ---- ----
08:02:08  244 34.3 24.6     3 Dynamic  CMS2      1    0  58.7  0.2    155   No   Yes
                                                  1  47.8  0.1    155   No   Yes
                                                  2  53.2  0.1    155   No   Yes
                                                     ----- ----
                                             LPAR 159.7  0.4

                                        SWCF      2    0  36.6  0.1    130   No   Yes
                                                  1  43.0  0.1    130   No   Yes
                                                  2  46.7  0.1    130   No   Yes
                                                     ----- ----
                                             LPAR 126.3  0.3

                                        CMS8      3    0   9.1  0.1     15   No   Yes
                                                  1   4.6  0.2     15   No   Yes
                                                     ----- ----
                                             LPAR  13.7  0.3


Total Logical Partition busy:                     299.6
Total Physical Management time: 0.366
```

CMS2 LPAR:

- It has 3 CPs
- The LPAR weight is 155
- Therefore, each of the vCPUs is only entitled to 50% of one real CPU.
- The Master vCPU is constrained at 58%
- The LPAR is using over its entitlement (159)
- The box is at capacity (299)

Performance Enhancement Suggestions:

1 – Lower the vCPU count for the CMS2 LPAR from 3 to 2.

- Since both of the other vCPUs were not over 50% utilization (over time), one of them can be removed to give the Master processor more processing ability.
- If the weight of the LPAR stays the same (155), with two vCPUs, each would have 77% (155/200) instead of 51% (155/300).

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Performance Enhancement Suggestions:

2 – The box was at full capacity for all three LPARs (ESALPAR). Another physical CPU would be helpful (if possible).

• This would help with CPU wait, but not necessarily Sim wait.