CICS Debugging Essentials: Performance Problems

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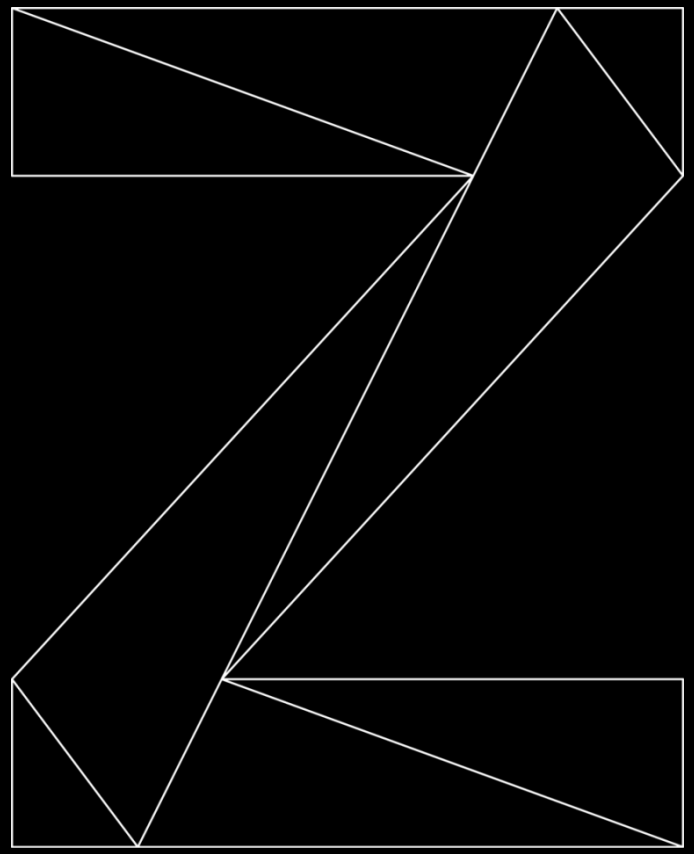

AGENDA

- PREMISE
- WHAT IS A PERFORMANCE PROBLEM?
- WHAT IS THE BEST DOCUMENTATION TO COLLECT?
- EXAMPLE 1: LACK OF CPU
- EXAMPLE 2: QR TCB SATURATION
- EXAMPLE 3: TASK SUSPENDS
- SUMMARY
- Q&A

PREMISE

- THE PERFORMANCE OF YOUR CICS REGION IS ALWAYS OF THE UTMOST CONCERN AND WE ALWAYS WANT TO MAKE SURE THAT OUR SYSTEMS ARE RUNNING AS EFFICIENT AS POSSIBLE.
- WHEN THERE ARE PROBLEMS IN THIS AREA, THEY ARE OFTEN NOT THE EASIEST PROBLEMS TO SOLVE AS THEY ARE NOT ALWAYS THE MOST STRAIGHTFORWARD OF PROBLEMS (AS COMPARED TO AN ABEND FOR EXAMPLE)
- HOW DO WE BEST GO ABOUT TRYING TO BOTH UNDERSTAND THE PROBLEM IS OCCURRING AND ALSO FIGURING OUT WHAT IS TO BE DONE ABOUT IT?

WHAT IS A PERFORMANCE PROBLEM?

WHAT IS A PERFORMANCE PROBLEM?

- ‘PERFORMANCE PROBLEMS’ IS A VERY WIDE-RANGING TERM, BUT THEY TEND TO FALL INTO ONE OF TWO COMMON CATEGORIES:

  1. POOR RESPONSE TIME - TASKS FAIL TO START RUNNING AT ALL OR TAKE A LONG TIME TO COMPLETE. BOTH SYMPTOMS CONTRIBUTE TO YOUR PERCEPTION THAT CICS IS RUNNING SLOWLY.
  2. INCREASED CPU TIME - EITHER THE END USER PAYING THE BILL IS COMPLAINING THAT CPU COSTS HAVE GONE UP, OR SOMEONE HAS NOTICED THAT THEY ARE USING MORE CPU THAN BEFORE.

- EVEN UNDER THESE CATEGORIES, THERE CAN BE A MYRIAD OF CONTRIBUTORS TO THE ISSUES THAT ARE SEEN. THESE CAN COME FROM WITHIN THE CICS REGION(S) THAT ARE HAVING THE PROBLEM, OR THOSE REGIONS CAN BE A VICTIM OF OUTSIDE CONTRIBUTORS.

QTNA

- BEFORE DIVING INTO DUMPS AND PERFORMANCE DATA, IT IS WORTHWHILE TO TRY AND THINK ABOUT WHAT FLAVOR OF A PROBLEM YOU ARE HAVING. RELEVANT QUESTIONS TO ASK:
  - WHAT IS THE PROBLEM (CPU INCREASE OR RESPONSE TIME INCREASE, SPECIFIC TRANSACTION OR ALL TRANSACTIONS)?
  - HOW MUCH OF AN INCREASE IN CPU OR RESPONSE TIME ARE YOU SEEING?
  - WHAT IS THE SCOPE AND BUSINESS IMPACT (IS IT AN OVERALL SLOWDOWN, ARE ALL TRANSACTIONS AFFECTED, OR ARE ONLY A FEW TRANSACTIONS AFFECTED, PERHAPS A SINGLE APPLICATION)?
  - DOES THE PROBLEM OCCUR AT A SPECIFIC TIME IN THE DAY (PEAK HOURS, INTERMITTENTLY, OR CONTINUOUSLY)?
  - DID SOMETHING CHANGE WHEN THE PROBLEM STARTED? IF SO, WHAT CHANGED?
    -

WHAT DOCUMENTATION SHOULD I COLLECT?

WHAT DOCUMENTATION SHOULD I COLLECT?

1. COMPLETE CICS JOB LOG (THAT INCLUDES AT MINIMUM JESMSGLG, MSGUSR, AND CEEMSG) BACK TO THE STARTUP OF THE CICS REGION.
2. MVS SYSTEM DUMP OF YOUR CICS REGION TAKEN DURING THE TIME OF THE PROBLEM. IF POSSIBLE, AN MVS SYSTEM DUMP OF SAME REGION DURING A TIME OF EQUIVALENT WORKLOAD WHEN THE PROBLEM IS NOT OCCURRING.
3. SMF110 RECORDS FROM ALL LPARS INVOLVED IN THE PROBLEM. IF POSSIBLE, THE SMF110 RECORDS SHOULD SPAN FROM ABOUT 15 MINUTES BEFORE THE PROBLEM STARTED TO ABOUT 15 MINUTES AFTER THE PROBLEM ENDED. IF THAT IS NOT FEASIBLE, SEND ABOUT 1 HOUR OF SMF110 RECORDS STARTING FROM ABOUT 15 MINUTES BEFORE THE PROBLEM STARTED.
   - MONITORING DATA - SMF TYPE 110 SUBTYPE 0001 RECORDS (PERFORMANCE AND EXCEPTION DATA) SHOW RESOURCE USAGE BY INDIVIDUAL TRANSACTIONS.
   - STATISTICS DATA - SMF TYPE 110 SUBTYPE 0002 - 0005 RECORDS SHOW SYSTEM-WIDE RESOURCE USAGE.

- TROUBLESHOOTING DATA FOR PERFORMANCE PROBLEMS IN CICS TS (MUSTGATHER)

WHAT DOCUMENTATION SHOULD I COLLECT?

- HAVING JUST ONE OR THE OTHER WILL ALLOW YOU TO FIGURE OUT SOME THINGS BUT WILL NOT GIVE YOU THE COMPLETE PICTURE OF WHAT IS GOING ON.
- THE DUMP WILL GIVE YOU THE SPECIFIC SNAPSHOT IN TIME SO YOU CAN SEE WHAT IS GOING ON IN THAT MOMENT. BUT IF YOU WANT TO TRY AND SEE WHAT LED TO THE SCENARIO, THAT WILL NOT BE AS EASY TO SEE SOLELY WITH THE DUMP.
- WHEN YOU ONLY HAVE SMF110 RECORDS, CAN SEE THE TIME LEADING UP TO, AFTER AND DURING PROBLEM. BUT IF THERE ARE SPECIFICS THAT YOU NEED (SPECIFIC EXEC CICS REQUESTS, SPECIFIC ENQUEUES INVOLVED, WHAT PROGRAMS ISSUED SPECIFIC REQUEST) YOU WILL NOT HAVE THAT.
- IN A PERFECT WORLD WE WOULD LIKE TO HAVE BOTH, BUT WE ARE REALISTIC IN THE SENSE THAT AT TIMES THAT MAY NOT ALWAYS BE POSSIBLE. GETTING THE SYSTEMS BACK TO A PRODUCTIVE STATE CAN TAKE PRECEDENCE OVER GATHERING DOCUMENTATION.

EXAMPLE 1: LACK OF CPU

LACK OF CPU

- ONE OF THE MAIN INDICATORS OF A LACK OF AVAILABLE CPU FOR A CICS REGION IS A POOR QR TCB CPU/DISPATCH RATIO. THIS RATIO IS EXPLAINED IN OUR BOOKS AS FOLLOWS:

- *"A TCB CPU DISPATCH RATIO IS THE ACCUMULATED CPU TIME AS A FRACTION OF ACCUMULATED DISPATCH TIME, EXPRESSED AS A PERCENTAGE. IN A CICS ENVIRONMENT THIS RATIO IS ONLY OF VALUE FOR THE QR TCB AND IS MEANINGLESS FOR OTHER TCBS. THE QR TCB CPU DISPATCH RATIO IS AN INDICATOR OF HOW MUCH PROCESSOR RESOURCE IS ASSIGNED TO THE QR TCB BY THE OPERATING SYSTEM AND HARDWARE, WHEN COMPARED TO THE AMOUNT OF PROCESSOR RESOURCE REQUESTED BY THE CICS DISPATCHER.*

- *FOR A GIVEN INTERVAL, A HIGH RATIO INDICATES THAT WHEN CICS DISPATCHED A TASK ON THE QR TCB, PROCESSOR RESOURCE WAS MADE AVAILABLE BY THE OPERATING SYSTEM AND HARDWARE ALMOST WITHOUT INTERRUPTION UNTIL THE CICS TASK HAD COMPLETED. IN THIS CASE, THE CPU TIME IS CLOSELY CORRELATED WITH THE OVERALL ELAPSED TIME (THE CICS DISPATCH TIME).*

- *A LOW RATIO INDICATES THAT DESPITE CICS REQUESTING PROCESSOR RESOURCE, A COMBINATION OF THE OPERATING SYSTEM, HARDWARE, OR BOTH RESULTED IN FREQUENT OR LONG DELAYS WAITING FOR A PHYSICAL PROCESSOR. IN THIS CASE, THE CPU TIME IS SIGNIFICANTLY SMALLER THAN THE OVERALL ELAPSED TIME."*

IN ENGLISH PLEASE?

- IN SIMPLE TERMS, WE TEND TO THINK OF THIS AS THE ABILITY FOR THE TRANSACTION RUNNING ON THE QR TCB TO GET THE CPU THAT IT NEEDS WHEN IT NEEDS IT. WHEN THE RATIO IS HIGH, CPU RESOURCES ARE READILY AVAILABLE, AND THE DISPATCHED TASK CAN GET THE CPU THAT IT NEEDS. WHEN IT IS LOW THE TRANSACTION IS STRUGGLING TO GET THAT CPU

- WHEN THE QRCPU / QRDISPT RATIO IS LOWER, EACH TASK SPENDS LONGER ON THE QR TCB. IT TAKES MORE TIME ON THE QR TCB TO EXECUTE THE SAME PATHLENGTH OF INSTRUCTIONS.

- WITHIN A BUSY SYSTEM IT IS NORMAL FOR CICS WORK TO QUEUE FOR PROCESSOR RESOURCE, THEREFORE A DISPATCH RATIO OF LESS THAN 100% IS ACCEPTABLE. HOWEVER, A CICS REGION MAY SUFFER PERFORMANCE PROBLEMS SUCH (I.E. POOR TRANSACTION RESPONSE TIMES) IF THIS RATIO FALLS TO A LOW VALUE. A LOW VALUE FOR THE QR TCB CPU DISPATCH RATIO IS TYPICALLY LESS THAN 70%

COMMON REASONS FOR A LOW RATIO

- THE LPAR IS BUSY. THE CICS REGION IS COMPETING WITH OTHER ADDRESS SPACES FOR CPU AND THE OPERATING SYSTEM CANNOT ALLOCATE PROCESSOR RESOURCE WHEN REQUESTED.
- THE LPAR FAIR SHARE IS REACHED OR CAPPED. THE OPERATING SYSTEM HAS DISPATCHED THE CICS QR TCB ONTO A LOGICAL PROCESSOR, BUT THE HARDWARE CANNOT DISPATCH THE LOGICAL PROCESSOR ONTO A PHYSICAL PROCESSOR.
- CICS IS SUBJECT TO CAPPED RESOURCES IN THE LPAR. THE LPAR MAY NOT BE FULLY UTILIZED, BUT OPERATING SYSTEM CONTROLS HAVE RESTRICTED THE AMOUNT OF PROCESSOR RESOURCE AVAILABLE TO THE CICS REGION.
- APPLICATION CODE ISSUING NON-CICS API REQUESTS (FOR EXAMPLE, MVS MACRO REQUESTS) WHICH RESULT IN THE QR TCB BEING BLOCKED UNTIL THE REQUEST COMPLETES.
- EXCESSIVE SYSTEM PAGING IS TAKING PLACE.

HOUSTON, WE HAVE A PROBLEM

- SUDDENLY DURING BUSINESS HOURS, YOU RECEIVE ALERTS FROM YOUR AUTOMATION HINTING A BIT OF PERFORMANCE DEGRADATION FOR ALL THE TRANSACTIONS RUNNING IN CICSRGNA. THERE DOES NOT APPEAR TO BE ANYTHING THAT HAS LED TO THIS AND THERE HAVE BEEN NO CHANGES TO THE REGION (OR ITS APPLICATIONS) THAT WOULD HAVE LED TO THIS BEHAVIOR.
- THIS PROBLEM DOES NOT LAST A LONG TIME, BUT YOU NEED TO UNDERSTAND THE CAUSE OF THE PROBLEM AND WHAT CAN BE DONE TO TRY AND AVOID IT
- YOU HAVE COLLECTED A CONSOLE DUMP TAKEN DURING THE PERFORMANCE BLIP ALONG WITH THE SMF RECORDS THAT COVER THE TIME BEFORE, DURING AND AFTER THE PROBLEM.

DISPATCHER (DS) DOMAIN

- LOOKING IN THE DUMP HERE IS WHAT THE DISPATCHER DOMAIN SHOWS:

```
IPCS OUTPUT STREAM ------------------------------------------------------------------------------------------ Line 2778 Cols 1 130
 DS_TOKEN KE_TASK  T S F P TT RESOURCE RESOURCE_NAME    W TIME OF      TIMEOUT      DTA      AD ATTACHER MD SUSPAREA XM_TXN_TOKEN
                             TYPE                        SUSPEND      DUE          (DSTSK)     TOKEN

 0682D805 2F7FAE00 N D                                                            6CE20200 XM 30481D00 QR          30481D00002592
 0684350B 3013E000 N D                                                            6CE20380 XM 3509B700 QR          3509B700002594
 068649F3 3DA52E00 N D                                                            6CE20500 XM 37BAA100 QR          37BAA100002666
 068A22BC 2F74B000 N D                                                            6CE20800 XM 31727400 QR          31727400002659
 0690B487 307DE000 N D                                                            6CE20C80 XM 30825400 QR          30825400002646
 070E5302 307FD600 N D                                                            6CE21B00 XM 3509BA00 QR          3509BA00002587
 078499D0 2FD67000 N D                                                            6CE22380 XM 3F315A00 QR          3F315A00002587
 078C3C5B 2FEAA000 N D                                                            6CE22980 XM 34C6D400 QR          34C6D400002585
 0790BBE0 2FCBD000 N D                                                            6CE22C80 XM 30423A00 QR          30423A00002589
 08083319 37BA3000 N D                                                            6CE23680 XM 30825D00 QR          30825D00002572
 080A0252 3D9F0000 N D                                                            6CE23800 XM 39844A00 QR          39844A00002591
 0886A49A 2F593000 N D                                                            6CE2D500 XM 30153400 QR          30153400002617
 090C54A4 300FDA00 N D                                                            6CE2E980 XM 4035BA00 QR          4035BA00002669
 090E9EDC 2F5FBE00 N D                                                            6CE2EB00 XM 3E4C0D00 QR          3E4C0D00002665
 091088AE 3033F000 N D                                                            6CE2EC80 XM 30239700 QR          30239700002586
 0984D67E 3006F000 N D                                                            6CE2F380 XM 301B1D00 QR          301B1D00002589
 098A330B 2F9BA000 N D                                                            6CE2F800 XM 2FF18400 QR          2FF18400002663
 098E3F2D 3D7BAA00 N D                                                            6CE2FB00 XM 30239A00 QR          30239A00002566
 09922D41 30672000 N D                                                            6CE2FE00 XM 30239D00 QR          30239D00002566
 0A080F3C 307FA400 N D                                                            6CE30680 XM 3D7DA100 QR          3D7DA100002663
 0A10278B 2F763000 N D                                                            6CE30C80 XM 3DA4F700 QR          3DA4F700002635
 0A8282D0 35BE8000 N D                                                            6CE31200 XM 36ABD700 QR          36ABD700002594
Command ===>                                                                                          SCROLL ===> CSR
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DISPATCHER DOMAIN

- WHAT WE NOTICE ON THE PREVIOUS SCREEN IS MANY TASKS WHO HAVE A TASK STATUS OF D (DISPATCHABLE) AND THE TCB THAT THEY ARE WAITING ON IS THE QR
- THERE IS ONLY 1 QR TCB PER CICS REGION AND ONLY ONE TRANSACTION IS ALLOWED TO RUN ON IT AT ANY GIVEN TIME
- AS THERE IS ONLY 1 QR THERE IS COMPETITION FOR IT, BUT UNDER 'NORMAL' CIRCUMSTANCES TRANSACTIONS ARE ABLE TO GET ON AND OFF THE QR TCB WHEN THEY NEED TO AND PERFORM THEIR WORK
- IN THE CASE WHERE THERE ARE MANY TRANSACTIONS IN THIS DISPATCHABLE STATE LIKE THIS, IT IS A CLEAR INDICATION THAT THERE IS A PROBLEM GOING ON (IN SOME FORM OR FASHION) RELATED TO THE QR. POSSIBLE REASONS COULD BE:
  - THERE IS A TRANSACTION THAT IS MONOPOLIZING THE QR TCB
  - THE CICS REGION HAS ACCESS TO AMPLE CPU BUT THE QR IS UNABLE TO KEEP UP WITH THE AMOUNT OF WORK THAT IS BEING THROWN AT IT
  - THE QR TCB IS NOT GETTING THE CPU THAT IT NEEDS TO HANDLE THIS WORKLOAD

TASK SUMMARY (TK) DOMAIN

```
IPCS OUTPUT STREAM ------------------------------------------------------------------------------- Line 1407 Cols 1 130
 ---------------------------------------------------------------------------------------------------------------------
 Tran  Tran Term SC Primary  W  Start Time    Time entered       Elapsed       Total CPU  Current S Resource Resource        F Abe
 num   id   ID      Client       (LOCAL)      Current state       Time          Time       TCB      Type     Name              Cod
 ---------------------------------------------------------------------------------------------------------------------
 25846 SHR3 N/A  T  MRO sess N  09:53:51.455  09:53:56.272  000:00:00:05.693  00:00.002476 QR     D                          N
 25847 SHR3 N/A  T  MRO sess N  09:53:51.455  09:53:56.293  000:00:00:05.693  00:00.002517 QR     D                          N
 25850 SHR3 N/A  T  MRO sess N  09:53:51.455  09:53:56.323  000:00:00:05.693  00:00.007019 QR     D                          N
 25852 SHR3 N/A  T  MRO sess N  09:53:51.455  09:53:56.365  000:00:00:05.693  00:00.002979 QR     D                          N
 25853 SHR3 N/A  T  MRO sess N  09:53:51.455  09:53:56.395  000:00:00:05.693  00:00.003703 QR     D                          N
 25858 SHR1 N/A  SD Start    N  09:53:51.496  09:53:56.333  000:00:00:05.652  00:00.028027 QR     D                          N
 25859 SHR3 N/A  T  MRO sess N  09:53:51.507  09:53:56.400  000:00:00:05.641  00:00.002305 QR     D                          N
 25860 SHR3 N/A  T  MRO sess N  09:53:51.507  09:53:56.410  000:00:00:05.641  00:00.002654 QR     D                          N
 25863 SHR3 N/A  T  MRO sess N  09:53:51.507  09:53:56.411  000:00:00:05.641  00:00.002733 QR     D                          N
 25865 SHR3 N/A  T  MRO sess N  09:53:51.507  09:53:56.426  000:00:00:05.641  00:00.003579 QR     D                          N
 25868 SHR3 N/A  T  MRO sess N  09:53:51.560  09:53:56.427  000:00:00:05.589  00:00.002097 QR     D                          N
 25869 SHR3 N/A  T  MRO sess N  09:53:51.560  09:53:56.518  000:00:00:05.589  00:00.002246 QR     D                          N
 25870 SHR3 N/A  T  MRO sess N  09:53:51.560  09:53:56.545  000:00:00:05.589  00:00.008009 QR     D                          N
 25871 SHR3 N/A  T  MRO sess N  09:53:51.560  09:53:56.555  000:00:00:05.588  00:00.008249 QR     D                          N
 25873 SHR3 N/A  T  MRO sess N  09:53:51.560  09:53:56.589  000:00:00:05.588  00:00.005207 QR     D                          N
 25875 SHR3 N/A  T  MRO sess N  09:53:51.560  09:53:56.605  000:00:00:05.588  00:00.002803 QR     D                          N
 25885 SHR1 N/A  T  MRO sess N  09:53:51.615  09:53:56.576  000:00:00:05.533  00:00.043954 QR     D                          N
 25894 SHR3 N/A  T  MRO sess N  09:53:51.668  09:53:56.716  000:00:00:05.480  00:00.008795 QR     D                          N
 25895 SHR3 N/A  T  MRO sess N  09:53:51.668  09:53:56.729  000:00:00:05.480  00:00.006108 QR     D                          N
 25896 SHR3 N/A  T  MRO sess N  09:53:51.668  09:53:56.741  000:00:00:05.480  00:00.004693 QR     D                          N
 25860 SHR3 N/A  T  MRO sess N  09:53:51.507  09:53:56.410  000:00:00:05.641  00:00.002654 QR     D                          N
Command ===>                                                                                  SCROLL ===> CSR
```

TASK SUMMARY (TK) DOMAIN

- THE TK DOMAIN ALLOWS US TO SEE JUST HOW LONG THE TRANSACTIONS HAVE BEEN AROUND, HOW MUCH CPU THEY HAVE USED AND WHEN THEY ENTERED THE CURRENT STATE THAT THEY ARE IN
- MANY OF THESE TASKS, HAVE BEEN AROUND FOR 5+ SECONDS, BUT HAVE USED VERY LITTLE CPU (THERE DOES NOT APPEAR TO BE A QR HOG) YET FOR SOME REASON THEY ARE UNABLE TO EFFICIENTLY RUN TO COMPLETION
- GIVEN THAT WE HAVE A SNAPSHOT OF THE REGION AND THE TRANSACTIONS WITHIN IT, LETS TAKE A LOOK AT THE SMF 110 DATA TO SEE WHAT WE CAN LEARN FROM THAT

REVIEWING THE SMF 110 DATA

- WHEN ANALYZING THESE PROBLEMS, IT IS GOOD TO EVENTUALLY DRILL DOWN TO LOOK AT THE TRANSACTION WORKLOAD ON 1-MINUTE INTERVALS WHEN APPROPRIATE. THAT LEVEL OF GRANULARITY ALLOWS YOU TO BE VERY SPECIFIC (TIMEFRAME WISE) IN EXPLAINING EXACTLY WHEN THE PROBLEM OCCURS.
- IN THIS SCENARIO WE ARE NOT QUITE SURE (AS OF YET) EXACTLY WHY THE TRANSACTIONS ARE NOT ABLE TO RUN AS THEY NORMALLY WOULD, BUT WE DO KNOW THAT THERE APPEARS TO BE ISSUES WITH THE ABILITY FOR THOSE TRANSACTIONS TO GET DISPATCHED ON THE QR AND RUN. KNOWING THAT HERE ARE SOME KEY MONITORING FIELDS TO FOCUS ON:

  - **DISPWTT**
  - **USRCPUT**
  - **QRCPUT**
  - **QRDISPT**
  - **DSPDELAY**

REVIEWING THE SMF 110 DATA

- **DISPWTT (DISPWAIT)** - ELAPSED TIME FOR WHICH THE USER TASK WAITED FOR REDISPATCH
- **DSPDELAY (DISP1DLY)** - THE ELAPSED TIME WAITING FOR FIRST DISPATCH.
- **USRCPUT (USER CPU)** - PROCESSOR TIME FOR WHICH THE USER TASK WAS DISPATCHED ON EACH CICS TCB UNDER WHICH THE TASK RAN.
- **QRCPUT (QR CPU)** - THE PROCESSOR TIME FOR WHICH THE USER TASK WAS DISPATCHED ON THE CICS QR TCB
- **QRDISPT (QR DISP)** - THE ELAPSED TIME FOR WHICH THE USER TASK WAS DISPATCHED ON THE CICS QR TCB

- PERFORMANCE DATA IN GROUP DFHTASK

REVIEWING THE SMF 110 DATA

START INTERVAL	#TASKS	AVG RESPONSE TIME	AVG DISPWAIT TIME	TOTAL USER CPU TIME	AVG QR CPU TIME	AVG QR DISP TIME	TOTAL QR DISP TIME	AVG DISP1DLY TIME
09:48:00	5762	.024121	.001861	23.31709	.003885	.004117	23.72177	.000201
09:49:00	5523	.028967	.002330	23.91567	.004120	.004359	24.07291	.000711
09:50:00	6165	.026509	.002287	25.10724	.003887	.004092	25.22940	.000279
09:51:00	6350	.037175	.004307	26.91790	.004023	.004324	27.45608	.001661
09:52:00	5935	.041847	.006462	23.78376	.003812	.004884	28.98415	.002395
09:53:00	5893	.063511	.013308	25.57677	.004136	.006135	36.15402	.007245
09:54:00	5568	.056237	.010682	24.74491	.004224	.006383	35.54083	.004699
09:55:00	5843	.062793	.011995	25.21470	.004126	.006373	37.23984	.005543
09:56:00	5030	.144743	.049575	22.13297	.004236	.008904	44.78731	.033701
09:57:00	5698	.330714	.162426	24.60503	.004117	.008716	49.66267	.083474
09:58:00	5483	1.392818	.701716	25.37408	.004403	.010681	58.56443	.361033
09:59:00	5917	.344228	.148105	25.59669	.004136	.008330	49.28647	.093377
10:00:00	5364	.058386	.012170	24.25390	.004312	.005688	30.51115	.005586
10:01:00	5360	.023562	.001635	22.02851	.003919	.004118	22.07514	.000345
10:02:00	5803	.029697	.002745	23.93415	.003931	.004140	24.02211	.001571
10:03:00	5684	.028119	.001925	23.33759	.003902	.004088	23.23517	.000216
10:04:00	5475	.032095	.002319	22.72578	.003979	.004179	22.87802	.000549
10:05:00	5165	.030691	.001765	21.38578	.003973	.004151	21.44005	.000121

REVIEWING THE SMF 110 DATA

START INTERVAL	#TASKS	AVG RESPONSE TIME	AVG DISPWAIT TIME	TOTAL USER CPU TIME	AVG QR CPU TIME	AVG QR DISP TIME	TOTAL QR DISP TIME	AVG DISP1DLY TIME
09:48:00	5762	.024121	.001861	23.31709	.003885	.004117	23.72177	.000201
09:49:00	5523	.028967	.002330	23.91567	.004120	.004359	24.07291	.000711
09:50:00	6165	.026509	.002287	25.10724	.003887	.004092	25.22940	.000279
09:51:00	6350	.037175	.004307	26.91790	.004023	.004324	27.45608	.001661
09:52:00	5935	.041847	.006462	23.78376	.003812	.004884	28.98415	.002395
09:53:00	5893	.063511	.013308	25.57677	.004136	.006135	36.15402	.007245
09:54:00	5568	.056237	.010682	24.74491	.004224	.006383	35.54083	.004699
09:55:00	5843	.062793	.011995	25.21470	.004126	.006373	37.23984	.005543
09:56:00	5030	.144743	.049575	22.13297	.004236	.008904	44.78731	.033701
09:57:00	5698	.330714	.162426	24.60503	.004117	.008716	49.66267	.083474
09:58:00	5483	1.392818	.701716	25.37408	.004403	.010681	58.56443	.361033
09:59:00	5917	.344228	.148105	25.59669	.004136	.008330	49.28647	.093377
10:00:00	5364	.058386	.012170	24.25390	.004312	.005688	30.51115	.005586
10:01:00	5360	.023562	.001635	22.02851	.003919	.004118	22.07514	.000345
10:02:00	5803	.029697	.002745	23.93415	.003931	.004140	24.02211	.001571
10:03:00	5684	.028119	.001925	23.33759	.003902	.004088	23.23517	.000216
10:04:00	5475	.032095	.002319	22.72578	.003979	.004179	22.87802	.000549
10:05:00	5165	.030691	.001765	21.38578	.003973	.004151	21.44005	.000121

REVIEWING THE SMF 110 DATA

- YOU CAN SEE IN EACH MINUTE THE NUMBER OF TASKS IS RELATIVELY CONSISTENT, AND THE TOTAL USER CPU IS CONSISTENT THUS THE QR TCB IS NOT 'BUSIER' BECAUSE OF CHANGES IN THOSE THINGS.
- THE BIG CHANGE IS IN THE AMOUNT OF TIME IT TAKES TO USE THAT CPU.
- RIGHT IN THAT 9:52:00 MINUTE WE CAN SEE THAT THE RATIO DROPS PRECIPITOUSLY FROM OVER 90% TO 78%.
- IN THE SUBSEQUENT MINUTES IT DROPS EVEN LOWER, WITH THE WORST PERIOD BEING THE 9:58:00 MINUTE WHERE THE RATIO GETS DOWN TO 41%. THIS SUGGESTS TO US THAT THIS SPECIFIC CICS REGION IS STARVED FOR CPU DURING THIS TIME.

CPU CAPPING

- THIS PARTICULAR PROBLEM WAS THE RESULT OF LPAR CPU CAPPING. FROM THE ONE OF THE PREVIOUS SLIDES, REMEMBER WE MENTIONED THIS AS ONE OF THE POSSIBLE EXPLANATIONS FOR A LOW DISPATCH RATIO:
- *THE LPAR FAIR SHARE IS REACHED OR CAPPED. THE OPERATING SYSTEM HAS DISPATCHED THE CICS QR TCB ONTO A LOGICAL PROCESSOR, BUT THE HARDWARE CANNOT DISPATCH THE LOGICAL PROCESSOR ONTO A PHYSICAL PROCESSOR.*
- *CICS IS SUBJECT TO CAPPED RESOURCES IN THE LPAR. THE LPAR MAY NOT BE FULLY UTILIZED, BUT OPERATING SYSTEM CONTROLS HAVE RESTRICTED THE AMOUNT OF PROCESSOR RESOURCE AVAILABLE TO THE CICS REGION.*
- THE CPU - CPU ACTIVITY REPORT THAT INCLUDES SMF TYPE 70 SUBTYPE 1 (CPU ACTIVITY) RECORDS LEADING UP TO AND INCLUDING THE TIME OF THE PROBLEM TO SHOW YOU IF CPU CAPPING IS OCCURRING DUE TO LIMITS THAT HAVE BEEN SET.

CPU ACTIVITY REPORT

- HERE IS AN EXAMPLE OF OUTPUT FROM THAT THAT REPORT ON AN LPAR WHERE THERE WERE REGIONS EXPERIENCING POOR RATIOS. THE DATA COMES FROM THE PARTITION DATA REPORT SECTION OF THE CPU ACTIVITY REPORT. IT SHOWS, FOR SEVERAL CONSECUTIVE 5-MINUTE INTERVALS, HOW MANY MSUS SHARLPAR WAS USING AND WHAT THE DEFINED CAPACITY IS:

```
           ------------ PARTITION DATA ------------------ -----------
                                ----MSU----   --CAPPING--- --PROCESSOR
           NAME        S BT WGT    DEF     ACT   DEF      WLM%    NUM   TYPE
12:09:00 SHARLPAR    A    139    300     392   N N N     0.0      5   CP
12:14:00 SHARLPAR    A    139    300     435   N N N     0.0      5   CP
12:19:00 SHARLPAR    A    139    300     399   N N N    13.8      5   CP
12:24:00 SHARLPAR    A    139    300     299   N N N   100.0      5   CP
12:29:00 SHARLPAR    A    139    300     290   N N N   100.0      5   CP
12:34:00 SHARLPAR    A    139    300     298   N N N   100.0      5   CP
12:39:00 SHARLPAR    A    139    400*    213   N N N    27.6      5   CP
12:44:00 SHARLPAR    A    139    400     134   N N N     0.0      5   CP
```

CPU ACTIVITY REPORT

- ACT IS THE ACTUAL MSUS USED. WLM% IS THE PERCENTAGE OF TIME WHEN WLM CAPPED THE PARTITION.
- YOU CAN SEE THAT IN THE FIRST INTERVALS SHARLPAR WAS USING MORE THAN ITS DEFINED CAPACITY OF 300.
- IN THE 12:19:00 INTERVAL YOU CAN SEE THAT, FOR THE FIRST TIME, WLM STARTS CAPPING THE LPAR. (NOTE THE 13.8% WLM CAPPING FIGURE.)
- THEN WLM CAPS 100% OF THE TIME FOR SEVERAL INTERVALS. THIS CAUSES THE ACTUAL MSUS USED TO DROP TO THE 300 CAPACITY LIMIT. THIS SEVERELY IMPACTS ALL APPLICATIONS ON THE LPAR. THEY ARE STARVED FOR CPU AND CICS TRANSACTIONS WERE SLOW DURING THE PROBLEM PERIOD.
- IN THIS CASE YOUR CICS REGION WAS A VICTIM TO LPAR WIDE PROBLEMS THAT WERE GOING ON OUTSIDE OF THIS REGION.

EXAMPLE 2: QR TCB SATURATION

QR TCB SATURATION

- A COMMON CAUSE OF CICS TRANSACTION RESPONSE TIME (OR PERFORMANCE) PROBLEMS IS A QR TCB THAT IS TOO BUSY. IN ANY GIVEN INTERVAL OF TIME, THE QR TCB WILL SPEND PART OF THAT INTERVAL IN DISPATCH TIME, AND PART IN WAIT TIME. THE QR TCB DISPATCH / INTERVAL RATIO IS A WAY TO DESCRIBE AND MEASURE HOW BUSY A CICS REGION'S QR TCB IS.
- LET'S SAY WE ARE OBSERVING TRANSACTIONS RUNNING ON 10-MINUTE INTERVAL OF TIME, AND DURING THOSE 10 MINUTES THE QR TCB HAS A TOTAL OF 7 MINUTES OF DISPATCH TIME AND 3 MINUTES OF WAIT TIME. THE QR TCB DISPATCH / INTERVAL RATIO FOR THAT INTERVAL IS 70%. THE QR TCB IS 70% SATURATED IN THAT INTERVAL. (6 MINUTES OF DISPATCH TIME DIVIDED BY THE 10 MINUTES OF INTERVAL TIME.)
- IF THE QR TCB IS 100% SATURATED FOR AN INTERVAL, THAT MEANS THAT THE QR TCB IS VERY BUSY. WHENEVER A CICS TRANSACTION GIVES CONTROL OF THE QR TCB BACK TO THE CICS DISPATCHER, THERE IS ALWAYS ANOTHER TRANSACTION READY TO RUN. THE CICS DISPATCHER NEVER PUTS THE QR TCB INTO A NO-WORK MVS WAIT BECAUSE THERE IS ALWAYS ANOTHER TRANSACTION WAITING TO BE GIVEN CONTROL OF THE QR TCB BY THE CICS DISPATCHER.

QR TCB SATURATION

- IF THE QR TCB BECOMES TOO BUSY AND TOO SATURATED, IT BECOMES A BOTTLENECK POINT THAT CAUSES TRANSACTION RESPONSE TIMES TO INCREASE.
- THE CLOSER THE QR TCB DISPATCH / INTERVAL RATIO GETS TO THE 90% RANGE AND HIGHER, THERE WILL BE MORE AND MORE TIMES WHERE LOTS OF TRANSACTIONS ARE ALL READY TO RUN ON THE QR TCB AT THE SAME TIME.
- ONLY ONE TRANSACTION AT A TIME RUNS ON THE QR TCB, WHILE THE OTHER TRANSACTIONS JUST WAIT.

HOUSTON, WE HAVE A PROBLEM (AGAIN)

- HOW WOULD A SITUATION LIKE THIS MANIFEST ITSELF IN THE SMF 110 DATA? LET'S TAKE A LOOK.
- IN THIS SCENARIO, LETS IMAGINE THAT INSTEAD OF THE MINUTES LONG PROBLEM THAT WE OBSERVED IN THE PREVIOUS EXAMPLE WE ARE NOW DEALING WITH A PROBLEM THAT LASTED HOURS LONG DURING MARKET OPEN.
- ONE OF OUR SYSTEM PROGRAMMERS OBSERVED THAT THERE WERE TRANSACTIONS BACKING UP IN TCLASS SUSPENDS AND ARE NOT SURE HOW THAT FACTORS INTO THE PROBLEM.
- THE REGION THAT IS ENCOUNTERING THE PROBLEM IS HOSED UP IN SUCH A WAY THAT YOU ARE UNABLE TO GET INTO THE REGION TO GET A SYSTEM DUMP AND ALL AVAILABLE RESOURCES HAVE BEEN ALLOCATED TO TRY AND GET THE REGION BACK IN WORKING ORDER SO THERE ARE NO CONSOLE DUMPS. ALL WE HAVE ARE SMF 110 RECORDS.
- TO WHAT LEVEL CAN WE UNDERSTAND THE PROBLEM AND WHAT KINDS OF SUGGESTIONS CAN WE COME UP WITH BASED ON THAT?

REVIEWING THE SMF DATA

- IN THIS SCENARIO WE ARE SURE WHY THE TRANSACTIONS ARE NOT ABLE TO RUN AS THEY NORMALLY WOULD, BUT WE DO KNOW THAT THERE APPEARS TO BE ISSUES WITH THE ABILITY FOR THOSE TRANSACTIONS TO GET DISPATCHED ON THE QR AND RUN.
- WE ALSO KNOW THAT THIS IS NOT A SITUATION WHERE THERE IS A LACK OF AVAILABLE CPU AS WE HAVE ELIMINATED THAT AS A POSSIBLE SOLUTION.
- IN THIS CASE WE LOOK AT SOME OF THE SAME FIELDS THAT WE FOCUSED ON BEFORE AND WE WILL ALSO INCLUDE ADDITIONAL FIELDS SUCH AS:

  - **QRMODDLY** - THE ELAPSED TIME FOR WHICH THE USER TASK WAITED FOR REDISPATCH ON THE CICS QR MODE TCB
  - **TCLDELAY** - THE ELAPSED TIME WAITING FOR FIRST DISPATCH, WHICH WAS DELAYED BECAUSE OF THE LIMITS SET FOR THE TRANSACTION CLASS OF THIS TRANSACTION

REVIEWING THE SMF DATA

- HERE IS HOW THINGS LOOK DURING 'GOOD' PERIODS DURING THE MORNING:

START INTERVAL	#TASKS	AVG RESPONSE TIME	AVG DISPATCH TIME	AVG SUSPEND TIME	AVG QR CPU TIME	AVG QR DISP TIME	TOTAL QR DISP TIME	AVG DISPWAIT TIME	AVG DISP1DLY TIME	AVG QRMODDLY TIME	AVG TCLDELAY TIME
09:00:00	8292	.0921	.0066	.0855	.0055	.0058	48.1345	.0256	.0317	.0254	.0000
09:01:00	8241	.0579	.0065	.0514	.0054	.0057	46.9250	.0119	.0144	.0117	.0000
09:02:00	8051	.0966	.0068	.0898	.0056	.0060	48.2237	.0277	.0356	.0274	.0000
09:03:00	7900	.0501	.0067	.0434	.0054	.0058	45.4634	.0102	.0090	.0099	.0000
09:04:00	8191	.0721	.0065	.0656	.0054	.0057	46.6622	.0177	.0224	.0174	.0000
09:05:00	8280	.0784	.0066	.0717	.0055	.0059	48.6219	.0191	.0259	.0188	.0000
09:06:00	7709	.0609	.0067	.0542	.0055	.0059	45.6167	.0135	.0153	.0132	.0000
09:07:00	8412	.0672	.0068	.0604	.0054	.0060	50.1140	.0148	.0196	.0144	.0000
09:08:00	8666	.0770	.0067	.0703	.0054	.0059	50.7357	.0197	.0251	.0194	.0000
09:09:00	8298	.0546	.0063	.0483	.0051	.0055	45.2774	.0112	.0122	.0109	.0000
.....											
10:22:00	7914	.0562	.0065	.0498	.0052	.0056	44.3974	.0123	.0140	.0121	.0000
10:23:00	8498	.0668	.0065	.0603	.0053	.0057	48.0628	.0143	.0178	.0140	.0000
10:24:00	8939	.1059	.0068	.0991	.0055	.0059	52.9644	.0295	.0419	.0292	.0000
10:25:00	8660	.0860	.0067	.0793	.0054	.0058	50.1382	.0212	.0312	.0209	.0000
10:26:00	7828	.0554	.0067	.0487	.0054	.0057	44.9417	.0115	.0123	.0112	.0000
10:27:00	8053	.0621	.0065	.0555	.0053	.0057	46.2320	.0142	.0165	.0139	.0000
10:28:00	8156	.0499	.0065	.0433	.0053	.0057	46.6322	.0096	.0086	.0093	.0000
10:29:00	8239	.0574	.0066	.0509	.0053	.0056	46.3759	.0117	.0122	.0115	.0000

REVIEWING THE SMF DATA

- ONCE AGAIN, WE ARE SUMMARIZING THINGS ON A 1-MINUTE INTERVAL TO FIND A MORE PRECISE INDICATION OF WHEN THINGS STARTED TO GO AWRY
- THIS ALSO ALLOWS US TO FORMULATE SOMEWHAT OF A BASELINE OF VALUES FOR COMPARISON DURING THE TIMES OF POOR PERFORMANCE

REVIEWING THE SMF DATA

- HERE IS HOW THINGS LOOK DURING 'BAD' PERIODS DURING THE MORNING:

START INTERVAL	#TASKS	AVG RESPONSE TIME	AVG DISPATCH TIME	AVG SUSPEND TIME	AVG QR CPU TIME	AVG QR DISP TIME	TOTAL QR DISP TIME	AVG DISPWAIT TIME	AVG DISP1DLY TIME	AVG QRMODDLY TIME	AVG TCLDELAY TIME
09:12:00	9911	.2578	.0066	.2512	.0054	.0057	56.8290	.0948	.1199	.0945	.0000
09:13:00	9640	.7736	.0070	.7667	.0056	.0060	58.1003	.3624	.3349	.3620	.0009
09:14:00	9139	1.4958	.0071	1.4886	.0058	.0062	57.0558	.6218	.7461	.6215	.1980
09:15:00	9155	1.6635	.0074	1.6562	.0058	.0063	57.8252	.6623	.8917	.6619	.3171
09:16:00	9199	2.0000	.0071	1.9929	.0058	.0063	57.5012	.6242	1.2598	.6239	.6994
09:17:00	9405	2.1690	.0068	2.1622	.0057	.0060	56.8271	.5760	1.4799	.5757	.9478
09:18:00	9293	2.4669	.0074	2.4596	.0058	.0062	57.5689	.6340	1.7348	.6337	1.1670
09:19:00	9163	2.5918	.0081	2.5837	.0058	.0063	57.4980	.6312	1.8676	.6309	1.2909
09:20:00	8800	2.8055	.0076	2.7980	.0060	.0064	56.3172	.6409	2.0592	.6405	1.4886
09:21:00	8993	2.5169	.0072	2.5096	.0059	.0063	56.7875	.6299	1.7841	.6296	1.2278
09:22:00	9519	2.5755	.0072	2.5683	.0057	.0061	57.6097	.6053	1.8448	.6050	1.2900
09:23:00	9060	2.7462	.0077	2.7385	.0059	.0063	57.1466	.6229	2.0110	.6226	1.4444
09:24:00	8825	2.7640	.0073	2.7567	.0059	.0064	56.6692	.6225	2.0135	.6222	1.4474
09:25:00	8722	2.7446	.0076	2.7370	.0060	.0065	56.3689	.6443	1.9682	.6440	1.4112
09:26:00	9250	2.6478	.0070	2.6408	.0057	.0061	56.6389	.6002	1.9465	.5998	1.3710
09:27:00	9250	2.6725	.0071	2.6654	.0058	.0062	57.1936	.6072	1.9591	.6069	1.4088
09:28:00	9208	2.5935	.0072	2.5863	.0058	.0062	57.1859	.6288	1.8414	.6285	1.3011
09:29:00	8783	2.7830	.0074	2.7756	.0060	.0065	56.8457	.6429	2.0287	.6425	1.4533
09:30:00	8333	2.8917	.0079	2.8838	.0061	.0067	55.7039	.7393	2.0391	.7389	1.4511
09:31:00	8672	2.7430	.0078	2.7352	.0059	.0065	56.0154	.6488	1.9825	.6485	1.4256
09:32:00	8711	2.8326	.0075	2.8251	.0061	.0066	57.4450	.6658	2.0531	.6654	1.4654
09:33:00	8496	2.7487	.0076	2.7411	.0061	.0066	55.8901	.6697	1.9580	.6694	1.3879

REVIEWING THE SMF DATA

- ‘BAD’ TIMES (CONTINUED)

START INTERVAL	#TASKS	AVG RESPONSE TIME	AVG DISPATCH TIME	AVG SUSPEND TIME	AVG QR CPU TIME	AVG QR DISP TIME	TOTAL QR DISP TIME	AVG DISPWAIT TIME	AVG DISP1DLY TIME	AVG QRMODDLY TIME	AVG TCLDELAY TIME
09:34:00	8964	2.5566	.0074	2.5491	.0059	.0064	57.0524	.6609	1.7684	.6605	1.2193
09:35:00	9151	2.6722	.0073	2.6650	.0058	.0063	57.3361	.6673	1.8975	.6670	1.3200
09:36:00	8941	2.7491	.0073	2.7418	.0059	.0063	56.6138	.6560	1.9749	.6557	1.4082
09:37:00	9243	2.7629	.0073	2.7556	.0059	.0062	57.7509	.6912	1.9352	.6909	1.3736
09:38:00	9243	11.6115	.0088	11.6027	.0070	.0074	68.7098	1.0983	10.2564	1.0979	9.5308
09:39:00	9300	33.9497	.0140	33.9357	.0109	.0115	107.0098	2.0935	31.0934	2.0927	30.3577
09:40:00	8764	83.6552	.0059	83.6493	.0050	.0053	46.8488	.6037	82.9526	.6035	82.3400
09:41:00	8654	68.8386	.0059	68.8327	.0051	.0054	46.4563	.7178	68.0274	.7175	67.3457
09:42:00	8054	49.1083	.0060	49.1023	.0050	.0054	43.2150	.8160	48.1626	.8158	47.4026
09:43:00	8104	35.2374	.0059	35.2315	.0050	.0054	43.4668	.6282	34.5048	.6281	33.8726
09:44:00	8180	24.3347	.0055	24.3292	.0046	.0050	40.8783	.3336	23.9447	.3334	23.5254
09:45:00	8205	6.5122	.0064	6.5058	.0051	.0055	45.4901	.3650	6.0946	.3648	5.6876
09:46:00	9194	2.3323	.0072	2.3251	.0057	.0062	56.9666	.6450	1.5728	.6447	1.0113

REVIEWING THE SMF DATA

- IN THOSE MINUTE INTERVALS YOU SEE DURING THE PROBLEM TIME PERIOD THAT THE TOTAL QR DISPATCH TIME FOR THE INTERVAL IS CONSISTENTLY NEAR THE 60 SECOND RANGE.
- DURING THIS PERIOD THE QR TCB IS VERY SATURATED, AND THE NUMBER OF ACTIVE TRANSACTIONS HAVE INCREASED
- THIS IS ACCOMPANIED BY AN INCREASE IN DISP1DLY (WAIT FOR 1ST DISPATCH), DISPWAIT (WAITING FOR REDISPATCH) AND QRMODDLY (WAITING FOR REDISPATCH ON THE QR TCB SPECIFICALLY).
- AS TIMES GO ON AND THINGS SLOW DOWN MORE, THIS LEADS TO TRANSACTIONS WAITING FOR TCLASS REASONS AS THE TRANSACTIONS ARE NOT GETTING IN AND OUT OF THE REGION AS FAST AS NORMAL AND THINGS START BACKING UP. BUT THESE ARE DOWNSTREAM PROBLEMS THAT ARE FALLOUT FROM THE BOTTLENECK THAT IS LEADING UP TO IT

THE QR TCB IS SATURATED, WHAT NOW?

- A CICS REGION WHOSE QR TCB DISPATCH / INTERVAL RATIO IS TOO HIGH IS LIKELY TO EXPERIENCE TRANSACTION RESPONSE TIME PROBLEMS AND WOULD BENEFIT FROM SPLITTING WORKLOAD TO SEPARATE AORS. THIS GIVES YOU MORE THAN ONE QR TCB TO TAKE ADVANTAGE OF AND STOPS THE ISSUE OF TRYING TO SIGN
- IN ADDITION, IF THE WORKLOAD IS ABLE TO TAKE ADVANTAGE OF THREADSAFETY THIS WOULD BE A VALUABLE OPTION AS WELL AS IT WOULD LESSEN THE DEMAND OF THE QR TCB BY TAKING ADVANTAGE OF OPEN TCBS.
- THERE WERE NO DELAYS DUE TO AVAILABLE CPU AND ALL OF THE ACTIVE PROCESSORS WERE BEING USED AND TAKEN ADVANTAGE OF, SO UPGRADING THE HARDWARE WOULDN'T NECESSARILY BE THE BEST (OR MOST COST EFFECTIVE) CHOICE.
- THIS PROBLEM WAS THE RESULT OF A GRADUAL INCREASE IN WORKLOAD OVER TIME. EVENTUALLY THE REGION SIMPLY REACHED A POINT WHERE IT WAS NOT ABLE TO HANDLE THE WORKLOAD THAT WAS BEING THROWN AT IT, AS CURRENTLY INSTITUTED

EXAMPLE 3: TASK SUSPENDS

TASK SUSPENDS

- PERFORMANCE PROBLEMS CAN MANIFEST THEMSELVES IN WAYS THAT AREN'T AS DETRIMENTAL TO THE ENTIRE REGION, JUST A SPECIFIC TRANSACTION
- WHILE THE REST OF THE REGION IS ABLE TO RUN CLEANLY AND SPEEDILY, DEPENDING ON THE IMPORTANCE OF THAT ONE SINGULAR TRANSACTION IT CAN STILL BE OF A MAJOR BUSINESS IMPACT
- WHEN RECENT CHANGES TO A PROGRAM OR TO A DEFINITION IMMEDIATELY PRECEDE THE PROBLEMS WITH THE TRANSACTION, THAT GIVES YOU A POINT OF REFERENCE TO FOCUS ON AS A POSSIBLE CAUSE
- BUT, WHAT IF THE PROBLEM MANIFESTS ITSELF IN A WAY THAT DOES NOT (OUTWARDLY) APPEAR RELEVANT TO THE CHANGE THAT YOU MADE? WHAT IF THE CHANGE REVEALS PROBLEMS THAT HAD BEEN LYING DORMANT IN AN APPLICATION PROGRAM, IN A PIECE OF THE CODE THAT YOU WOULD NOT EVEN CORRELATE WITH YOUR CHANGES?

HOUSTON PLEASE, NO MORE PROBLEMS

- HERE IS THE SITUATION:
- YOU HAVE A PRODUCTION JOB THAT EXECUTES A CICS TRANSACTION (SHNO) IN BATCH. THE FILE (NOLAFILE) OF IMPORTANCE THAT THE TRANSACTION INTERACTS WITH WAS CHANGED FROM A VSAM FILE TO AN RLS. AFTER THIS CHANGE JOBS THAT NORMALLY WOULD TAKE 3 MINUTES TO COMPLETE NOW TAKE 30 (AND SOMETIMES 40) MINUTES TO COMPLETE.
- AS THIS IS A ISSUE THAT IS EASILY REPRODUCED (AS IT HAPPENS EVERY TIME YOU RUN THE JOB) YOU HAVE BEEN ABLE TO COLLECT A DUMP DURING THE RUNNING OF THE JOB, AND SMF 110 DATA WHEN THE FILE WAS DEFINED AS VSAM FILE AND WHEN THE FILE WAS DEFINED AS A RLS FILE.

REVIEWING THE SMF DATA

- LET'S START WITH LOOKING AT THE PERIOD WHEN THINGS WERE RUNNING SMOOTHLY.

- CICS PA HAS REPORT CALLED A 'TRANSACTION FILE USAGE SUMMARY REPORT' THAT IS USEFUL WHEN TRYING TO BREAK OUT FILE USAGE FOR INDIVIDUAL TRANSACTIONS.
- FOR EACH TRANSACTION ID, IT GIVES TRANSACTION IDENTIFICATION AND FILE CONTROL STATISTICS FOLLOWED BY A BREAKDOWN OF FILE USAGE FOR EACH FILE USED BY THE TRANSACTION.
- THIS REQUIRES THAT YOU HAVE RESOURCE CLASS MONITORING TURNED ON IN THIS CICS REGION. THIS CAN BE TURNED ON IN A COUPLE OF WAYS:
  - MNRES=ON (TOGETHER WITH MN=ON) IN THE SIT
  - MASTER TERMINAL COMMAND: CEMT SET MONITOR ON RESRCE
  - API COMMAND FROM WITHIN AN APPLICATION PROGRAM: EXEC CICS SET MONITOR STATUS(ON) RESRCECLASS(RESRCE)

REVIEWING THE SMF DATA

IF RESOURCE CLASS MONITORING IS TURNED ON, YOU WILL SEE SOMETHING LIKE THE FOLLOWING WHEN YOU RUN A TAKEUP ON YOUR SMF DATASET:

```
                CICS PERFORMANCE ANALYZER
                  END OF FILE RECORD COUNTS

 ____________________________________________________________

RECID          RECORD TYPE          COUNT     PCT OF TOTAL
X'30'     PERFORMANCE DICTIONARY         X           X%
X'31'     PERFORMANCE CLASS          XXXXX       XX.XX%
X'35'     RESOURCE USAGE             XXXXX       XX.XX%  <--------
X'41'     EXCEPTION CLASS            XXXXX       XX.XX%
X'51'     CICS STATISTICS            XXXXX       XX.XX%
TOTAL                                XX,XXX      100.00%
TOTAL     SMF RECORDS                XX,XXX
```

REVIEWING THE SMF DATA

- HERE IS THE OUTPUT FROM RUNNING THE FILE USAGE REPORT AGAINST THE SMF DATA COLLECTED WHEN THE FILE WAS A VSAM FILE:

```
                                                    -------START-------  --------STOP-------  -------SYSTEM-------    RECORD
 DDNAME  DATA SET OR LOG STREAM NAME                   DATE       TIME      DATE       TIME    NAME     TYPE   IMAG    COUNT
SMFIN001 CICSRGN.VSAM.SMF                           2023-08-12 01.55.00  2023-08-12 02.15.00  CICSRGN  CICS   IBMS     35112

                                 ********************** FC CALLS ********************** ******** I/O WAITS *******   EXCL    ACCMETH
TRAN           #TASKS                  GET      PUT    BROWSE     ADD    DELETE   TOTAL     FILE      RLS      CFDT   CONTROL  REQUESTS
----           -------          -------- -------- -------- -------- -------- -------- -------- -------- -------- -------- --------
SHNO             1472 ELAPSE AVG                                                          .0049    .0000    .0000    .0000
                      ELAPSE MAX                                                          .0173    .0000    .0000    .0000
                      COUNT  AVG       9        6        0        0        0       19       11        0        0        0       30
                      COUNT  MAX      12        9        1        0        1       25       20        0        0        0       41

                                 ********************** FC CALLS ********************** ******** I/O WAITS *******   EXCL    ACCMETH
     FILE      #TASKS                  GET      PUT    BROWSE     ADD    DELETE   TOTAL     FILE      RLS      CFDT   CONTROL  REQUESTS
     --------  -------          -------- -------- -------- -------- -------- -------- -------- -------- -------- -------- --------
     NOLAFILE     1471 ELAPSE AVG    .0006    .0006    .0000    .0000    .0000    .0012    .0011    .0000    .0000    .0000
                      ELAPSE MAX    .0032    .0052    .0000    .0000    .0000    .0056    .0055    .0000    .0000    .0000
                      COUNT  AVG       1        1        0        0        0        2        2        0        0        0        4
                      COUNT  MAX       1        1        0        0        0        2        4        0        0        0        4
```

REVIEWING THE SMF DATA

- FOR THE NOLAFILE FILE (WHICH AT THE TIME OF THIS SMF DATA WAS NOT AN RLS FILE) WE CAN SEE THAT IT HAS A SMALL AMOUNT OF TIME ATTRIBUTED TO FILE I/O WAIT AND NO TIME ATTRIBUTED TO RLS I/O WAITS.

- NOW LET'S LOOK AT THE SHNO TRANSACTIONS ON AN INDIVIDUAL BASIS (LISTX REPORT):

REVIEWING THE SMF DATA

START TIME	TASKNO	OTRAN	OTASKNO	RESPONSE TIME	SUSPEND TIME	CICSWAIT TIME	CICSWAIT COUNT	FC WAIT TIME	RLS WAIT TIME	FC TOTAL	FCAMRQ
02:01:27	25640	SHNO	25640	9.3367	9.1749	9.1618	1472	.0000	.0000	0	0
02:01:27	25641	SHNO	25640	.0090	.0072	.0000	0	.0071	.0000	25	41
02:01:27	25642	SHNO	25640	.0079	.0064	.0000	0	.0063	.0000	25	41
02:01:27	25643	SHNO	25640	.0079	.0063	.0000	0	.0062	.0000	25	41
02:01:27	25644	SHNO	25640	.0079	.0062	.0000	0	.0062	.0000	25	41
02:01:27	25645	SHNO	25640	.0073	.0058	.0000	0	.0058	.0000	25	41
02:01:27	25646	SHNO	25640	.0075	.0059	.0000	0	.0058	.0000	25	41
02:01:27	25647	SHNO	25640	.0073	.0059	.0000	0	.0058	.0000	25	41
02:01:27	25648	SHNO	25640	.0072	.0057	.0000	0	.0056	.0000	25	41
02:01:27	25649	SHNO	25640	.0076	.0061	.0000	0	.0061	.0000	25	41
02:01:27	25650	SHNO	25640	.0078	.0065	.0000	0	.0064	.0000	25	41
02:01:27	25651	SHNO	25640	.0073	.0059	.0000	0	.0059	.0000	25	41
02:01:27	25652	SHNO	25640	.0082	.0067	.0000	0	.0067	.0000	25	41
02:01:27	25653	SHNO	25640	.0081	.0067	.0000	0	.0066	.0000	25	41
02:01:27	25654	SHNO	25640	.0084	.0069	.0000	0	.0069	.0000	25	41
02:01:27	25655	SHNO	25640	.0078	.0064	.0000	0	.0064	.0000	25	41
02:01:27	25656	SHNO	25640	.0078	.0064	.0000	0	.0064	.0000	25	41
02:01:27	25657	SHNO	25640	.0050	.0039	.0000	0	.0039	.0000	17	25
02:01:27	25658	SHNO	25640	.0053	.0040	.0000	0	.0040	.0000	17	25

REVIEWING THE SMF DATA

- SHNO TRANSACTION 25640 IS THE ORIGINATING TASK (OTRAN) FOR THESE SUBSEQUENT SHNO TRANSACTIONS. THAT SPECIFIC TRANSACTION HAS A 9 SECOND RESPONSE TIME THE MAJORITY OF WHICH IS MADE UP OF CICS WAIT EVENT (WTCEWAIT) TIME. MEANING THE TRANSACTION HAS ISSUED A EXEC CICS WAITCICS ECBLIST, OR EXEC CICS WAIT EVENT COMMAND AS A PART OF ITS PROCESSING

- YOU CAN SEE THAT THIS TRANSACTION ENTERED INTO AND OUT OF THAT WAIT 1472 TIMES WHICH ALSO CORRESPONDS TO THE # OF SHNO TRANSACTIONS THAT WE SEE HAVE BEEN CAPTURED IN THE SMF RECORDS (THE #TASKS FIELD IN THE FILE SUMMARY REPORT). SO DURING A GOOD TIME, THIS TRANSACTION HAD A RESPONSE TIME OF ABOUT 9 SECONDS IN THE SMF.

- AS EXPECTED, WE ARE NOT SEEING ANY ELEVATED VALUES IN FCWAIT OR RLSWAIT (BASED ON WHAT WE FOUND IN THE FILE USAGE REPORT

- NOW LET'S TAKE A LOOK AT THE SMF DATA FOR THE PERIOD WHERE THE FILE IS DEFINED AS RLS. BECAUSE SURELY, WE WILL SEE AN INCREASE IN THESE FILE CONTROL RELATED FIELDS AND HAVE A

REVIEWING THE SMF DATA

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REVIEWING THE SMF DATA

- HERE IS THE OUTPUT FROM RUNNING THE FILE USAGE REPORT AGAINST THE SMF DATA COLLECTED WHEN THE FILE WAS A VSAM FILE:

DDNAME	DATA SET OR LOG STREAM NAME	DATE	TIME	DATE	TIME	NAME	TYPE	IMAG	COUNT
SMFIN001	CICSRGN.RLS.SMF	2023-08-11	01.55.00	2023-08-11	03.00.00	CICSRGN	CICS	IBMS	88909

				********** FC CALLS **********					******** I/O WAITS *******		EXCL	ACCMETH
TRAN	#TASKS			GET	PUT	BROWSE	ADD	DELETE	TOTAL	FILE	RLS	CFDT	CONTROL	REQUESTS
SHNO	1569	ELAPSE	AVG							.0053	.0014	.0000	.0000	
			MAX							.0614	.0079	.0000	.0004	
		COUNT	AVG	9	6	0	0	0	20	9	1	0	0	30
			MAX	12	9	1	0	1	25	15	2	0	2	40

					********** FC CALLS **********					******** I/O WAITS *******		EXCL	ACCMETH
TRAN	FILE	#TASKS			GET	PUT	BROWSE	ADD	DELETE	TOTAL	FILE	RLS	CFDT	CONTROL	REQUESTS
SHNO	NOLAFILE	1568	ELAPSE	AVG	.0009	.0016	.0000	.0000	.0000	.0026	.0000	.0014	.0000	.0000	
				MAX	.0061	.3424	.0000	.0000	.0000	.3436	.0000	.0079	.0000	.0000	
			COUNT	AVG	1	1	0	0	0	2	0	1	0	0	2
				MAX	1	1	0	0	0	2	0	2	0	0	2

REVIEWING THE SMF DATA

- FOR THE NOLAFILE FILE (DURING THE RLS PERIOD) WE ACTUALLY DO NOT SEE MUCH OF A DIFFERENCE FROM WHEN THE FILE WAS DEFINED AS A VSAM FILE.

- THERE ARE NO HUGE JUMPS IN FCWAIT TIME
- WE ARE NOW ACCRUING *SOME* RLSWAIT TIME (AS YOU WOULD EXPECT) BUT THE INCREASE IS NOT DRAMATIC
- THE NUMBER OF REQUESTS THAT ARE ISSUED ARE ABOUT THE SAME
- THE NUMBER OF TRANSACTIONS ISSUING REQUESTS TO THE FILE HAS DROPPED BY A BIT
- WHAT GIVES? WHERE IS THIS TIME NOW BEING SPENT? LETS RUN A LISTX ON THE DATA TO SEE WHAT IT SHOWS

REVIEWING THE SMF DATA

START TIME	TASKNO	OTASKNO	SUSPEND TIME	CICSWAIT TIME	CICSWAIT COUNT	IC DELAY TIME	IC DELAY COUNT	FC WAIT TIME	RLS WAIT TIME	FC TOTAL	FCAMRQ
02:26:03	75857	75857	1592.765	1592.711	1569	.0000	0	.0000	.0000	0	0
02:26:03	75858	75857	.0075	.0000	0	.0000	0	.0034	.0025	17	24
02:26:03	75859	75857	1.0493	.0000	0	1.0422	1	.0040	.0016	17	24
02:26:04	75877	75857	1.0237	.0000	0	1.0143	1	.0052	.0025	25	40
02:26:05	75884	75857	1.0408	.0000	0	1.0297	1	.0074	.0013	25	40
02:26:06	75896	75857	1.1666	.0000	0	1.1483	1	.0119	.0053	25	40
02:26:07	75902	75857	1.0451	.0000	0	1.0325	1	.0079	.0031	25	40
02:26:08	75910	75857	1.0495	.0000	0	1.0410	1	.0052	.0016	25	40
02:26:09	75933	75857	1.0487	.0000	0	1.0388	1	.0057	.0023	25	40
02:26:10	75941	75857	1.0460	.0000	0	1.0369	1	.0055	.0017	25	40
02:26:11	75953	75857	1.0175	.0000	0	1.0066	1	.0062	.0015	17	24
02:26:12	75972	75857	1.0781	.0000	0	1.0694	1	.0052	.0016	25	40
.....											
02:47:57	96970	75857	1.1107	.0000	0	1.0899	1	.0106	.0079*	17	24
02:47:58	96996	75857	.0099	.0000	0	.0000	0	.0048	.0023	25	40
02:47:58	96997	75857	1.0122	.0000	0	1.0006	1	.0084	.0008	25	40
02:47:59	97009	75857	1.0910	.0000	0	1.0842	1	.0033	.0015	17	24

REVIEWING THE SMF DATA

- THE ORIGINATING SHNO TRANSACTION HAS NOW HAD A HUGE JUMP IN IT'S SUSPEND TIME, FROM 9 SECONDS TO 1500+ SECONDS.

- THE OTHER SHNO TRANSACTIONS ARE NOW ACCRUING MORE SUSPEND TIME AND SPECIFICALLY ICDELAY TIME. MEANING THAT THE TRANSACTION ISSUED ONE OF THE FOLLOWING:
  - AN INTERVAL CONTROL EXEC CICS DELAY COMMAND FOR A SPECIFIED TIME INTERVAL.
  - AN INTERVAL CONTROL EXEC CICS DELAY COMMAND FOR A SPECIFIED TIME OF DAY TO EXPIRE.
  - AN INTERVAL CONTROL EXEC CICS RETRIEVE COMMAND WITH THE WAIT OPTION SPECIFIED.

- THE CICS WAIT COUNT CORRESPONDS WITH THE NUMBER OF SHNO TRANSACTIONS THAT ORIGINATING SHNO (75857) IS THE OTRAN FOR. FROM THE DATA IT LOOKS LIKE SHNO (75857) ISSUES A COMMAND (SAY AN EXEC CICS WAIT EVENT) AND KICKS OFF ANOTHER SHNO TRANSACTION THAT THEN DOES SOME SORT OF FILE CONTROL WORK ON BEHALF OF THE ORIGINATING SHNO. THIS FILE CONTROL WORK DOES NOT TAKE A LONG AT ALL (AS YOU CAN SEE THE SHORT TIMES FOR FC AND RLS WAIT) BUT IT REMAINS IN 1 SINGLE ICDELAY/ICWAIT FOR ABOUT A SECOND. IN THIS RUN, 75857 APPEARS TO HAVE KICKED OFF AROUND 1569 SHNO TRANSACTIONS, ALL OF WHICH TAKE ABOUT 1 SECOND TO DO WHAT THEY NEED TO DO WHICH LEADS TO HIM HAVING 1500+ SECONDS OF RESPONSE TIME.

- NOW WE JUST NEED TO FIGURE OUT WHO IS ISSUING THIS EXEC CICS DELAY COMMAND VIA THE DUMP

REVIEWING THE DUMP

- SINCE THE DUMP WAS TAKEN DURING THE PROBLEM, WE WOULD HOPE THAT IT WOULD CATCH ONE OF THESE SHNO TRANSACTIONS IN AN ICWAIT THEN FIGURE OUT THE PROGRAM (AND THE OFFSET WITHIN THAT PROGRAM) WHERE THE REQUEST IS COMING FROM. HERE IS THE OUTPUT FROM THE TK DOMAIN

```
IPCS OUTPUT STREAM ------------------------------------------------------------------------ Line 47 Cols 1 130
 ------------------------------------------------------------------------------------------------------------------
 Tran  Tran Term SC Primary  W  Start Time    Time entered        Elapsed          Total CPU  Current S Resource Resource       F Abe
 num   id   ID      Client       (LOCAL)      Current state        Time             Time      TCB       Type     Name             Cod
 ------------------------------------------------------------------------------------------------------------------
 00003 CMPE N/A  C  None     N  04:00:36.426  04:00:36.599  002:11:19:06.966  00:00.000305 L8001   S MPDQEMW  MPSUSPND       N
 00006 CSOL N/A  C  None     N  04:00:36.597  15:15:17.031  002:11:19:06.795  00:00.011640 SL      S SODOMAIN SO_NOWORK      N
 00007 CEPM N/A  C  None     N  04:00:36.598  21:37:01.011  002:11:19:06.795  00:00.000263 EP000   S EPECQEMT EPSUSPND       N
 00008 CSSY N/A  C  None     N  04:00:36.745  00:00:00.247  002:11:19:06.647  00:00.003526 QR      S ICMIDNTE DFHAPTIM       N
 00009 CSSY N/A  C  None     N  04:00:36.745  15:19:42.316  002:11:19:06.647  00:00.655909 QR      S ICEXPIRY DFHAPTIX       N
 00011 CSTP N/A  C  None     N  04:00:36.792  15:19:42.239  002:11:19:06.601  00:12.193002 QR      S TCP_NORM DFHZDSP        N
 00025 CEPF N/A  C  None     N  04:00:36.829  04:00:36.829  002:11:19:06.563  00:00.000060 EP001   S ECDFQEMW ECSUSPND       N
 00027 CFQS N/A  C  None     N  04:00:37.226  15:19:28.468  002:11:19:06.166  00:00.011964 QR      S FCCFQS                  N
 00028 CFQR N/A  C  None     N  04:00:37.226  15:19:28.468  002:11:19:06.166  00:00.013430 QR      S FCCFQR                  N
 00030 CSNC N/A  C  None     N  04:00:37.250  15:19:28.469  002:11:19:06.143  00:00.050874 QR      S CSNC     MROQUEUE       N
 00034 CONL N/A  C  None     N  04:00:37.927  15:19:28.328  002:11:19:05.465  00:00.040053 QR      S                         N
 00035 CSSY N/A  C  None     N  04:00:38.039  04:00:38.039  002:11:19:05.353  00:00.000128 QR      S KCCOMPAT SINGLE         N
 00038 COI0 N/A  C  None     N  04:00:40.082  13:42:00.106  002:11:19:03.311  00:00.001090 QR      S USERWAIT WorkWait       N
 00040 COIE N/A  C  None     N  04:00:40.146  15:19:36.813  002:11:19:03.246  00:11.888166 QR      S USERWAIT EMSTATUS       N
 00048 CSHQ N/A  C  None     N  04:00:40.419  15:00:00.834  002:11:19:02.973  00:00.014170 QR      S SHSYSTEM                N
 00056 CISR N/A  C  None     N  04:00:40.423  04:00:40.441  002:11:19:02.969  00:00.000418 QR      S IS_INPUT IS_PROCQ       N
 00057 CISE N/A  C  None     N  04:00:40.423  04:00:40.425  002:11:19:02.969  00:00.000390 QR      S IS_ERROR IS_ERROQ       N
 00058 CISM N/A  C  None     N  04:00:40.423  04:00:40.439  002:11:19:02.969  00:00.000394 QR      S IS_SCHED IS_SCHDQ       N
 00059 CISP N/A  C  None     N  04:00:40.423  15:18:46.217  002:11:19:02.969  00:00.099832 QR      S                         N
 00060 CHCK N/A  C  None     N  04:00:40.425  15:04:18.261  002:11:19:02.967  00:00.152749 QR      S ICWAIT                  N
 05151 SHNO N/A  S  Start    N  15:19:42.318  15:19:42.319  000:00:00:01.074  00:00.000564 QR      S ICWAIT   <-------       N
Command ===>                                                                                            SCROLL ===> CSR
```

REVIEWING THE DUMP

- SHNO (TRAN# 05151) IS CURRENTLY IN AN ICWAIT AT DUMP TIME AND HAS BEEN IN THE WAIT FOR 1 SECOND PRIOR TO DUMP TIME. IF YOU WERE LOOKING IN THE DUMP IN FAULT ANALYZER YOU WOULD BE ABLE TO SIMPLY CLICK ON THE TRANSACTION NUMBER, THEN CLICK ON THE 'LAST EXEC CICS COMMAND' FIELD AND IT WOULD DISPLAY THE REGISTERS FOR THE LAST EXEC CICS COMMAND THAT THE TRANSACTION ISSUED INCLUDING THE PROGRAM NAME IN THE R14 VALUE.

- YOU CAN DO THE SAME THING VIA IPCS VIA THE FOLLOWING:
  - ENTER **VERBX DFHPDXXX 'APS=<TASKID= 05151>'** ON THE COMMAND LINE TO SEE THE AP DOMAIN INFORMATION FOR ONLY THIS TASK. THEN DO A FIND FOR 'SYSEIB.05151' TO GET DOWN TO THE EIB BLOCK SO WE CAN SEE THE EIBFN AT X'1B' INTO THAT BLOCK:

```
SYSEIB.05151 0007CA88 System EXEC Interface Block

 -0008                                                5CE2E8E  C5C9C240  *                    *SYSEIB *

  0000  0151942F 0123199F E2C8D5D6 0005151C  00000000 00000000 00000010 04000000  *..m.....SHNO.....................*
  0020  000000C4 C5C6C740 40404000 00000000  00000040 40404040 40404000 00000000  *...DEFG    ........          .....*
  0040  00000000 00000000 00000000 00000000  00000000 00                          *.....................            *
```

1004	DELAY

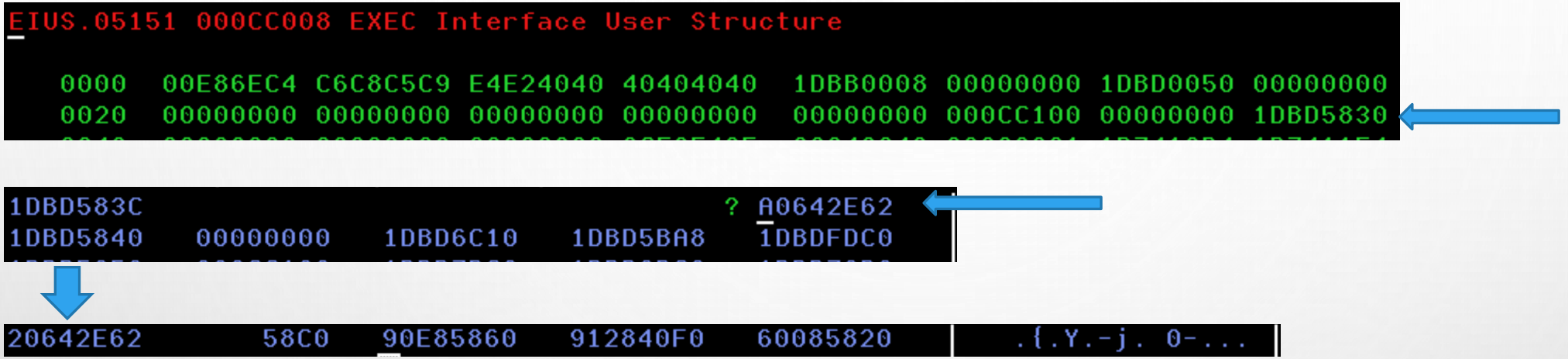
REVIEWING THE DUMP

- NEXT WE WANT TO SEE WHERE THIS REQUEST IS COMING FROM. FOR THAT YOU WOULD NEED TO DO A FIND (IN THE AP OUTPUT) FOR ‘EIUS.05151’ MAKING NOTE OF THE ADDRESS THAT IS AT X’3C’ INTO THAT BLOCK. THIS IS THE RSA AT THE TIME OF THE ISSUING OF THE COMMAND.

- YOU THEN TAKE THAT ADDRESS INTO BROWSE MODE AND GO TO +X’C’ FROM THAT ADDRESS AS THIS POINTS TO THE REGISTERS THAT WERE SAVED AT THAT TIME (STARTING WITH R14). PLACE A ? NEXT TO THAT ADDRESS TO GO THERE AND THEN YOU CAN SCROLL UP UNTIL YOU SEE THE HEADER FOR THE PROGRAM . ALTERNATIVELY, YOU CAN ALSO TAKE THAT R14 ADDRESS INTO THE LOADER DOMAIN (VERBX DFHPDXXX ‘LD’) AND SEE WHICH PROGRAM THIS ADDRESS POINTS WITHIN.

- THEN YOU SIMPLY SUBTRACT THE R14 ADDRESS FROM THE ENTRY POINT ADDRESS TO FIGURE OUT THE OFFSET IN THE PROGRAM WHERE THE REQUEST IS COMING FROM. IN OUR CASE THIS REQUEST IS COMING FROM X’1F8A’ WITHIN PROGRAM GREATPGM

REVIEWING THE DUMP



REVIEWING THE DUMP

- WE STARTED WITH THE THOUGHT THAT THE ELONGATED TIME WE SAW WOULD REVEAL ITSELF IN RLSWAIT (OR PERHAPS FCWAIT) AS THOSE ARE MOST RELATED TO THE CHANGE.

- IN ALL ACTUALITY, WHAT WE SAW WAS THAT THE CHANGE LED TO THE APPLICATION BEHAVING DIFFERENTLY WHEN WORKING WITH THESE FILES AND ISSUING 1 SECOND EXEC CICS DELAYS ON THESE REQUESTS OUT TO THE NOW RLS FILES.

- PROBLEMS CAN PRESENT THEMSELVES IN ONE WAY, BUT THE DOCUMENTATION ACTUALLY REVEALS THAT SEPARATE FACTOR HAS COME INTO PLAY THAT NOW NEEDS TO BE ADDRESSED.

SUMMARY

SUMMARY

- PERFORMANCE PROBLEMS AND PRESENT THEMSELVES IN MANY DIFFERENT WAYS.
- THESE ARE JUST 3 (OF MANY) WAYS THAT THEY CAN BE OBSERVED
- WHEN ENCOUNTERING THESE TYPES OF ISSUES, IT IS BENEFICIAL TO GET FAMILIAR WITH REVIEWING THE SMF 110 DATA IN ADDITION TO THE DUMP TO BETTER UNDERSTAND THE PROBLEM
- THE OUTCOME OF THE INVESTIGATION WILL HELP TO DETERMINE WHAT THE BEST PATH FORWARD IS TO AVOID THAT SPECIFIC PROBLEM HAPPENING AGAIN
- GETTING FAMILIAR WITH THE DIFFERENT KINDS OF PROBLEMS THAT MAY OCCUR AND THE BEST WAYS TO REVEAL THOSE PROBLEMS AIDS IN QUICKER DIAGNOSIS AND RESOLUTIONS TO THESE PROBLEMS

RELEVANT LINKS

- TROUBLESHOOTING DATA FOR PERFORMANCE PROBLEMS IN CICS TS
- HTTPS://WWW.IBM.COM/DOCS/EN/CICS-TS/6.1?TOPIC=SUPPORT-PERFORMANCE

- PERFORMANCE DATA IN GROUP DFHTASK
- HTTPS://WWW.IBM.COM/DOCS/EN/CICS-TS/6.1?TOPIC=FIELDS-PERFORMANCE-DATA-IN-GROUP-DFHTASK

- CPU - CPU ACTIVITY REPORT
- HTTPS://WWW.IBM.COM/DOCS/EN/ZOS/2.4.0?TOPIC=POSTPROCESSOR-CPU-CPU-ACTIVITY-REPORT

- PARTITION DATA REPORT
- HTTPS://WWW.IBM.COM/DOCS/EN/ZOS/2.4.0?TOPIC=REPORT-USING-INFORMATION-IN-PARTITION-DATA

- TRANSACTION FILE USAGE SUMMARY REPORT
- HTTPS://WWW.IBM.COM/DOCS/EN/CICS-PA/5.4.0?TOPIC=CONTENT-TRANSACTION-FILE-USAGE-SUMMARY-REPORT#TRFUSUMM

- FUNCTION CODES OF EXEC CICS COMMANDS
- HTTPS://WWW.IBM.COM/DOCS/EN/CICS-TS/5.6?TOPIC=CODES-FUNCTION-EXEC-CICS-COMMANDS

RELEVANT LINKS

- WHAT TO INVESTIGATE WHEN ANALYZING PERFORMANCE
- HTTPS://WWW.IBM.COM/DOCS/EN/CICS-TS/6.1?TOPIC=TECHNIQUES-WHAT-INVESTIGATE-WHEN-ANALYZING-PERFORMANCE

QUESTIONS?