



IBM Software Group

IMS Scheduling Considerations



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Scheduling basics

- **Functions taken when scheduling**
 - **Scheduling time**
 - **Get CSA and DLI PSB Pool space (wait if necessary)**
 - **Castout old and not in use PSB's**
 - **Load or copy PSB**
 - **Get necessary latches (wait if necessary)**
 - **PSB / DMB hookup**
 - **Get PSBW space**
 - **Get ECPB pool space**
 - **After scheduling**
 - **Program loading (LLA/VLF, Preload, ...)**
 - **Program housekeeping**
 - **Subroutine loading**
 - **DB2 thread creation/termination**

Scheduling basics

- **POOLS**

- **DLI PSB and CSA PSB**

- **Set ratio correctly**
 - *Will vary by installation*
 - **Increase both in proper proportion**
 - *Increasing one may just cause constraint in the other*
 - **Unless enough space for ALL then pools will always be full**

- **PSBW**

- **Gotten / freed for every schedule**
 - **Specify size so it will never be full**

- **EPCB**

- **Will grow to a max based on number of regions**

- **DMBW**

- **Not really a scheduling pool – typically very small size**

- **DMB**

- **Also not really gotten at scheduling**
 - **Big impact if too small – data set close / open**

Scheduling Pool exceptions

- **APPLCTN**
 - **RESIDENT** will place PSB in storage gotten at initialization
 - **DLI** and **CSA PSB** pools used for copies however
- **DATABASE**
 - **RESIDENT** will place DMB in storage gotten at initialization
- **RES=**
 - **N** will negate above
- **Online changed resources**
 - **Become non-resident until next restart**



Scheduling Statistics

- **Online Monitors**
 - Dynamically obtain from IMS internal statistics
- **Written by IMS at every checkpoint**
 - **Formatted by**
 - DFSKDVS0 (KBLA which is part of IMS)
 - IMSPA (Separate tool)

Measuring Scheduling Overhead

- **IMS Monitor**
 - Scheduling time in region summary
 - DB2 Thread Creation/Termination in Region IWAIT
 - Program load and program housekeeping in Program Summary
 - Sched. to 1st call
- **IMS Log**
 - V10 and above for IMS/TM
 - All supported versions for DBCTL

Scheduling Parameters

- **APPLCTN**
 - **SCHDTYP=SERIAL or PARALLEL**
 - **PGMTYPE=(TP,,class)**
- **TRANSACT**
 - **WFI**
 - **MAXRGN**
 - **MSGTYPE=(,,class) – overrides class on APPLCTN**
 - **PARLIM**
 - **PROCLIM**
 - **PRTY**
 - **SCHD**
 - **SERIAL**

PARLIM Parameter

- **Requires SCHDTYP=PARALLEL on APPLCTN macro**
- **Determines if/when transaction will be scheduled in another region**
 - If number on queue is greater than PARLIM times number of regions already scheduled then schedule another region *
- **Default is 65535 – Parallel scheduling disabled**
- **Too low = unnecessary scheduling**
- **Too high = possible response time delays**

* handled differently for shared queues

MAXRGN Parameter

- **Maximum number of regions which may be concurrently scheduled for a given transaction**
- **Assuming number of regions for this transaction class available**
- **Helps prevent one transaction from using too many regions**
 - **Remember that each region must have a copy of the PSB**

PROCLIM Parameter

- **Count**
 - determines how many consecutive transactions may be processed in a region
 - Assuming queue count > 0
 - 65535 means no limit
- **When count reached**
 - IMS may try to schedule some other transaction
 - IMS goes to termination / scheduling routines
- **Set count low for low priority transactions**
- **Set high for high priority transactions**
 - 65535?

QUICK Reschedule function

- **PROCLIM count has been reached**
- **IMS looks at scheduling class and rules**
- **If it is determined that the same transaction would be scheduled**
 - **Avoid actual termination / scheduling**
 - **Write 07 and 08 log records**
 - **Bit in 08 record will indicate quick reschedule**
 - **Return next transaction to application**
- **Else return QC status to application**
 - **Go through termination**
 - **Schedule some other application / transaction**
- **PROCLIM of 0 disables quick reschedule**

WFI – Wait For Input

- Specified on TRANSACT at system definition
- If no more messages available
 - Does not return QC to application
 - Application remains in region until a transaction arrives
- Region not available for any other work
- PROCLIM count reached will return QC
- PARLIM too low may cause many regions to be occupied for a long time

PWFI – Pseudo Wait For Input

- **Specified on the MPP region JCL instead of TRANSACT macro**
 - // EXEC PGM=DFSRRC00,PARM='MSG,...,PWFI=Y,...'
- **GU to IO-PCB will not return QC status code**
 - Region remains scheduled and waits for next message
 - Avoids termination and scheduling
- **However if next message is a different transaction**
 - Return QC to application
 - Terminate application
 - Schedule new application / transaction
- **IMS will try to schedule new tran in other non-pwfi region first**

PWFI – Notes

- **Tends to work well for most situations**
- **However**
 - **If too many trans is same class or too many classes for region then could work well at low to medium volume but revert back to non PWFI performance at peak when needed most**
- **So to get maximum benefit**
 - **Need to consider how many transactions in same class**
 - **Need to consider how many classes for region**

Shared Queues Scheduling differences

- **PARLIM calculation is different**
 - **A given IMS does not know depth of shared queue**
 - **IMS will count successful GU's instead of number on the queue**
 - **0 and 1 handled the same**
 - **2 and above will help avoid false scheduling**
 - **Could be less reactive if long running trans**

Shared Queues Scheduling differences

- **False schedules**
 - **When a message is placed in the CF all IMS's will be notified**
 - **If number of IMS's more than the number of messages then regions may be unnecessarily scheduled**
 - *CPU and pool space impacted*
 - *CFCC 16 helps to avoid*
 - **IMS V11 will have changes to help keep messages local to the IMS where they arrive**
 - **(P)WFI can be even more beneficial**
 - **IMS may 'wake' a region but no scheduling takes place and application goes back to sleep**
 - **(P)WFI region available tends to keep tran 'local'**

Summary

- **Many different parameters interact**
 - Parlim, Proclim, Maxrgn, Class, etc.
- **Many different options**
 - Resident
 - WFI
 - PWFI
 - Quick Reschedule
- **Give consideration to high volume trans**
 - Let lower volume/priority share regions