



Virtual CICS user group: Newsletter 51



Welcome to the Virtual CICS user group newsletter. The Virtual CICS user group at www.fundi.com/virtualcics is an independently-operated vendor-neutral site run by and for the CICS user community.

Virtual CICS user group presentation

The latest webinar from the Virtual CICS user group was entitled, "How to solve CICS Enqueue problems", and was presented by Colin Pearce.

Colin has been a z/OS and CICS Systems Programmer for over 30 years and has been teaching for more than 20 years. He has worked in permanent and contract roles. He's installed CICS and related software many times.

He is well versed in the Application side of CICS using Command level and with CICS Debugging in both the Transaction level, and CICS Systems Dumps using IPCS. He's written many courses in CICS namely (CICS for System Programmers, CICS Transaction Debugging, CICS Command Level

KEY FOR SUMMARY

T = TYPE OF TASK
S = STATE OF TASK
F = PURGEABILITY FLAG
P = PURGE STATUS
TT = TIMEOUT TYPE
W = WAIT/SUSPEND TYPE
DPA= DISPATCHER TASK AREA
AD = ATTACHING DOMAIN
MD = TASK MODE

S-SYSTEM N=NON-SYSTEM
D=DISPATCHABLE S=SUSPENDED R=RUNNING A=RUNNING A\$TERM YES J=RUNNING IN JVM
B=RESUMED EARLY
P=PURGEABLE N=NOT PURGEABLE
N=NO PURGE X=PURGED P=PURGE PENDING A=ABTERM PENDING
IN=INTERVAL DD=DEADLOCK DELAYED DI=DEADLOCK IMMEDIATE
M=WAIT MVS S=SUSPEND C=WAIT OLDC W=WAIT OLDW

DS	TASK	EN	TASK	T	S	F	TT	RESOURCE	RESOURCE_NAME	W	TIME OF	TIMEOUT	DPA	AD	ATTACHING	NO	SUSP	AREA	
								TYPE			SUSPEND	DIR		(DSTSK)	NO			TOKEN	
00020001	1P210000	S	S	N	N			DDP	DDI1PT	M	10:55:02.112	-	1F33C000	DM	1P410000	DR		1P410010	
00040003	51429000	S	S	N	N			SC	DPD2RAC1	S	10:49:46.806	-	1F33C000	DM	1P409000	DR		1F33C000	
00060003	1P360000	S	S	N	N			MDD000M	MDD000M	M	10:55:03.546	-	1F33C000	DM	1P407000	LR		1P43F000	
00080003	1P230000	S	R																1F33C000 AP 00041000 CQ
00080003	20CA5000	S	S	N	N			IN	LGHARTY L1_NORST	S	10:50:45.677	10:55:45.677	1F33C000	DM	1P407000	DR		1F33C000	
00080003	20C60000	S	S	N	N				ICDP000M ICDS000M	M	10:50:03.887	-	1F33C000	DM	1P407000	DR		1P441000	
00080003	1P240000	S	S	N	N				MPD000M MPD000M	M	10:55:03.346	-	1F33C000	DM	1P407000	DR		1P410000	
00080003	1P380000	S	S	N	N				ICWAIT	S	10:32:57.453	-	1F33C000	DM	1P409000	DR		1F33C000	
00080003	1P375000	S	S	N	N				ICM000M DPA000M	S	00:00:00.460	-	1F33C000	DM	1P407000	DR		1F33C000	
01040003	20C87000	S	S	N	N				ICD000M DPA000M	S	10:32:57.440	-	1F33C000	DM	1P407000	DR		1F33C000	
010C0005	51438000	S	S	N	N				IS_IMPVT IS_P000Q	S	10:54:07.373	-	1F33C000	DM	1P408000	DR		1F33C000	
010C0005	20C00000	S	S	N	N				IS_BNDUR IS_B000Q	S	10:55:07.248	-	1F33C000	DM	1P408000	DR		1F33C000	
02040003	20C00000	S	S	N	N				IS_BNDUR IS_B000Q	S	10:55:07.351	-	51437000	DM	1P409000	DR		1F33C000	
02060003	20C00000	S	S	N	N				ICP_NORM DPA000M	W	10:51:10.586	-	51437000	DM	1P407000	DR		00040000	
020A0005	20C09000	S	S	N	N			IN		M	10:50:54.066	10:51:04.066	51437000	DM	1P408000	DR		200P0100	
020B0005	51407000	S	S	N	N			IN	SIST000M	S	10:00:00.875	11:00:00.875	51437000	DM	1P407000	DR		1F33C000	
02120003	1P225000	S	S	N	N				ICD000M DE_NUDGE	S	10:51:03.745	-	51437000	DM	00000003	DR		1F33C000	
020A0001	51450000	S	S	N	N			IN	SMS000M	S	10:50:25.639	10:55:05.639	51400000	DM	00000002	DR		1F33C000	
020C0001	1P410000	S	S	N	N				anytype mvs_srch	M	10:55:02.743	-	51400000	DM	00000015	DR		1P215A44	
0F040703	20C00000	M	R																5201C000 DM 1P408000 DR

Access Computing Education

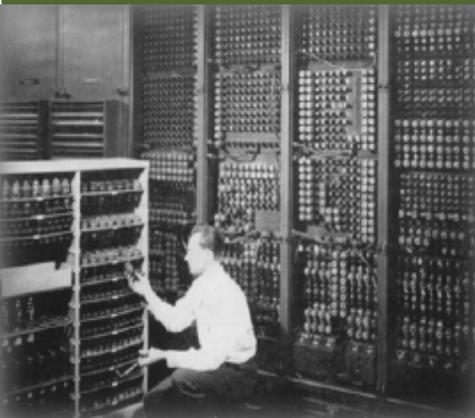
Figure 1: Dispatcher Domain Task Summary Table

Programming, and CICS Internals). He knows and understand the newer facilities in CICS, such as Web Services and Threadsafe.

He is also well versed in z/OS, and, in 2013, he upgraded the Bank of America z/OS systems

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from V1.12 to V1.13 on more than 20 LPARS. He's written courses in RACF, SMPE, JES2, TSO/ISPF, JCL, Storage, VSAM, and z/OS Structure and Design. He knows both Assembler and COBOL programming languages.

He's conducted training for customers in many countries, including, Australia, New Zealand, South Africa, India, Singapore, Malaysia, Hong Kong, Thailand, The Philippines, The Netherlands, Belgium, and the UK. Many of my customers are from financial industries, and he's worked at and taught for Development Bank of Singapore (DBS), Citibank, Bank of America, Westpac, and Commonwealth Bank. He's taught for IBM in Australia, India, and Singapore. He's also taught for third-party suppliers such as Compuware, Computer Associates, ASG, and Sterling Software.

He worked for IBM Singapore for a number of years, supporting Citibank, where his main role was to take their problems, and try and reproduce them on the IBM site before engaging the IBM Level 2 support.

He is currently working at Lloyds Bank (for over 4 years). He's supporting their CICS systems and their in-house Message Switch system written in Assembler.

They use most of CICS services including MQ, DTP, DPL, and Web Services.

Colin Pearce's presentation was mainly a demonstration, with some slides. Colin started his presentation by looking at the Dispatcher Domain Task Summary Table (see Figure 1).

Once a transaction completes the Attach process, it must wait in the Dispatcher Domain for dispatch. Its DTA (Dispatcher Task Area) will be on one of the TCBs. For the completion of the Attach, the DTA will be on the quasi-re-entrant TCB.

There is only one Master DTA chain, however each DTA is logically queued to its associated TCB.

Once the transaction has spent some time in RUN mode, it will be interrupted whenever it issues some I/O. This could be File I/O, Program I/O, or Intersystem Communication or Terminal I/O. This task will be interrupted, placed back on the executable DTA chain in SUSPEND state, and in priority order. The Resource fields will be updated to reflect the wait reason. The SUSPAREA can provide the address of an ECB, or more often than not just the address of the DTA. The XM_TXN_TOKEN will display the Task number

For example: the Resource Type and Resource Name of ZCIOWAIT/DFHZARQ1 means that CICS is waiting for the VTAM terminal to respond. Basically, it's waiting for the signed-on user to respond.

Another example is the Resource Type and Resource Name of FILENAME/FCXCSUSP. This means that CICS is waiting for an exclusive control of a VSAM Control Interval of File FILENAME. In IPCS, the VERBX 'DS=1' command will display this table.

The *CICS/TS Problem Determination Guide* has all the details about the wait reasons.

The Kernel Domain Task Summary Table displays every task in the system, both task and transaction. The TCB tasks are also displayed. Each task is represented by a TCB and the address of its associated TCB is given with its entry under KE_KTCB.

Each KE_NUM is represented by a TASENTRY. The address of each task's TASENTRY is given under the KE_TASK. The address of each Task's DTA is given under the DS_TASK.

Tasks marked as 'not running' are probably waiting for a resource. An

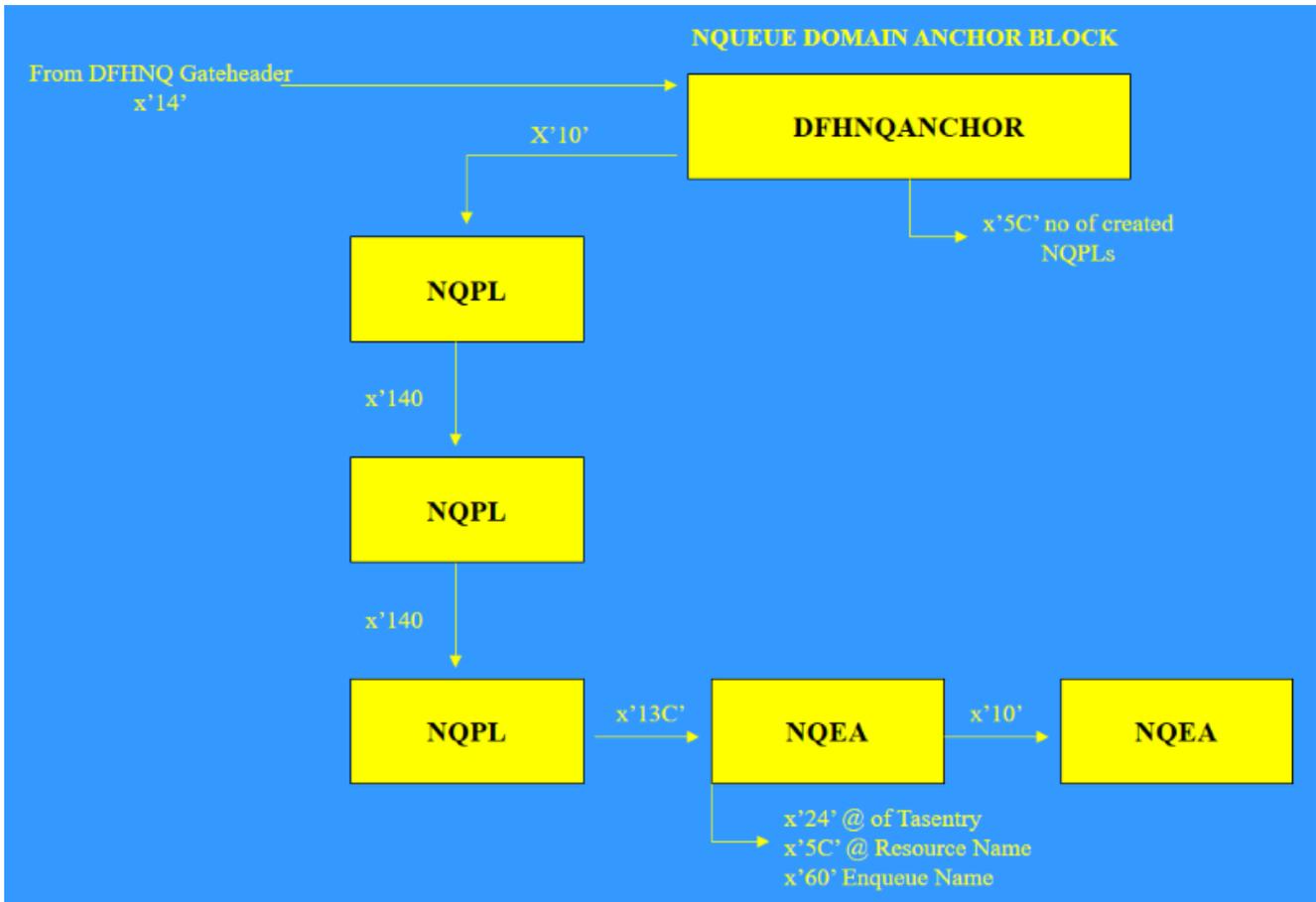


Figure 2: The Enqueue Domian

entry marked as UNUSED indicates this is a free slot.

This table is displayed through IPCS and the VERBX 'KE=1' command.

An entry having '*YES*' under the ERROR heading indicates this task was in error at the time of the dump. This will probably only be seen if the dump was taken as a result of a Transaction Abend caused by a Program Check.

The Transaction Manager Summary Table is a list of all transactions that are currently somewhere

between Attach and Detach. The Start Code indicates how the transaction was initiated:

- C specifies this transaction was attached internally by CICS.
- S specifies this transaction was started.
- SD specifies this transaction was started with data.
- T specifies this transaction was entered via a terminal.

The display also gives a variety of addresses for the various tokens that will be

assigned to the transaction during its life. These tokens are the SMX address, TCA address, and the Transaction Monitoring area.

This can provide an insight to the transaction status, especially if they are just entering or leaving the CICS environment. The TxdAddr is the TXD associated with this Transaction. Offset x'10' is the transid. Offset x'60' is the name of the program. Offset x'68' is the name of the Profile.

The Txnaddr is the link to the task number held at offset x'1C'.

The Enqueue Domain handles the requests that require serialization access to a resource.

Specifying VERBX 'NQ=3' will list all the of the control blocks and which enqueues are currently being utilized.

The Enqueue Domain Anchor Block is called DFHNQANCHOR. Each Enqueue type has Enqueue Pool Control Blocks – NQPL controls whether a transaction has ownership of the resource and which transaction(s) are waiting for it. Offset x'5C' contains the number of NQPLs that have been created (see Figure 2).

The NQPLs are chained from the anchor block at offset x'10'. Each NQPL points to the next one at offset x'140'.

Any request that causes CICS to create and manage the ENQUEUE, such as a File Control request, will create an ENQUEUE ELEMENT AREA (NQEA). This first NQEA from the NQPL can be located at offset x'6C'.

If a second and subsequent request is made for the resource, there will be an additional NQEA for each waiting request. Each NQEA will contain the address of the next NQEA that is waiting for the same resource. This is found at offset x'10'.

The Dispatcher Domain Summary Table will display the name of the NQPL in the Resource Name field if the task is waiting for an Enqueue. The task number will also be given in the XM_TXN_TOKEN heading.

The Dispatcher Domain Summary Table will list the Enqueues that are current. Note the Resource Type and Resource Name. If the Resource Type is ENQUEUE, then the Resource Name will identify what type of resource the transaction is waiting for. This is the name of the NQPL.

Review the KE_TASK address for these entries. This is the Tasentry for the task. In the Kernel Domain Summary Table, the Tasentry address will be listed, and its number and the Transaction Id will be given. The Task number will also be given.

In IPCS, issue VERBX 'NQ=3', the Resource Name can be located in its associated NQPL. The chain of NQEAs will be found at offset x'10'.

In the NQEA, the address of the associated Task's Tasentry can be located at x'24'.

Once the Tasentry has been found this can be matched with its entry in the Kernel Domain Summary Table.

Then from there it can be matched to the DTA and Task number.

The NQEA owning the Resource will have the address of the resource at offset x'5C'. The resource name will begin at offset x'60'. The NQEA waiting for the same resource will have the address of the same resource and name in the same offsets.

The CEMT INQ TASK will list all transactions and what resources they are waiting for.

The CEMT INQ UOWENQ will list all the ENQs and their Own/Wai classification. It will also list the name of the transaction.

The Dispatcher Domain will list all the tasks and what they are waiting for.

Once the Resource name is known, it is just a matter of going to the NQ Domain and issuing VERBX 'NQ=3'.

Now look for the NQPL having that Resource Name.

The name of the Resource Name can then be searched until the NQPL with this name is found.

There will be one or more NQEAs under it. The OWNER will be first followed by all the WAITERS.

The Kernel Domain will list all the Tasks and their Tasentry, Transid, and Task Numbers.

The VERBX 'NQ=3' command in IPCS will also list each of the table of Enqueues, and the NQEAs will be listed with the Owner/Waiting details. This list will contain the Task Number and the Transaction id.

Offset x'24' is the address of the Tasentry. The address of the Resource Name can be found at x'5C'. Offset x'60' will have the Enqueue Name.

The *CICS/TS Problem Determination Guide* 'Dealing with Waits', should be consulted for each Enqueue name and how to deal with it.

A copy of Colin Pearce's presentation is available for download from the Virtual CICS user group Web site at <http://fundi.com/virtualcics/presentations/CICSENQJul19.pdf>.

You can see and hear the whole user group meeting on YouTube at <https://youtu.be/awBmtWi4zCQ>.

Meeting dates

The following meeting dates have been arranged for the Virtual CICS user group:

- On 10 September 2019, Glenn Schneck, Principal

Technical Architect at GT Software will be discussing "Mainframe Integration – Handling Legacy Application Challenges".

- The following meeting is on 12 November 2019, when Eugene S Hudders, President of C\TREK Corporation, will be discussing "CICS TS LSR Tuning Revisited".

We are using Webex for the user group meetings.

Recent CICS articles

Introducing CICS Bundle Maven plug-in version 0.0.1 by Stewart Francis on CICS DevCenter (31 July 2019). Find out more at: <https://developer.ibm.com/cics/2019/07/31/cics-bundle-maven-plug-in-0-0-1/>

Avoiding HTTP outages by managing Liberty HTTP endpoints by Eric Phan on CICS DevCenter (8 July 2019). You can find the article at: <https://developer.ibm.com/cics/2019/07/08/avoiding-http-outages/>

Happy 50th Birthday CICS by Trevor Eddolls on IT Toolbox (7 July 2019). Find out more at: <https://it.toolbox.com/blogs/trevoreddolls/happy-50th-birthday-cics-070719>

CICS CM adds to new capabilities by Satish Tanna on CICS DevCenter (3 June 2019). You can find the article at: <https://developer.ibm.com/cics/2019/06/03/cics-cm-adds-to-new-capabilities/>

About the Virtual CICS user group

The Virtual CICS user group was established as a way for individuals using IBM's CICS TS systems to exchange information, learn new techniques, and advance their skills with the product.

The Web site at www.fundi.com/virtualcics provides a central point for coordinating periodic meetings (which contain technically-oriented topics presented in a webinar format), and provides articles, discussions, links, and other resources of interest to IBM CICS practitioners. Anyone with an interest in CICS is welcome to join the Virtual CICS user group and share in the knowledge exchange.

To share ideas, and for further information, contact trevor@itech-ed.com.

The Virtual CICS user group is free to its members.