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, “The CICS/Db2 interface”, and was presented by Tom Dunlap, CTO at Themis.

Tom has been working with CICS since its first release in April 1969. Throughout his career with CICS, he has developed applications, worked as a system programmer and administrator, and lead architect for commercial software products that worked in CICS, and provided both applications and systems-level training to many corporations. The extent of his coding exposure in CICS includes, COBOL, Assembler, PL/I, C, and Java. Beyond his CICS background, he has worked with z/OS (and its predecessors back to OS MFT) and many related components at both the applications and systems levels. This operating system experience includes efforts as a lead architect for commercial software products. Also included during his career is extensive work with DB2, performance and capacity planning efforts, large

Figure 1: DB2 SQL commands in COBOL programs

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system integration efforts, and problem solving for large corporate application and systems environments. For the past 20 years he has also been involved with work on distributed environments which include UNIX, Linux, and Windows. These efforts include working with products like TXSeries (CICS on distributed systems), DB2, IBM MQ, plus many other supportive products. These efforts also include the use of application development tools like IBM RAD and IDz, CICS Explorer, DB2 Data Studio, plus the IBM Problem Determination Tools.

Tom Dunlap started his presentation with a look at application programs. He said that each application program that executes using SQL statements requires a few basic inclusions of generated code. The DECLARE statements have been generated using the DCLGEN option of the DB2 Interactive panels. The SQLCA is distributed as part of the DB2 product libraries. The DCLEMP and DCLDEPT includes represent the DB2 tables being used by the application. The prime reason for using the DB2 INCLUDE statements is due to the SQL preprocessor being invoked before the COBOL compile. If you utilize the integrated DB2 processor, as they do, you could use a standard COPY statement in place of the INCLUDE.

Figure 1 includes one of the included DECLARE statements. This SQL statement is required to provide the table name and column names for use by the application. This statement also provides the DB2 data type definitions for the columns of the table. Also, as part of the DCLGEN

Figure 2: Trace for DB2 commands in applications
output, there is a COBOL data structure representing the columns of the table and their data types. This data area can be used on the SQL statements to supply the “host variables” to accept the data being processed. One special style of definitions is related to DB2 VARCHAR data type, where you will notice the COBOL structure contains a half-word binary length field along with the character data attribute. This length contains the actual number of significant characters within the character attribute.

Tom then went on to look at other examples.

Tom next took a look at trace for the application program. Figure 2 contains the portion of trace entries representing the SQL SELECT statement to find the average and maximum SALARY. The bracketed entries on the left represent the total time spent in the CICS DB2 interface. Most of this time (processor time) will actually be captured and reported on the DB2 region side. This is because control is transferred from the DB2 interface to DB2 as a secondary address space very quickly. Tom has always classified the time spent between “ERM ENTRY” and “ERM EXIT” as time when the application has turned control over to DB2 and entered a wait state.

The bracketed entries on the right represent the total time spent in the DB2 region itself. The “D2EX1 ENTRY” trace entry occurs just before giving control to DB2. The “D2EX1 EXIT” occurs just after DB2 give control back to the CICS DB2 interface. This time is considered to be solely done on behalf of the DB2 region and the CICS application is in a wait state for its completion.

While the times shown in Figure 2 might seem to be relatively low, on their small mainframe they have executed around 1.5 million
instructions to complete this SELECT statement.

Tom went on to look at trace in more detail.

Tom next looked at CEDF screens for the DB2 interface in order to show the use of CEDF to stop on SQL statements in a similar fashion to the EXEC CICS commands. In Figure 3, we can see the completion of the SQL SELECT statement execution. We do not see the complete statement but can directly tie back to the compile listing by the STMT= option. We can see the first data variable being returned (OVAR 001) in packed decimal format. If we were to place the cursor on the plus sign below OVAR 001 and hit enter, we could see all the data variables being returned.

We also see most of the attributes from the SQLCA including the most important ones like SQLCODE and SQLSTATE, which indicate successful completion of the statement.

Tom looked at more examples.

Tom Dunlap then turned his attention to statistics for the DB2 interface. Figure 4 provides a set of CICS DS domain statistics. While not directly associated with the CICS DB2 interface, the timings for the L8 and L9 TCBs do include the amount of CPU and WAIT time consumed by the DB2 interface. Tom then showed lots of other examples.

Tom next looked at DB2 resource definitions. Figure 5 provides an overview of the CICS DB2 interface. It is implemented as a TRUE (Task-Related User Exit) in CICS, which is provided by the CICS product itself. Any support or enhancements will be provided by the CICS Development groups.

The CICS DB2 interface is designed to provide a “multi-threaded” interface with the connected DB2. CICS can establish a connection with only one DB2 region at a time.
time. This is controlled by the DB2CONN resource.

There will be three different style of threads managed by the interface:

1. Command threads – on which any DB2 command will be issued
2. Pool threads – which will be utilized for applications not associated with a DB2ENTRY resource
3. Entry threads – used in support of applications associated with a specific DB2ENTRY resource

Pool threads will consume more processor time since they will have to perform DB2 “sign-on” function with each request. This is because the thread may be used by different applications. If many applications are using pool threads, this can add as much as 4-7% overhead in processing these requests.

Entry threads will be defined and dedicated to a given application to ensure better thread reuse and reduce the overhead required to process the DB2 requests. Only one command thread is required since CICS will typically issue only one DB2 command at a time.

There will be defined “Plans” used to allow DB2 to choose access paths to be used with these requests. This is especially true for Pool and Command threads.

Tom explained the parameters that can be coded, with examples of values used.

Tom also described using SVC dump information for the DB2 interface, more DSNC commands (for example to issue a DB2 command to display the current threads from the DB2 point of view), and DB2 resource definitions with complete CEDA screens.

You can see and hear the whole user group meeting on YouTube at https://youtu.be/SPoZq5W2DHo.

**Meeting dates**

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

- On 5 March 2019, Ezriel Gross, CEO, Circle Software will be discussing “Efficient management of online resources using CICS Configuration Manager”.

- The following meeting is on 14 May 2019, when Tom Dunlap, CTO at Themis, Inc will be back with us. He will be discussing, “The CICS / MQ interface”.

We will be using Citrix GoToMeeting for the user group meetings.

**Recent CICS articles**


**Getting started with Node.js in CICS** by Mark Cocker on CICS DevCenter (11 January 2019). You can find the article at: https://developer.ibm.com/cics/2019/01/11/getting-started-with-node-js-in-cics/

**Understanding zIIP Usage in CICS** by Ian Burnett in IBM Systems Magazine (January 2019). You can find the article at: http://ibmsystemsmag.com/mainframe/administrator/cics/ziip-usage/


**How to recreate the source of Program List Tables (PLTs)** by Darren Beard on CICS DevCenter (20 December 2018). You can find the article at: https://developer.ibm.com/cics/2018/12/20/recreate-the-source-of-program-list-tables/

**Defining your own actions for policy system rules** by Andy Wharmby on CICS DevCenter (20 December 2018). You can find the article at: https://developer.ibm.com/cics/2018/12/20/defining-your-own-actions-for-policy-system-rules/
CICS TS V5.5 – our best release yet, now generally available! by Sam Catling on CICS DevCenter (14 December 2018). You can find the article at: https://developer.ibm.com/cics/2018/12/14/cics-ts-v5-5-release/

CICS Explorer 5.5 GA – new tools to analyze your CICS resources and definitions by Dave Nice on CICS DevCenter (13 December 2018). You can find the article at: https://developer.ibm.com/cics/2018/12/13/cics-explorer-5-5-ga-new-tools-to-analyze-your-cics-resources-and-definitions/

Arcati Mainframe Yearbook 2019

Many members of the Virtual CICS user group contributed to this year’s user survey in the Arcati Mainframe Yearbook.

If you want to get your hand on this one-stop shop for mainframers, the Yearbook is free to download from the Arcati Web site here: http://www.arcati.com/newyearbook19.

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.