IBM ®

CICS Tools
Hands-On Workshop

Understanding Resource Relationships with CICS Interdependency Analyzer V2.2

Assigned Userid: **CICSTxx**

CICS Interdependency Analyzer V2.2 – Workshop

Session Objectives

This workshop serves as a hands-on introduction to CICS Interdependency Analyzer (IA) Explorer. The intent is to introduce you to queries you can perform from a PC and to familiarize you with navigation techniques within the IA Explorer. Some of the basic features of CICS IA have already been performed as follows:

1. Running the CINT transaction to setup and collect dependency data
2. Running a test suite of transactions for data collection and queries
3. Running the batch load job to copy the VSAM collection files to DB2 Tables
4. Running the Threadsafe reporter job
5. Configuring the IA Explorer preferences with the connection information

By the end of this lab, you will be able to navigate the explorer and demonstrate how CICS IA can help understand the relationships within your CICS applications. It is comprised of a several hands-on exercises designed to familiarize you with the product so that you can:

1. Navigate the CICS IA Explorer interface
2. Understand Threadsafe analysis
3. Review a Threadsafe batch report

Ten exercises are included to accomplish these objectives:

Exercise 1 - Initial System Definition and Basic Navigation
Exercise 2 - Finding Resources
Exercise 4 - Inquire on resources by region
Exercise 5 - Inquire on resources by program
Exercise 5 - Inquire on resources by transaction (optional exercise)
Exercise 6 - Using the sample queries
Exercise 7 - Using the sample queries for Migration (optional exercise)
Exercise 8 – Creating you own queries
Exercise 9 – Comparing Query Results
Exercise 10 – Review of Batch Threadsafe Report

There are optional exercises that cover additional features of CICS IA. With limited class time, you may not have time to cover these topics during the CICS Tools Work Shop. However, if you complete the other exercises early you can work on the optional exercises independently.

It is expected that the user of this document as a nominal amount of experience with PC and is familiar with terms for navigation.

For detailed information regarding CICS Interdependency Analyzer, please reference the CICS Interdependency Analyzer User's Guide. This document can be found on the WEB at:
http://www.elink.ibmlink.ibm.com/publications/servlet/pbi.wss?CTY=US&FNC=SRX&PBL=SC34-6799

## *Exercise 1 - Initial System Definition and Basic Navigation*

The IA Explorer is an Eclipse based RFP that uses bits of Eclipse bundled into it, and you do not need to install Eclipse separately. It requires approximately 60 meg of storage on your PC.

Normally, the first time you go into the explorer you would be presented with the configuration window which allows you to select the Preferences window by clicking on the green arrow to configure your connections.

Otherwise you will need to open the connections window. Click on **Window->Preferences**. Then select **Connections** on the left hand side.

In this window you would specify the address of the zOS system where your IA DB2 database resides, the TCP/IP Port Number, the Database Name (which is actually the DB2 Location ID from the DB2 startup job), your User ID, Password and IA DB2 Schema. You can leave the schema blank if you only have one database.

You will need to type in your assigned User ID and password.
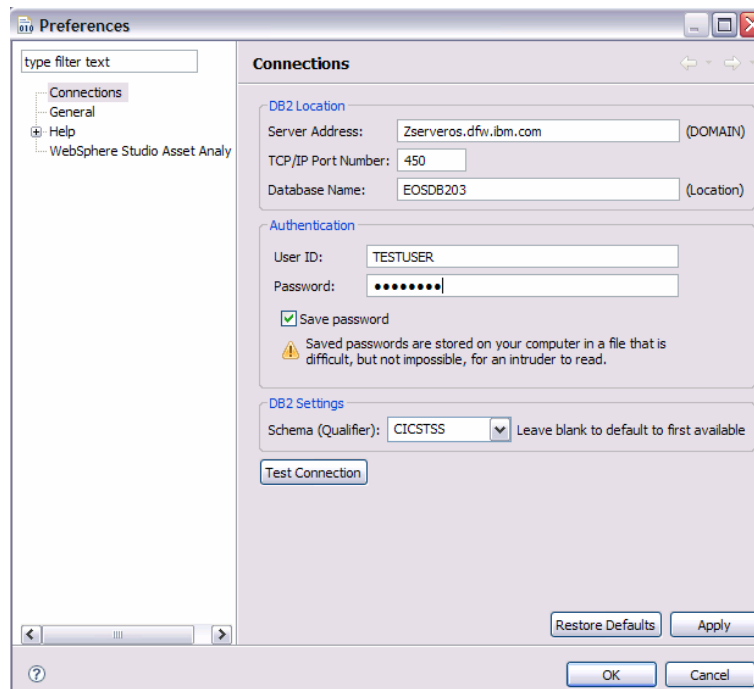
Since this step has already been configured for this lab exercise, you will be presented with the default perspective screen. A perspective contains a number of views where you can move views, resize them, drag and drop or maximize and minimize.

Views contain a list of all Regions, Transactions and Programs from data collected in CICS during runtime with IA collection for affinities or dependencies. For this exercise you will be looking at dependency data and data collected with batch scanners of the load libraries.

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Initial Perspective view
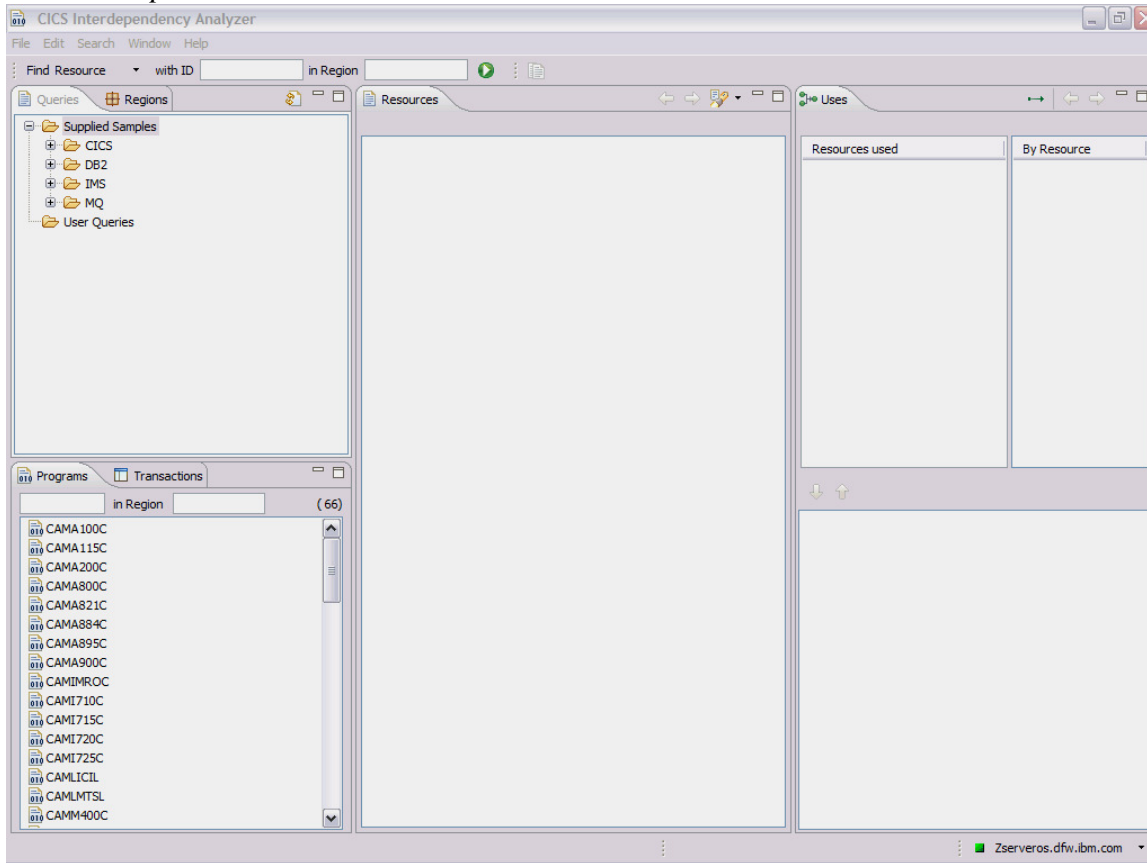
Now you can try some basic navigation to get an understanding of the Explorer. **At the end of Exercise 1, you will reset back to the default view**. So have fun and play around with the views and do not worry about resetting. Actions on your part are included in check boxes.

Assume **click is a left mouse click unless right is specified**.
Menubar is on the top left with File as the first menu item.

- ☐ Click and **hold on a vertical bar** separating views until you see the **move arrow←→**. **Drag** to the desired location. This is standard windows resizing as you would see in other PC applications.

- ☐ Click on **Window->Show Properties View**. You will see a new view at bottom center for Properties. Program data in this view comes from a scan of the load module.

Note: **->** in the instructions indicates multiple actions after clicking on a selection, then hold down the mouse and move down to the desired sub-selection.
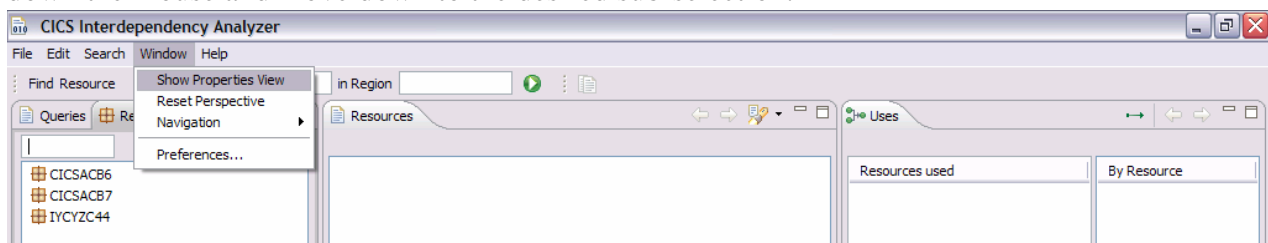
☐ In the view to the bottom left, click on the **Programs** tab. Scroll down until you see program **EHDRIVER**. Click on the **Program.** This prorogates the **Properties** view with data collected from the batch scanner programs.

Program EHDRIVER in CICSACB6
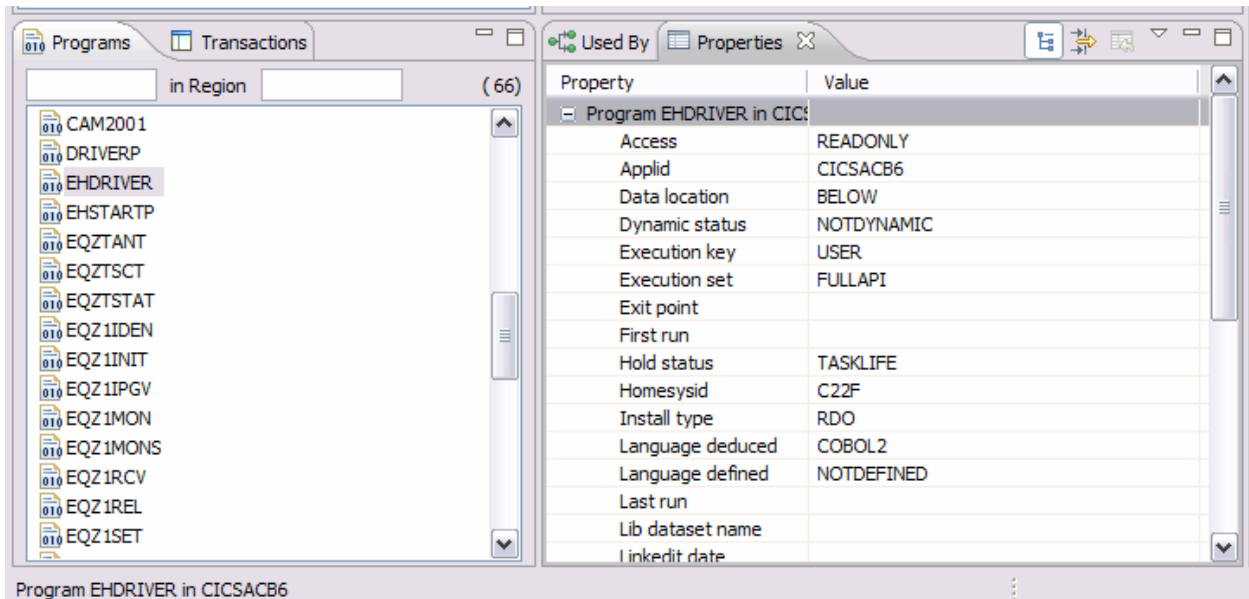
Note: You can also get detailed information in the Properties view for files. You can try this later after you become experienced at the end of the Lab exercises.

☐ **Hover** over the **buttons** located in the **top right** of each **view window** and it will give you a description as you see below with Previous Search.
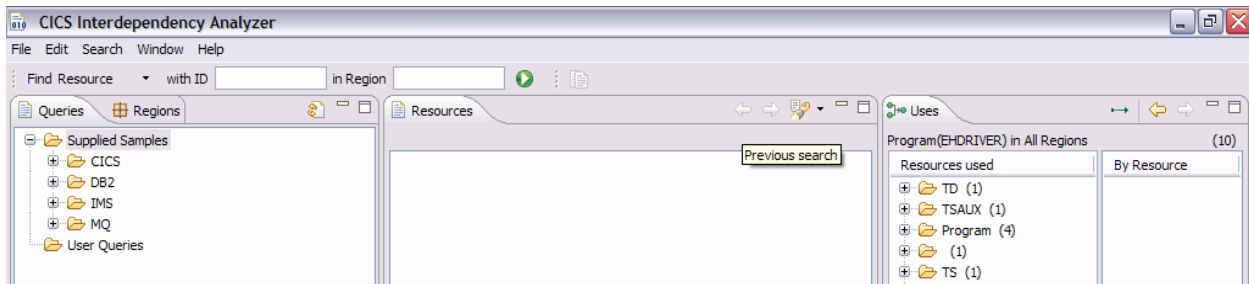
☐ Click on any **displayed resource** in a view window and press **PF1** for help with the selected View Window. Close the Help window by clicking on the X next to Help.
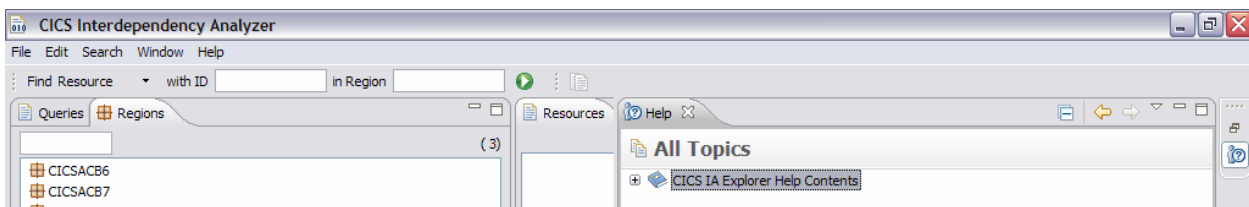
☐ After changing your views, and you wish to go back to the **default**, in the menu bar that runs across the top of the perspective click on **Window->Reset Perspective**.

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Exercise 2 - Finding Resources

In this section you will use the **Find Resources** bar to answer questions on the data collected in this environment. You will also use resource and region prefixes to narrow down the amount of data retrieved.

Is there any DB2 resource data collected?

☐ Under the menubar on the top left and to the right of **Find Resource** , click on the **pull down button ▼** and then select **Table.** The bar will change to **Find Table**.
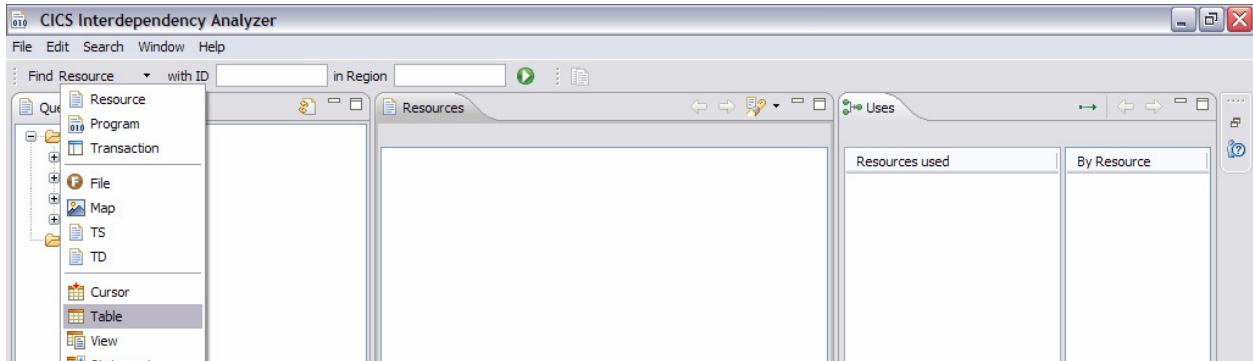
☐ Click on the green arrow to the right which indicates **Run Search**.
  The **Resources** window should now contain one collapsed entry for 1 Table resource.

☐ Click on the **+** to expand the resource tree to find out what tables are used.

What regions, programs and transactions use table, **TABLE ()?**

Note: Empty brackets () will appear in the Table Name when CICS IA cannot resolve the Table Name from the SYSIBM Table. This could be because the table is dynamic.

☐ Right click and highlight **Used by Programs**. Regions used are listed. There are 2 regions listed CICSACB6 and CICSACB7.

☐ Select the **Used by program** option for the CICSACB6 region. This will populate a **Used by Program** window. In this you will see a 'bottom' up tree of the programs that use this table.

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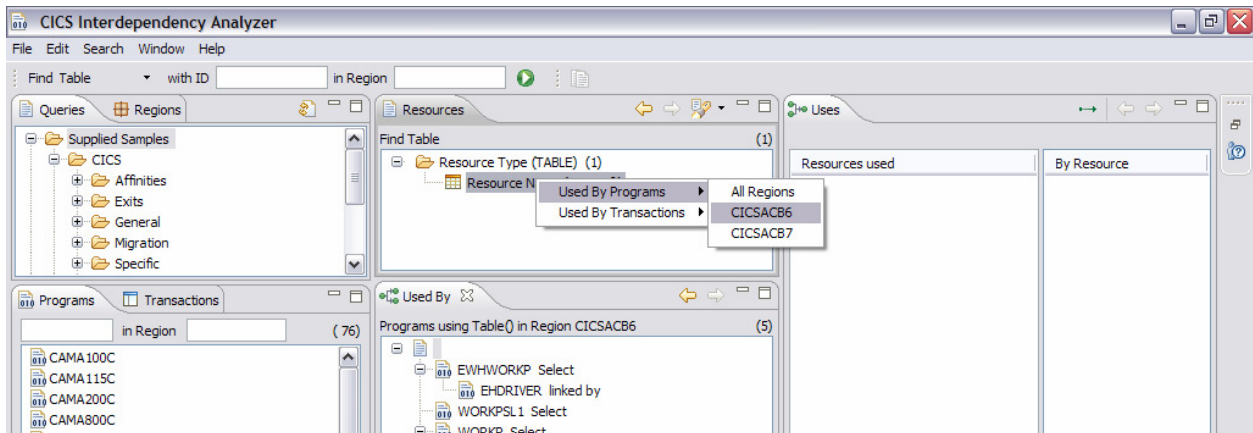
How do you search for more specific resources?

☐ Click on the **Regions** button under the menubar and under Find Table from the previous step. You will see 3 regions with one of them named **IYCYZC44.**

☐ You will now look for all resources with a prefix of **CA** in region **IYCYZC44**. Under the menubar, use the **pull down button ▼** to select **Resources**, enter **CA** in the ID box and **IYCYZC44** in the region box. Select the green **Run Search** arrow. The **Resources** window should now have **45 resource**s in it. Click the **+** to **expand** these **resources** to see what their names are.

Only resources in region IYCYZC44 and starting with CA are displayed.

When the Resources window displays the results of a new search, you can quickly recall the results of previous searches by using the back ⇦ and forward ⇨ arrows. The criteria used for the search results shown are displayed at the top of the view under the menubar.
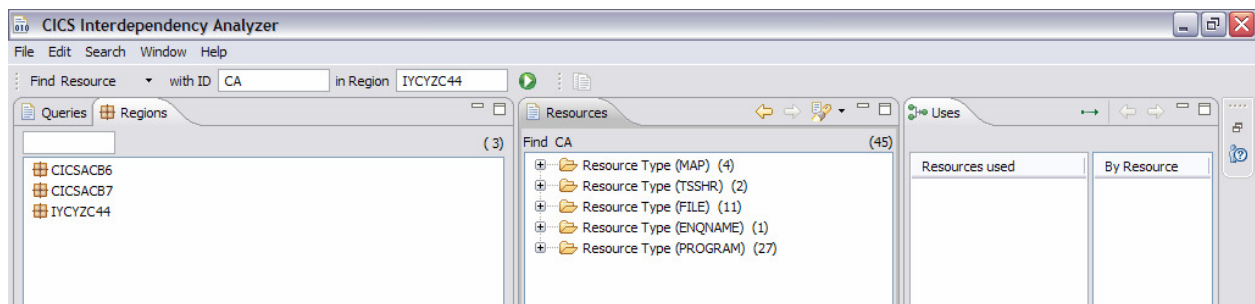
Exercise 3 - Inquire on resources by region

There is an alternative way of finding resources within the Explorer. In this task you will query for resources by using the **Region** window.

- ☐ Select the **Regions** window and limit your query to regions with a prefix of **CICS by typing CICS** in the box under the **Regions** tab, hit **enter**. You should now see 2 regions in the **Regions** view.

- ☐ Now show all resources used by region **CICSACB6.** Right click on **CICSACB6 - >Show Resources**. You should now see 56 resources in the **Resource** view. They will be displayed in a 'collapsed' tree.

- ☐ Note there are 2 **File Resources** used by this region. Expand **+** the resource tree to see **FILEA**. Right click **FILEA->Used By Programs->CICSACB6**. The programs using **FILEA** will be listed in the **Used By** view at the bottom of the perspective.
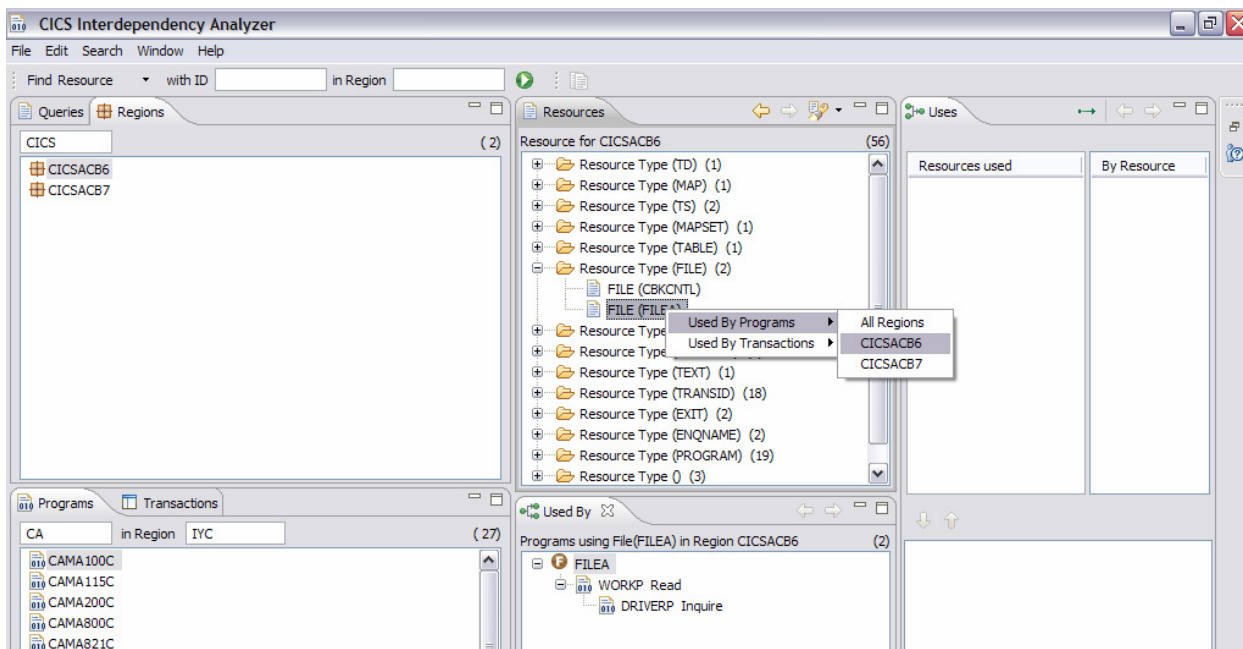
☐ Now look at **Resource Type (Program)**. There are 19 programs used in region **CICSACB6**. Expand + to see the **program names**.
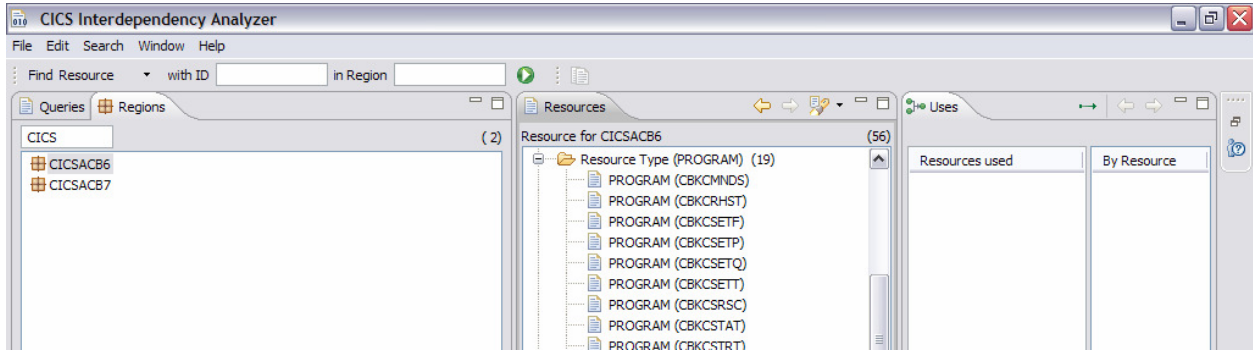
☐ To list these 19 programs in the **Programs** view, right click on region **CICSACB6->Programs Used**. The programs for region **CICSACB6** are now listed in the **Programs** view on the bottom left.

You can try the same with **Transactions Used.**

Exercise 4 - Inquire on resources by program

In this exercise you will learn how to find resources that are used by programs.

☐ With your program view listing all programs used in region CICSACB6, you can limit the list of programs for investigation with a prefix in the program bar. Replace the '*' in the **Program** view with **E**. You should see 4 programs.

What resources are used by program **EHDRIVER** in region **CICSACB6**?

☐ Right click on program **EHDRIVER->Uses Resources->CICSACB6**.
You should see 9 resources in the **Uses** view on the top right and the bottom right hand corner the flow for program **EHDRIVER**.

☐ Now put an '*' back in the selection filter under **Programs**. Repeat the previous step for program **DRIVERP**. This program has a more extensive list of **Resources Used**.

☐ Notice the execution tree in the bottom right view. Expand **File** in the **Uses** view and click on **FILEA** to select it. The execution tree changes to **Programs using FILEA**. You can move up and down the tree using the down arrow ⬇ and up arrow ⬆ buttons to view where the FILEA resource is used. Each time you click on the arrow it takes you to the next or previous use of FILEA, and highlights the resource selected for the tree. In this case, it is all the same program (WORKP) from multiple transactions.

☐ You can also check to see all the Transactions using FILEA in all regions. Right click on **FILEA** in the **Uses** view on the top right. Select **Used By Transactions->All Regions.**

The center bottom **Used By** view is populated with all accesses and the type of access.

Exercise 5 - Inquire on resources by transaction (optional)

This section explores resource usage by transaction. It is similar to the previous section but starts with transactions rather than programs.

☐ Click on the **Transactions** view instead of Programs. This lists all transactions in all regions. The filter bars should be blank.

☐ Change the filter to transactions starting with VA. This limits the list down to 3.

What resources are used by transaction **VA20** in region **IYCYZC44**?

☐ Right click on transaction **VA20** and select **Uses resources** then select region **IYCYZC44.** You should now see in the **Uses** view has 22 resources used. You will also see in the bottom right hand corner the flow for transaction **VA20**.

☐ You can now look at the resources used by transaction **VA20** as you did in the previous exercise for programs. Experiment and select some of the other resources such as Map or TD queues.
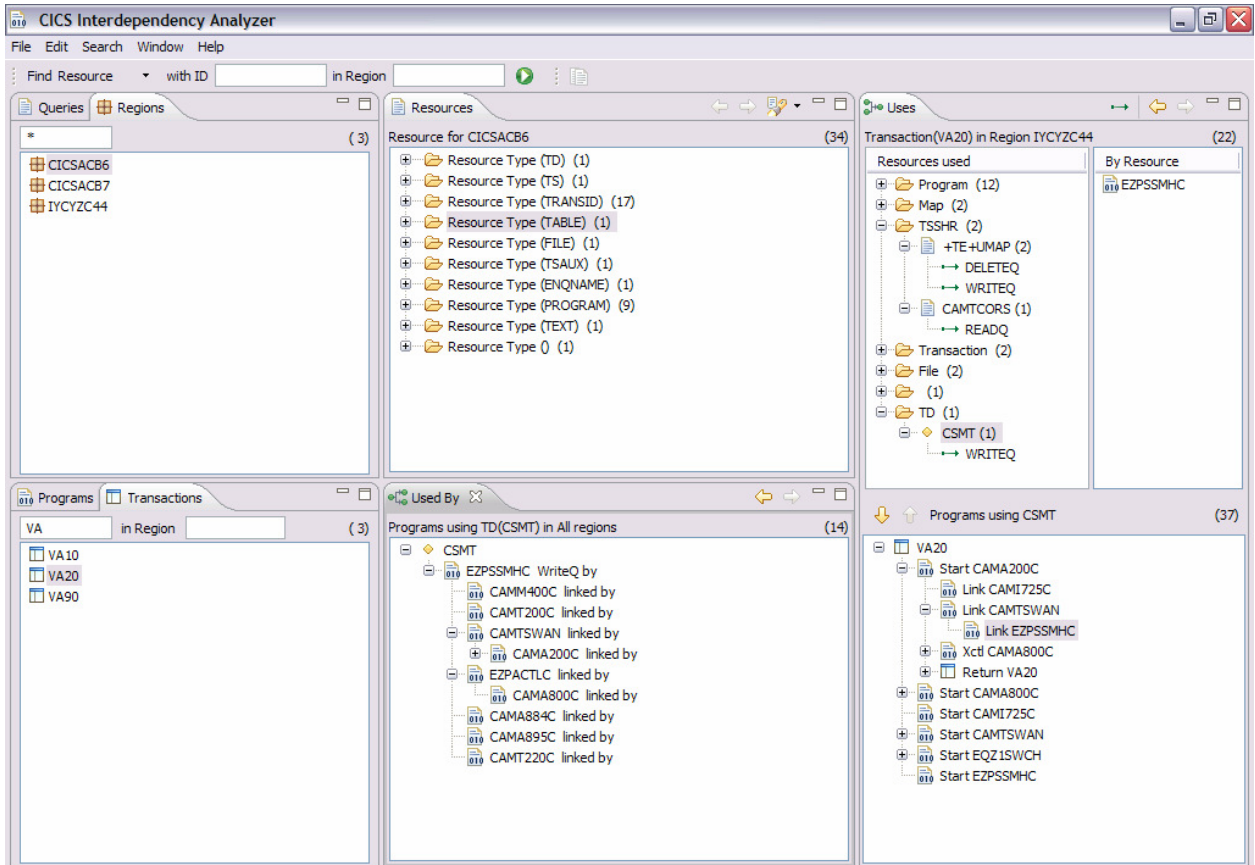
Exercise 6 - Using the sample queries

In this exercise you will use Threadsafe queries to get you familiar with IA query capabilities.

☐ Click on the **Queries** window, expand the **CICS** entry and then expand the Threadsafe entry.

☐ Double click on **All Programs that issue a CWA ADDRESS**.

☐ Expand the **EHDRIVERP, ADDRESS** and **CWA** entries. Right click on **CWA** select **Used by Transactions->All Regions**. The Used by view will populate with all the transactions that issue the **ADDRESS** command.

You should now see the results on this query in the center view.
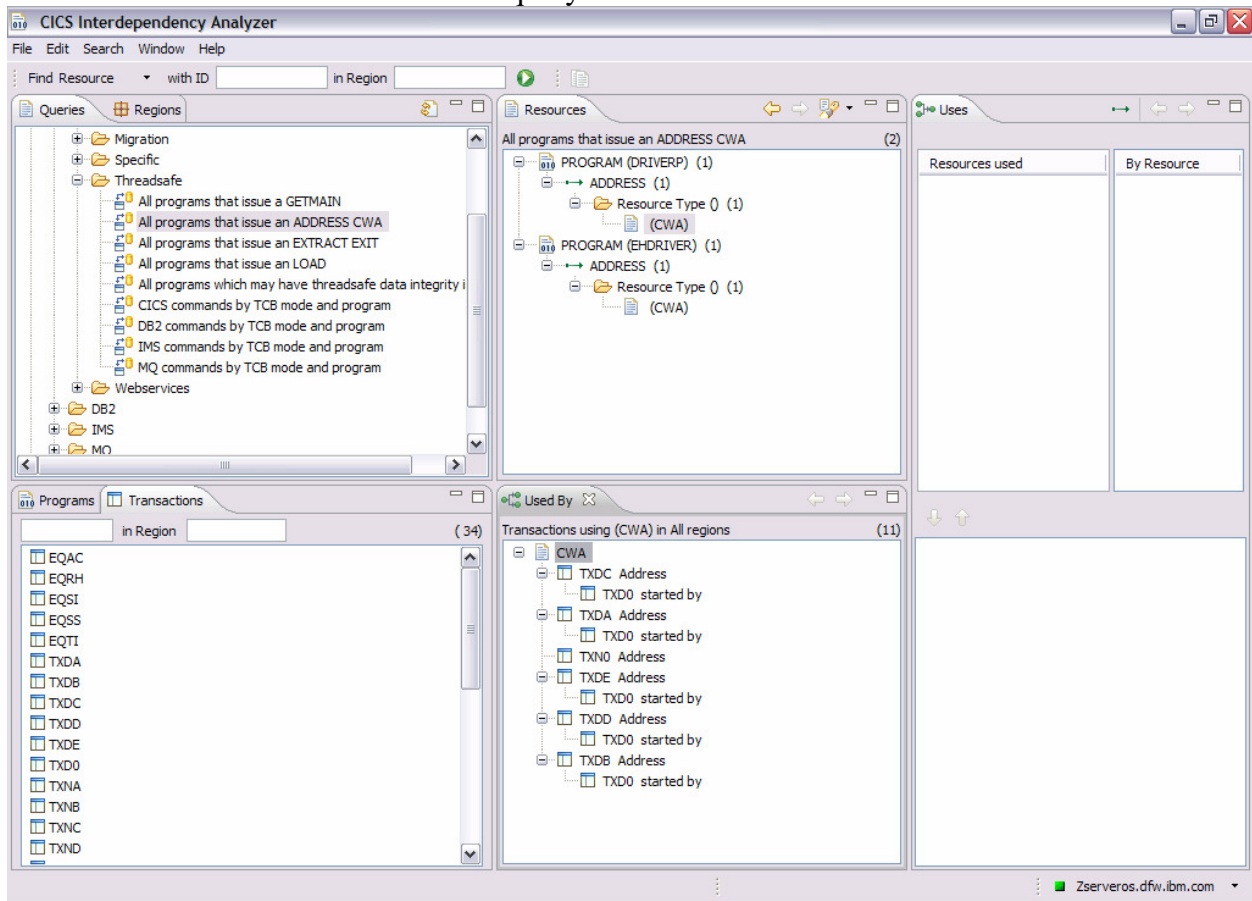
☐ Double click on **CICS commands by TCB mode and program** in the queries view**.**

☐ Scroll down to the **WORKP** program and expand it. Then expand **Task Control Block**. Notice that there are 2 executions on the **QR TCB** for the **non-threadsafe TQ commands** and 2 executions on the **L8 TCB** for the threadsafe **DEQ/ENQ** commands.
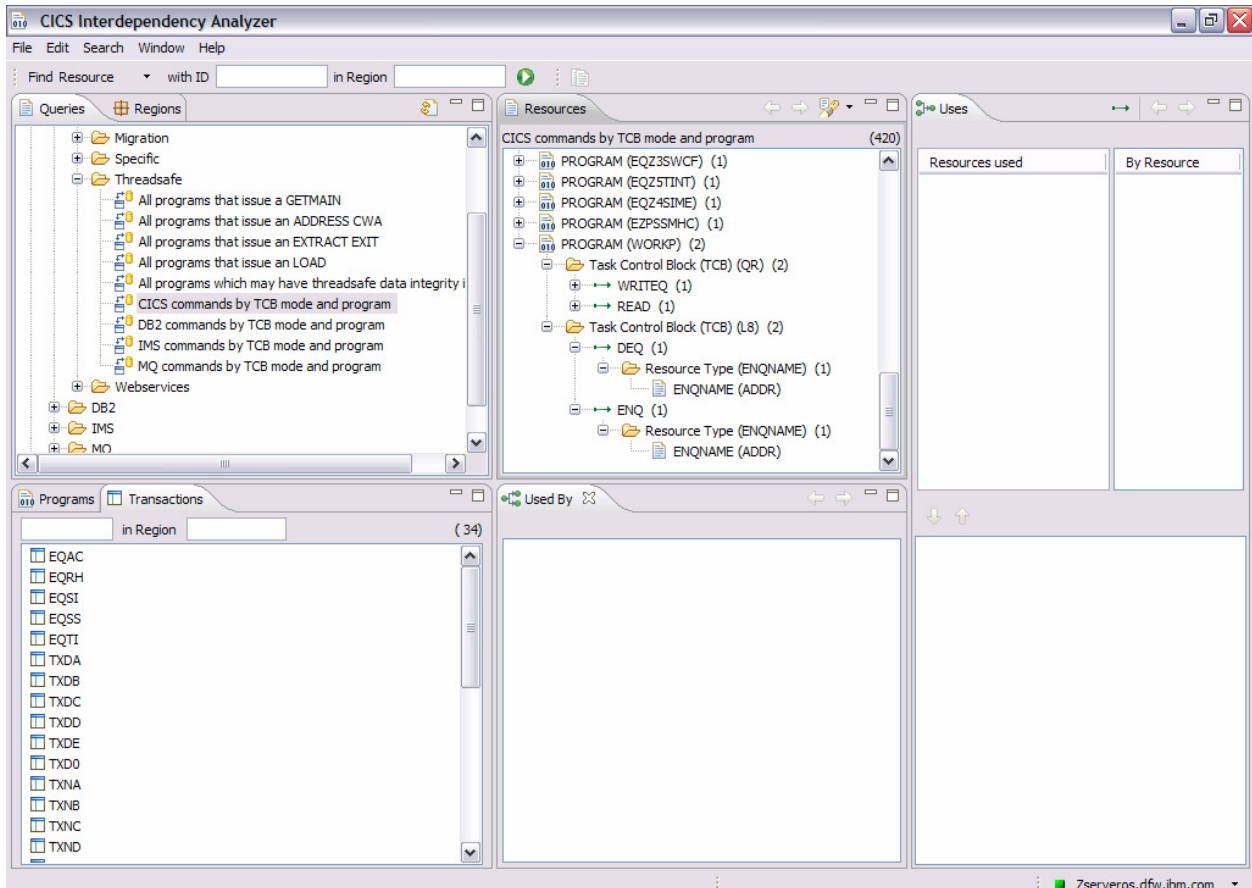
Exercise 7 - Using the sample queries for Migration (optional exercise)

This optional exercise will show help you understand changes when migrating from CICS TS 3.1 to CICS TS 3.2.

☐ Expand **Migration,** and **TS 3.1 to CICS TS 3.2**.
This gives you a list of resources with APIs or SPIs have changed. The results of these queries are the programs that contain these APIs or SPIs, and also a report on the resource name and the APIs or SPIs themselves.

☐ Select the **FILE APIs – new XRBA option** resource. Double click to run the query. It will now populate the **Resources** window and answer the following questions:

- Which programs use FILE APIs?

- Which SPIs are used within these programs?

- What is the FILE name used by the WRITE command?

Exercise 8 – Creating your own Queries

In this exercise you will use an existing query to create 2 new queries. These queries will be used in exercise 9 to show the difference between the same program in threadsafe and non-threadsafe mode. You will use the Queries window to view a list of queries and folders. Folders can contain other folders and are a way of organizing and grouping queries. Queries are a definition of resources to be searched for and you define them using the Query Editor.

☐ Click on the **Queries** view under Find Resources.

☐ Expand the **CICS** folder and the **Threadsafe** folder.

☐ Resize the **Queries** view so you can read the Query definitions. Click and hold on the vertical bar until you see the **move arrow←→**. Drag to the desired location.

Copy and Modify the query

☐ Right click on the query **CICS commands by TCB mode and program->Copy**.

Selecting **Copy** copies the definition of the query to the clipboard, which you can paste into either the same folder or a different folder in the Query window. If you paste the clipboard contents into a text editor, you see the raw SQL strings that are run against the DB2 tables. This feature is useful for users who have their own way of executing SQL and collecting results.
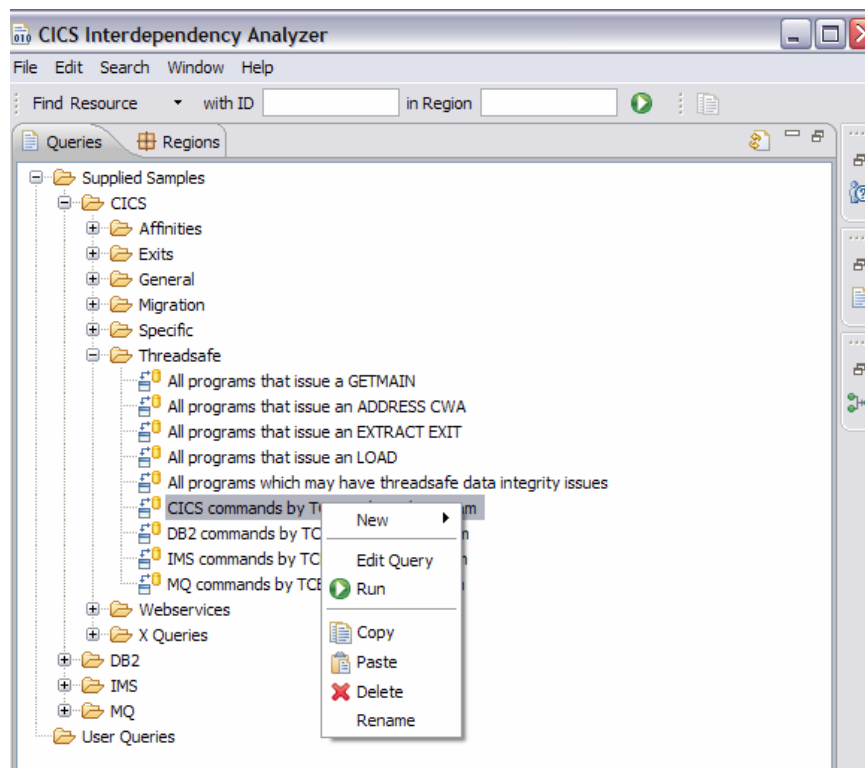
☐ Right click on the **Threadsafe folder->Paste**. You should see a new query that says **Copy of CICS commands by TCB mode and program**.

☐ Right click on the new query **Copy of CICS commands by TCB mode and program** and **rename** it to **CICSACB6 CICS commands by TCB mode and program.**

☐ Right click on **CICSACB6 CICS commands by TCB mode and program->Edit query.**
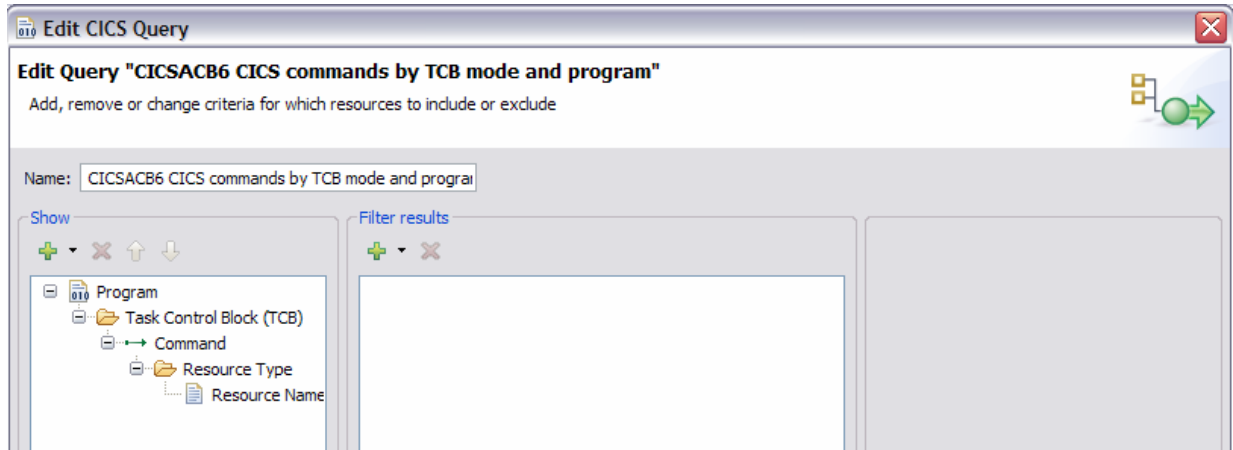
Background on the Query Editor

You can read this section for a detailed understanding of the Query Editor, or skip this section and go to the next check box on page 17 which will step you through the process.

The Query Editor is very flexible and allows you to create queries to show exactly what you want to see:

- Use a query to search for resources based on their criteria against a set of expressions.
- Create, delete, edit, execute, and view queries in the Query window menu.
- Name the query keeping to the naming guidelines using valid query and folder names.
- The Resources View displays the results of running a query.

You can specify two main criteria in a query: the parts of an interaction you want to see and the interactions you want to include.

The parts of an interaction to see
When you have selected the type of resource you want to query, you then choose the information you want to be shown in the tree structure of the resources view when the query has run.

To add a resource to the tree, use the green plus ✚ button above the tree structure. To remove a resource, use the red cross ✖ button while the resource is selected. You can move up and down the tree using the down arrow ⬇ and up arrow ⬆ buttons.

Interactions to include
To further refine the query for the resources you have chosen, use the Filter results panel. You can create multiple expression filters and each resource is provided with a set of filter possibilities. To add filters use the green plus ✚ button above the table of all expressions. To remove a filter, use the red cross ✖ button while the expression is selected.

Exercise 8 – Creating your own Queries *(continued)*

Add an interaction that you wish to see

☐ Click on the **pull down button** ▼ to the right of the green plus ➕ button above the tree structure. Select **Region Applid** to add this resource to the tree.
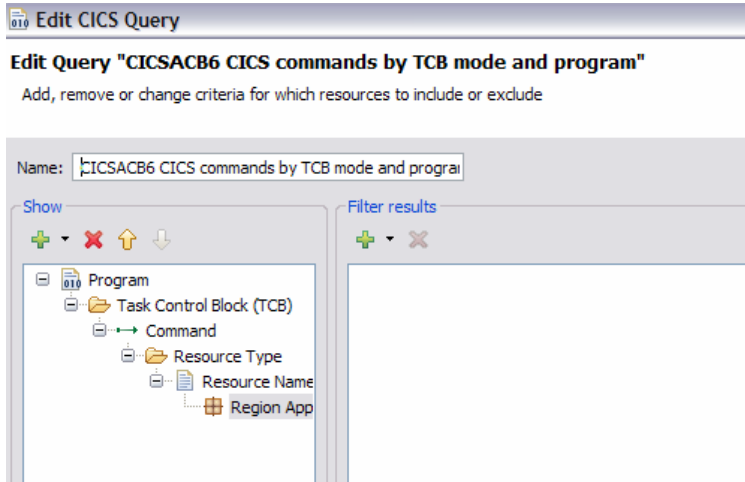
☐ Notice that **Region Applid** was added to the bottom of the tree and we would like it at the top. Click on **Region Applid** to highlight it, then move it up the tree using the **up arrow** ⬆ button. Click on the **up arrow** ⬆ button until **Region Applid** is at the **top**.

Add a couple of interactions you wish to use.

☐ As you just did previously in the Show view, click on the **pull down button** ▼ to the right of the green plus ➕ button in the Filter results view. Again select **Region Applid**.

☐ A new view will appear to the right. Type **CICSACB6** in the view under **Region Applid.** When you type in the filter qualifier, it is automatically added to the **Filter results** view.
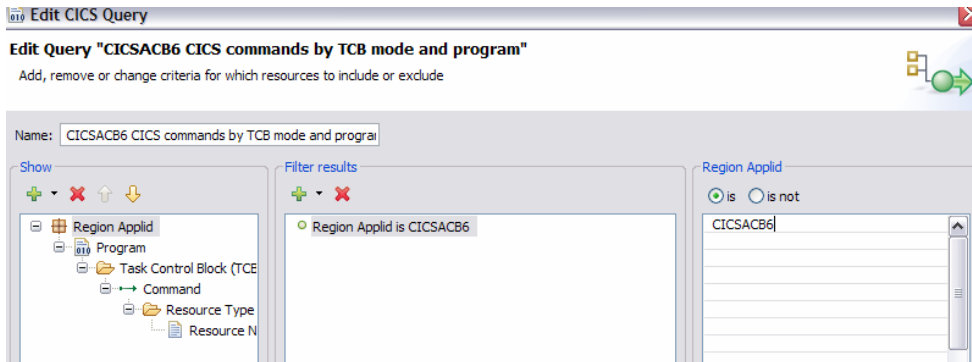
☐ Now repeat the previous 2 steps, but select **Program** expression instead of Region Applid.

☐ Under **Program**, you need to add your choices for the expression filter. Type in **EHDRIVER**, and on the next line **EWHWORKP**.
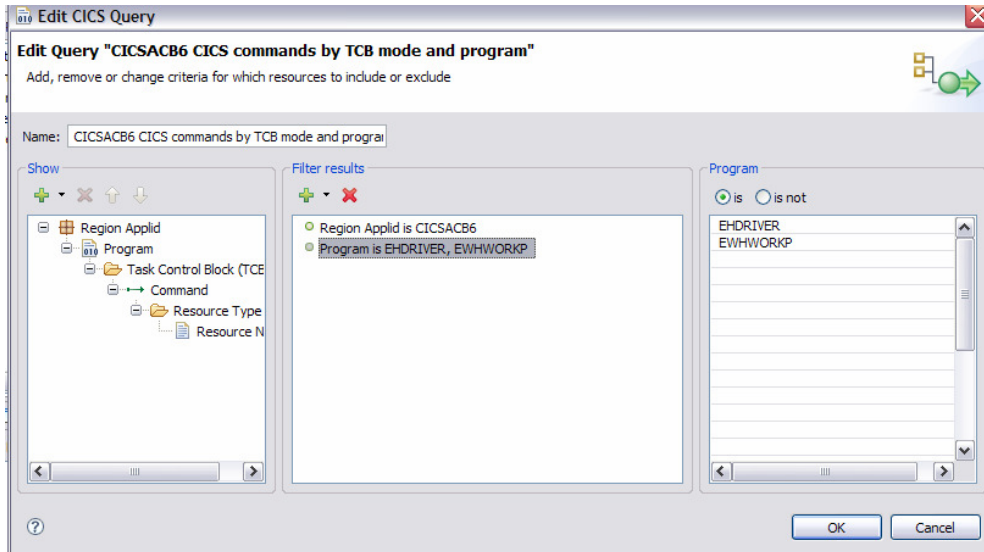
☐ Click the **OK** button to save your updated query.

Clone CICSACB6 commands by TCB mode and program for CICSACB7

☐ Right click on the query **CICSACB6 CICS commands by TCB mode and program**, click on **Copy**.

☐ Right click on the **Threadsafe** folder and click on **Paste**. You should see a new query that says **Copy of CICS commands by TCB mode and program**.

☐ Right click on the new query **Copy of CICSACB6 CICS commands by TCB mode and program** and **rename** it to **CICSACB7 CICS commands by TCB mode and program.**

☐ Right click on **CICSACB7 CICS commands by TCB mode and program** and click on **Edit query.**

☐ Click on **Region Applid CICSACB6** in the Filters view.

☐ A new view will appear to the right. Change **CICSACB6** in the view under **Region Applid** to **CICSACB7.**

☐ Click the **OK** button to save your updated query.

Exercise 9 – Comparing Query Results

In this exercise you will use the 2 new queries you created in Exercise 8 view the difference in running in threadsafe versus non-threadsafe for the same programs. CICSACB6 ran non-threadsafe and CICSACB7 ran threadsafe. ENQ/DEQ commands were wrapped around the Address CWA to run threadsafe in programs running in CICSACB7.

At this point you should have the queries view displayed with the Threadsafe Query list the various queries for threadsafe.

☐ Double-click on the **CICSACB6 CICS commands by TCB mode and program** to run the query. The results with populate in the view. Expand **CICSACB6**. Notice the 2 programs you added to the query in Exercise 8. Expand both programs.
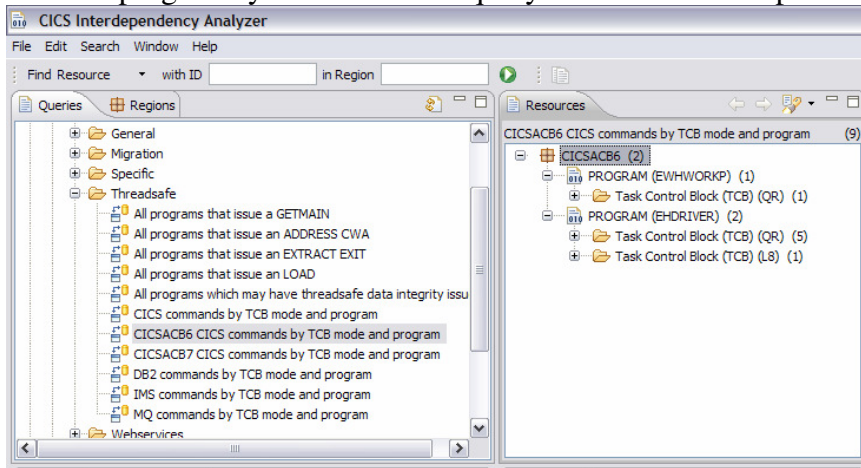
Program EWHWORKP has 1 command on the QR and EHDRIVER has 5 commands on the QR and 1 on the L8.

☐ Now look at the same query for CICSACB7 by double-clicking on the **CICSACB7 CICS commands by TCB mode and program.** Expand both of the programs again.
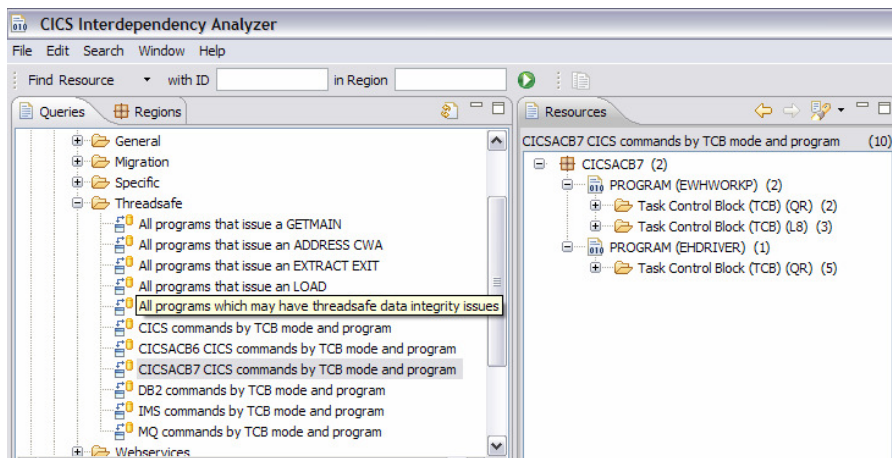
In comparison to CICSACB6 you see program EWHWORKP has 2 commands running on the QR, 3 on the L8 and program EHDRIVER has 5 commands running on the QR.

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☐ Recall your previous search from **search history for CICSACB6** by using the back ⇐ arrow.

☐ Expand the results down to the command level and expand the **Address command** to see that it is an **Address CWA**.
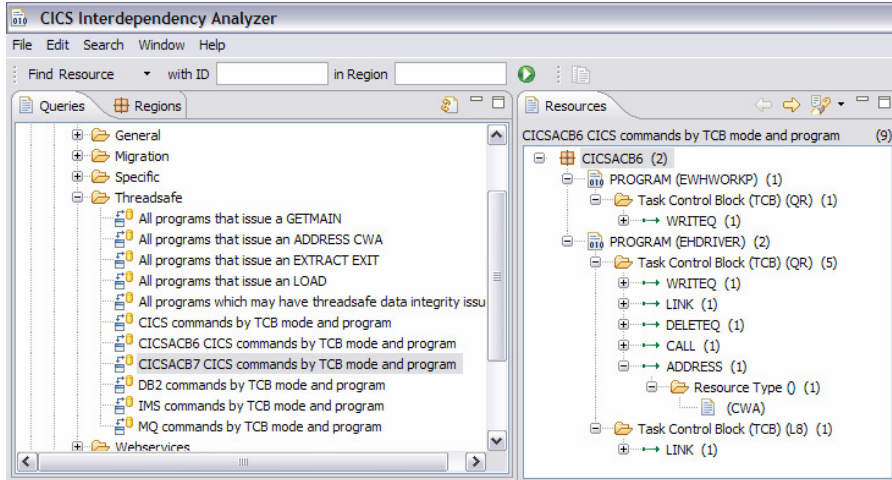
☐ Use the forward ⇨ arrow to move though the **query history stack** to get back to the **query for CICSACB7**.

☐ Expand the results down to the command level and expand the **Address command** to see **Address CWA** and the **ENQ/DEQ**.
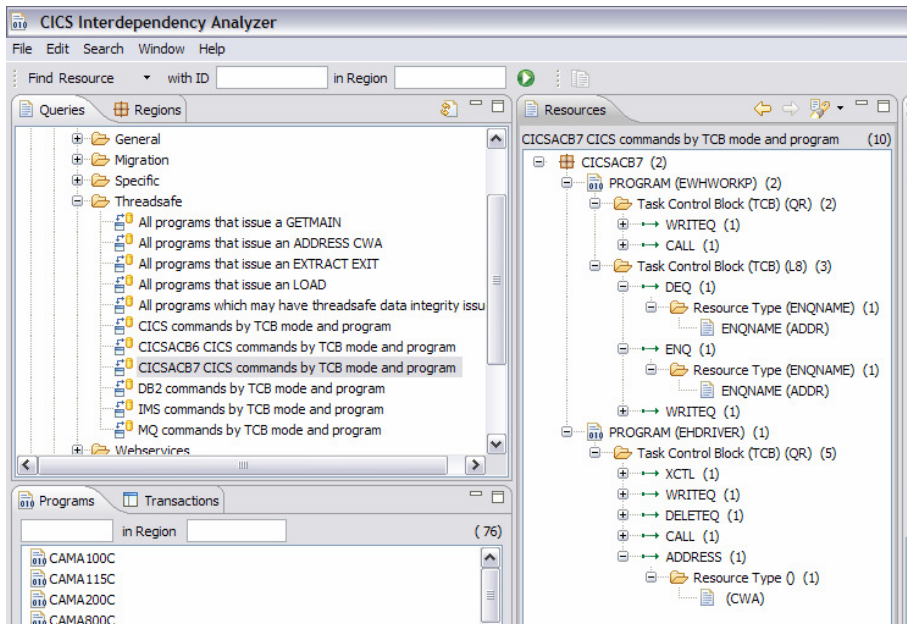
CICSACB7 shows the added ENQ/DEQ running on the L8 TCB since it is defined as threadsafe and EWHWORKP issues a DB2 select which puts the work over on the L8 TCB.

☐ At this point you may want to take a detailed look at program EHDRIVER since it is the initiating program. In the Programs view, right click on program **EHDRIVER->all resources for CICSACB7.** Note that the ENQ/DEQ shows in this view. Click on **ADDR** under the **ENQNAME**, the EWHWORKP program pops up in the by resources view. The tree view below titled **Programs using ADDR** shows EHDRIVER did an **XCTL** to EWHWORKP.
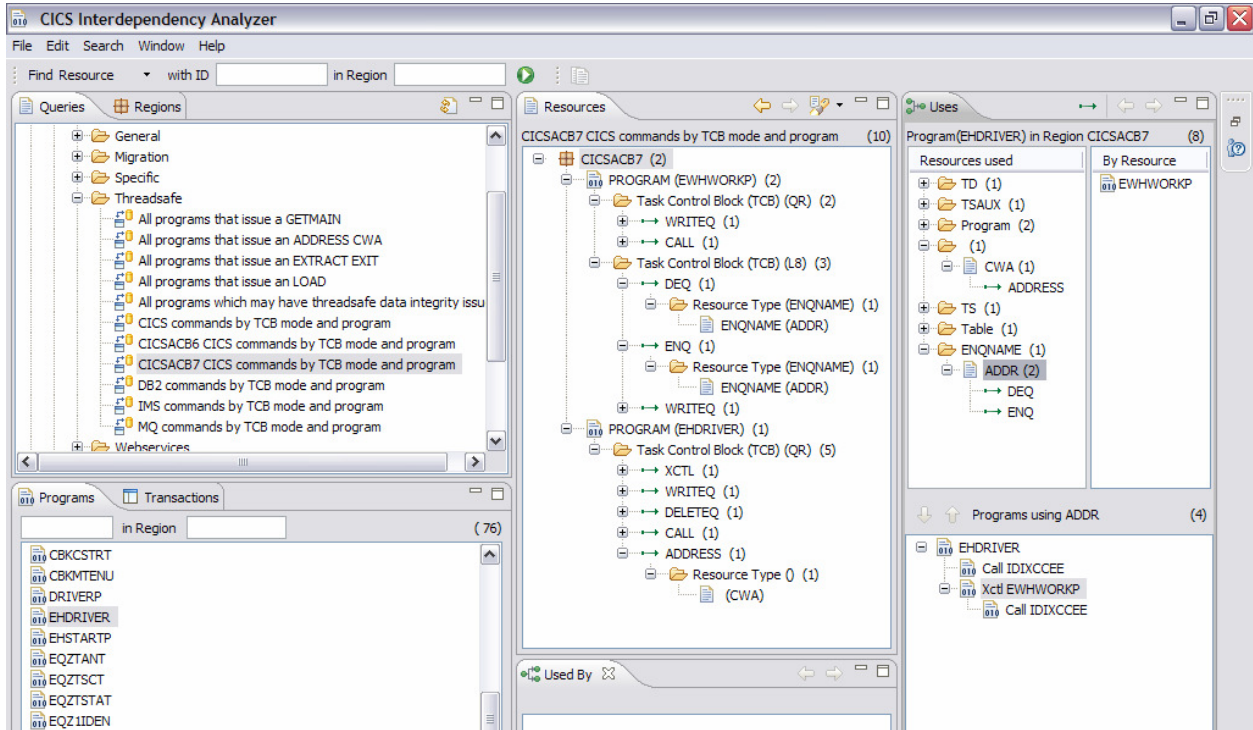
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In this final step you will let the system do a compare for you.

☐ Compare the results from your query history by clicking on the **Compare** toolbar button
  📝 from the **Resources** view to open the **Compare search results** window.
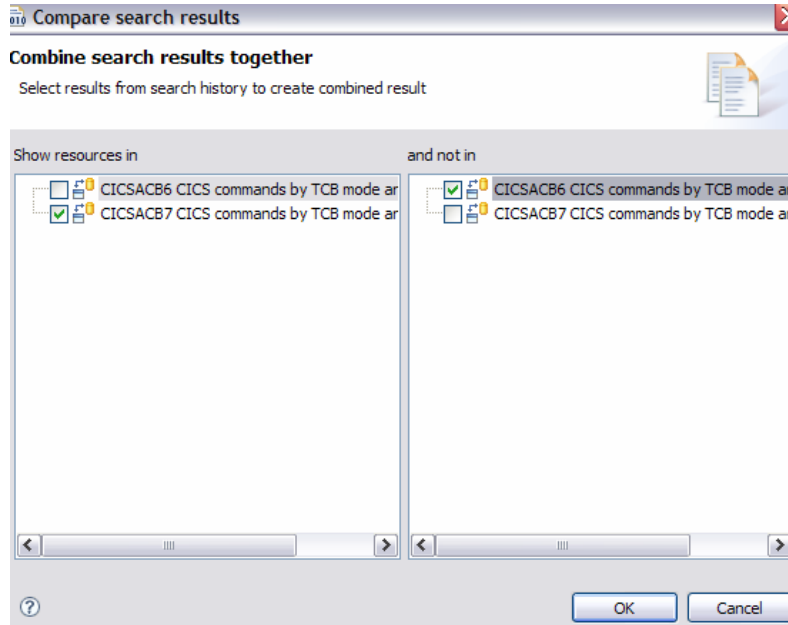
☐ In the window to the left click on the **check box** for **CICSACB7 CICS
  commands**…..to **show resources in** that query, and the window to the right, click on
  check box for **CICSACB6 CICS commands**….to show resources that **are not in** the
  CICSACB6 query.
☐ Click **OK** to run the compare.
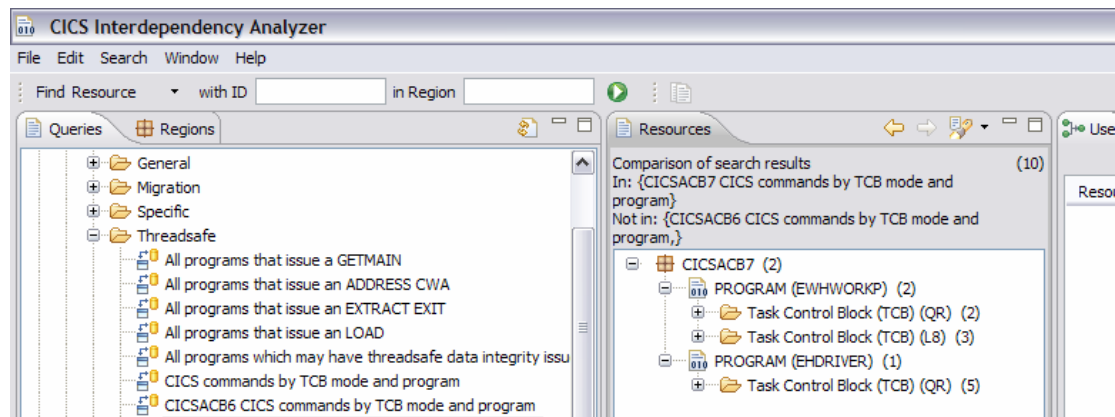
☐ Expand **CICSACB7** in the resources window to see the commands.

With the change for ENQ/DEQ and running in threadsafe mode you see the resource topology
has changed. Note EWHWORKP shows 3 commands running on the L8.

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You just used the Compare function for predefined queries. You can also use it to compare work across regions. For example, you could click on the Regions Tab next to queries, select all files for a region, then select another region and select all files for that region. Run a compare and get results as follows:
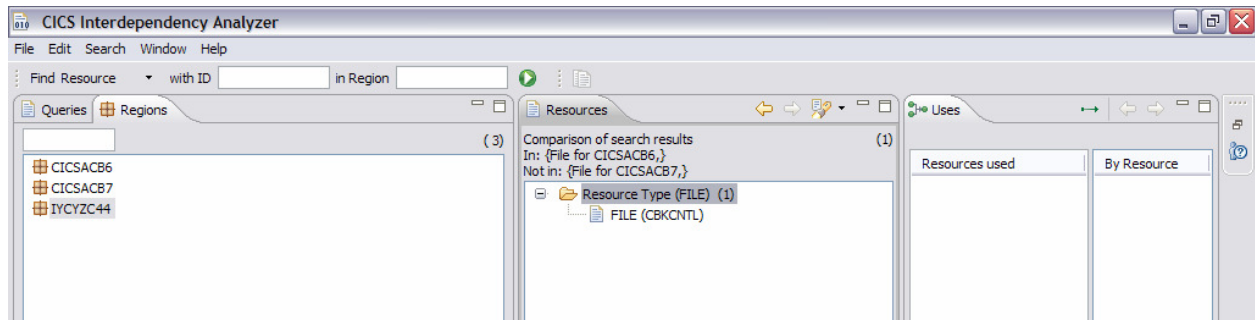
In this example you see that there is 1 file used in region 7 that is not used in 6.

This concludes the exercises for the CICS IA Explorer. Hopefully, you have discovered how easy it is to use the Explorer and how it can help you understand your resource relationships in CICS.

Exercise 10 – Review of Batch Threadsafe Report

This final exercise is a review of the Batch Threadsafe report. Excerpts from the Batch Threadsafe report follow. The first section is from the report for the transaction flow defined as Quasirent. The second is the same programs with the ENQ/DEQ added and the programs defined as threadsafe.

Take a few minutes to review the difference in the number of threadsafe commands and the workflow change with commands that moved from EHDRIVER to EWHWORKP.

Section 1 – Commands with programs defined as Quasirent

```
*********************************************************** Top of Data ************************************************************
CICS INTERDEPENDENCY ANALYZER VERSION 2.2.0                                            2008/07/14:20.30.23    PAGE    1
Program Dynamic Analysis - THREADSAFE DETAIL LISTING FOR CICS TS

Report options:
  PROGRAMNAME=*          REGIONNAME=*          CICSLEVEL=      REPORT=DETAIL    LINESPERPAGE=60



Definitions of Terms:

   'Threadsafe' calls are EXEC CALLS commands that do not cause a TCB swap.

   'Non-Threadsafe' calls are EXEC CALLS commands that cause a TCB swap.

   'Indeterminate Threadsafe' calls are EXEC CALLS commands where it cannot be determined if the call causes a TCB swap.

   'Dynamic calls' are calls to modules at execution time. Programs that are called dynamically take on the same environment
                 as the calling program.

   'Threadsafe Inhibitor calls' are EXEC CICS commands that need to be investigated further because they may prevent you from
                     defining your program as threadsafe. These commands are: ADDRESS CWA, EXTRACT EXIT, GETMAIN SHARED,
                     and LOAD.
```

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 Command ===> _                                                                        Scroll ===> PAGE
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APPLID   Program   Linkedit    Execution  Concurrency APIST  Storage  CICS  LIB Dataset Name
                   Date        Key                            Protect  Rel
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                   CMD  Function              Type       Resource                       Offset   Program  Use        Threadsafe
                   Type                                                                           Length   Count
                   ---- ----------------------- ---------- ------------------------------ -------- -------- ---------- ----------

CICSACB6 EHDRIVER ---------- USER       QUASIRENT   CICSAPI INACTIVE 0650
                   CICS ADDRESS                            CWA                            4D8      1460         10   Y  *
                   CICS ADDRESS                            CWA                            4D8      1500         20   Y  *
                   CICS CALL              PROGRAM    IDINDFUE                       FFFFFFFF  1460          9   N
                   CICS CALL              PROGRAM    IDIXCCEE                       FFFFFFFF  1460         10   N
                   CICS DELETEQ           TSAUX      OUTPUTQ                        4B4      1460         10   Y
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Program Dynamic Analysis - THREADSAFE DETAIL LISTING FOR CICS TS 3.2

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                   CMD  Function              Type       Resource                       Offset   Program  Use        Threadsafe
                   Type                                                                           Length   Count
                   ---- ----------------------- ---------- ------------------------------ -------- -------- ---------- ----------

                   CICS DELETEQ           TSAUX      OUTPUTQ                        4B4      1500         20   Y
                   CICS LINK              PROGRAM    EWHWORKP                       56E      1460         50   I
                   CICS LINK              PROGRAM    EWHWORKP                       56E      1500        500   I
                   CICS LINK              PROGRAM    EWHWORKR                       5DE      1500        500   I
                   CICS LINK              PROGRAM    EWHWORKR                       5D2      1460         10   I
                   CICS WRITEQ            TD         CESE                           FFFFFFFF  1460       4748   N
```

```
 Command ===> _                                                                        Scroll ===> PAGE
                CICS ADDRESS                     CWA                    4D8     1460       10    Y  *
                CICS ADDRESS                     CWA                    4D8     1500       20    Y  *
                CICS CALL        PROGRAM    IDINDFUE              FFFFFFFF      1460        9    N
                CICS CALL        PROGRAM    IDIXCCEE              FFFFFFFF      1460       10    N
                CICS DELETEQ     TSAUX      OUTPUTQ                    4B4     1460       10    Y
                CICS DELETEQ     TSAUX      OUTPUTQ                    4B4     1500       20    Y
                CICS LINK        PROGRAM    EWHWORKP                   56E     1460       50    I
                CICS LINK        PROGRAM    EWHWORKP                   56E     1500      500    I
                CICS LINK        PROGRAM    EWHWORKR                   5DE     1500      500    I
                CICS LINK        PROGRAM    EWHWORKR                   5D2     1460       10    I
                CICS WRITEQ      TD         CESE                 FFFFFFFF      1460     4740    N
                CICS ADDRESS                     CWA                    4D8     1460       10    Y  *
                CICS ADDRESS                     CWA                    4D8     1500       20    Y  *
                CICS CALL        PROGRAM    IDINDFUE              FFFFFFFF      1460        9    N
                CICS CALL        PROGRAM    IDIXCCEE              FFFFFFFF      1460       10    N
                CICS DELETEQ     TSAUX      OUTPUTQ                    4B4     1460       10    Y
                CICS DELETEQ     TSAUX      OUTPUTQ                    4B4     1500       20    Y
                CICS LINK        PROGRAM    EWHWORKP                   56E     1460       50    I
                CICS LINK        PROGRAM    EWHWORKP                   56E     1500      500    I
                CICS LINK        PROGRAM    EWHWORKR                   5DE     1500      500    I
                CICS LINK        PROGRAM    EWHWORKR                   5D2     1460       10    I
                CICS WRITEQ      TD         CESE                 FFFFFFFF      1460     4738    N
                CICS ADDRESS                     CWA                    4D8     1460       10    Y  *
 Command ===> _                                                                        Scroll ===> PAGE
                CICS ADDRESS                     CWA                    4D8     1500       20    Y  *
                CICS CALL        PROGRAM    IDINDFUE              FFFFFFFF      1460        9    N
                CICS CALL        PROGRAM    IDIXCCEE              FFFFFFFF      1460       10    N
                CICS DELETEQ     TSAUX      OUTPUTQ                    4B4     1460       10    Y
                CICS DELETEQ     TSAUX      OUTPUTQ                    4B4     1500       20    Y
                CICS LINK        PROGRAM    EWHWORKP                   56E     1460       50    I
                CICS LINK        PROGRAM    EWHWORKP                   56E     1500      500    I
                CICS LINK        PROGRAM    EWHWORKR                   5DE     1500      500    I
                CICS LINK        PROGRAM    EWHWORKR                   5D2     1460       10    I
                CICS WRITEQ      TD         CESE                 FFFFFFFF      1460     4742    N
                CICS ADDRESS                     CWA                    4D8     1460       10    Y  *
                CICS ADDRESS                     CWA                    4D8     1500       20    Y  *
                CICS CALL        PROGRAM    IDINDFUE              FFFFFFFF      1460        9    N
                CICS CALL        PROGRAM    IDIXCCEE              FFFFFFFF      1460       10    N
                CICS DELETEQ     TSAUX      OUTPUTQ                    4B4     1460       10    Y
                CICS DELETEQ     TSAUX      OUTPUTQ                    4B4     1500       20    Y
                CICS LINK        PROGRAM    EWHWORKP                   56E     1460       50    I
                CICS LINK        PROGRAM    EWHWORKP                   56E     1500      500    I
                CICS LINK        PROGRAM    EWHWORKR                   5DE     1500      500    I
                CICS LINK        PROGRAM    EWHWORKR                   5D2     1460       10    I
                CICS WRITEQ      TD         CESE                 FFFFFFFF      1460     4742    N
 APPLID   Program   Linkedit    Execution  Concurrency  APIST  Storage  CICS  LIB Dataset Name
                    Date        Key                             Protect  Rel
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                CMD   Function            Type       Resource              Offset   Program   Use        Threadsafe
                Type                                                                 Length    Count
                ----  ----------------- ----------- --------------------  -------- -------- --------- ----------
 Total CICS calls:       55  Threadsafe:        20  Non-Threadsafe:       15  Indeterminate Threadsafe:        20
                             DB2 calls:          0  MQ calls:              0  IMS calls:                        0
                             Dynamic Calls:     10  Threadsafe Inhibitor calls:    10

 CICSACB6 EHSTARTP ---------- USER      QUASIRENT   CICSAPI INACTIVE 0650
                CICS START                 TRANSID    TXDA                  3F0     1448       30    N
                CICS START                 TRANSID    TXDB                  44A     1448       30    N
                CICS START                 TRANSID    TXDC                  4A0     1448       30    N
                CICS START                 TRANSID    TXDD                  4F6     1448       30    N
                CICS START                 TRANSID    TXDE                  54C     1448       30    N
 Total CICS calls:        5  Threadsafe:         0  Non-Threadsafe:        5  Indeterminate Threadsafe:         0
                             DB2 calls:          0  MQ calls:              0  IMS calls:                        0
                             Dynamic Calls:      0  Threadsafe Inhibitor calls:     0
 Command ===> _                                                                        Scroll ===> PAGE
 CICSACB6 EWHWORKP ---------- USER      QUASIRENT   CICSAPI INACTIVE 0650
                CICS WRITEQ                TS         OUTPUTQ               5CA     1808      550    Y
                CICS WRITEQ                TS         OUTPUTQ               5CA     1808      550    Y
                CICS WRITEQ                TS         OUTPUTQ               5CA     1808      550    Y
                CICS WRITEQ                TS         OUTPUTQ               5CA     1808      550    Y
                CICS WRITEQ                TS         OUTPUTQ               5CA     1808      550    Y
                DB2  SELECT                TABLE                            68E     1808    50500    Y
                DB2  SELECT                TABLE                            68E     1808    50500    Y
                DB2  SELECT                TABLE                            68E     1808    50500    Y
                DB2  SELECT                TABLE                            68E     1808    50500    Y
                DB2  SELECT                TABLE                            68E     1808    50500    Y
 Total CICS calls:        5  Threadsafe:         5  Non-Threadsafe:        0  Indeterminate Threadsafe:         0
                             DB2 calls:          5  MQ calls:              0  IMS calls:                        0
                             Dynamic Calls:      0  Threadsafe Inhibitor calls:     0
```

This concludes the report for the Quasirent execution of the workflow.

Section 2 – Commands with programs defined as Threadsafe

The following report is for the threadsafe execution of the workflow with the ENQ/DEQ added.

```
 Command ===>                                                               Scroll ===> CSR
CICSACB7 EHDRIVER        _   USER      THREADSAFE  CICSAPI INACTIVE 0650  USER.CICSAOR7.LOADLIB
             CICS ADDRESS                        CWA                    4D2    1458      90   Y  *
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1458      40   N
             CICS DELETEQ          TSAUX         OUTPUTQ                4AE    1458      90   Y
             CICS WRITEQ           TD            CESE              FFFFFFFF    1458   19000   N
             CICS XCTL             PROGRAM       EWHWORKP               544    1458      90   Y
             CICS ADDRESS                        CWA                    4D2    1458      90   Y  *
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1458      40   N
             CICS DELETEQ          TSAUX         OUTPUTQ                4AE    1458      90   Y
             CICS WRITEQ           TD            CESE              FFFFFFFF    1458   19000   N
             CICS XCTL             PROGRAM       EWHWORKP               544    1458      90   Y
             CICS ADDRESS                        CWA                    4D2    1458      90   Y  *
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1458      40   N
             CICS DELETEQ          TSAUX         OUTPUTQ                4AE    1458      90   Y
             CICS WRITEQ           TD            CESE              FFFFFFFF    1458   19000   N
             CICS XCTL             PROGRAM       EWHWORKP               544    1458      90   Y
             CICS ADDRESS                        CWA                    4D2    1458      90   Y  *
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1458      40   N
             CICS DELETEQ          TSAUX         OUTPUTQ                4AE    1458      90   Y
             CICS WRITEQ           TD            CESE              FFFFFFFF    1458   19000   N
             CICS XCTL             PROGRAM       EWHWORKP               544    1458      90   Y
             CICS ADDRESS                        CWA                    4D2    1458      90   Y  *
 APPLID    Program   Linkedit   Execution  Concurrency  APIST   Storage  CICS  LIB Dataset Name
                     Date       Key                             Protect  Rel
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             CMD  Function               Type       Resource                     Offset   Program  Use       Threadsafe
             Type                                                                          Length   Count
             ---- ----------------------- ---------- -------------------------- -------- -------- --------- ----------
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1458      40   N
             CICS DELETEQ          TSAUX         OUTPUTQ                4AE    1458      90   Y
             CICS WRITEQ           TD            CESE              FFFFFFFF    1458   19000   N
             CICS XCTL             PROGRAM       EWHWORKP               544    1458      90   Y
   Total CICS calls:       25   Threadsafe:        15  Non-Threadsafe:         10  Indeterminate Threadsafe:        0
                              DB2 calls:            0  MQ calls:                0  IMS calls:                       0
                              Dynamic Calls:        5  Threadsafe Inhibitor calls:   5

CICSACB7 EHSTARTP ---------- USER      THREADSAFE  CICSAPI INACTIVE 0650  USER.CICSAOR7.LOADLIB
             CICS START            TRANSID       TXDA                   538    1618      90   N
             CICS START            TRANSID       TXDB                   592    1618      90   N
             CICS START            TRANSID       TXDC                   5E8    1618      90   N
             CICS START            TRANSID       TXDD                   63E    1618      90   N
             CICS START            TRANSID       TXDE                   694    1618      90   N
 BROWSE    DNETOU64.PRT.CNTL(IMTS)                                          Line 00000298 Col 001 132
 Command ===> _                                                            Scroll ===> CSR
   Total CICS calls:        5   Threadsafe:         0  Non-Threadsafe:          5  Indeterminate Threadsafe:        0
                              DB2 calls:            0  MQ calls:                0  IMS calls:                       0
                              Dynamic Calls:        0  Threadsafe Inhibitor calls:   0

CICSACB7 EWHWORKP ---------- USER      THREADSAFE  CICSAPI INACTIVE 0650  USER.CICSAOR7.LOADLIB
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1908      20   N
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1938      20   N
             CICS DEQ              ENQNAME       ADDR                   782    1810     100   I
             CICS ENQ              ENQNAME       ADDR                   6EA    1810     100   I
             CICS WRITEQ           TD            CESE              FFFFFFFF    1908   11903   N
             CICS WRITEQ           TD            CESE              FFFFFFFF    1938   11300   N
             CICS WRITEQ           TS            OUTPUTQ                5EA    1810      10   Y
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1908      20   N
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1938      20   N
             CICS DEQ              ENQNAME       ADDR                   782    1810     100   I
             CICS ENQ              ENQNAME       ADDR                   6EA    1810     100   I
             CICS WRITEQ           TD            CESE              FFFFFFFF    1908   11340   N
             CICS WRITEQ           TD            CESE              FFFFFFFF    1938   11300   N
             CICS WRITEQ           TS            OUTPUTQ                5EA    1810      10   Y
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1908      20   N
             CICS CALL             PROGRAM       IDIXCCEE          FFFFFFFF    1938      20   N
             CICS DEQ              ENQNAME       ADDR                   782    1810     100   I
             CICS ENQ              ENQNAME       ADDR                   6EA    1810     100   I
```

```
Command ===> _                                                        Scroll ===> CSR
              CICS WRITEQ            TD        CESE              FFFFFFFF   1908     11340    N
              CICS WRITEQ            TD        CESE              FFFFFFFF   1938     11300    N
              CICS WRITEQ            TS        OUTPUTQ                5EA   1810        10    Y
              CICS CALL              PROGRAM   IDIXCCEE          FFFFFFFF   1908        20    N
              CICS CALL              PROGRAM   IDIXCCEE          FFFFFFFF   1938        20    N
              CICS DEQ               ENQNAME   ADDR                  782   1810       100    I
              CICS ENQ               ENQNAME   ADDR                  6EA   1810       100    I
              CICS WRITEQ            TD        CESE              FFFFFFFF   1908     11340    N
              CICS WRITEQ            TD        CESE              FFFFFFFF   1938     11300    N
              CICS WRITEQ            TS        OUTPUTQ                5EA   1810        10    Y
              CICS CALL              PROGRAM   IDIXCCEE          FFFFFFFF   1908        20    N
              CICS CALL              PROGRAM   IDIXCCEE          FFFFFFFF   1938        20    N
              CICS DEQ               ENQNAME   ADDR                  782   1810       100    I
              CICS ENQ               ENQNAME   ADDR                  6EA   1810       100    I
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APPLID    Program   Linkedit   Execution  Concurrency  APIST  Storage   CICS  LIB Dataset Name
                    Date       Key                            Protect   Rel
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                    CMD   Function               Type      Resource                   Offset   Program  Use          Threadsafe
                    Type                                                                        Length   Count
```

```
Command ===> _                                                        Scroll ===> CSR
                    ----  ------------------------  ----------  ---------------------------  --------  --------  ---------  ----------
                    CICS WRITEQ            TD        CESE              FFFFFFFF   1908     11340    N
                    CICS WRITEQ            TD        CESE              FFFFFFFF   1938     11300    N
                    CICS WRITEQ            TS        OUTPUTQ                5EA   1810        10    Y
                    DB2  SELECT            TABLE                           6AE   1810       100    Y
                    DB2  SELECT            TABLE                           6AE   1810       100    Y
                    DB2  SELECT            TABLE                           6AE   1810       100    Y
                    DB2  SELECT            TABLE                           6AE   1810       100    Y
                    DB2  SELECT            TABLE                           6AE   1810       100    Y
  Total CICS calls:        35   Threadsafe:        5  Non-Threadsafe:       20  Indeterminate Threadsafe:       10
                               DB2 calls:         5  MQ calls:              0  IMS calls:                       0
                               Dynamic Calls:    10  Threadsafe Inhibitor calls:   0
```

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