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Application Analysis using the Command Flow
Feature in CICS/IA for z/OS: Session 1944.

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MAY 2-7 Las Vegas, NV



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Presentation Overview

- CICS Interdependency Analyzer V3.1?
 - What is CICS IA ?
 - Why use CICS IA ?
 - Who uses CICS IA ?
- IA Component Overview
- What data do we collect ?
- CICS Command Flow Feature
- Summary
- IA Explorer plug-in demo

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What is CICS Interdependency Analyzer for z/OS ?

- CICS IA
 - Captures CICS application relationships:
 - resources used
 - CICS : Transactions , Programs, Files, TSQs, TDQs , Webservices, etc
 - DB2: tables , views, cursors etc
 - MQ: Queues , QueueMgrs
 - IMS/DLI: PCBs and PSBs
 - Natural and Adabas resources
 - Captures CICS Affinity data
 - Batch Scanners
 - CSECT scanner , CICS command scanner
 - All data loaded into a DB2 data base
 - CICS Explorer plug-in integrates with CICS run-time and other tools
 - CICS Support
 - CICS TS for z/OS V2.x, V3.x and V4.1

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What is CICS Interdependency Analyzer for z/OS ?

- New in CICS IA V3.1
 - Supports all new and updated CICS TS V4.1 resources
 - Events, Atom feeds, Bundles, XML mappings, etc
 - Fully supported plug-in for the CICS Explorer
 - Command Flow feature
 - Natural program interactions and ADABAS usage
 - Migration queries for CICS TS V4.1
 - Collect Affinity and Dependency data at the same time
 - Change collector options dynamically

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Why use CICS Interdependency Analyzer for z/OS ?

- IA can be used in a number of day to day activities as well as major projects
 - Projects
 - Workload balancing – Threadsafe Analysis
 - CICS TS Migration
 - Understand the use of TRUEs and GLUEs
 - Understand the use of modified or deleted SPIs and APIs
 - Assist with test coverage
 - TS 3.2 and 4.1 MQ resource usage
 - Threadsafe Analysis
 - CICS Events deployment
 - Migration from VSAM to DB2
 - Batch Window Analysis

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Why use CICS Interdependency Analyzer for z/OS ?

- Day to day
 - Application changes
 - Which programs use a given resource
 - Application deployment
 - Governance – check for
 - » Affinities , Threadsafe commands , site rules
 - Problem determination
 - What new commands have been added to a given program
 - » First_used time stamp
 - VSAM or resource recovery
 - Disable all programs that use this file

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Who uses CICS Interdependency Analyzer for z/OS ?

- IA can be used by a number of people
 - System Programmers
 - Threadsafe, affinities, problem determination
 - Operators
 - resource usage – disable programs that use a given file.
 - Application Programmers
 - Resource usage – which programs use this resource
 - Testers
 - Coverage of Automated testing
 - Managers
 - Governance
 - Code deployment

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CICS IA Components

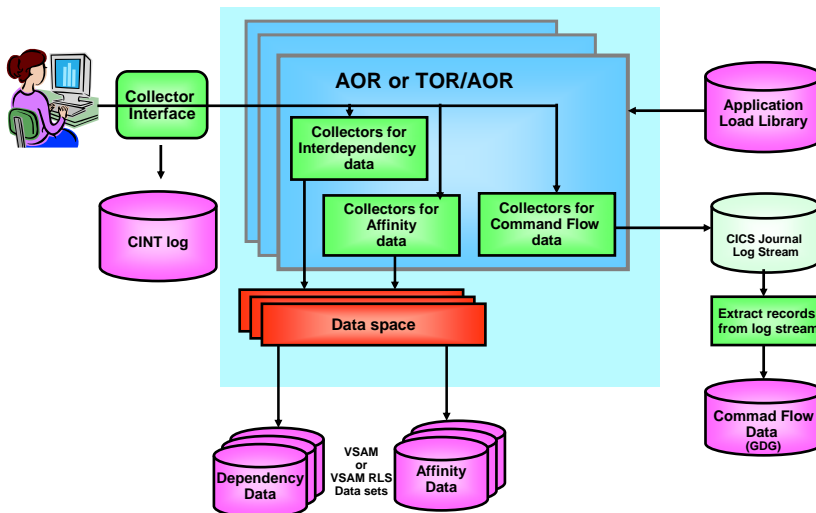
Data Collector
Scanners and Reports
Database
EXPLORER plug-in

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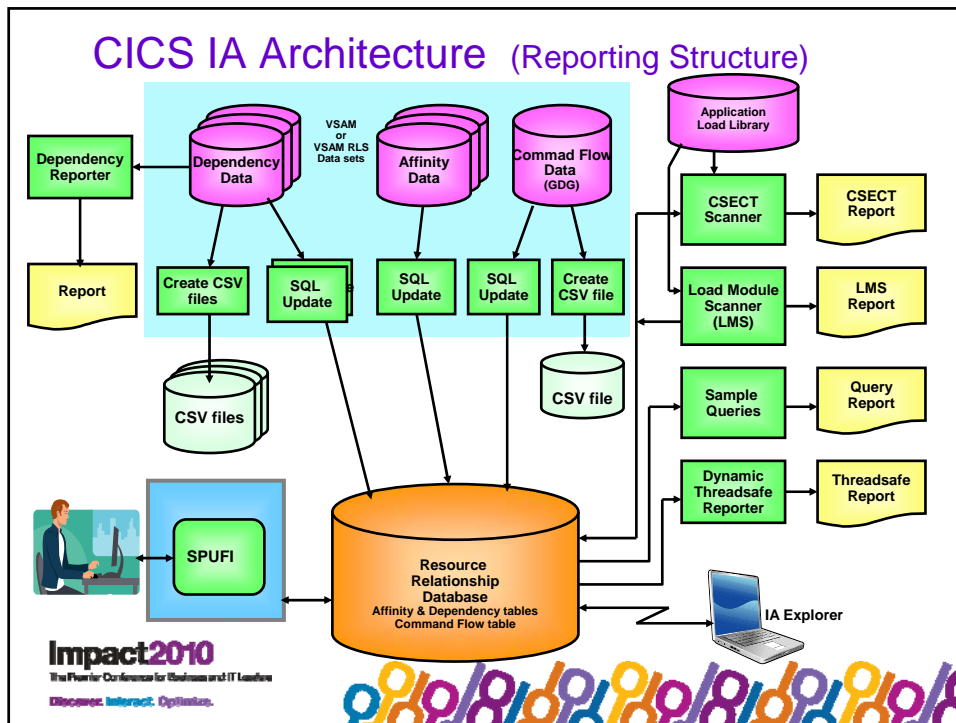


CICS IA Architecture (Collector structure)



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CICS IA – Data Collector

- Interface transaction – CINT
 - Operational control
 - Administration
 - Single or multi region
 - Can be issued from the MVS console
- How do we collect
- CINT log



CINT transaction

```

B - mvs2e
File Edit View Communication Actions Window Help
CIU000 CICS Intersystem Analyzer for z/OS - V3R1M0 2010/01/11
Main Administration Menu 09:58:23AM

Select one of the following. Then press Enter.

- 1 Operations Menu.
  2 Configure Region Options.
  3 Configure Global Options.

-

CICS Sysid: EJ02 CICS Applid: IYDZEJ02 TermID: TC30
CIU7000I 5655-U86 (C) Copyright IBM Corp. 2001,2009
F1=Help F2= F3=Exit F4= F5= F6=
F7= F8= F9= F10= F11= F12=Exit
b 13/000
  
```

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CINT transaction - Administration

```

B - mvs2e
File Edit View Communication Actions Window Help
CIU200 CICS Intersystem Analyzer for z/OS - V3R1M0 2010/01/11
Region Configuration Menu 10:03:42AM

Type action code then press ENTER. More : +
1=Add Region 2=Copy Region 3=Delete Region 4=Options

CICS CICS New New
Act Applid Sysid Applid Sysid Status Collecting
-
- DEFAULTS DFTS
- ALL ALL
- IYDZEJ0A EJ0A UNCONNECTED
- IYDZEJ0B EJ0B UNCONNECTED
- IYDZEJ02 EJ02 STOPPED
- IYDZEJ03 EJ03 STOPPED
- IYDZEJ04 EJ04 UNCONNECTED
- IYDZEJ05 EJ05 UNCONNECTED
- IYDZEJ06 EJ06 UNCONNECTED
- IYDZEJ07 EJ07 UNCONNECTED

CICS Sysid: EJ02 CICS Applid: IYDZEJ02 TermID: TC30
F1=Help F2= F3=Exit F4= F5= Refresh F6=
F7=Page Up F8=Page Down F9= F10= F11= F12=
b 10/004
  
```

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CINT transaction - Administration

```

B - mvs2e
File Edit View Communication Actions Window Help
CIU290 CICS Interdependency Analyzer for z/OS - V3R1M0 2010/01/11
Resource Options for 10:04:41AM
CICS Sysid: DFTS CICS Applid: DEFAULTS

Type action code then press ENTER: _

1 = General Options
2 = Time/Date Options

Interdependency Options Affinity Options
3 = CICS Options for APIs 8 = Affinity Options
4 = CICS Options for SPIs
5 = DB2/IMS/MQ Options
6 = Command Flow Options
7 = Natural Options

CICS Sysid: EJ02 CICS Applid: IYDZEJ02 TermID: TC30

F1=Help F2= F3=Exit F4= F5= F6=
F7= F8= F9= F10= F11= F12=Exit
    
```

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CINT transaction - Administration

```

B - mvs2e
File Edit View Communication Actions Window Help
CIU260 CICS Interdependency Analyzer for z/OS - V3R1M0 2010/01/11
General Options for 10:05:59AM
CICS Sysid : DFTS CICS Applid : DEFAULTS

Modify the options and press Enter to update, or PF12 to Cancel.

Control options
Data to Collect . . . . . : I (A=Affinity, I=Interdependency, B=Both)
Perform periodic saves . . . : Y (Y=Yes, N=No)
Trigger for CINB start . . . : 1 (2 to 9999 thousand record updates)
Inquire for DB2 resources . . : Y (Y=Yes, N=No)
Restore data on start . . . : Y (Y=Yes, N=No)
Multiple signon with same id : N (Y=Yes, N=No)
Maintain usage counts . . . : N (Y=Yes, N=No)
Size of dataspace . . . . . : 16 (10 to 2000 Mbytes)
Transid prefix (optional) . . : (1 to 4 characters)
Program exclude list . . . . : CIUXPROG (1 to 8 characters)
Transaction exclude list . . : CIUXTRAN (1 to 8 characters)
Resource prefix list . . . . : CIUPFXTR (1 to 8 characters)

CICS Sysid: EJ02 CICS Applid: IYDZEJ02 TermID: TC30

F1=Help F2= F3=Exit F4= F5= F6=
F7= F8= F9= F10= F11= F12=Cancel
    
```

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What data do we collect ?

```

B - mvs2e
File Edit View Communication Actions Window Help
CIU240 CICS Interdependency Analyzer for z/OS - V3R1M0 2010/01/11
CICS Resources Options for 10:07:13AM
CICS Sysid : DFTS CICS Applid : DEFAULTS

Modify the options and press Enter to update, or PF12 to Cancel.

Detect command types: Y=Yes, N=No
D=Yes+Detail ( Only for API types marked with * )

APIs
*Programs . . . D *Files . . . D *Transactions . D Task Control . Y
Presentation . Y *TS Queues . . D *TD Queues . . D Journals . . . Y
DTP . . . . . Y Counters . . . Y FEPI . . . . . Y *WEB Services . D
*Exits . . . . D Others . . . . Y EVENT proc . . Y ATOMServices . Y
XMLtransform . Y WAddressing . Y

-

CICS Sysid: EJ02 CICS Applid: IYDZEJ02 TermID: TC30

F1= F2= F3=Exit F4= F5= F6=
F7= F8= F9= F10= F11= F12=Cancel
  
```

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CINT transaction - Operations

```

B - mvs2e
File Edit View Communication Actions Window Help
CIU100 CICS Interdependency Analyzer for z/OS - V3R1M0 2010/01/11
Operations Menu 10:12:07AM

Type action code then press ENTER. More : +

1= Start 2= Stop 3= Pause 4= Continue 5= Statistics 6= Refresh Run Options

Act CICS CICS Start Start Collecting
Appid Sysid Status Date Time
- ALL ALL
- IYDZEJ0A EJ0A UNCONNECTED
- IYDZEJ0B EJ0B UNCONNECTED
- IYDZEJ02 EJ02 STOPPED
- IYDZEJ03 EJ03 STOPPED
- IYDZEJ04 EJ04 UNCONNECTED
- IYDZEJ05 EJ05 UNCONNECTED
- IYDZEJ06 EJ06 UNCONNECTED
- IYDZEJ07 EJ07 UNCONNECTED
- IYDZEJ08 EJ08 UNCONNECTED

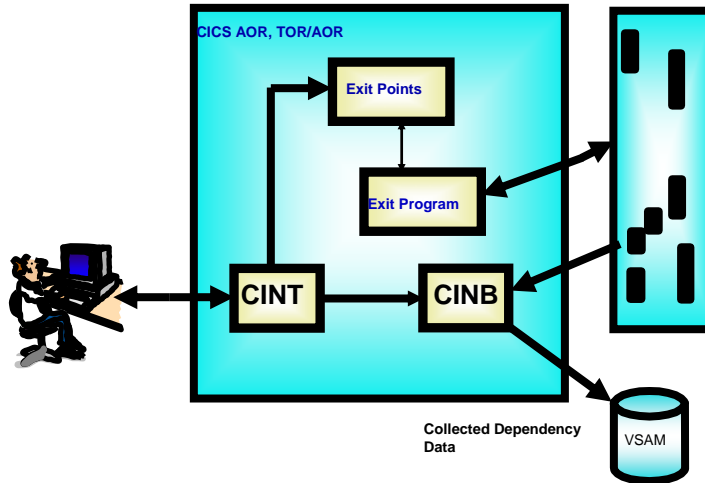
CICS Sysid: EJ02 CICS Applid: IYDZEJ02 TermID: TC30

F1=Help F2= F3=End F4= F5=Refresh F6=
F7=Page Up F8=Page Down F9= F10= F11= F12=
  
```

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How do we collect the data ?



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How do we collect the data ?

- Interdependency Exits

- GLUEs

- CIUXCCO1 at exit point XEIOUOUT and XEIN
- CIUXCCR1 at exit point XRMIOUT and XRMIN
- CIUXCCF1 at exit point XFCREQC
- CIUXCCP1 at exit point XPCREQC
- CIUXCCS1 at exit point XTSREQC
- CIUXCCD1 at exit point XTDREQC
- CIUXCC1 at exit point XICREQC
- CIUXCCL1 at exit point XDLIPOST
- CIUXCCF2 at exit point XFCSREQC (> TS 2.2)
- CIUXCCP2 at exit point XPCFTCH (> TS 2.2)
- CIUXCCW1 at exit point XWSPRROO (> TS 3.2)?

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How do we collect the data ?

- Affinity Exits
 - TRUE
 - CIUZCCI1 at task start and end
 - GLUEs
 - CIUZCCB1 at exit point XBADEACT
 - CIUZCCN1 at exit point XMEOUT
 - CIUZCCO1 at exit point XEIOU
 - CIUZCCX1 at exit point XICEXP
 - CIUZCCF1 at exit point XFAINTU
 - CICS TS 2.2 and later



CICS IA CINT log (TDQ) – at shutdown

```
EXEC CICS DISABLE EXITALL for program CIUXCCD1 OK
EXEC CICS DISABLE EXITALL for program CIUXCCI1 OK
EXEC CICS DISABLE EXITALL for program CIUXCCR1 OK
EXEC CICS DISABLE EXITALL for program CIUXCCF2 OK
EXEC CICS DISABLE EXITALL for program CIUXCCP2 OK
EXEC CICS DISABLE EXITALL for program CIUXCCW1 OK
EXEC CICS DISABLE EXITALL for program CIUXCCL1 OK
EXEC CICS DISABLE EXITALL for program CIUXCCO3 OK
EXEC CICS DISABLE EXITALL for program CIUXCCO2 OK
EXEC CICS DISABLE EXITALL for program CIUXCCR3 OK
EXEC CICS DISABLE EXITALL for program CIUXCCR2 OK
EXEC CICS DISABLE EXITALL for program CIUXCCT1 OK
CINT Stopped: Total Command flow records 25
CINB save started - because of STOP
CINB save ended - 0 records saved
CINB terminated - Collector is stopping
Interdependency collector is now STOPPED
EXEC CICS DISABLE EXITALL for program CIUXDUMM OK
```



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Load Module Scanners and reports

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CICS IA – Load Module Scanner.

- Scans for possible dependency and affinity commands.
 - Analyzes the members in the Application LoadLib to produce
 - Summary Reports
 - Shows Module name, length, Language, number of dependency commands, number of Affinity commands and LE information.
 - Detailed Reports
 - Shows details including offset, storage content, possible command , dependency type and affinity type.
 - Information can be stored in DB2 tables:
 - CIU_SCAN_SUMMARY
 - CIU_SCAN_DETAIL

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Sample Scanner Output - Summary

Module Name	Module Length	Module Language	Language Version	Possible statements..... Affinities	Dependencies
NSMTEST	00001B18	COBOL II	LE	2	0
NSMT01	00001828	COBOL II	LE	1	0
NSMT02	00001958	COBOL II	LE	0	0
NSMT03	000018F0	COBOL II	LE	3	0
NSMT792D	00001698	COBOL II	LE	0	0
NSMWEBTS	00002298	COBOL II	LE	25	3
NSM0XCFG	00002FA8	COBOL II	LE	18	0
NSM0XCUI	000037E0	COBOL II	LE	24	1
NSM0XGUI	00003878	COBOL II	LE	25	1
NSM4CVD1	00006658	COBOL II	LE	9	0
NTGFLGLS	00000340			0	0
NTGTESTJ	00001CF8	COBOL II	LE	16	0
NTG0FILE	00001328	COBOL II	LE	1	0
PROGA8	00000530	ASSEMBLER		0	0
RTRL	000016D0	COBOL II	LE	2	0
RTRT	00001670			0	0
SNMSQLO	000030D0			0	0

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Sample Scanner Output - Summary

CICS INTERDEPENDENCY ANALYZER Version 3.1.0
LOAD MODULE SCANNER - SUMMARY LISTING OF CICS/AD.TEST.LOADLIB

LOAD LIBRARY STATISTICS

```

=====
Total modules in library                =      235
Total modules scanned                  =      229
Total CICS modules/tables (not scanned) =         6
Total modules in error (not scanned)   =         0
Total modules containing possible MVS POSTs =         0
Total modules containing possible Dependency commands =      55
Total modules containing possible Affinity commands =     185
  Total ASSEMBLER modules               =        30
  Total C/370 modules                   =         0
  Total COBOL modules                   =         1
  Total COBOL II modules                 =       161
  Total PL/I modules                    =         7
Total number of possible Dependency commands =     220
Total number of possible Affinity commands =     1,647
  
```

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Sample Scanner Output - Detail

```

Module Name - TST4CVD2 / Load Module Length - 00006010 / Module Entry Point
Offset      Storage Content (HEX)                                EDF DEBUG Possibl
-----
00000FA6   1802D0000700000000050900000020                            00829  RECEIVE
00000FBD   1804F000070000000005E204000020                            00822  SEND
00000FD4   1802D0000700000000050900000020                            00798  RECEIVE
00000FEB   1804F000070000000005E204000020                            00791  SEND
0000103A   0A04E8000700008900                                        00677  READQ
0000104B   0A02E8000700004500                                        00617  WRITEQ
0000105C   160200000700000100                                        00610  SYNCPOI
0000106D   0E02E0000700000100                                        00602  LINK
0000107E   0A04E8000700008900                                        00580  READQ
0000108F   0A02E0000700004100                                        00500  WRITEQ
000010A0   0A0680000700002100                                        00423  DELETEQ
000010C2   0A0680000700002100                                        00390  DELETEQ
Total possible Affinity commands =                12
Total possible Dependency commands =                2
Total possible MVS POSTs =                          0
  
```

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Sample Scanner Output – Detail cont

Possible Command	Type	Depcy	Affinity
RECEIVE	MAP	Yes	
SEND	MAP	Yes	
RECEIVE	MAP	Yes	
SEND	MAP	Yes	
READQ	TSQUEUE	Yes	Trans
WRITEQ	TSQUEUE	Yes	Trans
SYNCPOINT	UOW	Yes	System
LINK	PROGRAM	Yes	
READQ	TSQUEUE	Yes	Trans
WRITEQ	TSQUEUE	Yes	Trans
DELETEQ	TSQUEUE	Yes	Trans
DELETEQ	TSQUEUE	Yes	Trans

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Sample use of Scanner tables

```
SELECT * FROM REDTOOLS.CIU_SCAN_DETAIL
WHERE PROGRAM='TST4CVD2'
AND DSNAME='CICSIAD.TEST.LOADLIB';
```

DSNAME	PROGRAM	OFFSET	COMMAND	RESOURCE_TYPE
CICSIAD.TEST.LOADLIB	TST4CVD2	4006	RECEIVE	MAP
CICSIAD.TEST.LOADLIB	TST4CVD2	4029	SEND	MAP
CICSIAD.TEST.LOADLIB	TST4CVD2	4052	RECEIVE	MAP
CICSIAD.TEST.LOADLIB	TST4CVD2	4075	SEND	MAP
CICSIAD.TEST.LOADLIB	TST4CVD2	4154	READQ	TSQUEUE
CICSIAD.TEST.LOADLIB	TST4CVD2	4171	WRITEQ	TSQUEUE
CICSIAD.TEST.LOADLIB	TST4CVD2	4188	SYNCPOINT	UOW
CICSIAD.TEST.LOADLIB	TST4CVD2	4205	LINK	PROGRAM
CICSIAD.TEST.LOADLIB	TST4CVD2	4222	READQ	TSQUEUE
CICSIAD.TEST.LOADLIB	TST4CVD2	4239	WRITEQ	TSQUEUE
CICSIAD.TEST.LOADLIB	TST4CVD2	4256	DELETEQ	TSQUEUE
CICSIAD.TEST.LOADLIB	TST4CVD2	4290	DELETEQ	TSQUEUE

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Sample use of Scanner tables - cont

```
SELECT * FROM REDTOOLS.CIU_SCAN_DETAIL
WHERE PROGRAM='TST4CVD2'
AND DSNAME='CICSIAD.TEST.LOADLIB';
```

RESOURCE_TYPE	AFFINITY	AFFINITY_TYPE	DEPENDENCY	MVS_POST	COMMAND_HEX
MAP	N		Y	N	1802D0000700000
MAP	N		Y	N	1804F0000700000
MAP	N		Y	N	1802D0000700000
MAP	N		Y	N	1804F0000700000
TSQUEUE	Y	IT	Y	N	0A04E8000700008
TSQUEUE	Y	IT	Y	N	0A02E8000700004
UOW	Y	TS	Y	N	160200000700000
PROGRAM	N		Y	N	0E02E0000700000
TSQUEUE	Y	IT	Y	N	0A04E8000700008
TSQUEUE	Y	IT	Y	N	0A02E0000700004
TSQUEUE	Y	IT	Y	N	0A0680000700002
TSQUEUE	Y	IT	Y	N	0A0680000700002

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Sample use of Scanner tables

```
SELECT DSNAME, PROGRAM, AFFINITY_COUNT
FROM REDTOOLS.CIU_SCAN_SUMMARY
WHERE AFFINITY_COUNT > 0;
```

DSNAME	PROGRAM	AFFINITY_COUNT
REDTOOLS.APPLS.LOADL	CSQ4CVB1	15
REDTOOLS.APPLS.LOADL	CSQ4CVB2	9
REDTOOLS.APPLS.LOADL	CSQ4CVB3	4
REDTOOLS.APPLS.LOADL	CSQ4CVB4	4
REDTOOLS.APPLS.LOADL	CSQ4CVB5	3
REDTOOLS.APPLS.LOADL	CSQ4CVD1	9
REDTOOLS.APPLS.LOADL	CSQ4CVD2	13
REDTOOLS.APPLS.LOADL	CSQ4CVD3	4
REDTOOLS.APPLS.LOADL	CSQ4CVD4	4
REDTOOLS.APPLS.LOADL	CSQ4CVD5	4

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CICS IA - CSECT Scanner

- Batch Program
 - Runs against Application Load Library
 - Reports load module and CSECT version related information
- Load module information consists of:
 - Data set name
 - Load module name, length and entry point offset
 - Alias of (CSECT information is not shown for aliases)
 - Binder/linkage editor name
 - Binder/linkage editor version
 - Bind/linkage edit date
 - AMODE and RMODE
- CSECT information consists of:
 - Data set name
 - Load module name and length
 - Bind/linkage edit date
 - CSECT name
 - First translation information (date, translator name and translator version)
 - Second translation information (date, translator name and translator version)
 - User data (data and data)
 - MHASPZAP data (date and data)

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Sample CSECT Scanner Output

CSECT SCANNER - LISTING OF: CICS/AD.TEST.LOADLIB

Program	Length	Entry	Alias of	Linker name	Version	Timestamp
CSECT	Tldate	Tlname	Tlver T2date	T2name	T2ver	UsrDate UserData
TST4CVD2	00006010	00000000		5695PMB01	01.08	2007060151822
TST4CVD2	2007060	5648A2500	21.00			
DFHECI	2005061	569623400	01.04			
CSQAA	2005129	569623402	01.04	2005129 PL/X-390	02.02	
CSQCSTUB	2006034	569623402	01.04	2006034 PL/X-390	02.02	2006034 UK11383
CEESG005	2006073	569623402	01.05	2006073 PL/X-390	02.03	2006073 RSI60734444
CEEBETBL	2006074	569623400	01.05			
CEESTART	2006074	569623400	01.05			
IGZCBSO	2006073	569623402	01.05	2006073 PL/X-390	02.03	2006073 RSI60734310
CEEARLU	2006074	569623402	01.05	2006074 PL/X-390	02.03	
CEEBPIRA	2006074	569623402	01.05	2006074 PL/X-390	02.03	
CEECPYRT	2006074	569623402	01.05	2006074 PL/X-390	02.03	
CEEBPUBT	2006074	569623400	01.05			
CEEBTRM	2006074	569623400	01.05			
CEEBLLST	2006074	569623400	01.05			
CEEBINT	2006074	569623402	01.05	2006074 PL/X-390	02.03	

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Sample use of CSECT Scanner tables

```
SELECT PROGRAM, LINKED, TRAN_1_NAME, DESCRIPTION
FROM REDTOOLS.CIU_CSECT_INFO A, REDTOOLS.CIU_TRANSLATORS B
WHERE A.TRAN_1_NAME = B.TRANSLATOR_NAME
AND CSECT_NAME= PROGRAM ORDER BY 1,2;
```

PROGRAM	LINKED	TRAN_1_NAME	DESCRIPTION
AFFTESTA	2007-09-14-13.19.05.000000	5655G5300	Enterprise COBOL for z/OS
AFFTESTA	2007-09-14-13.19.05.000000	5655G5300	Enterprise COBOL for z/OS
AFFTESTB	2007-09-14-11.19.47.000000	566895801	VS COBOL II
AFFTESTB	2007-09-14-11.19.47.000000	566895801	VS COBOL II
AFFTESTC	2007-09-14-13.20.02.000000	5655G5300	Enterprise COBOL for z/OS
AFFTESTC	2007-09-14-13.20.02.000000	5655G5300	Enterprise COBOL for z/OS
AFFTESTD	2006-08-25-09.32.19.000000	5648A2500	COBOL for OS/390 and VM V2
AFFTESTD	2006-08-25-09.32.19.000000	5648A2500	COBOL for OS/390 and VM V2
AFFTESTE	2006-08-25-09.26.10.000000	5648A2500	COBOL for OS/390 and VM V2
AFFTESTE	2006-08-25-09.26.10.000000	5648A2500	COBOL for OS/390 and VM V2

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Sample use of CSECT Scanner tables

```
SELECT A.PROGRAM, LINKED, FUNCTION, TYPE, OBJECT
FROM REDTOOLS.CIU_CICS_DATA A, REDTOOLS.CIU_PROGRAM_INFO B
WHERE A.PROGRAM = B.PROGRAM
AND A.PROGLEN = B.PROGLEN ORDER BY 1,2,3;
```

PROGRAM	LINKED	FUNCTION	TYPE	OBJECT
AFFTESTZ	2007-09-13-11.27	ADDRESS		CWA
AFFTESTZ	2007-09-13-11.27	ADDRESS		CWA
AFFTESTZ	2007-09-13-11.27	ASSIGN		IYDZZ32A
AFFTESTZ	2007-09-13-11.27	ASSIGN		IYDZZ32A
AFFTESTZ	2007-09-13-11.27	CREATE	FILE	EMSCNTL
AFFTESTZ	2007-09-13-11.27	CREATE	PROGRAM	AFFTESTP
AFFTESTZ	2007-09-13-11.27	CREATE	FILE	EMSCNTL
AFFTESTZ	2007-09-13-11.27	CREATE	PROGRAM	AFFTESTP
AFFTESTZ	2007-09-13-11.27	DEFINE	COUNTER	TESTCOUNTER
AFFTESTZ	2007-09-13-11.27	DEFINE	DCOUNTER	TESTDCOUNTER
AFFTESTZ	2007-09-13-11.27	DEFINE	COUNTER	TESTCOUNTER
AFFTESTZ	2007-09-13-11.27	DEFINE	DCOUNTER	TESTDCOUNTER
AFFTESTZ	2007-09-13-11.27	DELETE	COUNTER	TESTCOUNTER
AFFTESTZ	2007-09-13-11.27	DELETE	DCOUNTER	TESTDCOUNTER
AFFTESTZ	2007-09-13-11.27	DELETE	FILE	EXMPCAT

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Interdependency Reporter - CICS example output

2010/01/18 - CICS INTERDEPENDENCY ANALYZER (CIU) - Version 310 - Page: 2
CICS RESOURCES REPORT FOR APPLID: IYDZEJ02

Tran	Program	Offset	Command	Resource	Term	
		Sysid	Usage	First Run	Last Run	
MAIL	TST4CVD2	00003D26	DELETEQ	TSQUEUE AUX MAIL+TE+		Y
		----	1	2009-12-11 14.15.33	2009-12-11 14.15.33	
		00003DBC	DELETEQ	TSQUEUE AUX MAIL+TE+		Y
		----	1	2009-12-11 14.15.28	2009-12-11 14.15.28	
		00004102	WRITEQ	TSQUEUE AUX MAIL+TE+		Y
		----	1	2009-12-11 14.15.28	2009-12-11 14.15.28	
		0000430E	READQ	TSQUEUE AUX MAIL+TE+		Y
		----	1	2009-12-11 14.15.38	2009-12-11 14.15.38	
		00004416	WRITEQ	TSQUEUE AUX MAIL+TE+		Y
		----	1	2009-12-11 14.15.40	2009-12-11 14.15.40	

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CICSIA - Threadsafe Report

- CICS IA V2.2 provides two ways to identify what EXEC CICS commands are threadsafe in a program.
 - Query the V_CIU_SCAN_TRDSAFE view
 - A join between the CIU_SCAN_DETAIL table and the CIU_TREADSAFE_CMD table
 - Data from Load Module Scanner (LMS)
 - Sample queries are provided to detect non-threadsafe commands and indeterminate threadsafe commands
 - CIUSQL(CIUSAMPC)
 - Run 'THREADSAFE Dynamic SUMMARY/DETAIL' report against CIU_PROGRAM_DETAIL table and CIU_CICS_DATA table.
 - Create a report that identifies which EXEC CICS commands are:
 - Threadsafe
 - Non-threadsafe
 - Indeterminate



CICS IA – Threadsafe Sample Query

```
SELECT 'TS31 NON THREADSAFE CALLS FOR',
       DSNAME, "PROGRAM", '=', COUNT(*)
FROM REDTOOLS.V_CIU_SCAN_TRDSAFE
WHERE (CICS_TS31 = 'N' OR CICS_TS31 IS NULL)
GROUP BY DSNAME, "PROGRAM";
```

	DSNAME	PROGRAM	
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	AFFTESTA =	2
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	AFFTESTB =	3
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	AFFTESTC =	1
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	AFFTESTE =	1
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	AFFTESTS =	28
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	AFFTESTZ =	38
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	CSQ4CVB1 =	12
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	CSQ4CVB2 =	2
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	CSQ4CVB3 =	2
TS31 NON THREADSAFE CALLS	CICSIAD.TEST.LOADLIB	CSQ4CVB4 =	2



CICS IA - Threadsafes Report

- Threadsafes Dynamic Analysis report options

- PROGRAMNAME

- The program(s) name to be analyzed.
 - Wild card characters can be used: *ab*c
 - Default is * (which specifies all programs)

- REGIONNAME

- The CICS region(s) from which the programs are to be analyzed
 - Wild card characters can be used: IYDZZ3*
 - Default is * (which specifies all regions)

- CICSLEVEL

- The CICS level for which the threadsafes analysis is to be done
- Valid values: 3.1 , 3.2 or 4.1
- Default is the level of the region from which the data was collected.



CICS IA –Threadsafes Report - Summary

Program Dynamic Analysis - THREADSAFE SUMMARY LISTING FOR CICS TS 4.1

APPLID	Program	Linkedit Date	Execution Key	Concurrency	APIST	Storage Protect	CICS Rel	LIB Dataset Name
IYDZEJ02	DRIVERM	0001-01-01	USER	QUASIRENT	CICSAPI	INACTIVE	0660	REDTOOLS.WORKSEM.LOAD
	Total CICS calls:	10	Threadsafes:	4	Non-Threadsafes:	6	Indeterminate	Threadsafes:
	DB2 calls:	0	MQ calls:	0	IMS calls:	0		
	Dynamic Calls:	0	Threadsafes Inhibitor calls:	2				
IYDZEJ02	DSWDE1V	0001-01-01	USER	QUASIRENT	CICSAPI	INACTIVE	0660	CICSTOOL.DSW.LOAD
	Total CICS calls:	16	Threadsafes:	2	Non-Threadsafes:	13	Indeterminate	Threadsafes:
	DB2 calls:	0	MQ calls:	0	IMS calls:	0		
	Dynamic Calls:	0	Threadsafes Inhibitor calls:	1				
IYDZEJ02	DSWDE2V	0001-01-01	USER	QUASIRENT	CICSAPI	INACTIVE	0660	CICSTOOL.DSW.LOAD
	Total CICS calls:	30	Threadsafes:	10	Non-Threadsafes:	15	Indeterminate	Threadsafes:
	DB2 calls:	0	MQ calls:	0	IMS calls:	0		
	Dynamic Calls:	0	Threadsafes Inhibitor calls:	5				



CICS IA –Threadsafe Report - Detail

```

APPLID   Program Linkedit   Exec Concurrency APIST   Storage CICS LIB Dataset Name
         Date      Key      Key
-----
IYDZEJ02 TST4CVD4 0001-01-01 USER QUASIRENT  CICSAPI INACTIVE 0660 REDTOOLS.TEST.LOAD

CMD Function  Type      Resource                               Offset   Program  Use  Thread
Type                                               Length  Count    ---
-----
CICS RECEIVE  MAP      CSQ4VD4                               3FD0    5718    8    N
CICS RECEIVE  MAPSET   CSQ4VDM                               3FD0    5718    8    N
CICS SEND     MAP      CSQ4VD4                               3F7A    5718    8    N
CICS SEND     MAPSET   CSQ4VDM                               3F7A    5718    8    N
MQ PUT1       QUEUE    CSQ4SAMP.MAILMGR.JAMESE               4836    5718    4    Y
MQ PUT1       QUEUE    CSQ4SAMP.MAILMGR.JAMESE.JAMESE       4836    5718    4    Y

Total CICS calls: 4  Threadsafe: 0  Non-Threadsafe: 4  Indeterminate Threadsafe: 0
                   DB2 calls: 0  MQ calls: 2  IMS calls: 0
                   Dynamic Calls: 0  Threadsafe Inhibitor calls: 0
    
```

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The CICS IA Database

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CICS IA Database

CICS IA is made up of a number of DB2 tables, indexes and views

- Collector tables
 - CIU_REGION_INFO
 - CIU_CICS_DATA
 - CIU_IMS_DATA
 - CIU_DB2_DATA
 - CIU_MQ_DATA
 - CIU_NATURAL_DATA
 - CIU_RESOURCE
- Scanner Tables
 - CIU_SCAN_SUMMARY
 - CIU_SCAN_DETAIL
 - CIU_CSECT_INFO
 - CIU_PROGRAM_INFO
- Command Flow Data
 - CIU_CMDFLOW_DATA
 - CIU_CMDFLOW_INDEX
- Detailed Tables
 - CIU_PROGRAM_DETAIL
 - CIU_TRANSID_DETAIL
 - CIU_TSQUEUE_DETAIL
 - CIU_TDQUEUE_DETAIL
 - CIU_FILE_DETAIL
 - CIU_WEBSERV_DETAIL
 - CIU_EXIT_INFO
- Application Tables
 - CIU_APPLS_DESC
 - CIU_APPLS_RESOURCE
- Affinity Tables
 - CIU_AFF_GRP_DATA
 - CIU_AFF_CMD_DATA
 - CIU_AFF_INDEX
- Facilitating Tables
 - CIU_VERSION
 - CIU_TRANSLATORS
 - CIU_THREADSafe_CMD

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CICS IA Database – example table

CIU_CICS_DATA

APPLID	CHAR(8)
HOMESYSID	CHAR(4)
TRANSID	CHAR(4)
"PROGRAM"	CHAR(8)
"FUNCTION"	CHAR(24)
"TYPE"	CHAR(16)
OBJECT	CHAR(255)
OBJLENGTH	INTEGER
RMTSYSID	CHAR(4)
RMTNAME	CHAR(8)
TERMTRAN	CHAR(1)
TCBMODE	CHAR(2)
AFFINITY	CHAR(1)
OFFSET	CHAR(8)
PROGLEN	CHAR(8)
COMMAREA	CHAR(1)
CHANNEL	CHAR(1)
USECOUNT	INTEGER
FIRST_RUN	TIMESTAMP
LAST_RUN	TIMESTAMP

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CICS IA Database – sample query

- Show me all programs in a region that uses file ACCTFIL

```
– SELECT APPLID, PROGRAM, FUNCTION  
  FROM CIU_CICS_DATA  
  WHERE TYPE=FILE  
        AND OBJECT=ACCTFIL;
```

- Most queries will involve
 - TYPE
 - FUNCTION
 - APPLID
 - OBJECT
 - PROGRAM
 - TRANSAID

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IA Explorer plug-in

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Application Insight

The screenshot displays the IBM CICS Explorer interface. The left pane shows a tree view of resources under 'GETMAIN', including 'ADDRESS', 'PROGRAM (DSWDE1V)', 'PROGRAM (DSWDE2V)', 'PROGRAM (DSWDE3V)', 'PROGRAM (DSWDE4V)', 'PROGRAM (DSWDE5V)', 'PROGRAM (DSWDE6V)', 'PROGRAM (DSWDE7V)', 'PROGRAM (DSWDE8V)', 'PROGRAM (DSWDE9V)', 'PROGRAM (DSWDE10V)', 'PROGRAM (DSWDE11V)', 'PROGRAM (DSWDE12V)', 'PROGRAM (DSWDE13V)', 'PROGRAM (DSWDE14V)', 'PROGRAM (DSWDE15V)', 'PROGRAM (DSWDE16V)', 'PROGRAM (DSWDE17V)', 'PROGRAM (DSWDE18V)', 'PROGRAM (DSWDE19V)', 'PROGRAM (DSWDE20V)', 'PROGRAM (DSWDE21V)', 'PROGRAM (DSWDE22V)', 'PROGRAM (DSWDE23V)', 'PROGRAM (DSWDE24V)', 'PROGRAM (DSWDE25V)', 'PROGRAM (DSWDE26V)', 'PROGRAM (DSWDE27V)', 'PROGRAM (DSWDE28V)', 'PROGRAM (DSWDE29V)', 'PROGRAM (DSWDE30V)', 'PROGRAM (DSWDE31V)', 'PROGRAM (DSWDE32V)', 'PROGRAM (DSWDE33V)', 'PROGRAM (DSWDE34V)', 'PROGRAM (DSWDE35V)', 'PROGRAM (DSWDE36V)', 'PROGRAM (DSWDE37V)', 'PROGRAM (DSWDE38V)', 'PROGRAM (DSWDE39V)', 'PROGRAM (DSWDE40V)', 'PROGRAM (DSWDE41V)', 'PROGRAM (DSWDE42V)', 'PROGRAM (DSWDE43V)', 'PROGRAM (DSWDE44V)', 'PROGRAM (DSWDE45V)', 'PROGRAM (DSWDE46V)', 'PROGRAM (DSWDE47V)', 'PROGRAM (DSWDE48V)', 'PROGRAM (DSWDE49V)', 'PROGRAM (DSWDE50V)', 'PROGRAM (DSWDE51V)', 'PROGRAM (DSWDE52V)', 'PROGRAM (DSWDE53V)', 'PROGRAM (DSWDE54V)', 'PROGRAM (DSWDE55V)', 'PROGRAM (DSWDE56V)', 'PROGRAM (DSWDE57V)', 'PROGRAM (DSWDE58V)', 'PROGRAM (DSWDE59V)', 'PROGRAM (DSWDE60V)', 'PROGRAM (DSWDE61V)', 'PROGRAM (DSWDE62V)', 'PROGRAM (DSWDE63V)', 'PROGRAM (DSWDE64V)', 'PROGRAM (DSWDE65V)', 'PROGRAM (DSWDE66V)', 'PROGRAM (DSWDE67V)', 'PROGRAM (DSWDE68V)', 'PROGRAM (DSWDE69V)', 'PROGRAM (DSWDE70V)', 'PROGRAM (DSWDE71V)', 'PROGRAM (DSWDE72V)', 'PROGRAM (DSWDE73V)', 'PROGRAM (DSWDE74V)', 'PROGRAM (DSWDE75V)', 'PROGRAM (DSWDE76V)', 'PROGRAM (DSWDE77V)', 'PROGRAM (DSWDE78V)', 'PROGRAM (DSWDE79V)', 'PROGRAM (DSWDE80V)', 'PROGRAM (DSWDE81V)', 'PROGRAM (DSWDE82V)', 'PROGRAM (DSWDE83V)', 'PROGRAM (DSWDE84V)', 'PROGRAM (DSWDE85V)', 'PROGRAM (DSWDE86V)', 'PROGRAM (DSWDE87V)', 'PROGRAM (DSWDE88V)', 'PROGRAM (DSWDE89V)', 'PROGRAM (DSWDE90V)', 'PROGRAM (DSWDE91V)', 'PROGRAM (DSWDE92V)', 'PROGRAM (DSWDE93V)', 'PROGRAM (DSWDE94V)', 'PROGRAM (DSWDE95V)', 'PROGRAM (DSWDE96V)', 'PROGRAM (DSWDE97V)', 'PROGRAM (DSWDE98V)', 'PROGRAM (DSWDE99V)', 'PROGRAM (DSWDE100V)'. The right pane shows a list of programs using the resource, including 'MAIL', 'CSQ4C101', 'CSQ4C102', 'CSQ4C103', 'CSQ4C104', 'CSQ4C105', 'CSQ4C106', 'CSQ4C107', 'CSQ4C108', 'CSQ4C109', 'CSQ4C110', 'CSQ4C111', 'CSQ4C112', 'CSQ4C113', 'CSQ4C114', 'CSQ4C115', 'CSQ4C116', 'CSQ4C117', 'CSQ4C118', 'CSQ4C119', 'CSQ4C120', 'CSQ4C121', 'CSQ4C122', 'CSQ4C123', 'CSQ4C124', 'CSQ4C125', 'CSQ4C126', 'CSQ4C127', 'CSQ4C128', 'CSQ4C129', 'CSQ4C130', 'CSQ4C131', 'CSQ4C132', 'CSQ4C133', 'CSQ4C134', 'CSQ4C135', 'CSQ4C136', 'CSQ4C137', 'CSQ4C138', 'CSQ4C139', 'CSQ4C140', 'CSQ4C141', 'CSQ4C142', 'CSQ4C143', 'CSQ4C144', 'CSQ4C145', 'CSQ4C146', 'CSQ4C147', 'CSQ4C148', 'CSQ4C149', 'CSQ4C150', 'CSQ4C151', 'CSQ4C152', 'CSQ4C153', 'CSQ4C154', 'CSQ4C155', 'CSQ4C156', 'CSQ4C157', 'CSQ4C158', 'CSQ4C159', 'CSQ4C160', 'CSQ4C161', 'CSQ4C162', 'CSQ4C163', 'CSQ4C164', 'CSQ4C165', 'CSQ4C166', 'CSQ4C167', 'CSQ4C168', 'CSQ4C169', 'CSQ4C170', 'CSQ4C171', 'CSQ4C172', 'CSQ4C173', 'CSQ4C174', 'CSQ4C175', 'CSQ4C176', 'CSQ4C177', 'CSQ4C178', 'CSQ4C179', 'CSQ4C180', 'CSQ4C181', 'CSQ4C182', 'CSQ4C183', 'CSQ4C184', 'CSQ4C185', 'CSQ4C186', 'CSQ4C187', 'CSQ4C188', 'CSQ4C189', 'CSQ4C190', 'CSQ4C191', 'CSQ4C192', 'CSQ4C193', 'CSQ4C194', 'CSQ4C195', 'CSQ4C196', 'CSQ4C197', 'CSQ4C198', 'CSQ4C199', 'CSQ4C200'. The bottom pane shows a list of programs, including 'MAIL', 'CSQ4C101', 'CSQ4C102', 'CSQ4C103', 'CSQ4C104', 'CSQ4C105', 'CSQ4C106', 'CSQ4C107', 'CSQ4C108', 'CSQ4C109', 'CSQ4C110', 'CSQ4C111', 'CSQ4C112', 'CSQ4C113', 'CSQ4C114', 'CSQ4C115', 'CSQ4C116', 'CSQ4C117', 'CSQ4C118', 'CSQ4C119', 'CSQ4C120', 'CSQ4C121', 'CSQ4C122', 'CSQ4C123', 'CSQ4C124', 'CSQ4C125', 'CSQ4C126', 'CSQ4C127', 'CSQ4C128', 'CSQ4C129', 'CSQ4C130', 'CSQ4C131', 'CSQ4C132', 'CSQ4C133', 'CSQ4C134', 'CSQ4C135', 'CSQ4C136', 'CSQ4C137', 'CSQ4C138', 'CSQ4C139', 'CSQ4C140', 'CSQ4C141', 'CSQ4C142', 'CSQ4C143', 'CSQ4C144', 'CSQ4C145', 'CSQ4C146', 'CSQ4C147', 'CSQ4C148', 'CSQ4C149', 'CSQ4C150', 'CSQ4C151', 'CSQ4C152', 'CSQ4C153', 'CSQ4C154', 'CSQ4C155', 'CSQ4C156', 'CSQ4C157', 'CSQ4C158', 'CSQ4C159', 'CSQ4C160', 'CSQ4C161', 'CSQ4C162', 'CSQ4C163', 'CSQ4C164', 'CSQ4C165', 'CSQ4C166', 'CSQ4C167', 'CSQ4C168', 'CSQ4C169', 'CSQ4C170', 'CSQ4C171', 'CSQ4C172', 'CSQ4C173', 'CSQ4C174', 'CSQ4C175', 'CSQ4C176', 'CSQ4C177', 'CSQ4C178', 'CSQ4C179', 'CSQ4C180', 'CSQ4C181', 'CSQ4C182', 'CSQ4C183', 'CSQ4C184', 'CSQ4C185', 'CSQ4C186', 'CSQ4C187', 'CSQ4C188', 'CSQ4C189', 'CSQ4C190', 'CSQ4C191', 'CSQ4C192', 'CSQ4C193', 'CSQ4C194', 'CSQ4C195', 'CSQ4C196', 'CSQ4C197', 'CSQ4C198', 'CSQ4C199', 'CSQ4C200'.

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Application Insight

The screenshot shows the 'Edit CICS Query' dialog box. The title bar reads 'Edit CICS Query'. The main text says 'Edit Query "All programs which may have threadsafe data integrity issues"'. Below this, it says 'Add, remove or change criteria for which resources to include or exclude'. The 'Name' field contains 'All programs which may have threadsafe data integri'. The 'Show' section has a tree view with 'Task Control Block (TCB)' selected. The 'Filter results' section has two criteria: 'Command is ADDRESS, EXTRACT, GETMAIN, LOAD' and 'Task Control Block (TCB)'. The 'Task Control Block (TCB)' section has radio buttons for 'is' and 'is not', with 'is' selected. Below this is a list of checkboxes for various TCB types: RO - Resource-owning, CO - Concurrent, SZ - FEP1, RP - ONC/RPC mode, J8 - Open (CICS - Java), L8 - Open (CICS - DB2), SO - Sockets, SL - Sockets listener, S8 - Secure Sockets, SP - SSL PTH-READ owning, D2 - DB2 Housekeeping, JM - Master Java VM, L9 - Open (User - DB2), J9 - Open (User - Java), and others. The 'OK' and 'Cancel' buttons are at the bottom right.

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CICS Explorer: Putting it all together dynamically

Interdependency
Analyzer

Performance
Analyzer

Configuration
Manager

The screenshot displays the IBM CICS Explorer interface with several key components highlighted by callouts:

- Single point of control for CSDs and DREPs:** Points to the 'CICS Explorer Summary' and 'CICS Explorer' panels.
- Lists and ResDescs:** Points to the 'Resources' panel on the right.
- Search for Orphaned groups:** Points to the 'Orphaned groups' search results panel.
- Timeline of response times:** Points to the 'Response time' graph in the 'Performance Analyzer' section.
- Shipped Sample Queries:** Points to the 'Supplied Samples' tree on the left.
- View tree of resources used:** Points to the 'Resources used' section in the 'Transaction detail' view.
- Resources used by a transaction:** Points to the 'Resources used' table in the 'Transaction detail' view.
- Drilldown into transaction:** Points to the 'Transaction detail' view for a specific transaction.

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What data do we collect ?



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What data do we collect ?

CICS REGION data

- Collected for both Interdependency and Affinity data collection
- Into DB2 table CIU_REGION_INFO
- Data include:
 - Applid and Sysid
 - CICS release
 - CSD dataset name
 - CSD lists
 - Storage Protect key (threadsafe analysis)
 - Start/Stop time for Interdependency collection
 - Start/Stop time for Affinity collection



What data to we collect ?

- Interdependency command data
 - CICS APIs and SPIs into CIU_CICS_DATA table
 - Including FEPI commands
 - DB2 calls into CIU_DB2_DATA table
 - IMS calls into CIU_IMS_DATA table
 - Both EXEC DLI calls and macro calls (CBLTDLI,ASMTDLI,PLITDLI)
 - MQ calls into CIU_MQ_DATA table
 - Natural and ADABAS resources into CIU_NATURAL_DATA
 - Dynamic COBOL calls



What data do we collect ?

Interdependency Data – API commands

```
SEND MAP, RECEIVE MAP
ALLOCATE, CONNECT PROCESS, SEND CONVID/ SESSION, CONVERSE CONVID/ SESSION,
FREE
HANDLE ABEND PROGRAM
READ FILE, WRITE FILE, REWRITE FILE, DELETE FILE, STARTBR FILE, READNEXT FILE,
READPREV FILE, ENDBR FILE, RESETBR FILE, UNLOCK FILE
START
WAIT JOURNALNUM/NAME, WRITE JOURNALNUM/NAME
DEFINE COUNTER/ DOUNTER, DELETE COUNTER/ DOUNTER, GET COUNTER/DCOUNTER
QUERY COUNTER/ DOUNTER, REWIND COUNTER/ DOUNTER, UPDATE COUNTER/
DCOUNTER
LINK, LOAD, RETURN TRANSID, XCTL
ENQ, DEQ
READQ TS, WRITEQ TS, DELETEQ TS
READQ TD, WRITEQ TD, DELETEQ TD
WEB ENDBROWSE FORMFIELD/ HTTPHEADER, WEB EXTRACT, WEB READ FORMFIELD/
HTTPHEADER,
WEB READNEXT FORMFIELD/ HTTPHEADER, WEB RECEIVE, WEB RETRIEVE, WEB SEND,
WEB STARTBROWSE FORMFIELD/ HTTPHEADER, WEB WRITE HTTPHEADER
ADDRESS CWA, ASSIGN APPLID
PIPELINEs, WEBSERVICEs, URIMAPS, DOCTEMPLATES , CONTAINERS ,CHANNELS
EXITS, GETMAIN STORAGE, ATOMSERVICES , EVENTS
```



What data do we collect ?

- DETAILED data
 - PROGRAM
 - TRANSACTION
 - TDQUEUE
 - TSQUEUE
 - FILE
 - Webservice data
 - Inbound and Outbound Webservice details
 - CICS Exit data
 - GLUEs and TRUEs information



What data do we collect ?

Interdependency Data – SPI commands

INQUIRE
SET
CREATE
PERFORM
DISCARD
ENABLE
DISABLE
EXTRACT
CSD commands (new in TS 4.1)

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CICS IA – Data Collector

Dynamic COBOL calls

- Before IA V3.1 and APAR PK95283
 - Reported COBOL call on 1st LOAD of program
 - Resources usage reported under CALLING program
 - Incorrect offsets and program lengths reported
- After APAR PK95283
 - If LE option CBLPSHPOP is on then COBOL call reported correctly
 - Resource usage reported under correct COBOL program
 - Offsets and Program lengths reported correctly.

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What data do we collect ?

Affinity Data – Inter Transaction

ENQ / DEQ
READQ TS, WRITEQ TS, DELETEQ TS
ADDRESS CWA
LOAD
RELEASE
GETMAIN SHARED
FREEMAIN
RETRIEVE WAIT
DELAY
POST
START
CANCEL

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What data do we collect ?

Affinity Data – Transaction System

ENABLE / DISABLE PROGRAM
EXTRACT EXIT
INQUIRE
SET
PERFORM
RESYNC
DISCARD
CREATE
WAIT EXTERNAL
WAIT EVENT
WAITCICS
COLLECT STATISTICS

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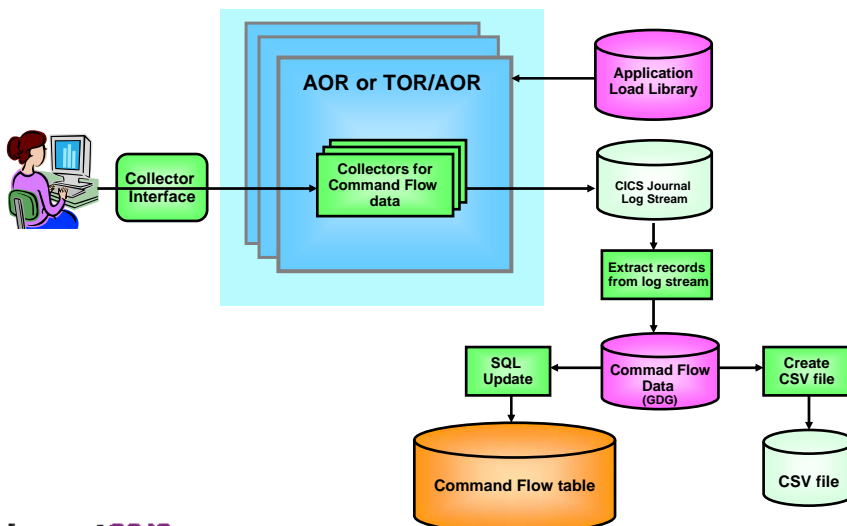
Command Flow Feature

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Command Flow option structure



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Command Flow Feature

- Command Flow Exits
 - TRUE
 - CIUXCCT1 at task start and end
 - GLUEs
 - CIUXCCO3 at exit point XEIOUT
 - CIUXCCO2 at exit point XEIIIN
 - CIUXCCR3 at exit point XRMIIN
 - CIUXCCR2 at exit point XRMIOUT

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CICS IA – CMDFLOW options panel

```
B - mvs2e
File Edit View Communication Actions Window Help
CUI295 CICS Interdependency Analyzer for z/OS - V3R1M0 2010/01/11
Task Resource Options for 10:09:31AM
CICS Sysid: DFTS CICS Applid: DEFAULTS

Modify the option and specify the Transactions to monitor.
Press Enter to update, or PF12 to Cancel

Command Flow Option . : Y Y=Yes, N=No
Command Flow Id . . . : WORK02
Transaction ID List . : TXM1 TXM2 TXM3 TXM4 TXM5
                       (Up to 5 transaction IDs)

CICS Sysid: EJ02 CICS Applid: IYDZEJ02 TermID: TC30

F1=Help F2= F3=Exit F4= F5= F6=
F7= F8= F9= F10= F11= F12=Exit
PF b 08/020
```

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Command Flow option

- The Command Flow options provides the ability to trace all of the commands invoked by a transaction.
- The data is placed into
 - the DB2 table CIU_CMDFLOW_DATA and CIU_CMFLOW_INDEX
 - or a QSAM data set with the data in the Comma Separated Value (csv) format.

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CMDFLOW option – CIU_CMDFLOW_DATA

CMDFLOW_ID	CHAR (08)
APPLID	CHAR (08)
SYSID	CHAR (04)
TRANSID	CHAR (04)
TASKID	CHAR (08)
DISTRIBUTED_UOW	CHAR (50)
CICS_UOW	CHAR (16)
USERID	CHAR (08)
CONCURRENCY	CHAR (10)
API	CHAR (08)
"PROGRAM"	CHAR (08)
OFFSET	CHAR (08)
FUNCTION_TYPE	CHAR (08)
FUNCTION_ID	CHAR (04)
FUNCTION	CHAR (24)
TYPE	CHAR (16)
RESOURCE_NAME	CHAR (48)
TCBMODE	CHAR (02)
PREV_TCBMODE	CHAR (02)
BEFORE_MODESWITCH	CHAR (01)
AFTER_MODESWITCH	CHAR (01)
CICS_VERSION	CHAR (04)
CMD_TIME_LOCAL	TIMESTAMP
CMD_EIBRESP	CHAR (08)
CMD_EIBRESP2	CHAR (08)
CMD_EIDARG0_DATA	CHAR (56)

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CMDFLOW option – CIU_CMDFLOW_INDEX

- Saved at the end of a command flow trace.
- Used by the IA Explorer plug-in.

CMDFLOW_ID	CHAR(08)
APPLID	CHAR(08)
SYSID	CHAR(04)
CMD_TIME_START	TIMESTAMP
CMD_TIME_END	TIMESTAMP
CMD_TRANID1	CHAR(04)
CMD_TRANID2	CHAR(04)
CMD_TRANID3	CHAR(04)
CMD_TRANID4	CHAR(04)
CMD_TRANID5	CHAR(04)
CMD_COUNT	INTEGER



Command Flow option

- One use of this feature is to identify where TCB mode switches occur which can decrease the performance of the transaction
- Sample query:

```
SELECT TASKID, CMD_TIME_LOCAL, "PROGRAM",  
       FUNCTION_TYPE      AS FTYPE,  
       FUNCTION_ID        AS FID,  
       FUNCTION_NAME      AS FNAME,  
       PREV_TCBMODE       AS PTCBM,  
       TCBMODE            AS TCBM,  
       BEFORE_MODESWITCH AS BMS,  
       AFTER_MODESWITCH  AS AMS  
FROM CICSIAD.CIU_CMDFLOW_DATA  
ORDER BY TASKID      ASC,  
       CMD_TIME_LOCAL ASC;
```



Command Flow option

- Sample result of query

TASKID	CMD_TIME_LOCAL	PROGRAM	FTYPE	FID	FNAME	PTCBM	TCBM	BMS	AMS
0002111C	2008-12-05-16.17.25.655339	LHTCBM01			START OF TRANSACTION	QR	QR	Y	N
0002111C	2008-12-05-16.17.25.955859	LHTCBM01	CICS	0202	ADDRESS	QR	QR	N	Y
0002111C	2008-12-05-16.17.25.956064	LHTCBM01	CICS	0C02	GETMAIN	QR	QR	Y	N
0002111C	2008-12-05-16.17.25.956138	LHTCBM01	CICS	0802	WRITEQ TD	QR	QR	Y	Y
0002111C	2008-12-05-16.17.25.956140	LHTCBM01	CICS	0802	WRITEQ TD	QR	QR	N	Y
0002111C	2008-12-05-16.17.25.956192	LHTCBM01	CICS	020A	IGNORE CONDITION	QR	QR	Y	N
0002111C	2008-12-05-16.17.25.956229	LHTCBM01	CICS	0806	DELETEQ TD	QR	QR	Y	Y
0002111C	2008-12-05-16.17.25.956230	LHTCBM01	CICS	0806	DELETEQ TD	QR	QR	Y	Y
0002111C	2008-12-05-16.17.25.957168	LHTCBM01	DB2	00E7	SELECT TABLE	QR	L8	Y	Y
0002111C	2008-12-05-16.17.25.957169	LHTCBM01	DB2	00E7	SELECT TABLE	L8	L8	Y	Y
0002111C	2008-12-05-16.17.25.957421	LHTCBM01	DB2	00E7	SELECT TABLE	L8	L8	Y	Y
0002111C	2008-12-05-16.17.25.957422	LHTCBM01	DB2	00E7	SELECT TABLE	L8	L8	Y	Y
0002111C	2008-12-05-16.17.25.957542	LHTCBM01	DB2	00E7	SELECT TABLE	L8	L8	Y	Y
0002111C	2008-12-05-16.17.25.957544	LHTCBM01	DB2	00E7	SELECT TABLE	L8	L8	Y	Y
0002111C	2008-12-05-16.17.25.957662	LHTCBM01	DB2	00E7	SELECT TABLE	L8	L8	Y	Y
0002111C	2008-12-05-16.17.25.957664	LHTCBM01	DB2	00E7	SELECT TABLE	L8	L8	Y	Y
0002111C	2008-12-05-16.17.25.957781	LHTCBM01	DB2	00E7	SELECT TABLE	L8	L8	Y	Y
0002111C	2008-12-05-16.17.25.957782	LHTCBM01	DB2	00E7	SELECT TABLE	L8	L8	N	Y
0002111C	2008-12-05-16.17.25.957839	LHTCBM01	CICS	0A06	DELETEQ TS	L8	QR	Y	N
0002111C	2008-12-05-16.17.25.957961	LHTCBM01	CICS	1806	SEND TEXT	QR	QR	Y	Y
0002111C	2008-12-05-16.17.25.957963	LHTCBM01	CICS	1806	SEND TEXT	QR	QR	Y	Y
0002111C	2008-12-05-16.17.25.958055	LHTCBM01	CICS	0802	WRITEQ TD	QR	QR	Y	Y
0002111C	2008-12-05-16.17.25.958057	LHTCBM01	CICS	0802	WRITEQ TD	QR	QR	N	Y
0002113C	2008-12-05-16.17.31.911099	LRHDB21	CICS	0802	WRITEQ TD	QR	QR	Y	N
0002113C	2008-12-05-16.17.31.912180	LRHDB21	DB2	00E7	SELECT TABLE	QR	L8	Y	Y
0002113C	2008-12-05-16.17.31.912345	LRHDB21	CICS	1806	SEND TEXT	L8	QR	N	Y

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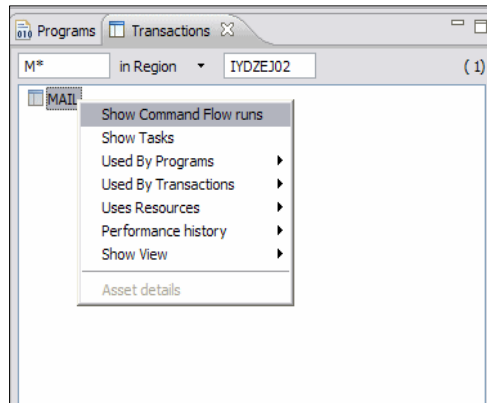
CICS IA – CMDFLOW jobs

- CIUJCLDS
 - defines the LOGSTREAM for the CICS IA COMMAND TRACE journal
- CIUJCLCG
 - defines the GDGs used to offload the COMMAND trace journal
- CIUJLCPY
 - offloads the logstream into the GDG files
- CIUJLDEL
 - deletes the logstream
- CIUUPDB5
 - loads the command flow data from GDG into the Db2 database
- CIUUB4
 - copies the command flow data into .csv files

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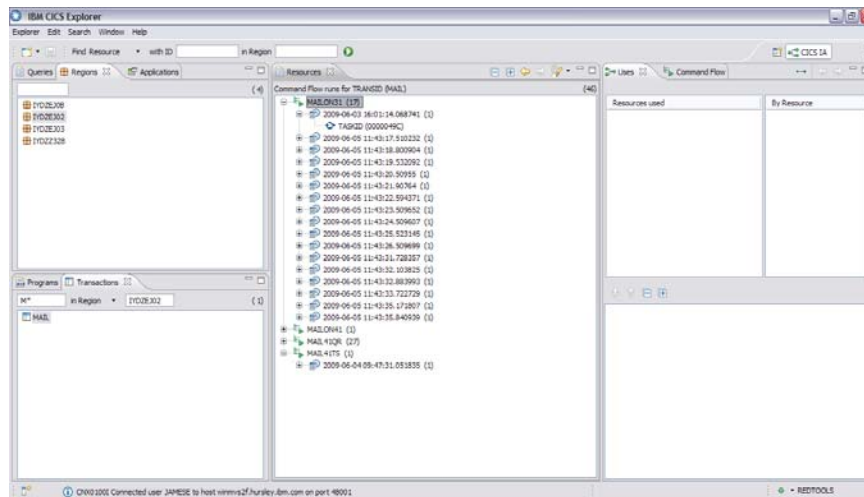
Explorer – Command Flow



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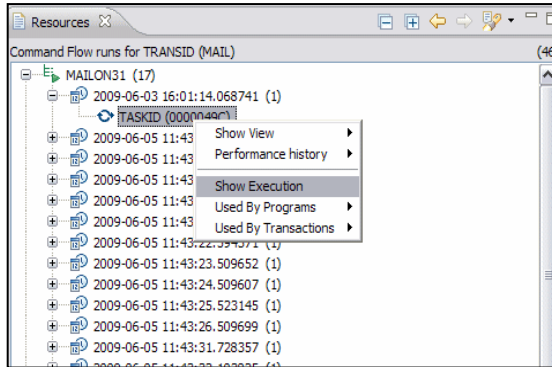
Explorer – Command Flow



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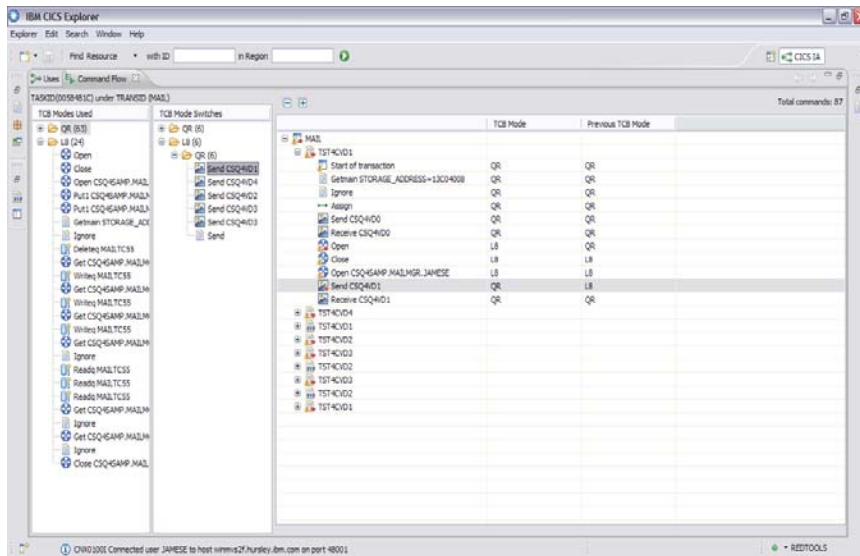
Explorer – Command Flow



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Explorer – Command Flow



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References

Redbooks:

IBM CICS Interdependency Analyzer, [SG24-6458-01](#)

Threadsafe considerations for CICS, [SG24-6351-03](#)

CICS Explorer, [SG24-7778-00](#)

Migration Considerations for CICS Using CICS CM, CICS PA, and CICS IA,
[SG24-7294-00](#)

Extend the CICS Explorer: A better way to manage your CICS, [SG24-7819-00](#)

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CICS Tools Sessions

Session 1944 - Application Analysis using the Command Flow feature in CICS IA for z/OS

Venetian – San Polo 3506
Tuesday , 3:15pm

Session 1945 - Investigating CICS Performance Issues using CICS PA for z/OS

Venetian – Murano 3203
Tuesday , 4:45pm

Session 1958 - Change Management and Deployment Analysis using CICS CM for z/OS

Venetian – Murano 3204
Wednesday , 3:15pm

Session 2925 - Lab: Understanding your Applications using the CICS Tools Explorer Plug-ins

Venetian – Murano 3304
Tuesday , 4:45pm

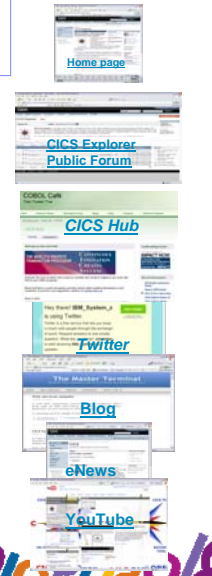
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CICS Communities and Information

- CICS Transaction Server V4.1
 - <http://ibm.com/cics/tserver/v41/>
- [CICS Explorer home page](#)
 - Remember this link ibm.com/cics/explorer
- [CICS Explorer Forum](#)
 - <http://tinyurl.com/68bndw>
 - IBM developerWorks forum with FAQs, Links and resources, ISV Contributions, etc. Ask questions, suggest improvements, report problems, chat
- New! CICS Hub on the Rational COBOL Café
 - <http://ibm.com/software/rational/cafe/community/cobol/cics>
- Twitter
 - Subscribe to the [IBM_System_z_channel](#) to get CICS Explorer news flashes
- CICS Blog
 - Comment and opinion at TheMasterTerminal.com
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