



International Technical Support Organization

CICS Tools

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CICS Interdependency Analyzer



Redbooks Workshop

IBM ITSO - International Technical Support Organization

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Agenda

- Overview of CICS IA
- CICS IA Scanner
- CICS IA Collector
- CICS IA – Interdependency Reporter
- CICS IA – Affinity Data
- CICS IA and CPSM
- CICS IA Query Interface

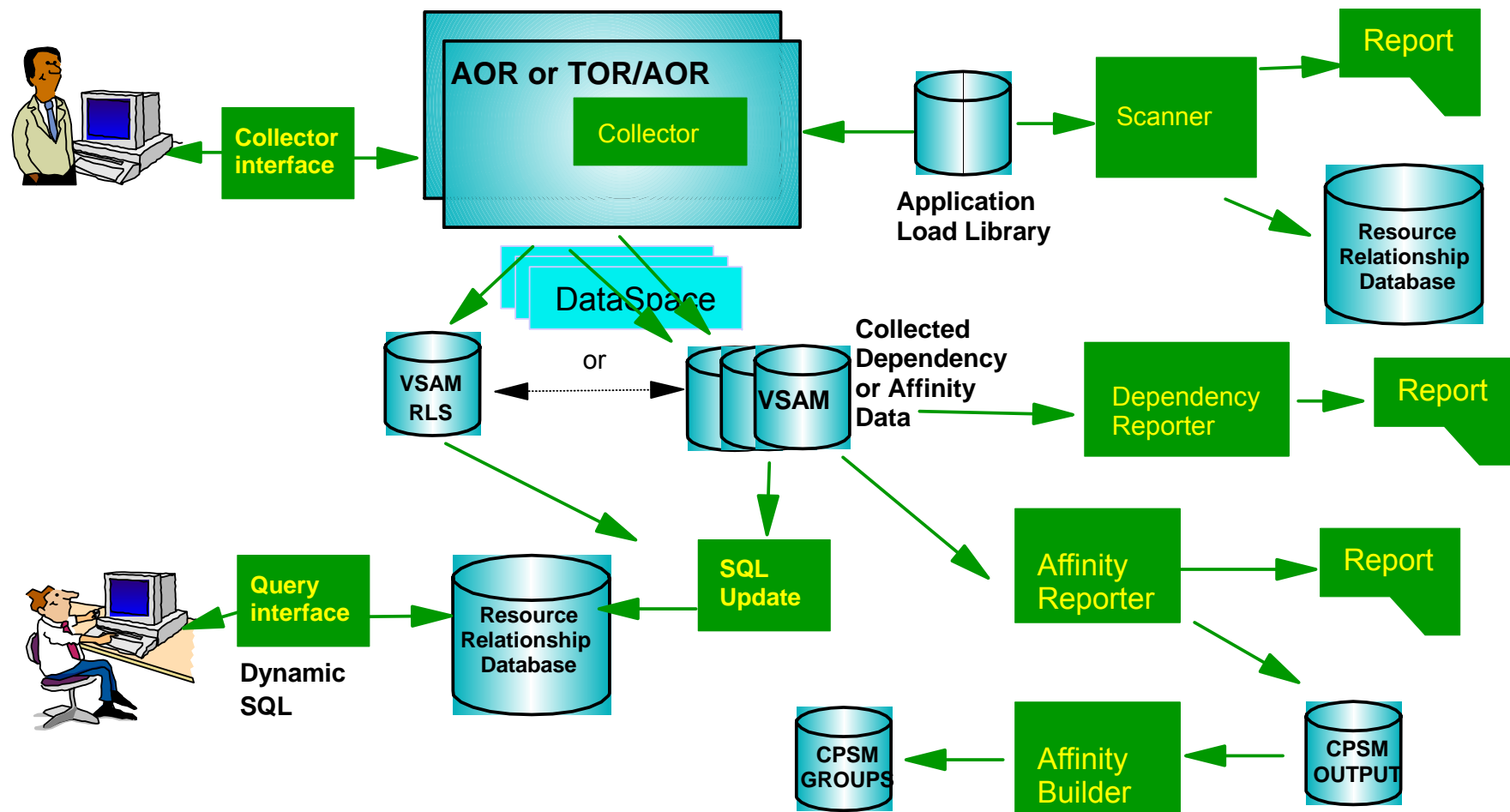
What is CICS Interdependency Analyzer ?

- **CICS Interdependency Analyzer for z/OS (CICS IA)**
 - Run-time and batch reporting tool
 - Captures resource relationships such as
 - what programs have potential affinities due to the CICS API commands within them
 - which resources (Programs, Files, TSQs TDQs etc) are required by a transaction
 - what resources are no longer used
 - which transactions have affinities to other transactions and the type and lifetimes of these affinities
 - the sequencing of transactions within an application
 - which transactions have affinities to particular CICS regions
 - Includes CICS, DB2, WebSphere MQ and IMS DB resources
 - Relationship data loaded onto a DB2 data base
 - Ad hoc analysis
 - Loadlib Scanner and VSAM File Reporter
 - Not part of CICS Transaction Server for OS/390
- **Program Product - 5655-G76**
- **CICS IA 1.3 GA - September 2003**
- **Releases Supported ...**
 - CICS Transaction Server for OS/390, Version 1.3
 - CICS Transaction Server for z/OS, Version 2.2 and 2.3
 - CICS Transaction Server for z/OS, Version 3.1 (PTF UK01842).

New in CICS IA V1.3

- Both affinity and interdependency data collected and stored in DB2 tables
- Online query interface for affinities and interdependencies
- Length of resource names increased to 200 bytes, to allow for long ENQ/DEQ names
- Sample SQL queries to enable resource comparisons on DB2 data
- The Scanner collects both Affinity and Interdependency data.
- New procedures, including sample data, for the installation process
- TCB data collected to assist in assessing threadsafe aspects of CICS-DB2 programs
- Main, auxiliary, and Coupling Facility temporary storage queues are differentiated
- Sample SQL queries to allow housekeeping functions on the DB2 data
- Additional support for SYSID – rolled into CICS IA 1.3
 - Gives more accurate depiction of distributed applications where remote SYSID is not specified in the program itself

CICS IA - Overview



CICS IA – Overview ...

■ Scanner

- ▶ CICS IA and TS Affinity Utility Scanners have been merged.
 - ▶ Now 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.
- ▶ Affinity information can be stored in DB2 tables.

CICS IA – Overview ...

■ **Dependency Reporter**

- Analyzes the interdependency data stored on VSAM
 - Selectable by Resource type
 - Selectable by Region (Applid)
 - Selectable by report type – CICS/DB2/IMS/MQ
 - Shows Tran, Program, Offset, Command, Resource name, SYSID , Usage , Terminal and TCB information.

■ **Affinity Reporter**

- Analyzes the affinity data stored on VSAM
 - Selectable by Affinity groups.
 - Selectable by Region (applid).
 - Shows Tran, Program, Offset, Command, Affinity information
 - affinity type, lifetime
- Provides input to the Affinity Build function.

CICS IA – Overview ...

■ **Collector**

- Gathers information on resource relationships
 - Gathers Interdependency or Affinity data.
- Staged to VSAM file through DataSpaces for reduced overhead
- Option to reload DataSpace from VSAM file at CICS restart

■ **Resource Relationship Database**

- Contains accumulated data about all your applications and the resources and affinities that they use.
 - Updated from VSAM files under operator control
- Contains user-defined Applications using SQL statements

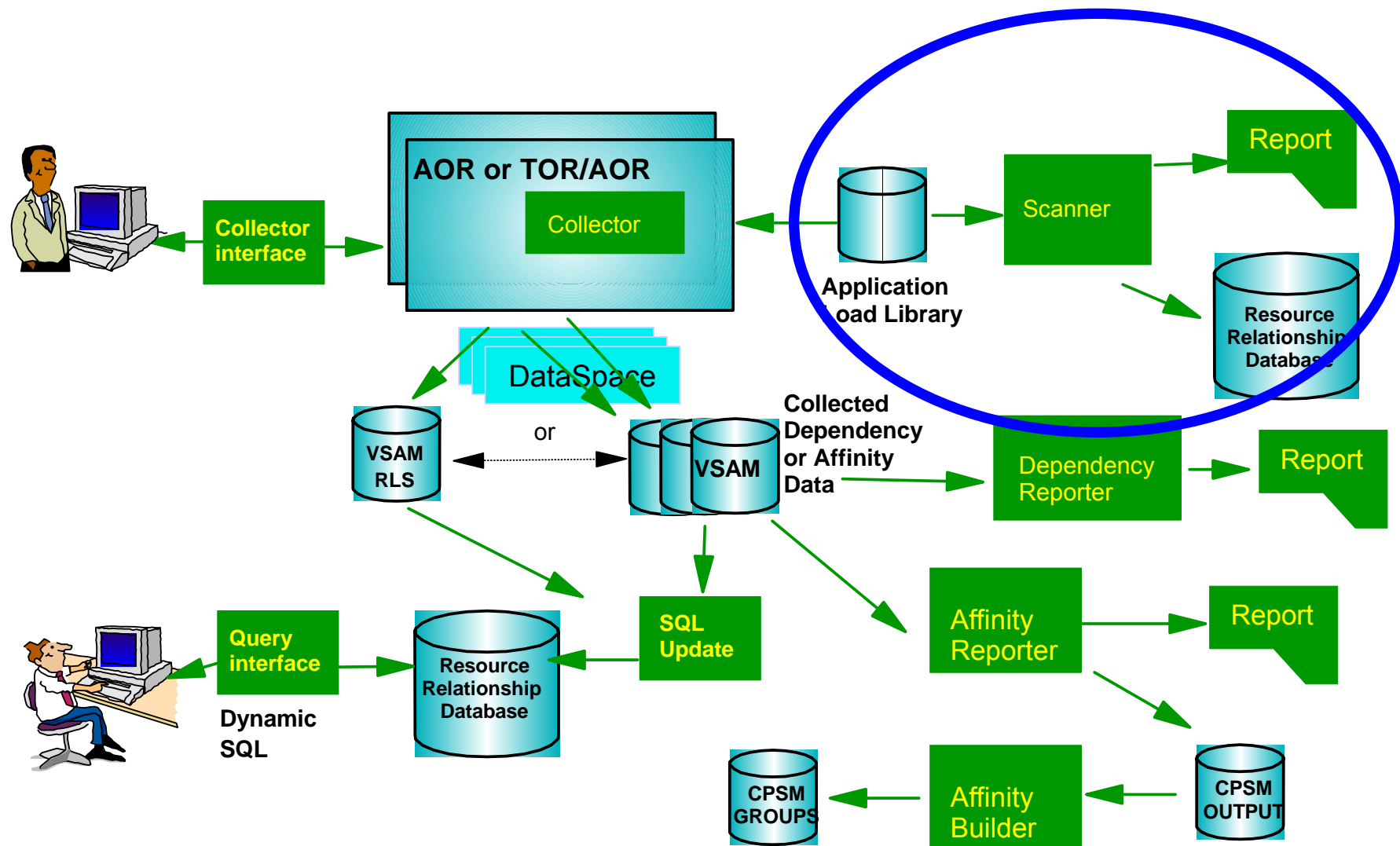
■ **The Query Interface**

- Suite of CICS COBOL BMS programs that dynamically interrogate the Dependency Database
- By resource type, for example
 - All files used by application AP1
 - All transactions started by transaction TRN1

Why use CICS IA?

- **Helps you identify Affinities within your Applications.**
 - Work load balancing.
 - SYSPLEX implementation.
- **Helps you understand your active Application Inventory**
 - Merger / Acquisition
 - Outsourcer
- **Helps you maintain or enhance Applications**
 - Request to change or upgrade an application
 - Transactions, programs, data elements:
 - Files , Queues , Screens, ...
- **Identifies the resources that are affected directly and indirectly**
 - What to change, what to build, what to test, what needs to be communicated to roles involved
 - Looks across boundaries, including through shared data - files, databases or queues

CICS IA - Scanner



The Scanner

▪ Batch Program

- Runs against Application Load Library
 - Summary or Detail reports
- Output can be loaded into DB2 database tables
- Scans for both Affinity and Dependency commands

▪ Summary report contains:

- A separate line giving the following information about each module in the library:
 - Name
 - Size
 - Language (if determined)
 - LE enabled ? (for PLI and COBOL)
 - Requires that at least one 'dependency-causing' or 'affinity-causing' EXEC CICS command is detected
 - Number of possible 'dependency-causing' EXEC CICS commands
 - Number of possible 'affinity-causing' EXEC CICS commands
- an INTMOD output file which can then be used as input to the detailed scan

The Scanner

- **Detailed report contains**

- **A section for each module, with:**

- **A header line giving the name, size, and entry point of the module**
 - **A line for each possible ‘dependency-causing’ or ‘affinity-causing’ command found, giving:**
 - **The offset of the command argument zero declaration from the start of the load module.**
 - **The contents of the command argument zero declaration (in hexadecimal).**
 - **The EDF DEBUG line number, if present.**
 - **What the command appears to be (for example, WRITEQ TS).**
 - **Affinity type (TS or IT).**
 - **Is it a dependency (Yes/No)**

Sample Scanner Output - Summary

CICS INTERDEPENDENCY ANALYZER Version 1.3.0

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LOAD MODULE SCANNER - SUMMARY LISTING OF PTF.V2R1M0.SEZPLOAD

Module Name	Module Length	Module Language	Language Version	Possible statements..... Affinities	Dependencies	MVS POSTs	Comment
-----	-----	-----	-----	-----	-----	-----	-----
CAMAA00C	000086F0	COBOL II	LE	15	30	0	
CAMAA10C	0000B780	COBOL II	LE	19	46	0	
CAMATRCC	00004460	ASSEMBLER		16	22	0	
CAMA001	00000330			0	0	0	
CAMA100C	00008870	ASSEMBLER		25	47	0	
CAMA101	00000298			0	0	0	
CAMA110C	000085F8	ASSEMBLER		21	40	0	
CAMA115C	00004B78	ASSEMBLER		15	24	0	
CAMA120C	000078B8	ASSEMBLER		21	35	0	
CAMA130C	00008DA0	ASSEMBLER		23	40	0	
CAMA200C	00008660	ASSEMBLER		21	40	0	
CAMA201	00000208			0	0	0	
CAMA210C	00009850	ASSEMBLER		29	50	0	
CAMA300C	0000A1E0	ASSEMBLER		23	51	0	

Sample Scanner Output - Summary

CICS INTERDEPENDENCY ANALYZER Version 1.3.0
LOAD MODULE SCANNER - SUMMARY LISTING OF PTF.V2R1M0.SEZPLOAD

LOAD LIBRARY STATISTICS

```
=====
Total modules in library                =      194
Total modules scanned                   =      194
Total CICS modules/tables (not scanned) =         0
Total modules in error (not scanned)    =         0
Total modules containing possible MVS POSTs =         0
Total modules containing possible Dependency commands =      107
Total modules containing possible Affinity commands =      103
    Total ASSEMBLER modules              =        53
    Total C/370 modules                  =         0
    Total COBOL modules                  =         0
    Total COBOL II modules               =        57
    Total PL/I modules                   =         0
```


Sample Scanner Output - Detail

CICS INTERDEPENDENCY ANALYZER Version 1.3.0

09/12/04

Page

LOAD MODULE SCANNER - DETAILED LISTING OF PTF.V2R1M0.SEZPLOAD

Module Name - CAMAA00C / Load Module Length - 000086F0 / Module Entry Point - 00000020

Offset	Storage Content (HEX)	EDF	DEBUG	Possible Command	Depcy	Affinit
000003BF	1802D0002700000000050900000020	00700		RECEIVE MAP	Yes	
00000404	1804F1000700C600001DE204000020	00678		SEND MAP	Yes	
0000041B	1804F1000700C200001DE204000020	00665		SEND MAP	Yes	
00000472	0E08E0000700001000	01064		RETURN TRANSID	Yes	
00000494	0A0680002700002100	01036		DELETEQ TS	Yes	Trans
000004A5	0E04E0002700000200	00920		XCTL PROGRAM	Yes	
000004B6	0E02E0002700000100	00020		LINK PROGRAM	Yes	
000004C7	0E02E0002700000100	00842		LINK PROGRAM	Yes	
000004E9	0E02E0002700000100	00725		LINK PROGRAM	Yes	
000004FA	0E02E0002700000100	00517		LINK PROGRAM	Yes	
00003E13	5402008029008000000000000000	00000		INQUIRE SYSTEM	Yes	System
00003E28	4E02802029802000000000000000	00000		INQUIRE PROGRAM	Yes	System
00003E3D	0E06C0002900002400	00000		LOADHOLD PROGRAM	Yes	Trans

CICS IA - New Scanner

- New jobs to load scanner into DB2 tables
 - ▶ CIUJCLTS – Load summary information into CIU3_SCAN_SUMMARY table.
 - ▶ CIUJCLTD – Load detailed information into CIU3_SCAN_DETAIL table.
 - ▶ These tables can be used to compare actual commands collected by CICS IA and stored in the CIU3_CICS_DATA table.

Sample use of Scanner tables

```
SELECT * FROM CIU3_SCAN_DETAIL
WHERE PROGRAM= 'CAMAA00C' ;
```

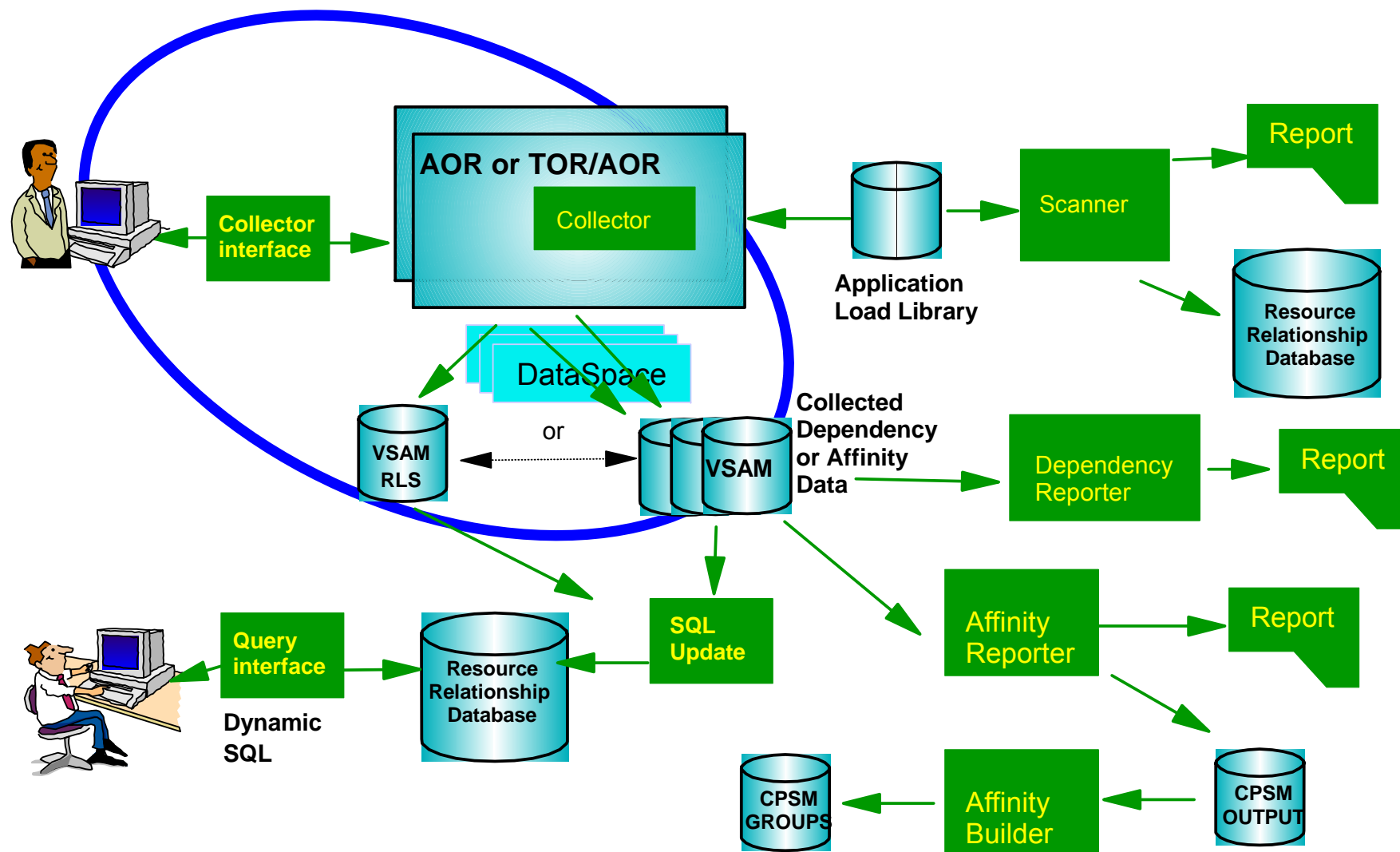
PROGRAM	OFFSET	COMMAND	RESOURCE_TYPE	AFFINITY	AFFINITY_TYPE	DEPENDENCY
CAMAA00C	959	RECEIVE	MAP	N		Y
CAMAA00C	1028	SEND	MAP	N		Y
CAMAA00C	1051	SEND	MAP	N		Y
CAMAA00C	1138	RETURN	TRANSID	N		Y
CAMAA00C	1172	DELETEQ	TS	Y	IT	Y
CAMAA00C	1189	XCTL	PROGRAM	N		Y
CAMAA00C	1206	LINK	PROGRAM	N		Y
CAMAA00C	1223	LINK	PROGRAM	N		Y
CAMAA00C	1257	LINK	PROGRAM	N		Y
CAMAA00C	1274	LINK	PROGRAM	N		Y
CAMAA00C	15891	INQUIRE	SYSTEM	Y	TS	Y
CAMAA00C	15912	INQUIRE	PROGRAM	Y	TS	Y

Sample use of Scanner tables

```
SELECT DSNAME, PROGRAM, AFFINITY_COUNT
FROM CIU3_SCAN_SUMMARY
WHERE AFFINITY_COUNT > 0;
```

DSNAME	PROGRAM	AFFINITY_COUNT
PTF.V2R1M0.SEZPLOAD	CAMAA00C	15
PTF.V2R1M0.SEZPLOAD	CAMAA10C	19
PTF.V2R1M0.SEZPLOAD	CAMATRCC	16
PTF.V2R1M0.SEZPLOAD	CAMA100C	25
PTF.V2R1M0.SEZPLOAD	CAMA110C	21

CICS IA - Collector



Commands Monitored by CICS IA for dependencies

CICS 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/ DCOUNTER, DELETE COUNTER/ DCOUNTER, GET COUNTER/DCOUNTER
QUERY COUNTER/ DCOUNTER, REWIND COUNTER/ DCOUNTER, 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

Commands Monitored by CICS IA for dependencies...

CICS SPI Commands

INQUIRE BRFACILITY, SET BRFACILITY
CREATE CORBASERVER, INQUIRE CORBASERVER, SET CORBASERVER,
PERFORM CORBASERVER, DISCARD CORBASERVER
CREATE DB2ENTRY, INQUIRE DB2ENTRY, SET DB2ENTRY, DISCARD DB2ENTRY
CREATE DJAR, INQUIRE DJAR, PERFORM DJAR, DISCARD DJAR
CREATE FILE, INQUIRE FILE, SET FILE, DISCARD FILE
INQUIRE JOURNALNUM/ NAME, SET JOURNALNUM/ NAME, DISCARD JOURNALNUM/ NAME
INQUIRE JVMPROFILE
CREATE PROGRAM, INQUIRE PROGRAM, SET PROGRAM, DISCARD PROGRAM
CREATE PCPIPSERVICE, INQUIRE TCPIPSERVICE, SET TCPIPSERVICE, DISCARD TCPIPSERVICE
CREATE TSMODEL, INQUIRE TSMODEL, DISCARD TSMODEL
INQUIRE TSPool
INQUIRE TSQUEUE, SET TSQUEUE, INQUIRE TSQNAME, SET TSQNAME
CREATE TRANSACTION, INQUIRE TRANSACTION, SET TRANSACTION, DISCARD TRANSACTION
CREATE TDQUEUE, INQUIRE TDQUEUE, SET TDQUEUE

Commands Monitored by CICS IA for dependencies ...

CICS FEPI API Commands

FEPI ALLOCATE PASSCONVID, FEPI ALLOCATE POOL

FEPI CONVERSE DATASTREAM CONVID, FEPI CONVERSE DATASTREAM POOL, FEPI CONVERSE FORMATTED CONVID,

FEPI CONVERSE FORMATTED POOL

FEPI EXTRACT CONV, FEPI EXTRACT FIELD, FEPI EXTRACT STSN

FEPI FREE

FEPI ISSUE

FEPI RECEIVE/ SEND DATASTREAM, FEPI RECEIVE/ SEND FORMATTED

FEPI REQUEST PASSTICKET

FEPI START

FEPI INQUIRE CONNECTION, FEPI SET CONNECTION

FEPI INQUIRE NODE, FEPI SET NODE

FEPI ADD POOL, FEPI INSTALL POOL, FEPI DELETE POOL, FEPI INQUIRE POOL, FEPI SET POOL, FEPI DISCARD POOL

FEPI INSTALL PROPERTYSET, FEPI INQUIRE PROPERTYSET, FEPI DISCARD PROPERTYSET

FEPI INQUIRE TARGET, FEPI SET TARGET

Commands Monitored by CICS IA for dependencies ...

Non-CICS API Commands

**EXEC SQL ALTER, EXEC SQL CLOSE, EXXEC SQL CREATE,
EXEC SQL DELETE, EXEC SQL DESCRIBE, EXEC SQL
DROP,
EXEC SQL EXECUTE, EXEC SQL EXECUTE IMMEDIATE,
EXEC SQL EXPLAIN, EXEC SQL FETCH, EXEC SQL INSERT,
EXEC SQL OPEN, EXEC SQL PREPARE, EXEC SQL SELECT,
EXEC SQL UPDATE
MQCLOSE, MQGET, MQOPEN, MQPUT, MQPUT1
EXEC DLI CALL**

Commands Monitored by CICS IA for Affinities

CICS Commands

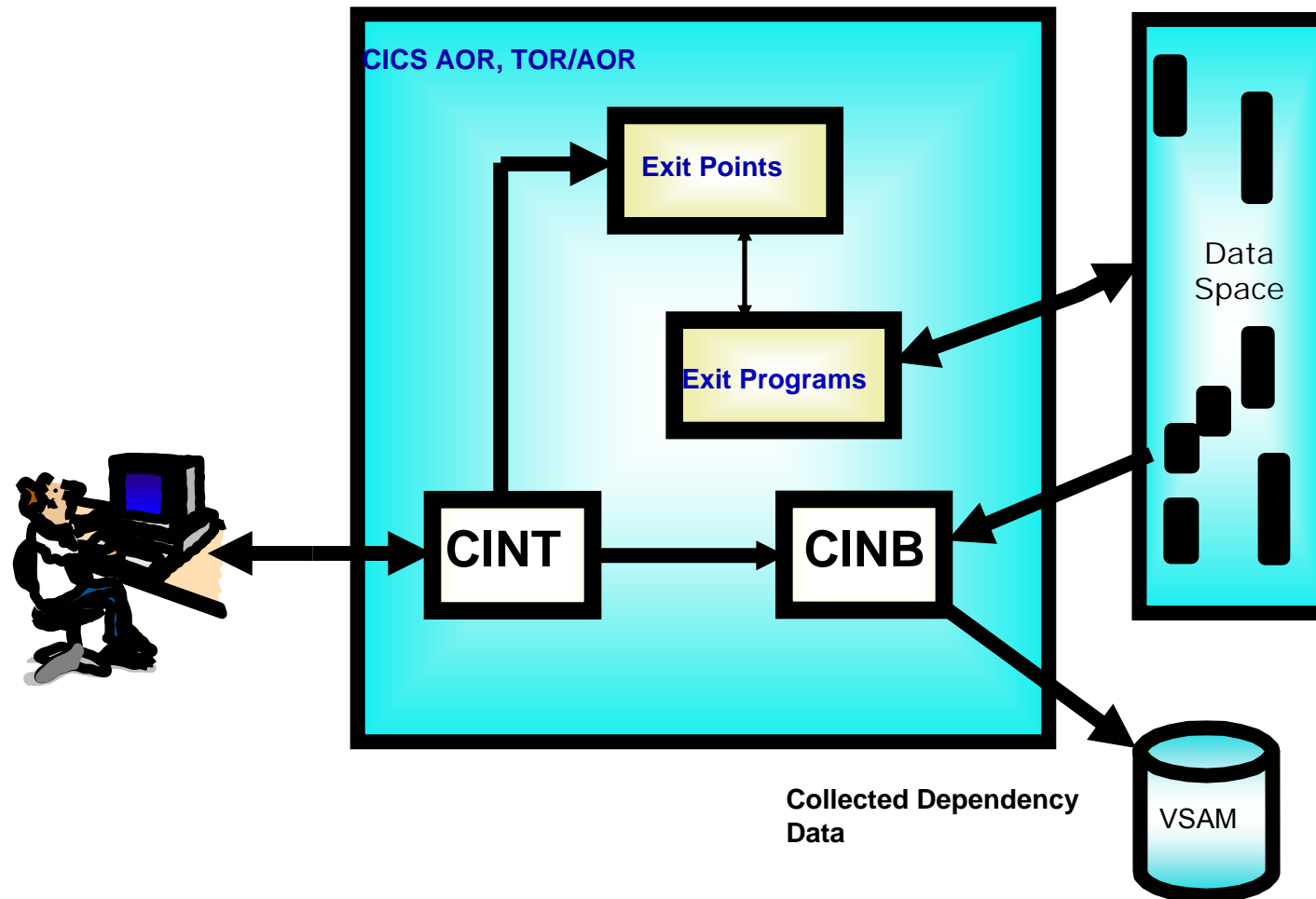
Inter Transaction Affinities :—

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

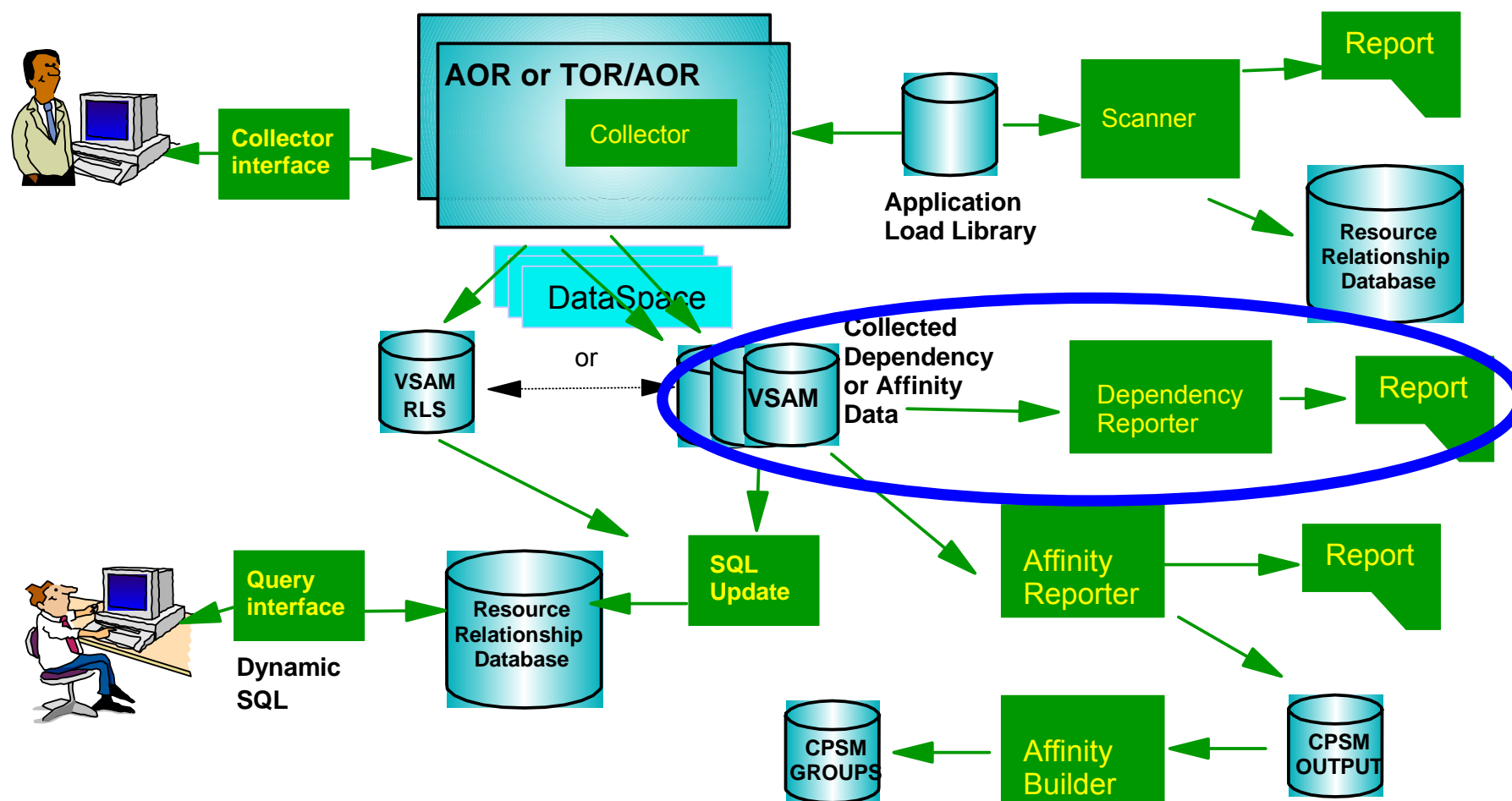
Transaction System Affinities :—

**INQ, SET, ENABLE, DISABLE, EXTRACT, COLLECT STATS
PERFORM, DISCARD, CREATE, RESYNC
CICS BTS BROWSE
WAITCICS, WAIT EVENTS , WAIT EXTERNAL.**

The Collector Architecture



CICS IA – Interdependency Reporter



The Interdependency Reporter

▪ Batch Program

- Runs against VSAM Dependency Data
- Report for all CICS regions or a specific CICS region via APPLID DD statement
- Report on all types of resources (CICS,DB2,MQ,DLI) or a specific one via REPTYPE DD statement
- Report on CICS Resources via CMDGRPS DD Statement
 - START- START
 - XCTL - XCTL
 - LOAD - LOAD
 - LINK - LINK
 - RETURN- RETURN TRANSID
 - HANDLE- HANDLE ABEND PROGRAM
 - TC - ENQ, DEQ
 - FC - READ, WRITE, DELETE, STARTBR, READNEXT, READPREV, ENDBR, RESETBR, UNLOCK, REWRITE
 - BMS - SEND MAP, RECEIVE MAP
 - TS - READQ TS, WRITEQ TS, DELETEQ TS
 - TD - READQ TD, WRITEQ TD, DELETEQ TD
 - JRNL - WRITE JOURNALNUM, WAIT JOURNALNUM
 - DTP - ALLOCATE, CONNECT, SEND CONVID/SESSION, CONVERSE CONVID/SESSION, FREE
 - COUNTER- DEFINE, DELETE, GET, QUERY, REWIND, UPDATE COUNRER/DCOUNTER
 - FEPI - FEPI APIs

The Interdependency Reporter...

•CMDGRPS cont...

- OTHER - ADDRESS CWA, ASSIGN APPLID
- ISPC - INQUIRE PROGRAM, SET PROGRAM, DISCARD PROGRAM
- ISFC - INQUIRE FILE, SET FILE, DISCARD FILE
- ISTR - INQUIRE TRANSACTION, SET TRANSACTION, DISCARD TRANSACTION
- ISTS - INQUIRE/SET TSQUEUE/TSQUEUEENAME, CREATE/INQUIRE/DISCARD TSMODEL, INQUIRE -TSPOOL
- ISTD - INQUIRE TDQUEUE, SET TDQUEUE
- IDB2 - INQUIRE/CREATE/SET/DISCARD DB2ENTRY/DB2TRAN
- IDJAR - INQUIRE/CREATE/PERFORM/DISCARD DJAR
- IBRFA - INQUIRE/SET BRFACILITY
- ICORB - INQUIRE/CREATE/SET/PERFORM/DISCARD CORBASERVER
- ITCP - INQUIRE/CREATE/SET/DISCARD TCPIPService
- IFEPI - FEPI SPIS
- FJRNL - INQUIRE/SET/DISCARD JOURNALNAME/JOURNALNUM

The Interdependency Reporter - full example header

```
Generated by CICS Transaction Inter-dependency Utility on 2005/05/18

2005/05/18 - CICS INTERDEPENDENCY ANALYZER (CIU) - Version 130 - Page: 1
--LIST OF CICS COMMAND GROUPS--

Command Type          Reporting
-----
START                 Yes
XCTL                  Yes
LOAD                  Yes
LINK                  Yes
RETURN                Yes
HANDLE                Yes
TC                     Yes
FC                     Yes
BMS                    Yes
TS                     Yes
TD                     Yes
JRNL                   Yes
DTP                     Yes
```

The Interdependency Reporter - full example header...

FC	Yes
BMS	Yes
TS	Yes
TD	Yes
JRNL	Yes
DTP	Yes
COUNTER	Yes
FEPI	Yes
WEB	Yes
OTHER	Yes
ISPC	Yes
ISFC	Yes
ISTR	Yes
ISTS	Yes
ISTD	Yes
IDB2	Yes
IDJAR	Yes
IBRFA	Yes
ICORB	Yes
ITCP	Yes
IFEPI	Yes
IJRNL	Yes

The Interdependency Reporter - CICS example output

2005/05/18 - CICS INTERDEPENDENCY ANALYZER (CIU) - Version 130 - Page: 2
CICS RESOURCES REPORT FOR APPLID: IYCYZC24

Tran	Program	Offset	Command	Resource					
		Sysid	Usage	First Run	Last Run	Term	TCBmode		
TSTB	EMSTESTB	000005A0	ASSIGN APPLID	IYCYZC24					
		----	6	2005-03-21 16.48.31	2005-03-22 17.26.13	Y	QR		

2005/05/18 - CICS INTERDEPENDENCY ANALYZER (CIU) - Version 130 - Page: 3
CICS RESOURCES REPORT FOR APPLID: IYCYZC25

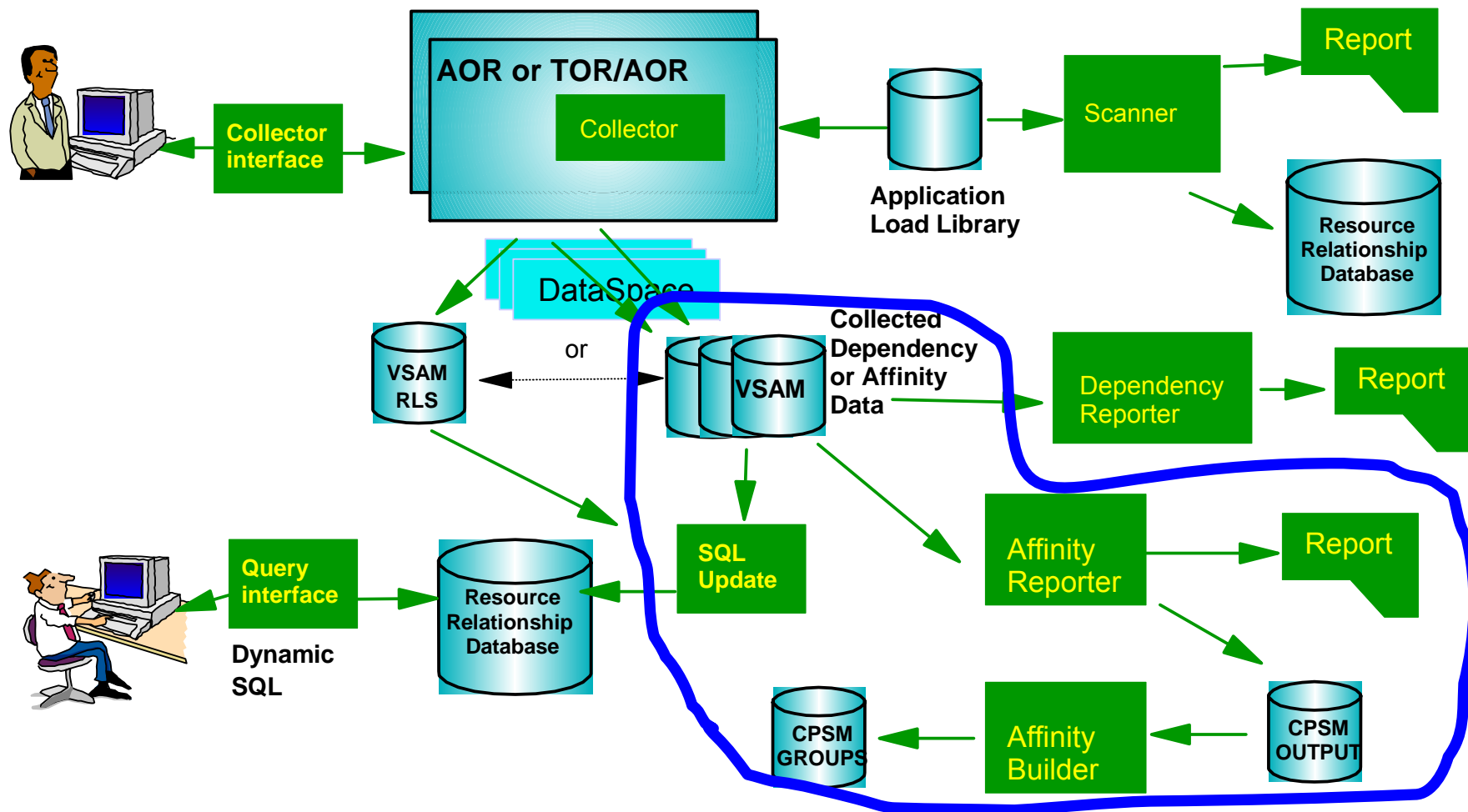
Tran	Program	Offset	Command	Resource					
		Sysid	Usage	First Run	Last Run	Term	TCBmode		
DB90	DB900001	000009FE	RECEIVE MAP	CBMS01					
		----	493	2005-03-30 11.09.28	2005-03-30 11.15.48	Y	QR		

The Interdependency Reporter - CICS example output

DB2 RESOURCES REPORT FOR APPLID: IYCYZC25

TRAN	PROGRAM	OFFSET	COMMAND	TYPE		RESOURCE				DB2ID	PLAN
			USAGE	FIRST RUN		LAST RUN		TERM	SECTION#	STATEMENT#	TCBMODE
DB90	DB900001	00000A98	OPEN	CURSOR		C1				DF2E	DB900001
			442	2005-03-30	11.13.45	2005-03-30	11.15.48	Y	1	265	L8
		00000B38	FETCH	CURSOR		C1				DF2E	DB900001
			3,536	2005-03-30	11.13.45	2005-03-30	11.15.48	Y	1	272	L8
DB91	DB910001	000013BC	OPEN	CURSOR		C1				DF2E	DB910001
			438	2005-03-30	11.13.45	2005-03-30	11.15.48	Y	1	389	L8
		0000146C	FETCH	CURSOR		C1				DF2E	DB910001
			438	2005-03-30	11.13.45	2005-03-30	11.15.48	Y	1	396	L8
		00001654	UPDATE	TABLE		JAMESE.ORDER00002				DF2E	DB910001
			438	2005-03-30	11.13.45	2005-03-30	11.15.48	Y	2	430	L8

CICS IA – Affinity Data



CICS IA – Affinity Data Collection

■ Affinity Collection now in CICS IA.

- APAR PK02704.
- Shared VSAM files.
- Single point of control for operating affinity collection across multiple regions.
- Affinity data loaded into DB2 tables.
- CINC - DB2 Query Interface extended for Affinity data.

■ Detector component function

- Detects EXEC CICS commands that can cause transaction affinities
- For ENQ/DEQ will distinguish between ENQ/DEQ by name and by address
- Will also detect
 - End of pseudo conversations
 - Logoffs and signoffs
 - Completion of CICS BTS activities and processes
 - Deletion of Link3270 bridge facilities

CICS IA – Affinity Reporter

■ CIUAFFRP

- Batch program.
- Runs against VSAM Affinity Data collected by CICS IA.
- Report for all CICS regions or a specific CICS region via APPLID DD statement
- Report on CICS Affinity groups via CMDGRPS DD Statement
- Provides input to the Affinity Builder process in the TRANGRPS DD statement

■ CIUAFFRX

- Batch program.
- Runs against VSAM Affinity Data collected by CICS TS Affinity Utility. Not available in TS 3.1
- Report on CICS Affinity groups via CMDGRPS DD Statement
- Provides input to the Affinity Builder process in the TRANGRPS DD statement

Creating and managing CPSM group definitions

- One of the new functions of CICS IA 1.3 is the ability to analyze affinity data collected by the CICS Affinities Utility. The affinity data is loaded into DB2 databases, on which SQL queries can be performed and from which detailed reports can be produced.
- In this section we will show how to create and upload an input file for CICSplex SM with the affinity-transaction-group definition.

CICS IA Affinity reporter

- CIUAFFRP: The Affinities Reporter is a batch utility that you can use to do either of the following:
 - Convert the affinity data in the Affinity Database into reports in a readable format.
 - From the affinity data in the Affinity Database, create a file of affinity-transaction-group definitions in a syntax approximating to the batch API of CICSplex SM. This file is intended as input to the Builder component. This is the function we used.
- CIUAFFBL:
 - The Builder is a batch utility that takes as input the file of basic affinity-transaction-group definitions created by the Affinities Reporter. It outputs a file of "combined" affinity-transaction-group definitions suitable for input to CICSplex SM, which insists that a specific CICS transaction ID (TRANSID) can appear in only one transaction group.

Reporter JCL CAUJCLRP

```
//CAUJCLRP JOB ACCNT#,'Th. Braun ',MSGLEVEL=(1,1),NOTIFY=&SYSUID
/*JOBPARM SYSAFF=SC66
//REPORT EXEC PGM=CAUREP,PARM='WORSEN=YES'
//STEPLIB DD DSN=CICSTS22.CICS.SDFHLOAD,DISP=SHR
//CAUAFF1 DD DSN=CICSSYSF.CICS620.PAA1.CAUAFF1,DISP=SHR
//CAUAFF2 DD DSN=CICSSYSF.CICS620.PAA1.CAUAFF2,DISP=SHR
//CAUAFF3 DD DSN=CICSSYSF.CICS620.PAA1.CAUAFF3,DISP=SHR
//CAUCNTL DD DSN=CICSSYSF.CICS620.PAA1.CAUCNTL,DISP=SHR
//CMDGRPS DD *
CWA
TS
GETMAIN
ENQ
CANCEL
COLLECT
CREATE
DISCARD
ENABLE
EXTRACT
INQUIRE
LOAD
PERFORM
RESYNC
RETRIEVE
//TRANGRPS DD DSN=CICSR7.JCL.TRANGRP1,DISP=(NEW,CATLG,DELETE),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000),SPACE=(CYL,(1,1))
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
```


Contents of the *TRANGRP* file

```
* HEADER APPLID(SCSCPAA4)  SAVEDATE(04/09/17)  SAVETIME(11:42:01);
*
* Generated by CICS Transaction Affinities Utility (Reporter) on 2004/09
* Note: NOT suitable for input to CICSplex SM
*
CREATE TRANGRP NAME(CW.00000001) AFFINITY(GLOBAL  ) AFFLIFE(SYSTEM  )
      DESC(ADDRESS CWA                                     );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(FOR);
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(HR1 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(HR2 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(HX1 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(HX2 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(IT1 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(IT2 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(IT8 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(IX1 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(IX2 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(IX8 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(PS2 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(PS3 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(PX2 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(PX3 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(SC2 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(SC4 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(SC6 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(SX2 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(SX4 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(SX6 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(TS1 );
CREATE DTRINGRP TRANGRP(CW.00000001) TRANID(TX1 );
*
CREATE TRANGRP NAME(EQ.00000001) AFFINITY(GLOBAL  ) AFFLIFE(SYSTEM  )
      DESC(L=8      CINT_TXN                               );
CREATE DTRINGRP TRANGRP(EQ.00000001) TRANID(CINT);
```

Customizing and running the Builder

```
//CIUAFFBL JOB ACCNT#,'C Rayns ',MSGLEVEL=(1,1),NOTIFY=&SYSUID
/*JOBPARM SYSAFF=SC66
//BUILD EXEC PGM=CAUBLD,
// PARM='STATE=ACTIVE,MATCH=LUNAME,DSPSIZE=16'
//STEPLIB DD DSN=CICSTS22.CICS.SDFHLOAD,DISP=SHR
//REPGRPS DD DSN=CICSR7.JCL.TRANGR41,DISP=SHR
//AFFGRPS DD DSN=CICSR7.JCL.CPSMGR41,DISP=(NEW,CATLG,DELETE),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000),SPACE=(CYL,(1,1))
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
```

Builder output

```
* HEADER APPLID(BUILDER )   SAVEDATE(04/09/17)   SAVETIME(11:42:01);
*
* Generated by CICS Transaction Affinities Utility (Builder) on 2004/09/
* Note: Suitable for input to CICSplex SM
*
* REMOVE TRANGRP NAME(FORGRP );
CONTEXT SC66PLEX;
CREATE TRANGRP NAME(FORGRP ) AFFINITY(GLOBAL ) AFFLIFE(SYSTEM )
      MATCH(LUNAME) STATE(ACTIVE );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(FOR );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(HR1 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(HR2 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(HX1 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(HX2 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(IT1 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(IT2 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(IT8 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(IX1 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(IX2 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(IX8 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(PS2 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(PS3 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(PX2 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(PX3 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(SC2 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(SC4 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(SC6 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(SX2 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(SX4 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(SX6 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(TS1 );
  CREATE DTRINGRP TRANGRP(FORGRP ) TRANID(TX1 );
*
* REMOVE TRANGRP NAME(CINTGRP );
CREATE TRANGRP NAME(CINTGRP ) AFFINITY(GLOBAL ) AFFLIFE(SYSTEM )
      MATCH(LUNAME) STATE(ACTIVE );
  CREATE DTRINGRP TRANGRP(CINTGRP ) TRANID(CINT);
```

Uploading the data into CICSplex SM

- To upload the created file in the previous step, we used the CICSplex SM tool BATCHREP(batched repository update facility).
- BATCHREP streams may be submitted for processing by:

- EYU9XDBC:

```
//BATCHREP JOB ,BATCHREP,CLASS=A,MSGCLASS=H,NOTIFY=&SYSUID
//SUBMIT EXEC PGM=EYU9XDBC,REGION=2M
//STEPLIB DD DISP=SHR,DSN=CICSTS31.CPSM310.SEYUAUTH
// DD DISP=SHR,DSN=CICSTS31.CPSM310.SEYULOAD
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
CMASNAME(IYEGZGC0)
EXECUTE
INPUTDSN(CVM.CICSIA.BUILDER.OUT)
OUTPUTUSER(*)
PRINTNODE(LOCAL)
/*
```

- TSO End User Interface BATCHREP View









- Web User Interface BATCHREP View – This is how we will do it.

BATCHREP Web User Interface view

Welcome to the CICSplex SM Web User Interface


General views

General views

- [CICS regions](#) 
- [Active tasks](#) 
- [ISC and MRO connections](#) 
- [Terminals](#) 
- [Local files](#) 
- [Remote files](#) 
- [Local or dynamic transactions](#) 
- [Remote transactions](#) 
- [Real Time Analysis \(RTA\) outstanding](#)

View menus

- [CICS operations views](#)
Work with the managed CICS resources.
- [Monitoring views](#)
View the results of CICS resources monitor
- [Real Time Analysis \(RTA\) views](#)
View the CICS resource status alerts.
- [Active workload views](#)
Work with the CICS workloads being managed.
- [CICSplex SM operations views](#)
View some of the CICSplex SM configuration
- [Administration views](#)
Work with CICSplex SM and CICS resource definitions.

- [CMAS configuration administration views](#)
- [Monitor administration views](#)
- [Topology administration views](#)
- [Workload manager administration views](#)
- [Batched repository update job](#) 

Real Time Analysis (RTA) views

- [System availability monitoring administration views](#)
- [MAS resource monitoring administration views](#)
- [Analysis point monitoring administration views](#)

CICS resource definitions using Business Application Services (BAS)

- [Basic CICS resource administration views](#)
- [Fully functional Business Application Services \(BAS\) administration views](#)

Me

Menu name: EYUSTARTMENU

Execute a *BATCHREP* stream

Batched Repository Update Job



EYUVC1280I 1 records collected at 10/07/05 16:44:06.



CMAS context: IYEGZGC0

Automatic refresh: ☐ 60 seconds.

Refresh

1 records on 1 pages.

Record	Processing state	Input data set name	Input member name

1 ☒ Stopped

1 records on 1 pages.

Check...

Execute...

Resource name: BATCHREP. View name: EYUSTARTBATCHREP.TABULAR

Specify BATCHREP source

Execute



Input data set name	<input checked="" type="checkbox"/> cvm.cicsia.builder.out
Input member name	<input type="checkbox"/>
Print class	<input type="checkbox"/>
Print node	<input checked="" type="checkbox"/> Local
Destination userid	<input checked="" type="checkbox"/> *

No Yes

Resource name: BATCHREP. View name: EYUSTARTBATCHREP.EXECUTE

BATCHREP stream submitted

Batched Repository Update Job



EYUVC1280I 1 records collected at 10/07/05 16:51:20.














CMAS context: IYEGZGC0

Automatic refresh: ☐ 60 seconds.

Refresh

1 records on 1 pages.

Record	Processing state	Input data set name	Input member name
 	  	  	  
1 <input type="checkbox"/>	Started	CVM.CICSIA.BUILDER.OUT	

1 records on 1 pages.

Check...

Execute...

Resource name: BATCHREP. View name: EYUVC1280I

TRANGRP view shows the new transaction groups

Transaction group definition



EYUVC12801 3 records collected at 10/07/05 17:31:10.



Context: SC66PLEX Automatic refresh: ☐ 60 seconds.

Transaction group name: =

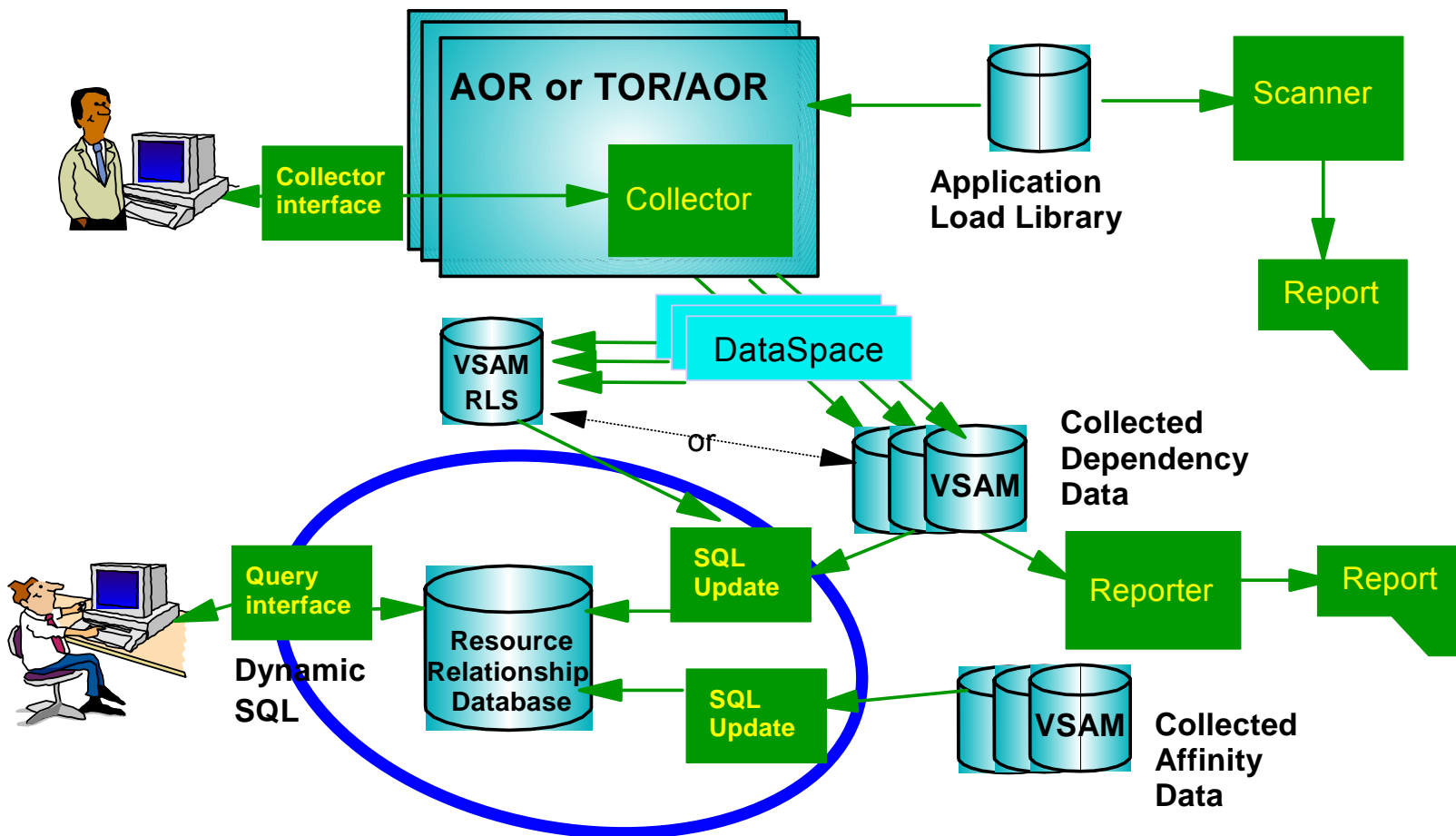
3 records on 1 pages.

Record	Transaction group name	Affinity relationship	Affinity lifetime	Automatic affinity creation option	Primary search criterion	Affinity relation and lifetime checking status	RTA event name	Description	Last time definition was changed
1 <input type="checkbox"/>	CAREXTRA	Luname	Logon	Yes	Luname	Active			10/07/05 16:49:46
2 <input type="checkbox"/>	CINTGRP	Luname	Logon	Yes	Luname	Active			10/07/05 16:49:46
3 <input type="checkbox"/>	FORGRP	Global	System	Yes	Luname	Active			10/07/05 16:49:46

3 records on 1 pages.

Resource name: TRANGRP. View name: EYUSTARTTRANGRP.TABULAR

CICS IA - Database



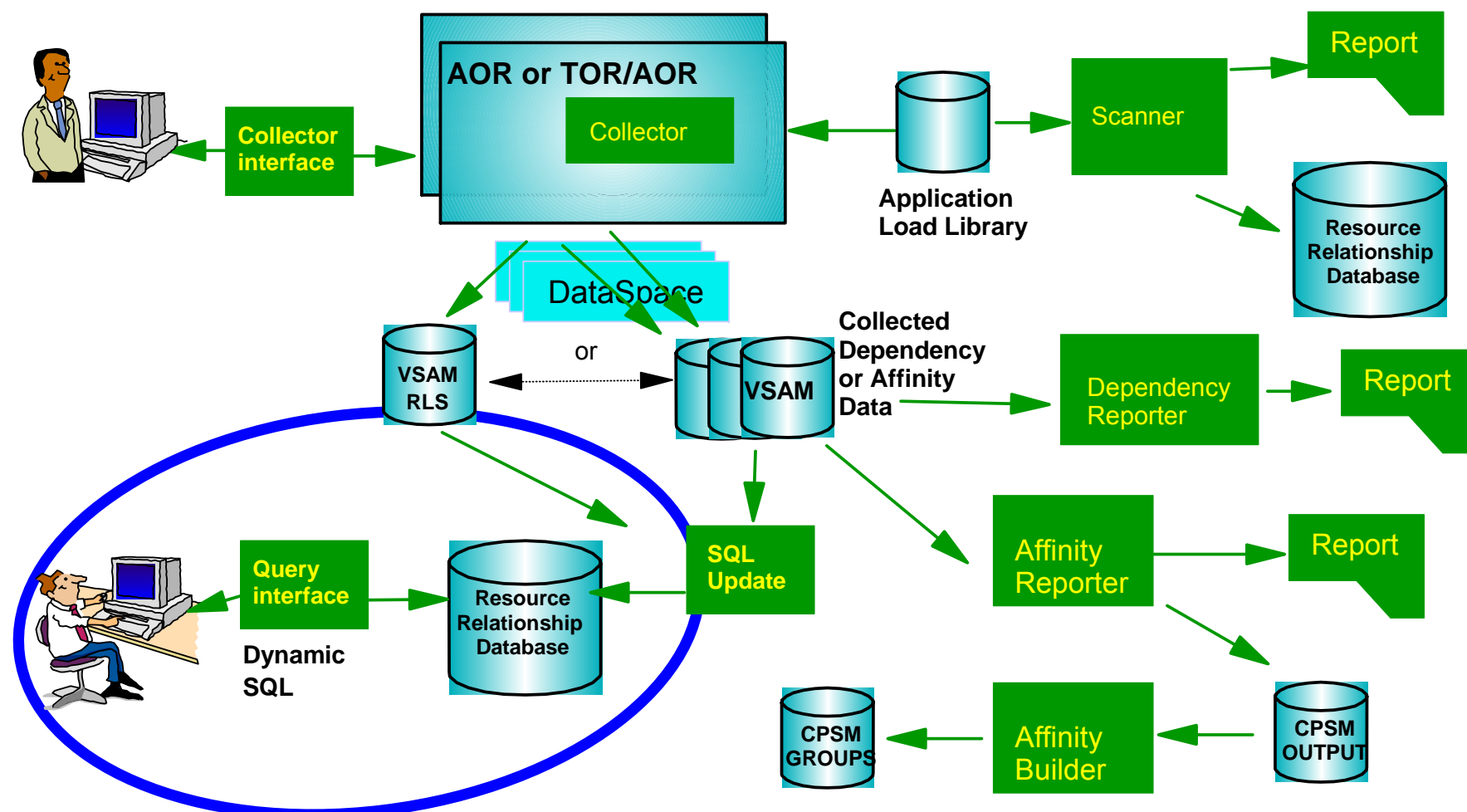
The Resource Relationship Database

- The database contains accumulated data about all your transactions and programs and the resources that they use.
 - Optionally you can define applications
 - By grouping your transactions
 - Supports queries at the application level
- The Database contains the following base tables:
 - **CIU3_CICS_DATA**
 - This table stores information about every unique combination of CICS region, transaction, program, function, and CICS resource recorded by the Collector.
 - **CIU3_MQ_DATA**
 - This table stores information about every unique combination of CICS region, transaction, program, function, and MQ resource recorded by the Collector.
 - **CIU3_DB2_DATA**
 - This table stores information about every unique combination of CICS region, transaction, program, function, and DB2 resource recorded by the Collector.
 - **CIU3_IMS_DATA**
 - This table stores information about every unique combination of CICS region, transaction, program, function, and DB2 resource recorded by the Collector.
 - **CIU3_SQL_DATA**
 - This table holds the SQL commands that satisfy application query commands.
 - **CIU3_CICS_CHAIN & CIU3_CICS_CHAINP**
 - These tables join with CIU3_CICS_DATA CIU3_MQ_DATA, CIU3_DB2_DATA or CIU3_IMS_DATA to show indirect dependencies.

The Resource Relationship Database

- **CIU3_AFF_GRP_DATA**
 - This table stores Affinity group information.
- **CIU3_AFF_CMD_DATA**
 - This table stores Affinity command information. Each command points to an Affinity group record..
- **CIU_SCAN_SUMMARY**
 - This table stores information reported from a summary scanner report.
- **CIU_SCAN_DETAIL**
 - This table stores information reported from a detailed scan
- There are other facilitating tables used in the updates of these base tables.

CICS IA - Query Interface



The Query Interface

- **The Query interface is:**
 - A suite of CICS COBOL BMS programs
 - These programs allow you to dynamically interrogate the dependency database.
 - The transaction CINQ drives this interface
- **CICS Transaction - CINQ**
 - Interrogate the data that was collected from running your applications
 - By resource type, for example
 - All files used by application AP1
 - All transactions started by transaction TRN1

Ad Hoc Queries against the Query Database

- **You can write SQL queries to generate reports to suit your particular needs.**

- ▶ To see programs that issued a READ for UPDATE against files then you refine this query as follows:

```
SELECT * FROM CIU_CICS_DATA WHERE TYPE='FILE' AND FUNCTION='READ UPD' AND OBJECT LIKE 'CAM%';
```

- **You will see from these queries that the 3 main arguments in generating a report are:**

- ▶ TYPE - the resource type eg. FILE, TDQUEUE , PROGRAM etc.
- ▶ FUNCTION - the CICS function associated with the above resource type , e.g. for FILE you could have READ,WRITE etc.
- ▶ OBJECT - the name of the resource within your system.

- **You can generate a query to list any resource type and function.**

- **You can narrow your report down further by using the fields APPLID , HOMESYSID , PROGRAM , TRANSID.**

- ▶ If you wish to report on all COUNTERS used by transaction FRED you write a query as follows:

```
SELECT * FROM CIU_CICS_DATA WHERE TRANSID='FRED' AND TYPE='COUNTER';
```

- ▶ If you wish to report by APPLID then add in the APPLID field:

```
SELECT * FROM CIU_CICS_DATA WHERE TRANSID='FRED' AND TYPE='COUNTER' AND APPLID='CICSAPPL';
```

CICS IA - Sample Queries

- New sample job CIUJSAMP is provided.
 - ▶ It allows users to select a number of sample SQL queries that we have provided in SCIUSQL.
 - ▶ It uses the DB2 provided program - **DSNTEP2**

```
//JOB LIB DD DSN=SYS2.DB2.V610.SDSNLOAD,DISP=SHR
//QUERY EXEC PGM=IKJEFT01
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//DBRMLIB DD DSN=DSN610P1.DBRMLIB.DATA,DISP=SHR
//SYSTSIN DD *
DSN SYSTEM(DE21)
  RUN PROGRAM(DSNTEP2) PLAN(DSNTEP61) -
    LIB('DSN610P1.RUNLIB.LOAD')
  END
/*
//SYSIN DD DSN=CIU.V1R3M0.SCIUSQL(CIUSAMP1),DISP=SHR
/*
```


CICS IA - Sample Queries

- Or you can run the query via SPUFI

- CIUSAMP1

```
-- SHOW ME DISTINCT FILES USED BY REGION TSTC AND NOT IN TSTB
SELECT DISTINCT HOMESYSID,TRANSID,PROGRAM,TYPE,OBJECT
      FROM CIU3_CICS_DATA
      WHERE TYPE='FILE'
      AND HOMESYSID='TCTC'
      AND OBJECT NOT IN (SELECT OBJECT FROM CIU3_CICS_DATA
                        WHERE HOMESYSID='TCTB') ;
```

HOMESYSID	TRANSID	PROGRAM	TYPE	OBJECT
TSTC	EQSS	EQZ3SUBS	FILE	EQZTRCA
TSTC	EQSS	EQZ3SUBS	FILE	EQZTRFA