IMS Tools
– Adding intelligence to tooling

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Agenda

- Smarter Reorgs
- Analyzing Complex Transactions

Disclaimer

IMS Tools – Smarter Reorgs

Fix the Right Problem and Reorg it and You're Done

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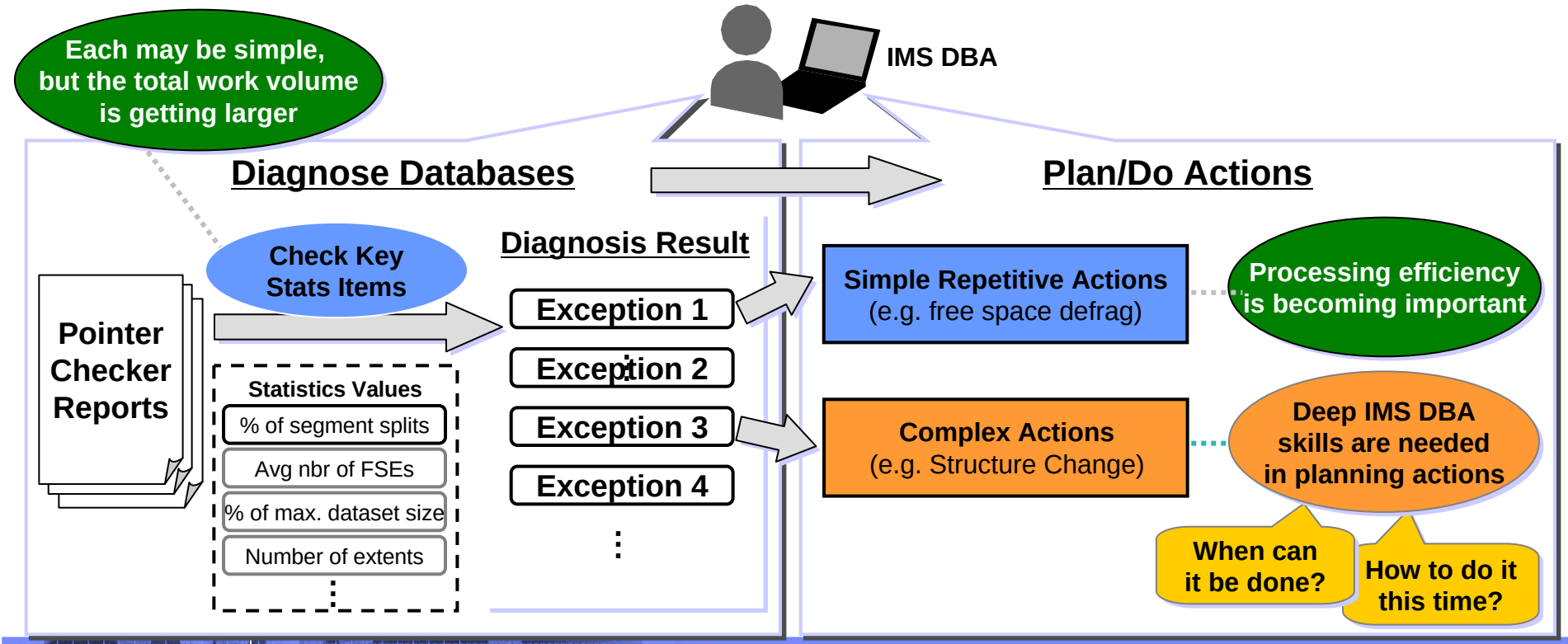
Objective of IMS Database Reorganization Expert

Help customers perform these tasks more efficiently with decreasing number of skilled DBAs.



IMS Database Reorganization Expert – 3 objectives

1. *Policy-based database space management*

Document DBA knowledge

- Exceptional states of database space usage are named
- Rules for exception detection are documented in a policy
- Target/method of exception notification are documented in the policy

2. *Policy-based automated operation*

Automate repetitive tasks

- The policy is used to detect reorganization need
- Free space reorg. can be done conditionally based on the policy
- Effectiveness of each free space reorg. can be evaluated

3. *Central management of information and data*

Keep info/data in one place

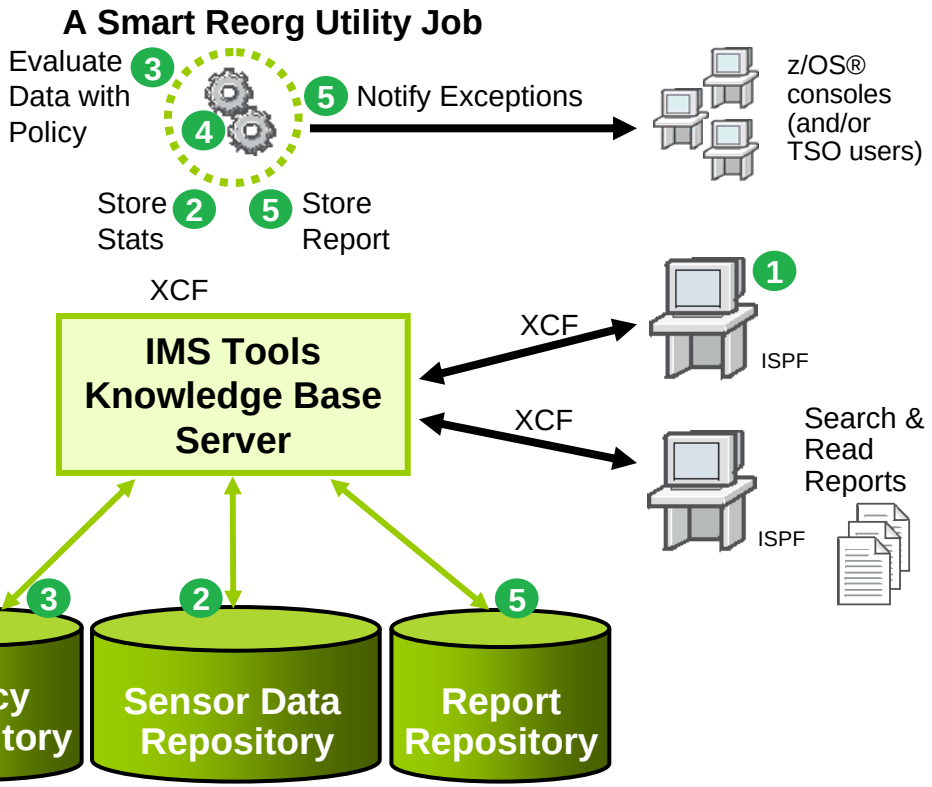
- Policies are kept and managed in a repository
- Statistics data needed for exception detection are kept in a repository
- History of exceptions and reorganizations are kept also in a repository

IMS Database Reorganization Expert – Follow-on product of IMS Parallel Reorganization

New *Smart Reorg Utility* extends Parallel Reorg Driver capability to provide smarter way of reorganization.

Smart Reorg 5 Major Features

1. Policy definition
2. Statistics data collection
3. Exception detection
4. Conditional reorganization
5. Exception reporting



All information and data are managed by IMS Tools Knowledge Base

IMS Tools Knowledge Base – Information and data for smarter reorganization

Smart Reorg Utility

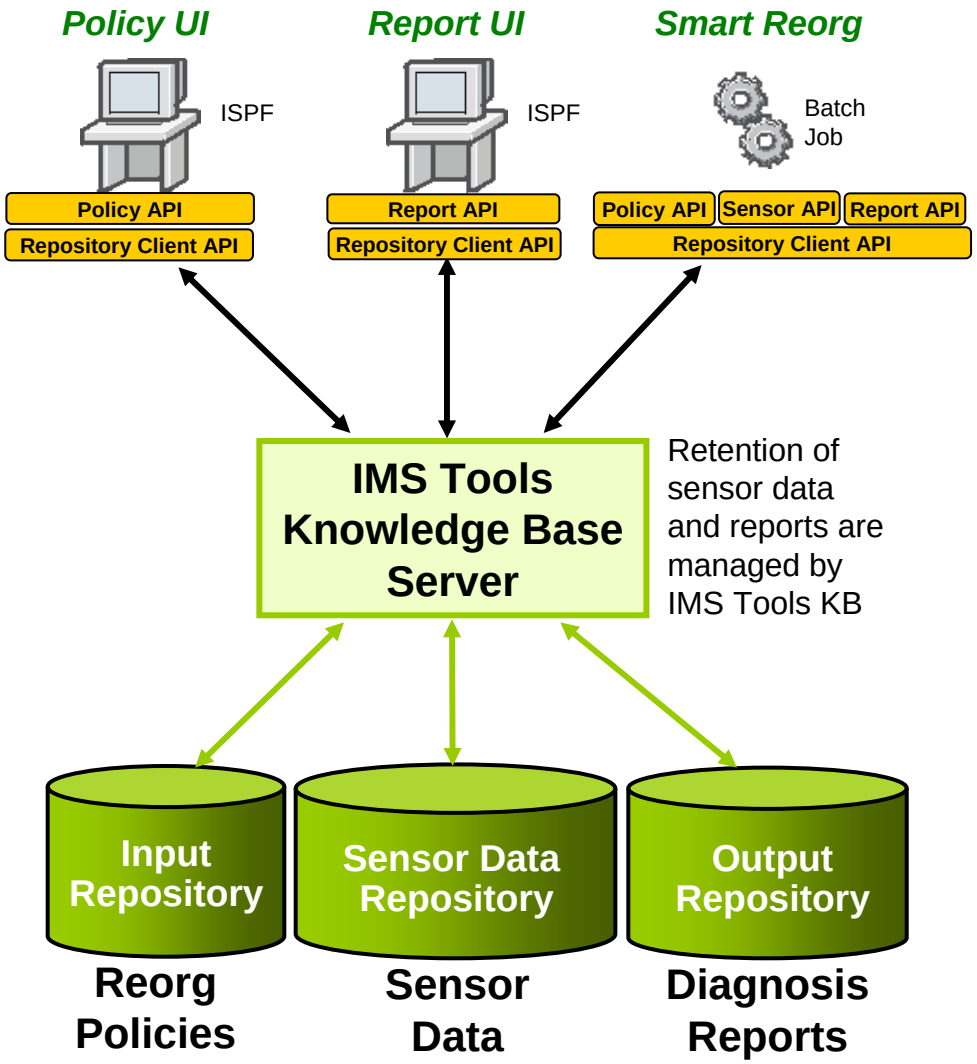
- Uses and/or generates the following information and data
  - **Reorganization Policies**
  - **Database Sensor Data** (database space statistics)
  - **Database Diagnosis Reports**

ISPF Policy User Interface

- Provided by IMS Tools Base – Policy Services
- Used to define and manage policies

ISPF Report User Interface

- Used to search and view reports of various IMS Tools



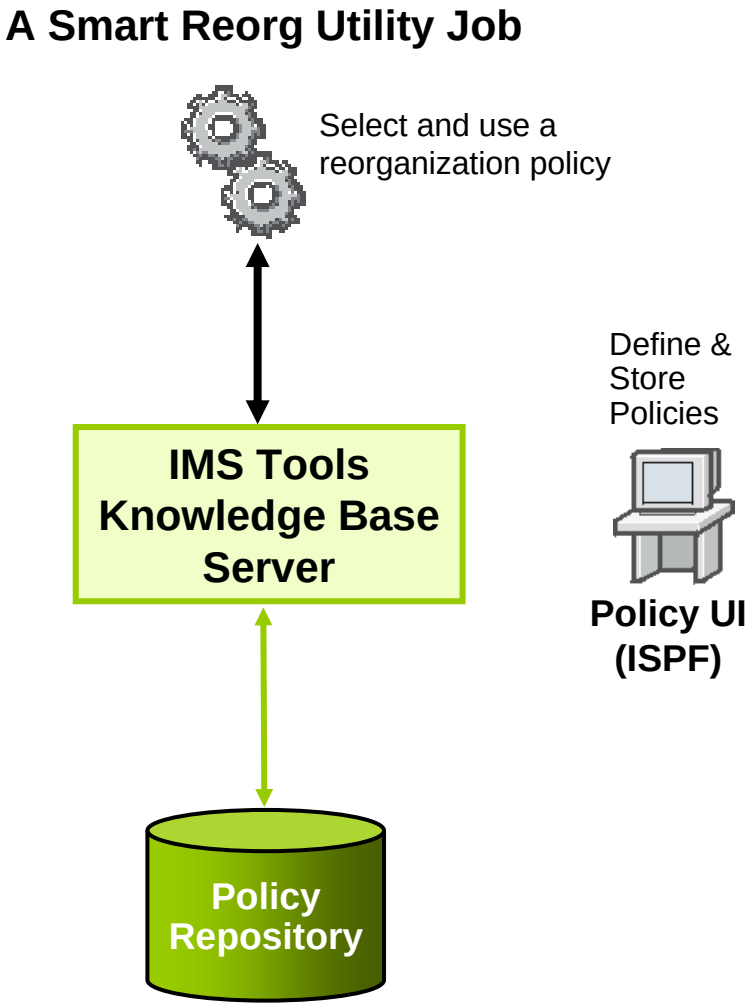
Policy-based
Database Space Management

Decision criteria and recommended actions are documented in a policy, and policies are kept in a centrally managed repository.

Policy-based Database Space Management – A policy describes decision criteria

Reorganization policy

- Describes
  - Criteria for exception detection
  - Action for detected exceptions
  - Destinations and methods of exception notification
- Can be defined
  - For a database type
  - For an individual database
  - For a group of databases
- Can be associated
  - With one or more Smart Reorg jobs through utility control statements



Policy-based Database Space Management – Structure of a policy description

Major components of a policy

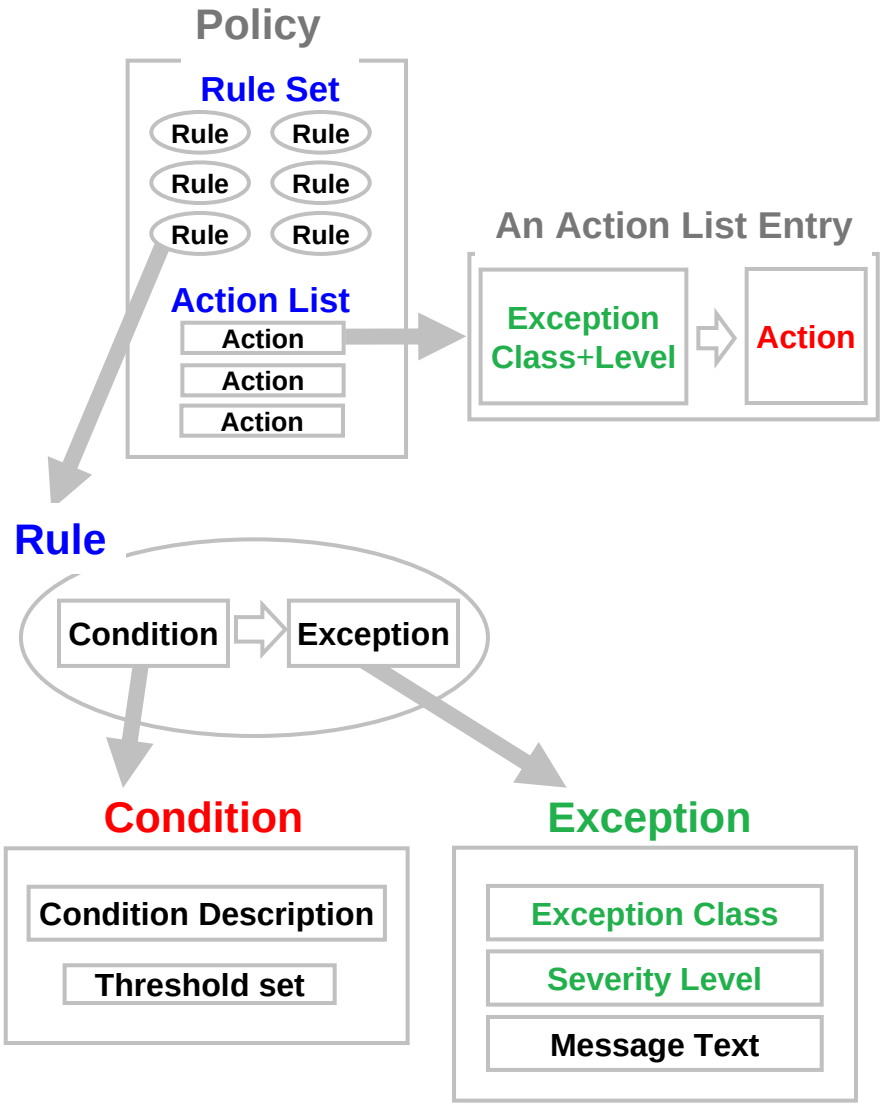
- Rules that detect exceptions
- Exception-based action list

A Rule

- Has two elements:
  - Condition
  - Exception

Action List

- Defines an exception-to-action mapping



Policy-based Database Space Management – A rule describes an exception detection criteria

A rule condition is defined as a pair of:

- **An evaluation condition**
  - Describes what data are evaluated and how
- **A set of threshold values**
  - Customizable

Sensor Data to Evaluate

DB_PCT_OF_MAX_DS_SIZE

The percentage of allocated bytes (bytes for High Allocated RBA) compared to the maximum size (4 GB or 8 GB).

DB_PCT_BYTES_FREE_SPACE

The percentage of bytes of total free spaces to the total used bytes for the data set.

Evaluation Condition

```
Help
REORG/OPERATION
Command ===>

Rule name . . . . . : IBM.DBDS_GROWTH.20    Locale . . : $IVP
Value set for threshold . MED
&1=85, &2=20,
 Evaluation formula description
Both of the following thresholds have been reached or
exceeded in a database data set. This condition indicates
the possibility that high percentage of unusable free
spaces has caused the growth in data set size.
 - Threshold on the percentage of data set size against
   its allowable maximum size:
     &1(85)
 - Threshold on the percentage of total free spaces against
   the used space that is allocated for the data set:
     &2(20)
******************************* Bottom of data ********************************
```

Name of Threshold Set

Threshold Values

```
Commands  Help
DOMAIN: REORG
Command ===>

View threshold values and press End to exit.

Locale . . . . . : $IVP      Rule name  : IBM.DBDS_GROWTH.20
Value set for threshold MED
ID#     Value                    Description
&1  85          Numeric, range: 0 to 100
                The percentage of allocated bytes (bytes for High allocated
                RBA) in the maximum size (4 GB or 8 GB).
&2  20          Numeric, range: 0 to 100
                The percentage of bytes of total free spaces compared to the
                total used bytes for the data set.
******************************* Bottom of data ********************************
```

Policy-based Database Space Management – Describing an exception

Exception Class

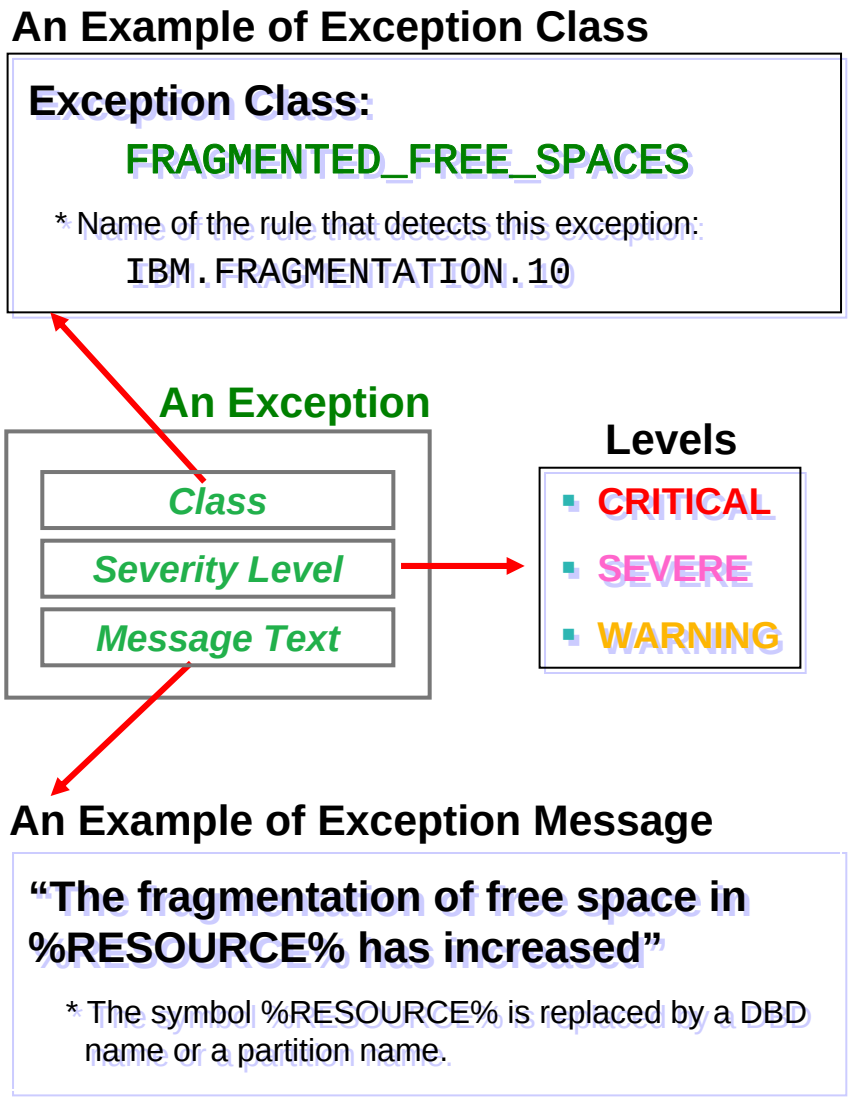
- A specific category of database states being monitored
- Defined by IBM

Exception Severity Level

- The severity of an exception detected by the Rule Condition
- Can be chosen from three levels

Exception Message Text

- The text describing the exception



Policy-based Database Space Management – Describing an action

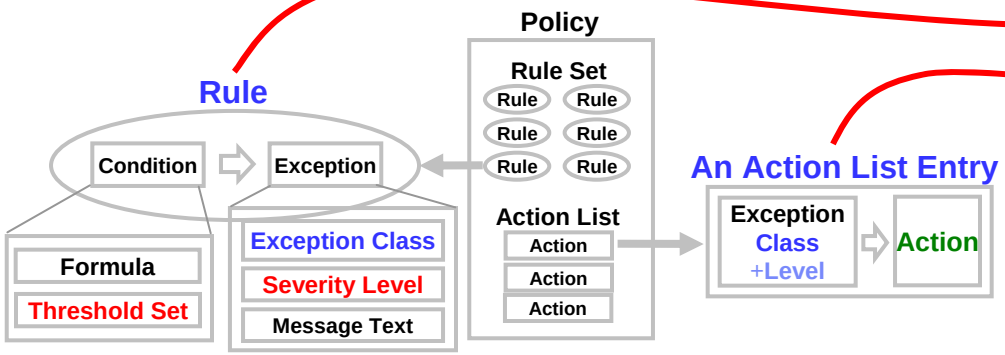
Exception-to-Action mapping

- Each rule is associated with an exception class
- The threshold set selected for the rule is associated with a severity level of the exception
- An action is associated with a pair of an exception class and its severity level

Reorganization (free space defrag through unload and reload without DBD change) is recommended

An Example

Threshold Set Name	Exception Class + Severity Level	Action
"HIGH"	CRITICAL	REORG
"MED"	SEVERE	MESSAGE
"LOW"	WARNING	



Alerting the user of the exception for preparation for user actions, or for immediate user actions

Policy-based Database Space Management – IBM-provided templates

IBM provides policies and rules

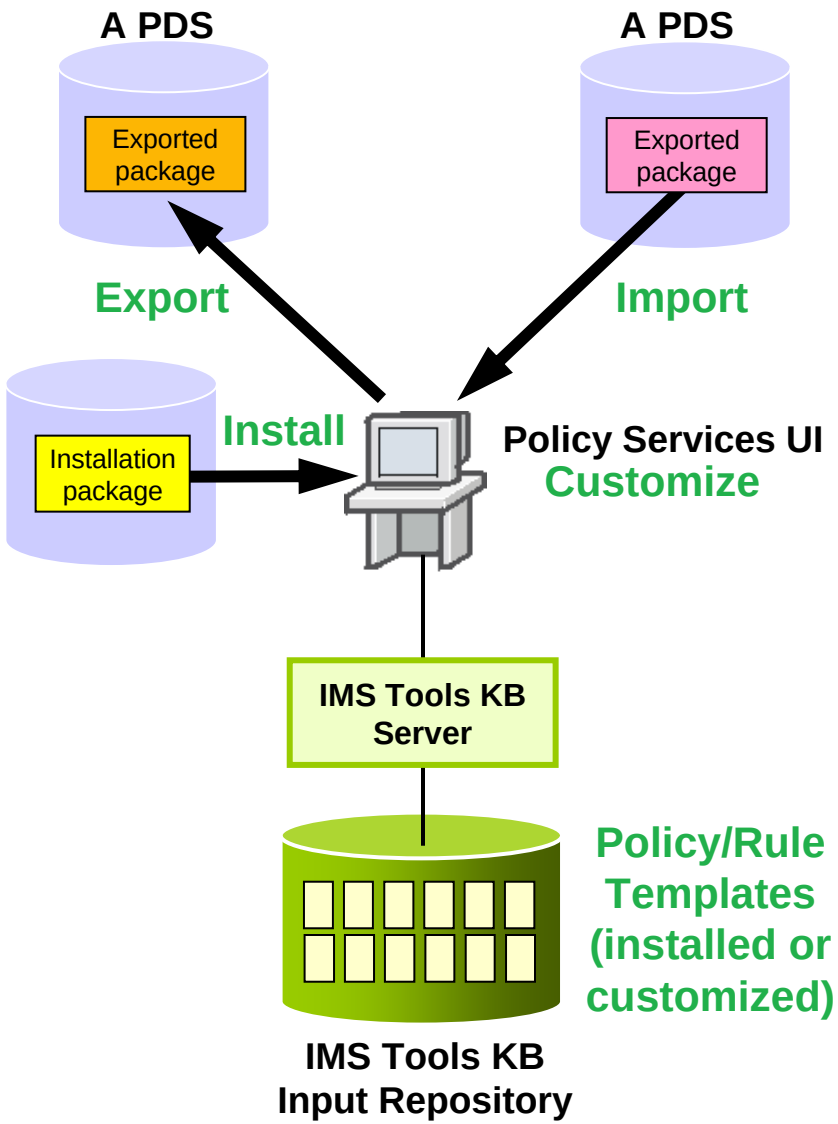
- Provided as a PDS member
- Installed into ITKB Input Repository as a set of policy/rule “templates”

Customization

- The installed policy/rule templates can be copied and customized

Import and export

- The copied/customized templates can be exported
  - For importing them into another environment
  - For backup



Using Smart Reorg Utility – Statistics Data Collection

Sensor data for an IMS full-function database

- A set of values of database statistics data elements at a specific time
- Used to detect exceptions by evaluating them with a reorg. policy

Data elements supported in the first release

- Total of about 60 data elements:
  - **Database Record Statistics** ← Per database or HALDB partition
  - **Randomizer Statistics** ← Per HDAM or PHDAM partition
  - **Volume/Extents Statistics**
  - **Data Set Space Usage Statistics**
  - **IMS Space Utilization Statistics**
  - **HISAM/SHISAM Statistics**

  ← Per data set

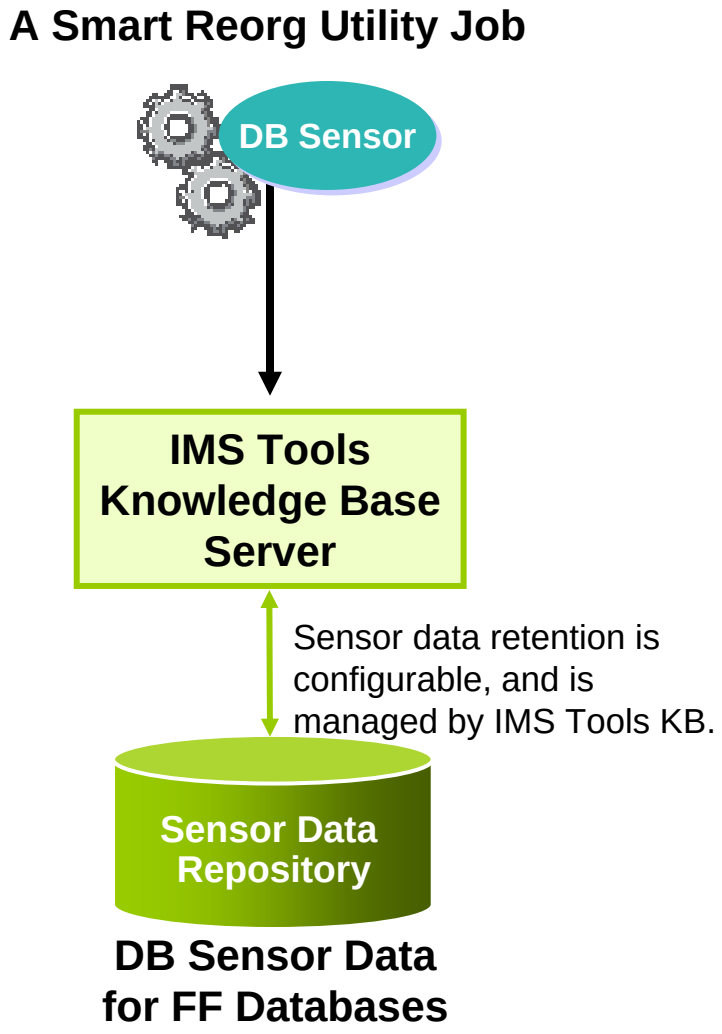
Complete list of data elements

- Can be found in *Policy Services User's Guide* (SC19-2718)

Using Smart Reorg Utility – Statistics Data Collection…

DB Sensor

- Is a sensor data collector for IMS full-function databases
- Is integrated in Smart Reorg Utility
- Can collect sensor data from a database or HALDB partition while it is online
  - One non-HALDB database or HALDB partition at a time
- Stores collected data in IMS Tools KB Sensor Data Repository
- Is much faster than HASH Check of High Performance Pointer Checker
  - DB Sensor bypasses pointer integrity check



Using Smart Reorg Utility – 3 modes of execution

Diagnosis Mode

- Sensor data is collected and evaluated by a policy to detect exceptions
- A diagnosis report can be stored in IMS Tools KB Output Repository
- Existence of an exception can be notified in various ways

Conditional Reorganization Mode

- Same as Diagnosis Mode
- But, performs reorganization when it is recommended by the diagnosis
  - The reorganized database is diagnosed again to see effectiveness of the reorganization and remaining exceptions

Unconditional Reorganization Mode

- Always performs reorganization regardless of the database status

Using Smart Reorg Utility – Conditional Reorganization Mode

Basic Scenario of Conditional Reorganization Mode

- **Step 1:** Sensor data are collected and stored in the Sensor Data Repository
- **Step 2:** The sensor data are evaluated with the specified policy
- **Step 3:** Reorganization is performed if it was recommended in Step 2
  - Sensor data of the reorganized database are stored
  - New sensor data is evaluated with the same policy again
- **Step 4:** A Diagnosis Report of the evaluation(s) is stored and the existence of remaining exceptions, if any, can be notified

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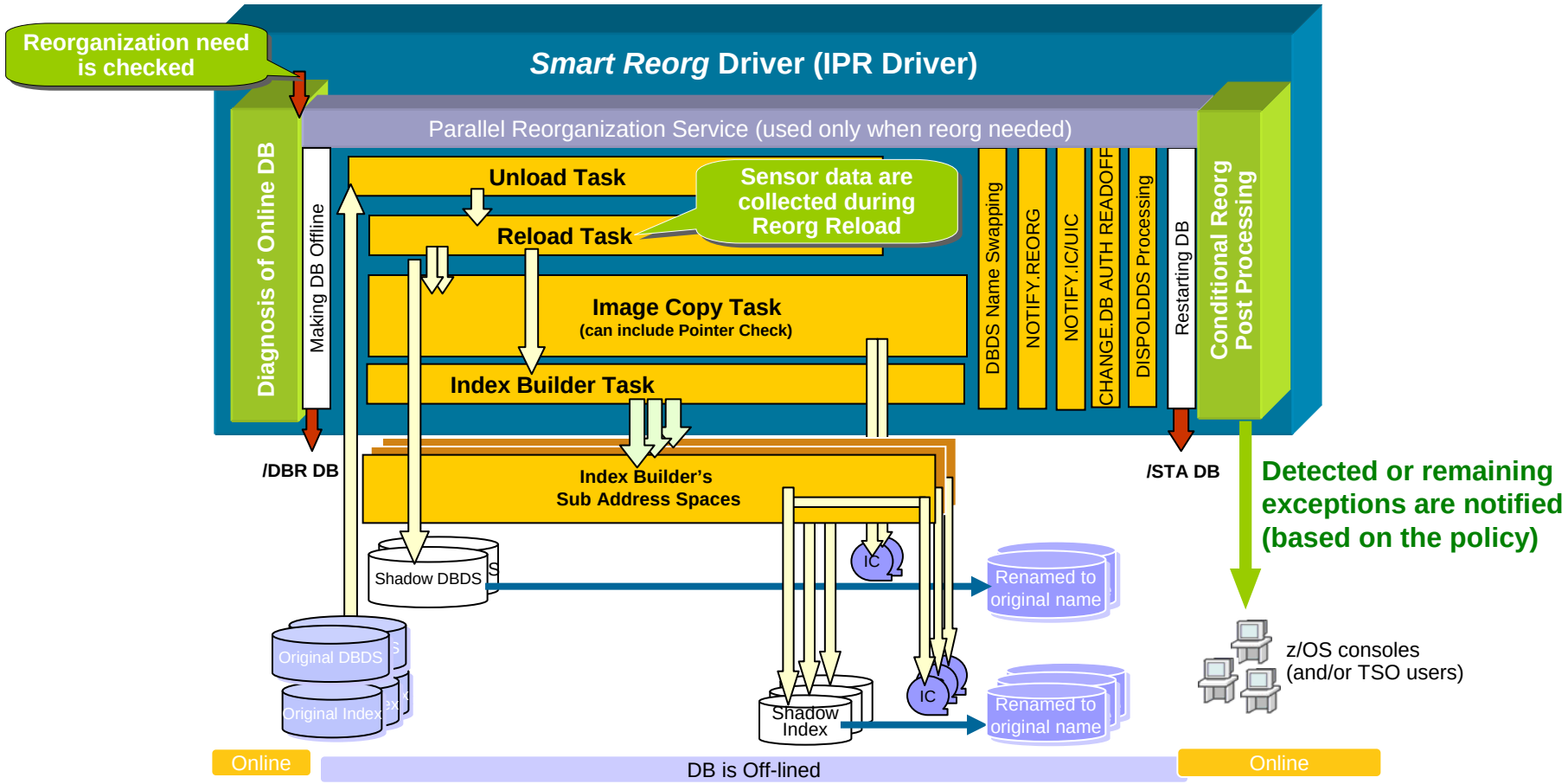
- **Step 5:** The Diagnosis Report is reviewed by DBA and necessity of further action (e.g., planning for database tuning) is determined

Using Smart Reorg Utility – Benefits of Conditional Reorganization

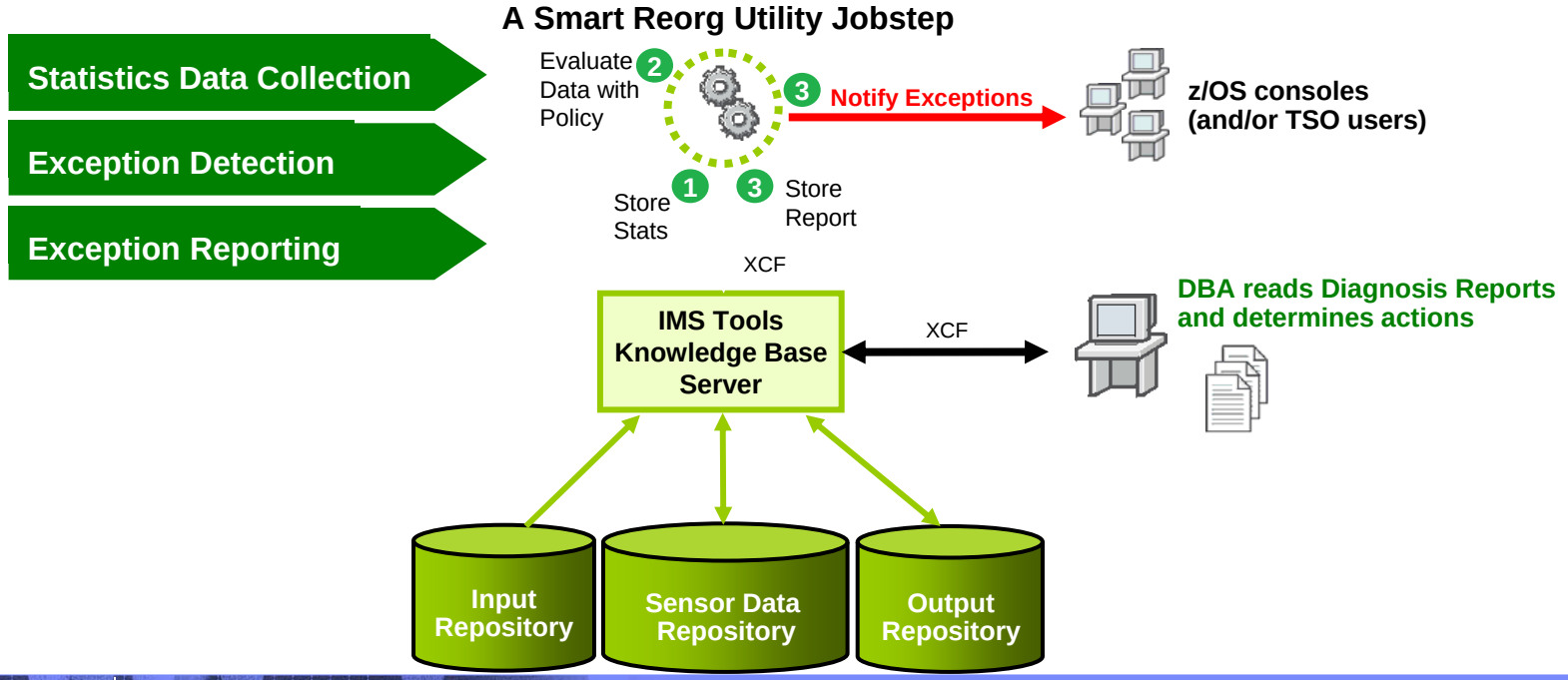
- A database can be reorganized only when it is really needed
- The Diagnosis Report provides an evidence of the necessity of reorganization and effectiveness of the reorganization



Using Smart Reorg Utility – Exception detection in Diagnosis Mode

Basic Scenario of Diagnosis Mode

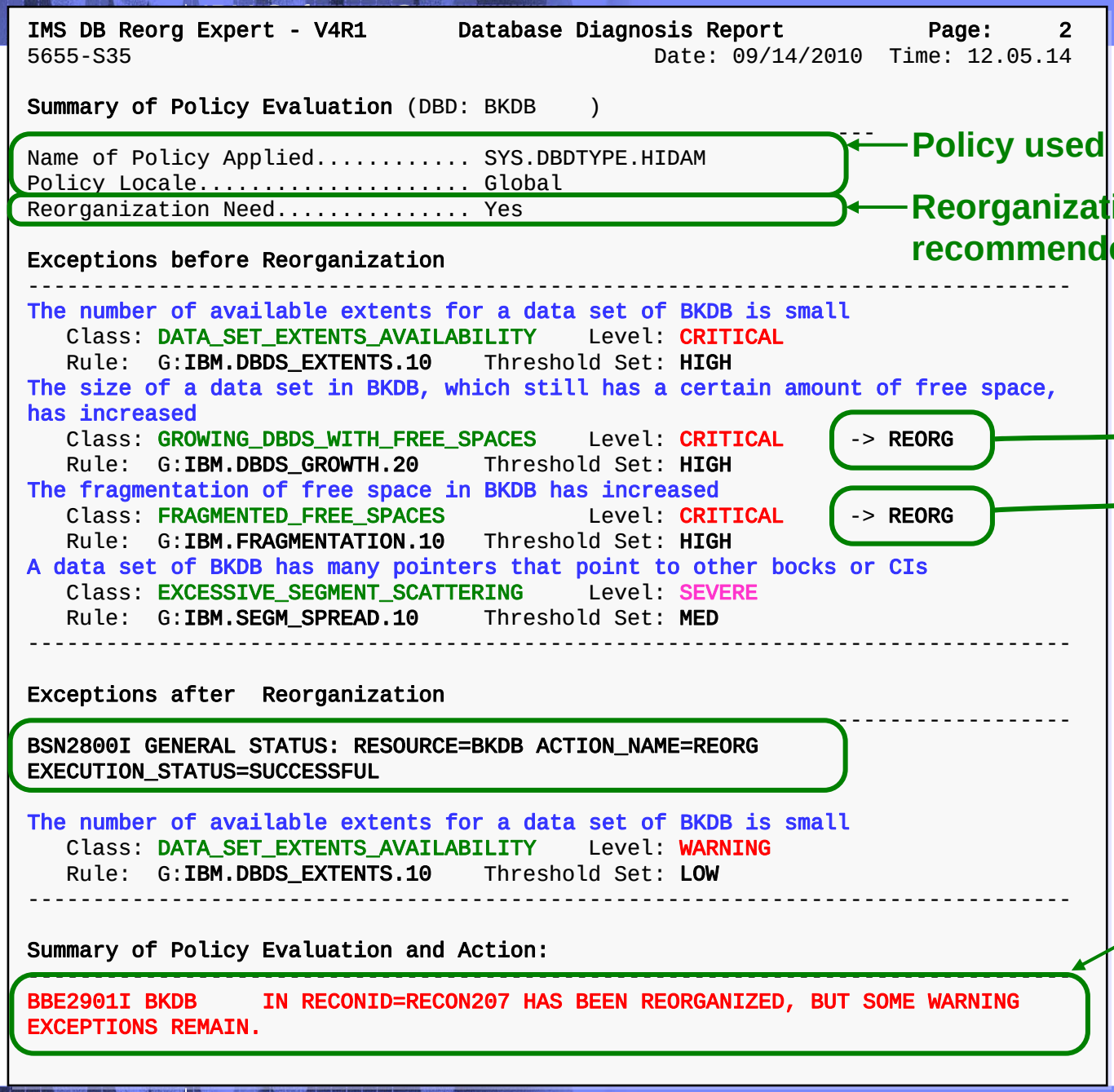
- **Step 1 & 2:** Same as those in Conditional Reorganization Mode
- **Step 3:** A Diagnosis Report of the evaluation is stored in the Output Repository and existence of an exception can be notified
- **Step 4:** The Diagnosis Report is reviewed by DBA and actions are determined. Or, the notification is used to control succeeding batch jobs or jobsteps.



Using Smart Reorg Utility – Exception reporting by Diagnosis Report

Information provided by Diagnosis Report

- **Summary of Policy Evaluation**
  - Policy that was applied to the database
  - Reorganization need
  - Result of policy evaluation
  - Result of policy evaluation after reorganization
    - if reorganization was performed
  - An evaluation summary message
- **Sensor data values before and after reorganization**
  - And their differences



IMS DB Reorg Expert - V4R1 Database Diagnosis Report Page: 6
5655-S35 Date: 09/14/2010 Time: 12.05.14

Data Set Statistics (DBD: BKDB , DSG: 01)

IMS Space Utilization Statistics

Note: The mark * in column P means that the data element is used in the policy.

Data Element Name	P	Before Reorg	After Reorg	Difference
DB_BYTES_SEG		2,465,800,000	2,465,800,000	0
DB_BYTES_FREE_SPACE		**1,610,723,680**	**283,136,678**	**-1,327,587,002**
DB_BYTES_UNIDENTIFIED	*	110	0	-110
DB_PCT_BYTES_FREE_SPACE	*	**39%**	**10%**	**-29**
DB_PCT_BYTES_SEG	*	**60%**	**89%**	**+29**
DB_PCT_UNUSED_BYTES	*	1%	1%	0
DB_NUM_SEG		85,620,000	85,620,000	0
DB_NUM_VLSEG		8,560,000	8,560,000	0
DB_NUM_VLSEG_SPLIT	*	0	0	0
DB_PCT_NUM_VLSEG_SPLIT	*	0%	0%	0
DB_NUM_UNIDENTIFIED	*	51	0	-51
DB_AVG_NUM_UNIDENTIFIED	*	0	0	0
DB_NUM_FSE	*	23,728,638	673,759	-23,054,879
DB_AVG_NUM_FSE	*	**23.75**	**1.00**	**-22.75**
DB_NUM_FSE_MIN	*	23,558,660	673,759	-22,884,901
DB_NUM_FSE_MAX	*	718,662	673,759	-44,903
DB_AVG_NUM_NOREUSE_FSE	*	.17	0	-.17
DB_NUM_PTR		85,070,408	84,946,241	-124,167
DB_NUM_PTR_DIFF_BLK	*	32,424,879	663,666	-31,761,213
DB_PCT_NUM_PTR_DIFF_BLK	*	**38%**	**1%**	**-37**

Using Smart Reorg Utility – A Simple Sample JCL

Three types of policy selection

- **By database type**
  - This is the default.
  - IBM-provided SYS.DBDTYPE.*type* policies is selected
- **By database name**
  - This is intended to be used to specify a database specific policy
- **By policy name**
  - This is intended to be used to specify a same policy for a group of databases

```
//CREORG EXEC PGM=HPSGMAIN,PARM='DBD=SAMPLEDB,DBRC=Y'
//STEPLIB  DD DISP=SHR,DSN=IMSTOOL.LOADLIB
//         DD DISP=SHR,DSN=IMS.SDFSRESL
//         DD DISP=SHR,DSN=USER.PGMLIB
//IMSDALIB DD DISP=SHR,DSN=IMS.MDALIB
//IMS      DD DISP=SHR,DSN=IMS.DBDLIB
//HPSIN    DD *
(REORG)
  CONDREORG=YES,DYAGONLY
  ITKBSRVR=FPQSVR00
  SPACEALLOC=YES
  NAMESWAP=YES
(CONDREORG)
  POLICYBY=DBTYPE
/*
```

Specifies Diagnosis Mode

Specifies XCF Group Name for ITKB Server to connect

Specifies how a policy is to be selected

Policy to be selected

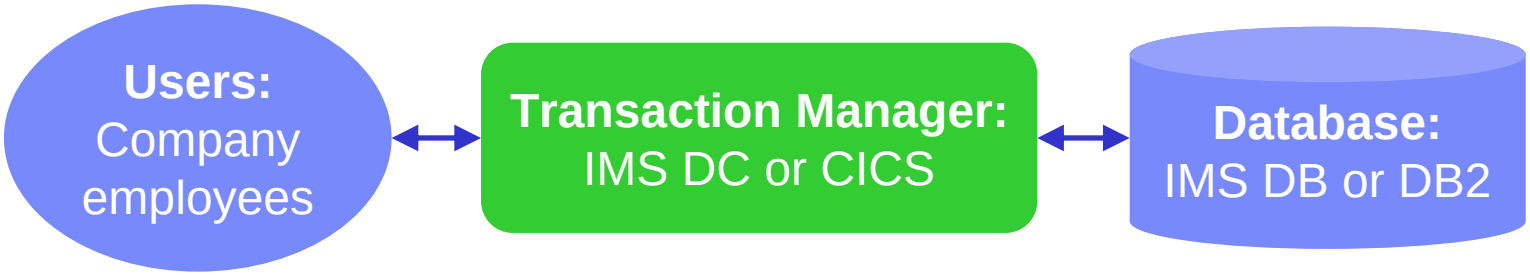
`POLICYBY=DBTYPE`	`SYS.DBDTYPE.`*`type`* (*type* = HDAM, HIDAM, PHDAM, PHIDAM, HISAM, or SHISAM)
`POLICYBY=DBDNAME`	`SYS.DBDNAME.`*`dbdname`*
`POLICYBY=NAME` `POLICYNM=MY.POLICY.GROUP1`	`MY.POLICY.GROUP1`

Introducing IBM Transaction Analysis Workbench for z/OS

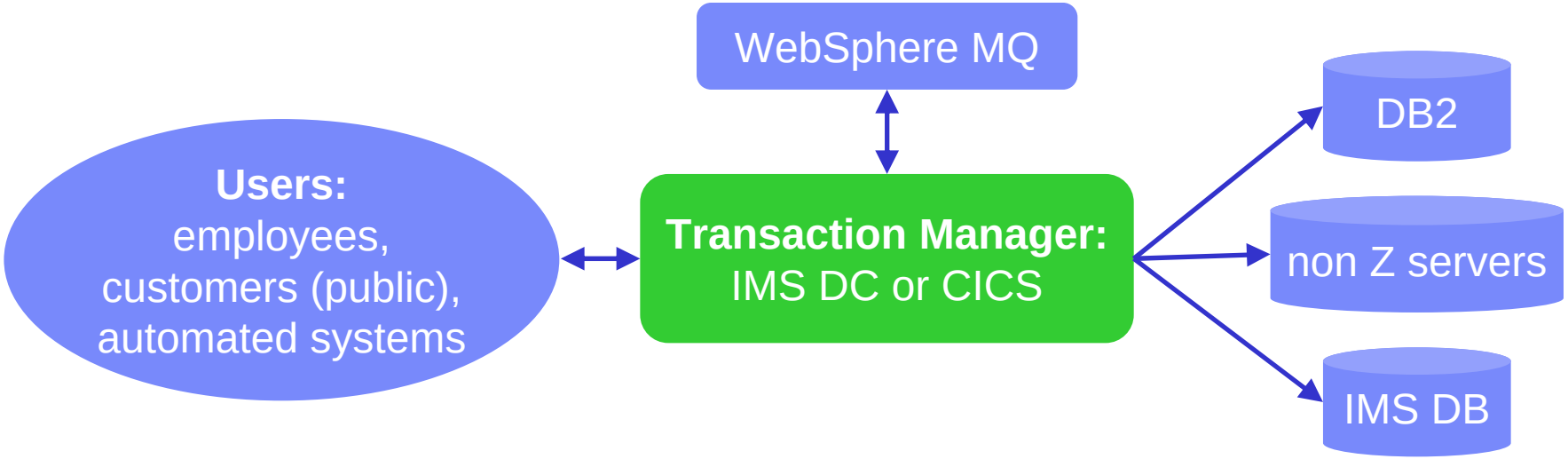
Silicon Valley Lab, San Jose, CA

It's all about evolution

1980: in-house users only; simple data, single data store

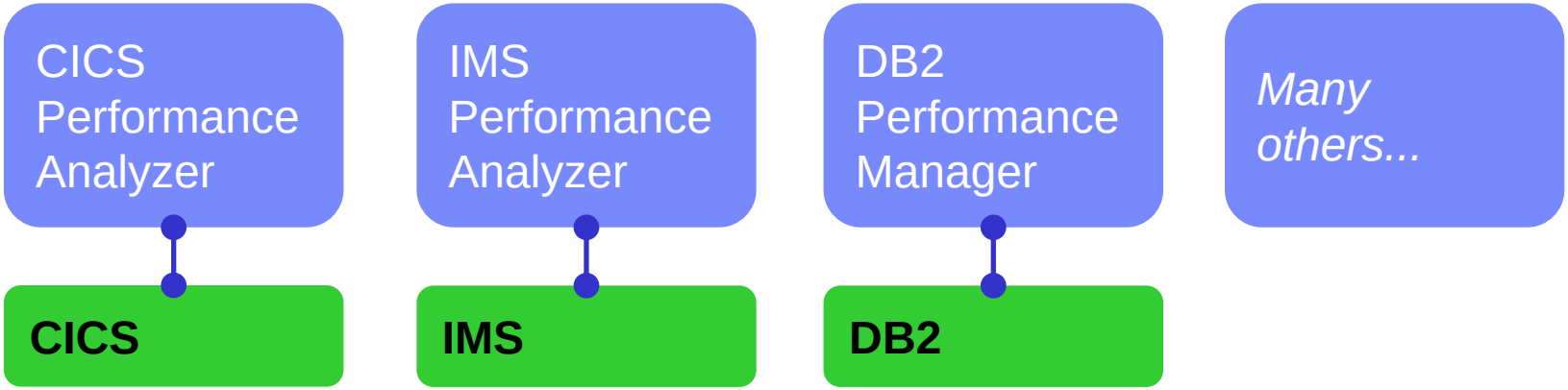


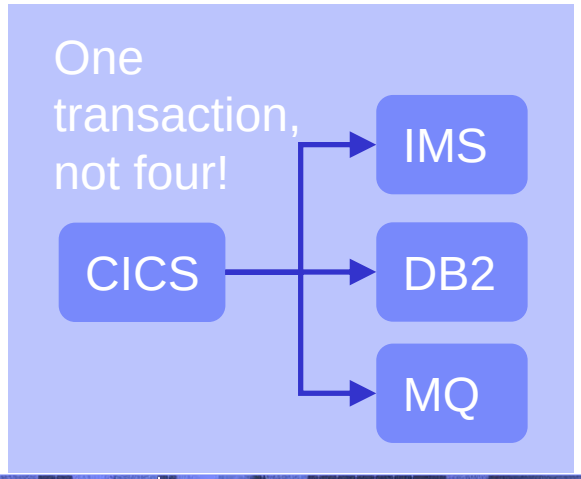
2011: users are customers; data is complex, often distributed

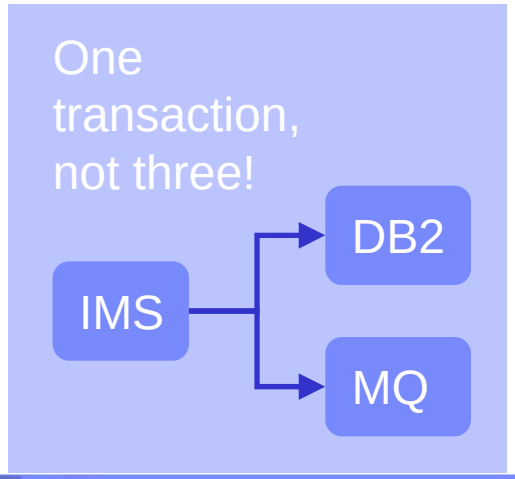


Analysis tools have not kept pace

There are many tools to help analyze *individual* transaction environments on System z:







Each tool is well-suited to its environment, but you often need a subject matter expert to use each tool

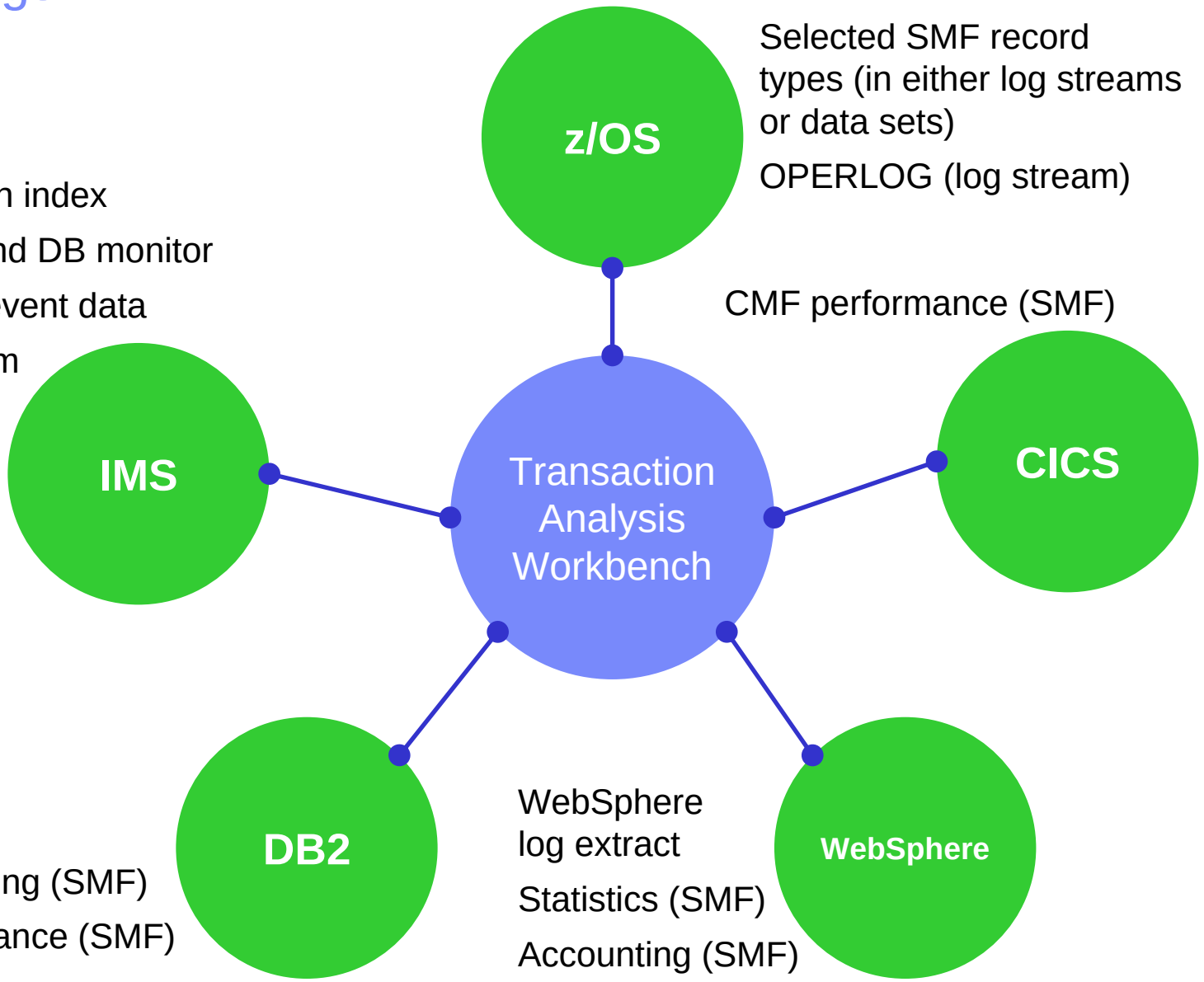
Product overview

- A transaction analysis framework for System z
  - Not transaction manager specific
  - Leverages current IBM tools for transaction analysis
- Not IMS or CICS specific, but first release provides more synergy with the existing tools for those transaction managers
- Automates collection of data needed for problem analysis
- Provides a session manager to manage problem analysis through its lifecycle
- In this presentation, it might look like the Workbench is IMS or CICS centric but that is not the case
  - The tools for IMS and CICS are the first to be engaged

Product goals

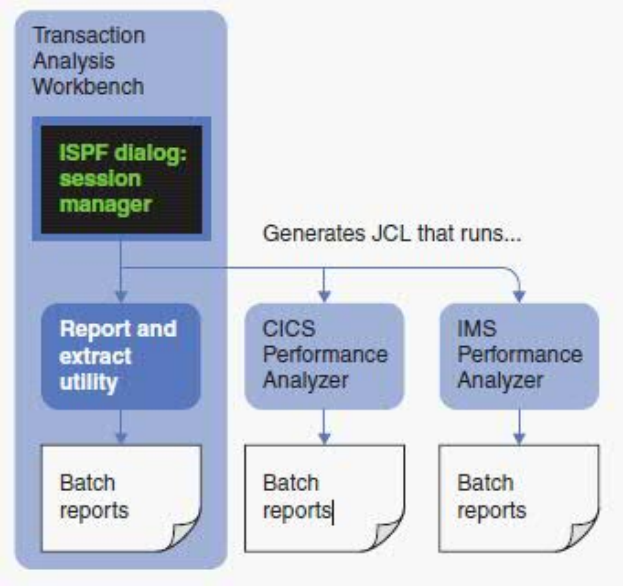
- Enable higher productivity by lower skilled staff, reduce problem analysis time, and serve as a training tool for new support staff
- Allow the “first responder” to determine the most likely source of the problem so that the right subject matter expert can work on the problem
- Allow for “deep dive” problem determination via synergy with other IBM tools
  - Subject-matter experts may also use tools not supported by the Workbench

Supported logs



Session manager (ISPF dialog)

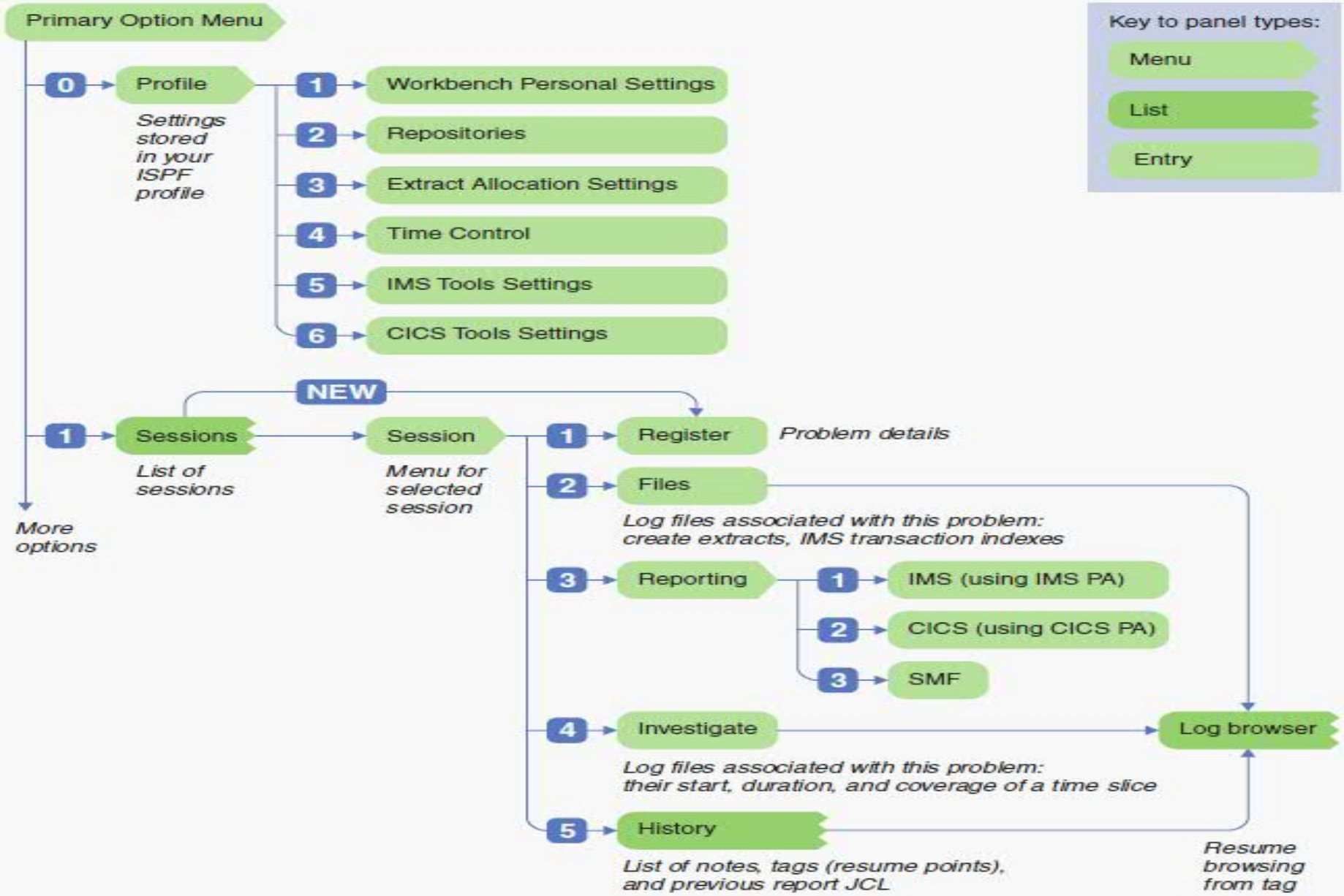
- Session manager approach to problem management: helps you to control the lifecycle of a problem
  - Register the problem
  - Locate the files required to diagnose the problem: IMS, DB2, CICS, SMF, OPERLOG etc.
  - Use PI-style interactive analysis to look at related logs and other subsystem events via SMF, OPERLOG etc.
  - Resume from where you left off, or from a previous save-point
  - Run reports that are specific to the problem
  - Write reminder notes and information as you go
  - Re-assign the problem to subject-matter expert

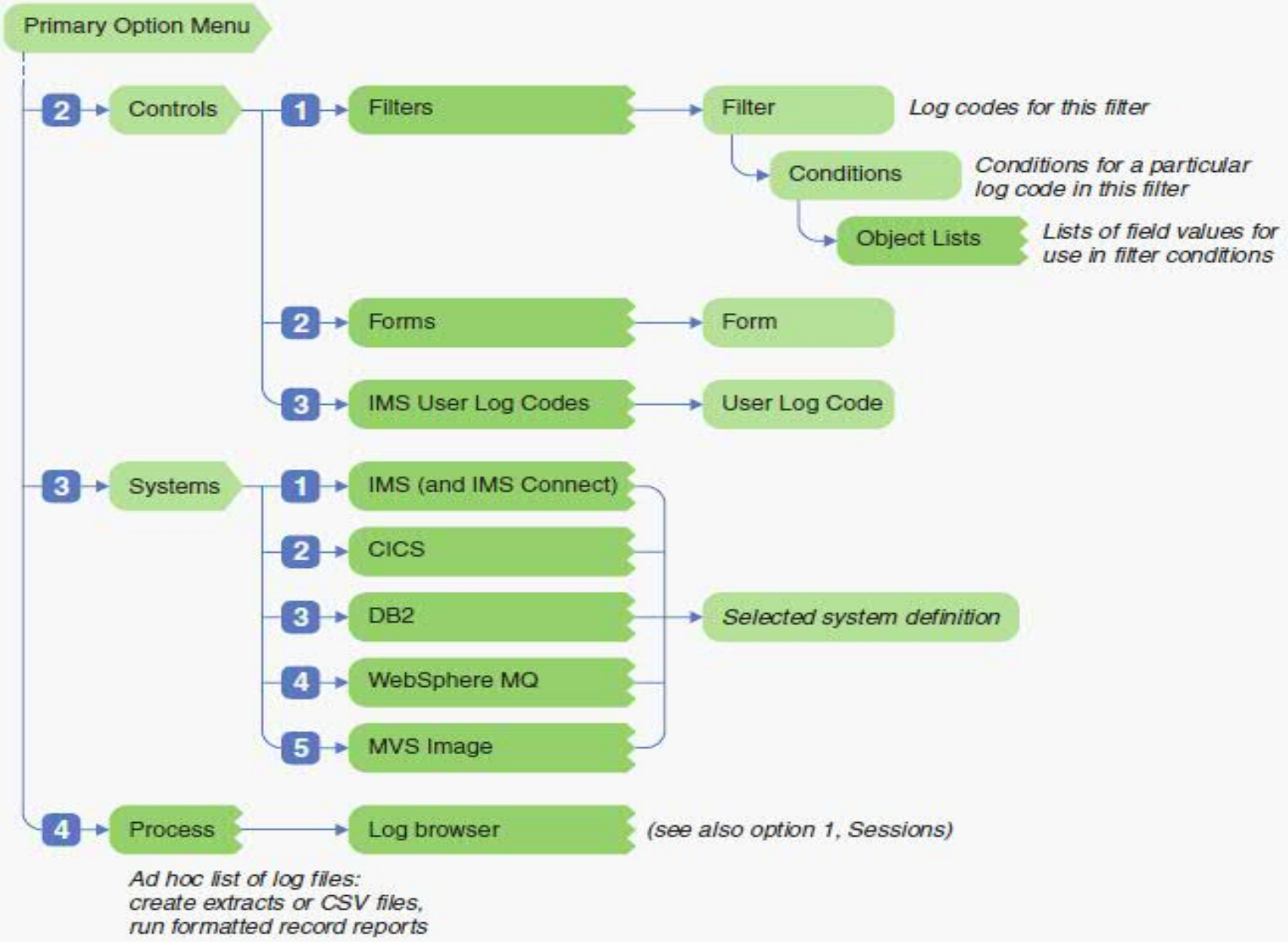


Scenario 1: CICS DBCTL problem

- On the following slides, we present an example scenario: a user has reported an abend in a CICS transaction
- The analysis is divided into two parts:

1. The **first responder** registers the problem in the Workbench session manager, and runs some preliminary batch reports to attempt to identify the cause of the problem
2. The **specialist** performs a “deep dive” on the problem: reviewing the reports, and using interactive analysis to identify the specific log records for the cause of the problem





CICS DBCTL problem: creating a session

```
   File  Help
V1R1M0          Transaction Analysis Workbench - Primary Option Menu
Option ===> 1

0 Profile      Customize your dialog profile
1 Sessions     Analyze problems using the session manager
2 Controls     Define record filtering and formatting controls
3 Systems      Define the systems where transactions are processed
4 Process      Analyze ad-hoc log files
X Exit         Quit the workbench

Session Repository  . . . FUW.SESSIONS                                +
```

CICS DBCTL problem: creating a session

```
  File  Help
─────────────────────────────────────────────────────────────────────────────
                                Session Manager          Row 1 of 3  More: < >
Command ===> new                                          Scroll ===> PAGE

Select a session or use the NEW command to register a new session.

/  Key       Status  Description
_  00000001  OPEN    CICS DB2
_  00000002  OPEN    CICS DBCTL
_  00000003  OPEN    IMS DB2
****************************** Bottom of data ********************************
```

CICS DBCTL problem: creating a session

```
  File  Help
------------------------------------------------------------------------------
                               Problem Details                 Row 1 to 3 of 3
Command ===> ________________________________________________ Scroll ===> PAGE

Key  . . . . . : 00000042
Summary  . . . . CICS DBCTL deadlock_____________  Description...
Severity . . . . _
Reference  . . . ____________   -- When problem occurred ---
Reported by  . . ____________        YYYY-MM-DD  HH.MM.SS.TH
Assigned to  . . ____________   From 2011-04-06  08.40.00.00
Status . . . . . OPEN__         To   2011-04-06  09.00.00.00  Zone . . LOCAL

Systems where problem occurred (maximum of 32):

/  System +   Type +
__ FUWTCIC_   CICS____
__ IBB1____   IMS_____
__ FTS1____   IMAGE___
******************************* Bottom of data ********************************
```

CICS DBCTL problem: defining IMS system

```
  File  Menu  Help
--------------------------------------------------------------------------------
                               IMS Subsystem                         More: < >
Command ===> _________________________________________________________________

IMS Subsystem definition:
 IMS Subsystem ID . . . . IBB1  IMS Version (VRM) . . . 111  +
 Description . . . . . . . ____________________________________
 RESLIB Data Set . . . . . 'IMS.V11.SDFSRESL'______________________________
------------------------------------------------------------------------------
Specify required view . . 1  1. DBRC Settings    4. Groups
                             2. Log Files        5. OMEGAMON TRF Files
                             3. Monitor Files    6. OMEGAMON ATF Journals
------------------------------------------------------------------------------
Specify DBRC Settings for automated log file selection:
                                                                More:     +
DBRC Subsystem ID . . . ________  (Specify RSENAME for XRF)
DBRC IMSplex name . . . _____     (RECON Loss Notification)
DBRC Sharing Group ID . ___       (Parallel RECON Access)
RECON Data Set 1  . . . 'IBB1.VB10.RECON1'______________________________
               2  . . . 'IBB1.VB10.RECON2'______________________________
               3  . . . 'IBB1.VB10.RECON3'______________________________
MDA Data Set  . . . . . ______________________________________________
```

CICS DBCTL problem: adding log files

```
  File  Help
 ──────────────────────────────────────────────────────────────────────────────
                          Locate and Manage Log Files          Row 1 to 2 of 2
Command ===> ____________________________________________________ Scroll ===> PAGE

Select an option to add log files to the session then press Enter
2  1. Manually specify the log files required for analysis
   2. Run automated file selection to locate the required log files

Automated File Selection:          ── Locate Files Interval ──
  System . . . IBB1     +                 YYYY-MM-DD  HH.MM.SS.TH
  Type . . . . IMS      +          From   2011-04-06  08.40.00.00
                                   To     2011-04-06  09.00.00.00

Log Files:
                                                    ─── System ─── File
/        Data Set Name                              Name     Type    Type
_______  FUNDID.SMF.D110406.DEADLOK.FULL            FTS1     IMAGE   SMF
_______  OPERLOG:SYSPLEX.OPERLOG                    FTS1     IMAGE   OPERLOG
****************************** Bottom of data ********************************
```

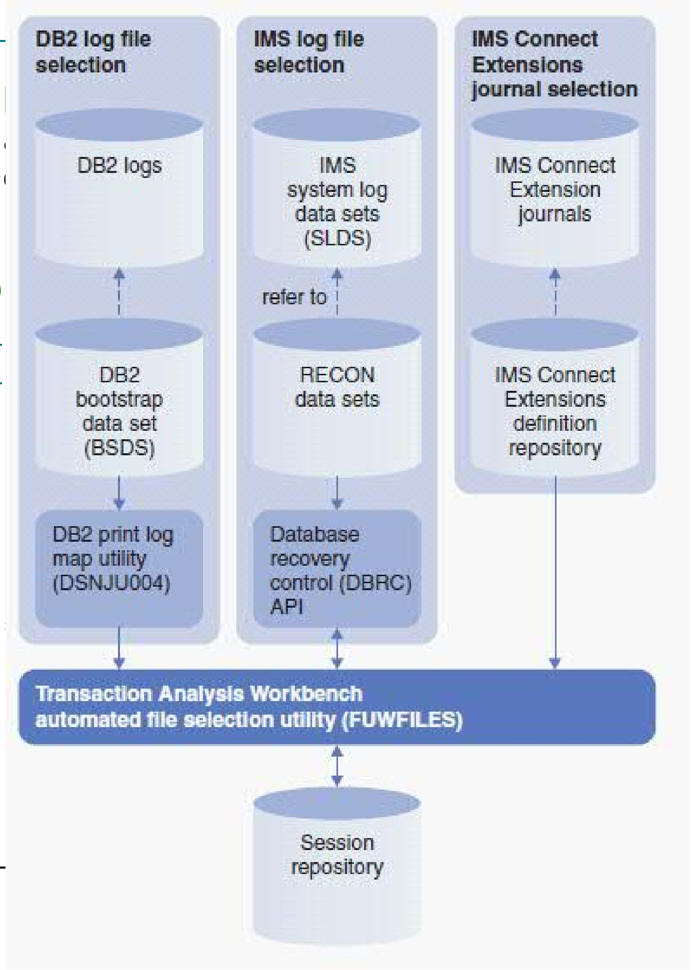
CICS DBCTL problem: automated file selection

```
  File  Help
-------------------------------------------------------------------------------
                         Locate and Manage Log Files               Row 1 to 3 of 3
Command ===> ____________________________________________

Select an option to add log files to the session t
_   1. Manually specify the log files required for
    2. Run automated file selection to locate the r

Automated File Selection:                 — Locate Files
  System . . . ________  +                    YYYY-MM-DD
  Type . . . . ________  +                From 2011-04-06
                                          To   2011-04-06
Log Files:

/        Data Set Name
________ FUNDID.SMF.D110406.DEADLOK.FULL
________ OPERLOG:SYSPLEX.OPERLOG
________ IBB1.SLDSP.IBB1.D11096.T0841415.V15
******************************* Bottom of data ***
```



CICS DBCTL problem: batch reporting

```
  File  Help
──────────────────────────────────────────────────────────────────────────
                                Reporting
Option ===> ____________________________________________________________

Select a reporting option then press Enter.

1  IMS       Transaction and system analysis using IMS PA
2  CICS      Transaction and system analysis using CICS PA
3  SMF       z/OS and subsystem analysis
4  OPERLOG   Sysplex operations log (SYSLOG)
```

CICS DBCTL problem: CICS PA reporting

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                    Reporting - CICS Transaction Analysis
Command ===> ____________________________________________________________

                                          ──── Report Interval ────
Type of analysis:                              YYYY-MM-DD  HH.MM.SS.TH
/  Individual transaction detail          From 2011-04-06  08.40.00.00
/  Transaction statistical summary        To   2011-04-06  09.00.00.00
/  Transaction suspend time breakdown

Focus of transaction analysis:
/  Response time and CPU usage
/  VSAM files
/  Virtual storage
/  DB2
/  IMS DBCTL

Select the CICS system to report against, or specify an SMF file:
2  1. System . . . ________  +
   2. SMF File . . 'FUNDID.SMF.D110406.DEADLOK.FULL'            +
```

CICS DBCTL problem: CICS PA reporting

```
                                                        CICS Performance Analyzer
                                                  Transaction details: Response time and
LIST0001 Printed at 16:55:17  4/11/2011    Data from 08:39:21  4/06/2011

Start          APPLID   Tran SC Term Userid   RSID Program    TaskNo Response Dispatch
Time                                                             Time     Time
08:43:19.3169 FUWTCIC  DBEU TO UW2B FUW2         TWM$UPD        150   7.3433    .0066
08:43:34.0141 FUWTCIC  DBEU TO UW2B FUW2         TWM$UPD        152   7.3112    .0065
08:47:22.0636 FUWTCIC  TWMU TO UW1B FUW1         TWM$UPD        170  14.0675    .0368
08:47:14.7397 FUWTCIC  DBEU TO UW2B FUW2         TWM$UPD        168  22.5172    .0082
08:47:36.1434 FUWTCIC  TWMU TO UW1B FUW1         TWM$UPD        171  14.9865    .0360
```

CICS Performance Analyzer report on transaction details.

Note – CICS task number 170 is the transaction that meets the criteria reported for the abend. .

```
! CPU


User CPU  Suspend DispWait  FC Wait ABcu
    Time      Time     Time     Time
   .0053    7.3367    .0006    .0000
   .0055    7.3047    .0008    .0000
   .0265   14.0308    .0031    .0000 ADCD
   .0061   22.5090    .0293    .0000
   .0271   14.9505    .0036    .0000 DE40
```

CICS DBCTL problem: IMS PA reporting

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                Reporting - IMS Transaction and System Analysis
Command ===> ____________________________________________________________

Type of analysis:                              ──── Report Interval ────
/  Individual transaction detail                    YYYY-MM-DD  HH.MM.SS.TH
/  Transaction statistical summary           From 2011-04-06  08.40.00.00
/  IMS system resources                      To   2011-04-06  09.00.00.00
/  Deadlock analysis

Focus of transaction analysis:
/  Response time breakdown and CPU usage
/  DLI calls
/  Fast Path database and buffers
_  Subsystem usage
/  CICS DBCTL

Select the IMS system to report against, or specify an IMS log file:
2  1. System . . . ____  +
   2. Log File . . 'IBB1.SLDSP.IBB1.D11096.T0841415.V15'        +
```

CICS DBCTL problem: IMS PA reporting

```
                                                    IMS Performance Analyzer
                                                  Tran detail: Response & CPU
LIST0001 Printed at 11:41:35 12Apr2011     Data from 08.41.45 06Apr2011

CICS                  CICS          IMS Tran                 DB Call     FP Call      CPU
APPLID   Trancode    TaskNo Program  Start            PST       Count       Count     Time
FUWTCIC  DBEU          150 DFHTWM04 08.43.19.317952   2          35          20 0.004429
FUWTCIC  DBEU          152 DFHTWM04 08.43.34.015461   2          35          20 0.004786
FUWTCIC  TWMU          170 DFHTWM04 08.47.22.064699   2          27          10 0.003550
FUWTCIC  DBEU          168 DFHTWM04 08.47.14.741096   1          35          20 0.004993
FUWTCIC  TWMU          171 DFHTWM04 08.47.36.145544   2          31          11 0.004575
```

IMS V11 has the improved instrumentation required to connect CICS and IMS events, and IMS PA now supports this (see APAR PM24076): the IMS PA reports show the CICS transaction name and task number.

```
 Process    Total IO     DB IO ABEND
    Time       Count      Time Code
7.340751           4 0.002947
7.308276           5 0.004377
13.98985           5 0.004129 U0777
22.51250           4 0.003052
14.97864           5 0.004057
```

CICS DBCTL problem: interactive investigation

```
  File  Menu  Time Slicing  Help
──────────────────────────────────────────────────────────────────────────────
                              Investigate                  Row 1 of 3 More: < >
Command ===> ____________________________________________  Scroll ===> PAGE

                ──────────────── Time Slice (ON) ─────────────────
                Time              Date            Duration
                HH.MM.SS.thmiju   YYYY-MM-DD      HH.MM.SS  Zone   Filter +
                08.41.41.519325   2011-04-06      00.14.19  LOCAL  ________
 /
 S ________   Type  Data Set Name                                  Coverage
 ________     SMF   FUNDID.SMF.D110406.DEADLOK.FULL               COMPLETE
 ________     IMS   IBB1.SLDSP.IBB1.D11096.T0841415.V15           COMPLETE
 ________     MVS   OPERLOG:SYSPLEX.OPERLOG                      COMPLETE
****************************** Bottom of data ********************************
```

CICS DBCTL problem: interactive investigation

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00000059 More: < >
Command ===> filter                                   Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
__ 50   Database Update Database=DI21PART Region=0002          08.41.41.519325
__ 50   Database Update Database=DI21PART Region=0002          08.41.41.519601
__ 50   Database Update Database=DI21PART Region=0002          08.41.41.519659
__ 43   Log Data Set Control                                  08.41.41.567359
__ 42   Log Buffer Control                                   08.41.41.567362
__ CA52 DFS3257I ONLINE LOG NOW SWITCHED - FROM DFSOLP00 TO DF 08.41.41.567883
__ CA52 DFS3257I ONLINE LOG NOW SWITCHED - FROM DFSOLS00 TO DF 08.41.41.569543
__ CA52 HTRT03I JCP1FUW  VERIFY0              00     69        08.41.41.649266
__ CA52 HTRT03I JCP1FUW  DELC0                00     30        08.41.41.802076
__ CA52 $HASP100 JCP1FUW  ON INTRDR      FUW Testing           08.41.41.997997
__ CA52 HTRT03I JCP1FUW  VERIFYS              00     53        08.41.42.040191
__ CA52 IRR010I  USERID JCP1     IS ASSIGNED TO THIS JOB.      08.41.42.139646
__ CA52 HTRT03I JCP1FUW  DELCS                00     36        08.41.42.203048
__ 5C   File System Activity                                   08.41.42.250000
__ CA52 HTRT03I JCP1FUW  DELETES              00     34        08.41.42.356674
__ CA52 $HASP100 IBB1#ARC ON INTRDR      IMSDBC                08.41.42.552139
__ CA52 IRR010I  USERID STC@IMS  IS ASSIGNED TO THIS JOB.      08.41.42.569636
```

CICS DBCTL problem: filtering records

```
   File  Menu  View  Help
 ------------------------------------------------------------------------------
 VIEW                           Filter                      Row 1 of 1 More: < >
 Command ===> ______________________________________________ Scroll ===> PAGE

 Specify filtering criteria then press EXIT (F3) to apply the filter.

 Filter  . . . . . ________  +
 Description . . . New Log Record Filter____________   _  Activate Tracking

 / Log Code + Exc Description
 S CMF  6E13          CICS Transaction
                      Level ___  Conditions ___  Form ________ + REXX ________
 ------------------------------------------------------------------------------
 ****************************** Bottom of data ********************************
```

CICS DBCTL problem: filtering records

```
   File  Menu  Edit  Object Lists  Help
 ------------------------------------------------------------------------------
                                  Conditions                       Row 1 to 1 of 1
 Command ===> ______________________________________________  Scroll ===> PAGE

 Code: 6E13 CICS Transaction

 /  Field Name +                              Oper Value +
 _  ABEND_________________________________    NE__ ' '___________________________________
 ******************************* Bottom of data ********************************
```

CICS DBCTL problem: viewing a CMF record

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00008199 More: < >
Command ===> _____________________________________________ Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ---------------
s  6E13 CICS Transaction TranCode=TWMU Task=170 Abend=ADCD     08.47.22.063694
__ 6E13 CICS Transaction TranCode=TWMU Task=171 Abend=DE40     08.47.36.143484
__ 6E13 CICS Transaction TranCode=TWMU Task=173 Abend=DE40     08.47.51.142989
__ 6E13 CICS Transaction TranCode=TWMU Task=174 Abend=DE40     08.48.06.140979
__ 6E13 CICS Transaction TranCode=DBEU Task=181 Abend=ADCD     08.48.42.298937
__ 6E13 CICS Transaction TranCode=DBEU Task=183 Abend=ADCD     08.48.56.165539
__ 6E13 CICS Transaction TranCode=TWMU Task=185 Abend=DE40     08.49.10.328848
__ 6E13 CICS Transaction TranCode=DBEU Task=188 Abend=ADCD     08.49.29.735139
__ 6E13 CICS Transaction TranCode=DBEU Task=189 Abend=ADCD     08.49.41.183492
__ 6E13 CICS Transaction TranCode=DBEU Task=193 Abend=ADCD     08.50.03.586072
__ 6E13 CICS Transaction TranCode=TWMU Task=201 Abend=DE40     08.50.56.233561
__ 6E13 CICS Transaction TranCode=DBEU Task=200 Abend=ADCD     08.50.50.772178
__ 6E13 CICS Transaction TranCode=TWMU Task=223 Abend=ADCD     08.55.31.495953
******************************** Bottom of Data ********************************
```

CICS DBCTL problem: viewing a CMF record

```
BROWSE     FUNDID.SMF.D110406.DEADLOK.FULL       Record 00000006 Line 00000000
Command ===> ____________________________________________________ Scroll ===> PAGE
Form    ===> CMF      +  /  Use Form in Filter                    Format ===> FORM
******************************** Top of data ********************************
+0005  Code... 6E13  CICS Transaction
+0366  STCK... C79458194C1A7D60      LSN.... 0000000000000006
       Date... 2011-04-06 Wednesday  Time... 08.39.14.241959.835

+0005  SMFRTY..... 6E          SMFSID..... 'FTS3'     SMFMNPRN... 'FUWTCIC '

+0352  DFHTASK.... Task Control
+0352  Tran....... 'TWMU'      SC......... 'TO..'
+09E2  Dispatch... 0.006213/55                         UserCPU.... 0.005241/55
+09FA  Suspend.... 7.032136/55                         TaskNo..... +113
+0396  NETName.... 'FTS3.VAPFUW1B.......'   NETUOWID... 9458194C25C60001
+0A06  DispWait... 0.001080/54
+0C0A  RMIElap.... 0.020270/43 RMISusp.... 0.018037/39 ExtWait.... 0
+0C5E  CICSWait... 0           ICDelay.... 7.013661/7  GiveUpWt... 0
+03EA  RRMSURID... 00000000    RRMSWait... 0           DSCHMDLY... 0
+0AEA  QRModDly... 0.001080/54                         MaxOTDly... 0
+0A1E  QRCPU..... 0.005241/55                          MSDisp..... 0

       DFHCICS.... CICS task information
+0366  Start...... C79458194C1A7D60
+036E  Stop....... C794582002735C60                    Response... 7.038349
+035A  Userid..... 'FUW1    '  ExcWait.... 0           RTyp....... '   T'
+03B2  RSID....... 00000000    RecCount... +1
+03C2  SrvClass... 'TRANLO  '  RptClass... 'RCICS   '  EICTotCt... +28
```

CICS DBCTL problem: viewing a CMF record

```
        DFHDATA.... Data processing
+0916   IMSReqs.... +37          IMSWait.... 0.018037/39
+091A   DB2Reqs.... +0           DB2ThdWt... 0           DB2ConWt... 0
+0CFA   DB2SQLWt... 0           WMQReqs.... +0          WMQGetWt... 0
+0DAE   WMQSRBtm... 0

        DFHRMI..... Resource Manager (RMI)
+0DBA   RMITotal... 0.020270/43
+0DC6   RMIOthr.... 0.000011/2  RMIDB2..... 0           RMIDBCTL... 0.008084
+0DEA   RMIEXDLI... 0.012174/40                         RMIMQ...... 0
+0E02   RMICPSM.... 0           RMITCPIP... 0

        DBCTL...... IMS DBCTL
+0E1A   PSBName.... 'DFHTWM04'  PoolWait... 0           IntCWait... 0
+0E32   SchTElap... 0.000149    DBIOElap... 0.005186    PILockEl... 0
+0E4A   DBIOCall... +5          GUcall..... +0          GNcall..... +0
+0E56   GNPcall.... +0          GHUcall.... +14         GHNcall.... +0
+0E62   GHNPcall... +0          ISRTcall... +7          DLETcall... +7
+0E6E   REPLcall... +7          DLIcalls... +35         TestENQs... +0
+0E7A   TestENQW... +0          TestDEQs... +0          UpdtENQs... +0
+0E86   UpdtENQW... +0          UpdtDEQs... +0          ExclENQs... +0
+0E92   ExclENQW... +0          ExclDEQs... +0          DEDBcall... +15
+0EAC   DEDBRdOp... +3          OvflBfrU... +0          UOWConts... +0
+0EB4   DEDBBfrW... +0          USSN....... 0000002B    ThredCPU... 000000B9
+0E9A   SchedSta... C79458194C57AD22        SchedEnd... C79458194C60F902
******************************** End of data ********************************
```

CICS DBCTL problem: transaction tracking

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00008199 More: < >
Command ===> _____________________________________________ Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ---------------
tx 6E13 CICS Transaction TranCode=TWMU Task=170 Abend=ADCD     08.47.22.063694
__ 6E13 CICS Transaction TranCode=TWMU Task=171 Abend=DE40     08.47.36.143484
__ 6E13 CICS Transaction TranCode=TWMU Task=173 Abend=DE40     08.47.51.142989
__ 6E13 CICS Transaction TranCode=TWMU Task=174 Abend=DE40     08.48.06.140979
__ 6E13 CICS Transaction TranCode=DBEU Task=181 Abend=ADCD     08.48.42.298937
__ 6E13 CICS Transaction TranCode=DBEU Task=183 Abend=ADCD     08.48.56.165539
__ 6E13 CICS Transaction TranCode=TWMU Task=185 Abend=DE40     08.49.10.328848
__ 6E13 CICS Transaction TranCode=DBEU Task=188 Abend=ADCD     08.49.29.735139
__ 6E13 CICS Transaction TranCode=DBEU Task=189 Abend=ADCD     08.49.41.183492
__ 6E13 CICS Transaction TranCode=DBEU Task=193 Abend=ADCD     08.50.03.586072
__ 6E13 CICS Transaction TranCode=TWMU Task=201 Abend=DE40     08.50.56.233561
__ 6E13 CICS Transaction TranCode=DBEU Task=200 Abend=ADCD     08.50.50.772178
__ 6E13 CICS Transaction TranCode=TWMU Task=223 Abend=ADCD     08.55.31.495953
******************************** Bottom of Data ********************************
```

CICS DBCTL problem: transaction tracking

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00007007 More: < >
Command ===> _____________________________________________ Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
__ 08   Application Start TranCode=TWMU Program=DFHTWM04        08.47.22.064705
__ 5607 Start of UOR Program=DFHTWM04 Region=0002               08.47.22.064706
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066178
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066466
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066498
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066649
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066690
__ CA52 HTRT03I JCP1FUW  REXEXPF              00    220         08.47.22.231829
__ CA52 HTRT03I JCP1FUW  UPDATE0              00     53         08.47.22.367418
__ CA52 HTRT03I JCP1FUW  DELETE0              00     36         08.47.22.515830
__ CA52 IEF404I JCP1FUW - ENDED - TIME=08.47.22                 08.47.22.519622
__ CA52 *=======================================================08.47.22.522669
__ CA52 |STEP# | STEPNAME | PROCSTEP | CONDCODE | CPUSECS | NU 08.47.22.525021
__ CA52 |=======================================================08.47.22.526151
__ CA52 |00001 | ALCMAST0 |          |   0000   |    0.03 |    08.47.22.527595
__ CA52 |00002 | FUWBAT   |          |   0000   |    0.04 |    08.47.22.528589
__ CA52 |00003 | REXEXM0  |          |   0000   |    0.12 |    08.47.22.530020
```

CICS DBCTL problem: identifying the specific problem

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00007297 More: < >
Command ===> _____________________________________________ Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday LSN
/  ---- ------------------------------------------------------ ----------------
s  67FF Exception Condition SNAP - DEADLOCK                     2-00000000000F0B
   38   Release Input Message after Application ABEND          2-00000000000F2F
   5938 FP SYNC Fail-Application Program or Pseudo ABEND       2-00000000000F30
   50   Database Update Database=DI21PART Region=0002          2-00000000000F31
   50   Database Update Database=DI21PART Region=0002          2-00000000000F32
   50   Database Update Database=DI21PART Region=0002          2-00000000000F33
   50   Database Update Database=DI21PART Region=0002          2-00000000000F34
   50   Database Update Database=DI21PART Region=0002          2-00000000000F35
   50   Database Update Database=DI21PART Region=0002          2-00000000000F36
   50   Database Update Database=DI21PART Region=0002          2-00000000000F37
   50   Database Update Database=DI21PART Region=0002          2-00000000000F38
   50   Database Update Database=DI21PART Region=0002          2-00000000000F39
   50   Database Update Database=DI21PART Region=0002          2-00000000000F3A
   50   Database Update Database=DI21PART Region=0002          2-00000000000F3B
   50   Database Update Database=DI21PART Region=0002          2-00000000000F3C
   50   Database Update Database=DI21PART Region=0002          2-00000000000F3D
   50   Database Update Database=DI21PART Region=0002          2-00000000000F3E
```

CICS DBCTL problem: identifying the affected segment

```
  File  Menu  Format  Help
-------------------------------------------------------------------------------
BROWSE     FUNDID.SMF.D110406.DEADLOK.FULL +     Record 00002368 Line 00000032
Command ===> ____________________________________________________ Scroll ===> CSR
Form    ===>          +     Use Form in Filter                    Format ===> STD
+0080  DIPWAITR... Waiter Entry
+0080  DIPWOWU.... 00AABBB71BBB7060
+0088  DIPWRWU.... 00AABBB71BBB7060
+0090  DIPWDBMS... 'IBB1    '  DIPWWRTH... 5C          DIPWFUNC... 02
+009A  DIPWSTAT... 06          DIPWFROM... 00          DIPWDURA... 00
+009D  DIPWCLS.... 00          DIPWFLG.... 0B

+00A0  DLKDLD..... IRLM supplied UserData
+00A0  DLKDJOB.... 'FUWTCIC '  DLKDSTEP... 'FUWTCIC '
+00B0  DLKDPSB.... 'DFHTWM04'  DLKDPCBN... 'DI21PART'
+00C0  DLKDBNM.... 'DI21PART'  DLKLRPRM... 30400378    DLKLRIPM... 30400358
+00D0  DLKDCALL... 01          DLKDFLG1... 80          DLKDFLG2... 00
+00D4  DLKDMBTY... 09          DLKDRTYP... 02          DLKDPSTN... 0001
+00D8  DLKDSTCK... 9459EC803E0A41                      DLKDKYLN... +16
+00E0  DLKDKEY.... Key of Data Base record
      +0000  F0F2F9F2 F5F3F6F3 60F1F3F6 40404040   *02925363-136     *

+01E0  DIPENTRY... Deadlock Information Parameter List Entry
+01E0  DIPFLAG2... C0
```

CICS DBCTL problem: tagging a specific log record

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00007297 More: < >
Command ===> _____________________________________________ Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
g_ 67FF Exception Condition SNAP - DEADLOCK                    08.47.36.016740
        UTC=08.47.36.016343 Region=0002
        Winner: IMS=IBB1 Job/Tran=FUWTCIC  PST=0001 PSB=DFHTWM04 DMB=DI21PART
        Victim: IMS=IBB1 Job/Tran=FUWTCIC  PST=0002 PSB=DFHTWM04 DMB=DI21PART
   -------------------------------------------------------------------------
__ 38   Release Input Message after Application ABEND          08.47.36.019855
        Region=0002 RecToken=FUWTCIC/C79459EA853EFB03
   -------------------------------------------------------------------------
__ 5938 FP SYNC Fail-Application Program or Pseudo ABEND       08.47.36.030531
        UTC=08.47.36.030522 Program=DFHTWM04 Region=0002
        OrgUOWID=IBB1/C79459F7D7136603 RecToken=FUWTCIC/C79459EA853EFB03
        RegTyp=DBC DBCall=10 DBGet=4 DBUpd=6 DBWait=0
   -------------------------------------------------------------------------
__ 50   Database Update                                        08.47.36.047752
        UTC=08.33.00.631046 Program=DFHTWM04 Database=DI21PART RBA=00008B5E
        Region=0002 RecToken=FUWTCIC/C79459EA853EFB03
   -------------------------------------------------------------------------
```

CICS DBCTL problem: tagging a specific log record

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00007297 More: < >
Command ===> _____________________________________________ Scroll ===> CSR
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 > 2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
__ TAG  Cause of abend in CICS DBCTL transaction          08.47.36.016740
__ 67FF Exception Condition SNAP - DEADLOCK               08.47.36.016740
__ 38   Release Input Message after Application ABEND     08.47.36.019855
__ 5938 FP SYNC Fail-Application Program or Pseudo ABEND  08.47.36.030531
__ 50   Database Update                                   08.47.36.047752
.
.
.
__ CA52 DFS968I  DBD=DI21PART WITHIN PSB=DFHTWM04 SUCCESSFULLY 08.47.51.053525
__ CA52 DFS980I BACKOUT PROCESSING HAS ENDED FOR DFHTWM04 IBB1 08.47.51.056589
```

- The cause of the CICS transaction problem has been narrowed down to a deadlock in IMS
- Sufficient information about the two applications involved can now be passed on to the application developers

SMF reports

- System events or constraints can affect transaction processing
- Workbench provides reports for selected SMF record types, specifically aimed at identifying performance-related issues

System-related:

- SMF 30: Address Space activity; including CICS, IMS, DB2
- RMF 70-1: CPU usage
- RMF 76: Page data sets
- RMF 78-2: Virtual Storage
- SMF 64: VSAM data set I/O

Subsystem-related:

- SMF 33-2: APPC conversations
- SMF 88-1: System Logger
- SMF 101: DB2 accounting
- SMF 116: WebSphere MQ

Where are we going from here?

Feedback from the recent IMS Tools CAC

- “Would rather have automation take care of monitoring the databases.”
- The amount of work continues to grow but not the number of skilled DBAs. Automation will help.“
- “Having the repository will replace tedious tasks for generating many reports and maintaining in-house written procedures.”
- "reduce the amount of time spent on monitoring database environment."
- “Front end improvements would attract younger technicians and benefit all. The ability to have both GUI and mainframe normal access would be good.”
- “Must be able to access information quickly and easily in an easy-to-read format.
- “Simplify user interface, especially the initial setup/configuration, share this info between tools so each tool does not require its own unique setup.”

For more information on IMS Tools products

- Visit following web pages:
  - **IMS Database Reorganization Expert for z/OS**
    ibm.com/software/data/db2imstools/imstools/ims-reorganization-expert/
  - **IMS Database Solution Pack for z/OS**
    ibm.com/software/data/db2imstools/imstools/ims-database-solution-pack/
  - **IMS Tools Base for z/OS (IMS Tools KB, Policy Services, etc.)**
    ibm.com/software/data/db2imstools/imstools/ims-base-solution-pack/
  - **IBM Transaction Analysis Workbench for z/OS**
    http://www-01.ibm.com/software/data/db2imstools/imstools/trans-analysis
- Visit also:
  - **IBM IMS Tools Portal**
    ibm.com/software/data/db2imstools/products/ims-tools.html

Any Question?

Additional TAW information

Scenario 2: IMS DB2 problem

- On the following slides, we present another example scenario: a user has reported a long transaction response time for an IMS transaction performing DB2 updates

IMS DB2 problem: creating a session

```
  File  Help
------------------------------------------------------------------------------
                               Problem Details                  Row 1 to 2 of 2
Command ===> ________________________________________________ Scroll ===> PAGE

Key  . . . . . . : 00000007
Summary  . . . . . IMS DB2 example____________________  Description...
Severity . . . . . 3
Reference  . . . . Example____   -- When problem occurred ---
Reported by  . . . TWM________         YYYY-MM-DD  HH.MM.SS.TH
Assigned to  . . . SEC________   From 2010-06-24  15.20.00.00
Status . . . . . . OPEN__        To   2010-06-24  16.50.00.00  Zone . . LOCAL

Systems where problem occurred (maximum of 32):

/  System +   Type +
__ IADG____   IMS_____
__ DB3A____   DB2_____
******************************* Bottom of data ********************************
```

IMS DB2 problem: adding log files

```
  File  Help
 ──────────────────────────────────────────────────────────────────────────────
                          Locate and Manage Log Files          Row 1 to 2 of 2
Command ===> ____________________________________________________ Scroll ===> PAGE

Select an option to add log files to the session then press Enter
_  1. Manually specify the log files required for analysis
   2. Run automated file selection to locate the required log files

Automated File Selection:          ── Locate Files Interval ──
  System . . . ________  +              YYYY-MM-DD  HH.MM.SS.TH
  Type . . . . ________  +         From 2010-06-24  15.20.00.00
                                   To   2010-06-24  16.50.00.00
Log Files:
                                                    ─── System ─── File
/        Data Set Name                              Name     Type    Type
x        IADG.SLDSP.IADG.D10175.T1624488.V25        IADG     IMS     LOG
         DSNDB0A.DB3A.ARCLG1.A0000037               DB3A     DB2     LOG
****************************** Bottom of data ********************************
```

IMS DB2 problem: creating an IMS transaction index

```
  File  Help
---------------------------------------------------------------------------
                            Extract Request
Command ===> ____________________________________________________________

Select an option then press Enter
2  1. Extract records from the log file using filtering criteria
   2. Create a transaction index (IMS log files only)

Extract records from : IADG.SLDSP.IADG.D10175.T1624488.V25
Extract Data Set . . . IMPOT00.SESSION7.TRANIX_______________________

Filtering Criteria:                  ---- Extract Interval ----
 Filter . . . ________  +                 YYYY-MM-DD  HH.MM.SS.TH
                                     From __________  ___________
                                     To   __________  ___________
```

IMS DB2 problem: creating an IMS transaction index

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                          Locate and Manage Log Files          Row 1 to 3 of 3
Command ===> ____________________________________________________ Scroll ===> PAGE

Select an option to add log files to the session then press Enter
_   1. Manually specify the log files required for analysis
    2. Run automated file selection to locate the required log files

Automated File Selection:          ── Locate Files Interval ──
  System . . . _________  +              YYYY-MM-DD  HH.MM.SS.TH
  Type . . . . _________  +         From 2010-06-24  15.20.00.00
                                   To   2010-06-24  16.50.00.00

Log Files:
                                                      ─── System ─── File
/        Data Set Name                                Name     Type    Type
_________ IMPOT00.SESSION7.TRANIX                     IADG     IMS     EXTRACT
_________ IADG.SLDSP.IADG.D10175.T1624488.V25         IADG     IMS     LOG
_________ DSNDB0A.DB3A.ARCLG1.A0000037                DB3A     DB2     LOG
****************************** Bottom of data ********************************
```

IMS DB2 problem: defining a time slice

```
  File  Menu  Time Slicing  Help
--------------------------------------------------------------------------------
                              Investigate                 Row 1 of 3 More: < >
Command ===> ________________________________________________ Scroll ===> PAGE

                ______________ Time Slice (ON) ________________
                Time             Date              Duration
                HH.MM.SS.thmiju  YYYY-MM-DD        HH.MM.SS  Zone    Filter +
                16.25.44.803974  2010-06-24        00.05.00  LOCAL   ________
/
________  Type  Data Set Name                                        Coverage
t_______  IMS   IMPOT00.SESSION7.TRANIX                              COMPLETE
________  IMS   IADG.SLDSP.IADG.D10175.T1624488.V25                  COMPLETE
________  DB2   DSNDB0A.DB3A.ARCLG1.A0000037                         COMPLETE
******************************* Bottom of data ********************************
```

IMS DB2 problem: interactive investigation

```
   File  Menu  Time Slicing  Help
 ------------------------------------------------------------------------------
                                Investigate                  Row 1 of 3 More: < >
 Command ===> ______________________________________________ Scroll ===> PAGE

                ------------- Time Slice (ON) ---------------
                Time            Date            Duration
                HH.MM.SS.thmiju YYYY-MM-DD      HH.MM.SS  Zone    Filter +
                16.25.44.803974 2010-06-24      00.09.12  LOCAL   ________
 /
 s_______  Type  Data Set Name                                    Coverage
 ________  IMS   IMPOT00.SESSION7.TRANIX                          COMPLETE
 ________  IMS   IADG.SLDSP.IADG.D10175.T1624488.V25              COMPLETE
 ________  DB2   DSNDB0A.DB3A.ARCLG1.A0000037                     COMPLETE
 ****************************** Bottom of data ******************************
```

IMS DB2 problem: interactive investigation

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    IMPOT00.SESSION7.TRANIX +                  Record 00000709 More: < >
Command ===> filter                                        Scroll ===> PAGE
   Slice . . Duration  00.09.12     Date  2010-06-24     Time  16.25.44.803974
   Code Description  <                 >  2010-06-24 Thursday  Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
__ CA01 Transaction                                          16.25.44.803974
        UTC=16.25.44.803961 TranCode=IVTNV Program=DFSIVP2 Userid=FUNTRM15
        LTerm=FUNTRM15 Terminal=SC0TCP15 Region=0004
        OrgUOWID=IADG/C62D2AF55962ED21 IMSID=IADG IMSRel=101
        RecToken=IADG/0000003000000000
        CPU=0.002527 InputQ=0.000647 Process=0.008113 OutputQ=0.179880
        TotalTm=0.188640 RegTyp=MPP DBCalls=1
   -------------------------------------------------------------------------
__ 01   Input Message                                        16.25.44.803974
        UTC=16.25.44.803961 TranCode=IVTNV Userid=FUNTRM15 LTerm=FUNTRM15
        Terminal=SC0TCP15 OrgUOWID=IADG/C62D2AF55962ED21
   -------------------------------------------------------------------------
__ 35   Input Message Enqueue                               16.25.44.804006
        UTC=16.25.44.803961 TranCode=IVTNV OrgUOWID=IADG/C62D2AF55962ED21
   -------------------------------------------------------------------------
__ 08   Application Start                                    16.25.44.804569
        UTC=16.25.44.804563 TranCode=IVTNV Region=0004
```

IMS DB2 problem: defining a filter

```
  File  Menu  View  Help
VIEW                            Filter                        Row 1 of 1 More: < >
Command ===> ______________________________________________ Scroll ===> PAGE

Specify filtering criteria then press EXIT (F3) to apply the filter.

Filter  . . . . . ________  +
Description . . . New Log Record Filter _______________  _  Activate Tracking

/ Log Code + Exc Description
s IMS CA01       Transaction
                 Level  1__  Conditions No_  Form ________ + REXX ________
------------------------------------------------------------------------------
******************************* Bottom of data ********************************
```

IMS DB2 problem: defining a filter

```
  File  Menu  View  Help
-------------------------------------------------------------------------------
VIEW                              Filter                    Row 1 of 1 More: < >
Command ===> _____________________________________________  Scroll ===> PAGE

Specify filtering criteria then press EXIT (F3) to apply the filter.

Filter  . . . . . ________  +
Description . . . New Log Record Filter_____  _  Activate Tracking

/ Log Code + Exc Description
s IMS CA01       Transaction
                 Level  1   Conditions  No   Form  ________ + REXX  ________
-------------------------------------------------------------------------------
****************************** Bottom of data ********************************
```

IMS DB2 problem: defining a filter

```
   File  Menu  Edit  Object Lists  Help
 ------------------------------------------------------------------------------
                                  Conditions                     Row 1 to 1 of 1
 Command ===> ______________________________________________   Scroll ===> PAGE

 Code: CA01 Transaction

 /  Field Name +                          Oper Value +
 _  PROCESS______________________________ GT__ 0.4_____________________________
 ******************************* Bottom of data ********************************
```

IMS DB2 problem: interactive investigation

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    IMPOT00.SESSION7.TRANIX +                  Record 00001602 More: < >
Command ===> _____________________________________________ Scroll ===> PAGE
   Slice . . Duration  00.09.12     Date  2010-06-24     Time  16.25.44.803974
   Code Description  < _____________ >  2010-06-24 Thursday  Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
tx CA01 Transaction                                          16.33.18.743854
        UTC=16.33.18.743821 TranCode=MQATREQ1 Program=MQATPGM Userid=FUNTRM15
        LTerm=FUNTRM15 Terminal=SC0TCP15 Region=0001
        OrgUOWID=IADG/C62D2CA6428BBD20 IMSID=IADG IMSRel=101
        RecToken=IADG/0000003400000000
        CPU=0.026647 InputQ=0.004280 Process=0.468912
        TotalTm=0.473192 RegTyp=MPP DBCalls=5
   -------------------------------------------------------------------------
__ CA01 Transaction                                          16.33.26.293611
        UTC=16.33.26.293602 TranCode=MQATREQ1 Program=MQATPGM Userid=FUNTRM15
        LTerm=FUNTRM15 Terminal=SC0TCP15 Region=0001
        OrgUOWID=IADG/C62D2CAD75C30D80 IMSID=IADG IMSRel=101
        RecToken=IADG/0000003500000000
        CPU=0.032212 InputQ=0.000553 Process=0.407164
        TotalTm=0.407717 RegTyp=MPP DBCalls=5
   -------------------------------------------------------------------------
__ CA01 Transaction                                          16.33.33.575325
```

IMS DB2 problem: transaction tracking

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    IMPOT00.SESSION7.TRANIX +                  Record 00001602 More: < >
Command ===> _____________________________________________ Scroll ===> PAGE
   Slice . . Duration  00.09.12     Date  2010-06-24     Time  16.25.44.803974
   Code Description  < _____________ >  2010-06-24 Thursday  Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
r  CA01 Transaction TranCode=MQATREQ1 Region=0001                16.33.18.743854
__ 01   Input Message TranCode=MQATREQ1                          16.33.18.743854
__ 35   Input Message Enqueue TranCode=MQATREQ1                  16.33.18.743882
__ 08   Application Start TranCode=MQATREQ1 Region=0001          16.33.18.748065
__ 5607 Start of UOR Program=MQATPGM Region=0001                 16.33.18.748065
__ 31   DLI GU TranCode=MQATREQ1 Region=0001                     16.33.18.748105
__ 5616 Start of protected UOW Region=0001                       16.33.18.748315
__ 5E   SB Handler requests Image Capture Region=0001            16.33.18.756898
__ 5E   SB Handler requests Image Capture Region=0001            16.33.18.756902
__ 50   Database Update Database=DI21PART Region=0001            16.33.18.757190
__ 50   Database Update Database=DI21PART Region=0001            16.33.18.757311
__ 50   Database Update Database=DI21PART Region=0001            16.33.18.757342
__ 50   Database Update Database=DI21PART Region=0001            16.33.18.757500
__ 50   Database Update Database=DI21PART Region=0001            16.33.18.757572
__ 5600 Sign-on to ESAF Region=0001 SSID=DB3A                    16.33.18.759842
__ 5600 Thread created for ESAF SSID=DB3A                        16.33.18.759872
__ 0020 DB2 Unit of Recovery Control - Begin UR                  16.33.18.766720
```

IMS DB2 problem: tracking (with relative elapsed time)

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    IMPOT00.SESSION7.TRANIX +                  Record 00001624 More: < >
Command ===> _____________________________________________ Scroll ===> PAGE
   Slice . . Duration  00.09.12     Date  2010-06-24     Time  16.25.44.803974
   Code Description  < _____________ >  2010-06-24 Thursday  Time (Relative)
/  ---- ------------------------------------------------------ ---------------
__ 0020 DB2 Update In-Place in a Data Page                          +0.022881
__ 0010 DB2 Savepoint                                              +0.023553
__ 0020 DB2 Delete from a Data Page                                 +0.023777
__ 0020 DB2 Insert into a Data Page                                 +0.024337
__ 5600 Sign-on to ESAF Region=0001 SSID=CSQ6                       +0.067829
__ 5600 Thread created for ESAF SSID=CSQ6                           +0.067859
__ 5600 Commit Prepare starting Region=0001 SSID=CSQ6               +0.455190
__ 0020 DB2 Unit of Recovery Control - End Commit Phase 1           +0.458449
__ 03   Output Message Response LTerm=FUNTRM15                      +0.462229
__ 35   Output Message Enqueue LTerm=FUNTRM15 Region=0001           +0.462252
__ 37   Syncpoint Region=0001                                       +0.462278
__ 37   Syncpoint message transfer Region=0001                      +0.462306
__ 33   Free Message                                               +0.462336
__ 31   Communications GU LTerm=FUNTRM15                           +0.462428
__ 36   Output Message Dequeue LTerm=FUNTRM15                      +0.467221
__ 33   Free Message                                               +0.467238
__ 5600 Commit Continue completed Region=0001 SSID=CSQ6             +0.469041
```

IMS DB2 problem: LUWID

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    IMPOT00.SESSION7.TRANIX +                          String found
Command ===> ____________________________________________ Scroll ===> PAGE
   Slice . . Duration  00.09.12     Date  2010-06-24     Time  16.25.44.803974
   Code Description  < _____________ > 2010-06-24 Thursday  Time (Relative)
/  ---- ------------------------------------------------- ----------------
__ 0020 DB2 Unit of Recovery Control - Begin UR                  +0.022865
        Userid=FUNTRM15 IMSID=IADG
        LUWID=FTS3/DB3ALU/C62D2CA64681/0001 URID=00002A400AD5
   ---------------------------------------------------------------------------
__ 0020 DB2 Update In-Place in a Data Page                       +0.022881
        DBID=0105 PSID=0002 URID=00002A400AD5
   ---------------------------------------------------------------------------
__ 0010 DB2 Savepoint                                           +0.023553
        URID=00002A400AD5
   ---------------------------------------------------------------------------
__ 0020 DB2 Delete from a Data Page                             +0.023777
        DBID=0105 PSID=0002 URID=00002A400AD5
   ---------------------------------------------------------------------------
__ 0020 DB2 Insert into a Data Page                             +0.024337
        DBID=0105 PSID=0002 URID=00002A400AD5
   ---------------------------------------------------------------------------
__ 5600 Sign-on to ESAF                                         +0.067829
```

DB2 expert can now use the DB2 Log Analysis Tool to investigate the associated DB2 table updates; based on the transaction's URID

Scenario 2: The end

- The cause of the IMS transaction problem has been narrowed down to a slowdown in DB2
- Sufficient information about the DB2 update activity has been collected and can be passed on to the DB2 DBA for further investigation

SMF reports

- System events or constraints can affect transaction processing
- Workbench provides reports for selected SMF record types, specifically aimed at identifying performance-related issues

System-related:

- SMF 30: Address Space activity; including CICS, IMS, DB2
- RMF 70-1: CPU usage
- RMF 76: Page data sets
- RMF 78-2: Virtual Storage
- SMF 64: VSAM data set I/O

Subsystem-related:

- SMF 33-2: APPC conversations
- SMF 88-1: System Logger
- SMF 101: DB2 accounting
- SMF 116: WebSphere MQ

SMF 30: Address Space Activity report

----------Interval----------			System			---------- CPU ----------		
Start Date/Time	Duration	Type	Name	Jobname	Comp	TCB	SRB	%CPU
2011-03-04 15:37:01	00:01	STE	MVS1	IMSCTL1	0004	0.445357	0.023205	15.1
2011-03-04 15:37:01	00:01	STT	MVS1	IMSCTL2	0004	0.445357	0.023205	15.0
2011-03-04 15:37:06	00:01	STE	MVS1	IMSCTL3	0004	0.404175	0.011985	19.3
2011-03-04 15:37:06	00:01	STT	MVS1	IMSCTL4	0004	0.404175	0.011985	19.2
2011-03-04 15:43:24	00:01	STE	MVS1	IMSCTL5	0004	0.904357	0.046920	18.9
2011-03-04 15:43:24	00:01	STT	MVS1	IMSVTL6	0004	0.904357	0.046920	18.9
2011-03-04 15:44:05	00:01	INT	MVS2	CICSPR1	0000	7.966200	0.241357	15.2
2011-03-04 15:44:58	00:01	INT	MVS2	CICSPR2	0000	0.141780	0.004335	11.2

At regular intervals, every address space can be monitored for unusual spikes (or lulls) in system-related resource consumption including CPU and I/O.

EXCPs	----Storage-----			-Paging/Sec-		
/Sec	<16M	>16M	64bit	In	Out	Swap
477	1M	11M	0M	0	0	0
476	1M	11M	0M	0	0	0
309	1M	11M	0M	0	0	0
309	1M	11M	0M	0	0	0
590	1M	11M	0M	0	0	0
589	1M	11M	0M	0	0	0
140	4M	1366M	0M	0	0	0
100	0M	12M	0M	0	0	0

SMF 33-2: APPC/MVS Conversation List report

```
                  Local                  Partner
Start Time        LU Name    Direction   UserId       Job Name   SyncLvl

18:16:47.624543   MVSLU02    Outbound                 TWM#RBAT   Syncpt
                  ** Partner ** TPname=IADGEXP_PROFILE

18:16:47.796620   IADGAPPC   Inbound                  IADGMPPA   Syncpt
                  *** Local *** TPname=IADGEXP_PROFILE
```

APPC requests processed on z/OS are logged to SMF. These requests may end up being processed by an IMS or CICS transaction.

A breakdown of processing inside MVS can identify bottlenecks and other performance related issues.

```
----------- Time -----------  ------ Bytes ------
  InputQ    Process     Total  Received       Sent

            .324737   .324737        68         83


 .166232    .154551   .320783        83         68
```

SMF 64: VSAM Data Set report

Close Date Time	Data set name	--Splits-- CA	CI	Ext
2011-02-02 16:00:01	FUNDIP.OME.FTS1MVS.RKM2EDS3.DATA	5	17	1
2011-02-02 16:00:01	FUNDIP.OME.FTS1MVS.RKM2EDS3.INDEX	0	5	1
2011-02-02 16:00:01	FUNDIP.OME.FTS1MVS.RKM2EDS3.DATA	5	18	1
2011-02-02 16:00:01	FUNDIP.OME.FTS1MVS.RKM2EDS3.INDEX	0	5	1
2011-02-02 16:00:32	FUNDIP.OME.FTS1MVS.RKM2EDS3.DATA	5	19	1
2011-02-02 16:00:32	FUNDIP.OME.FTS1MVS.RKM2EDS3.INDEX	0	5	1
2011-02-02 16:00:55	FUNDIP.ANF.QUEUE.DATA	0	0	1
2011-02-02 16:00:55	FUNDIP.ANF.QUEUE.INDEX	0	0	1

VSAM data sets are commonly used as databases in IMS and CICS.

As these data sets are re-opened (or extend), information about their I/O activity and general health (splits) is available.

	-------Calls-------				-RLS Activity-		
EXCPs	Get	Upd	Del	Ins	LSR	CF	DASD
3322	13	1	0	1314	0	0	0
1796	0	259	0	0	0	0	0
3378	13	1	0	1340	0	0	0
1850	0	261	0	0	0	0	0
3436	13	1	0	1353	0	0	0
1902	0	275	0	0	0	0	0
3754685	23K	8658	4353	1602	0	0	0
3739616	13	0	0	0	0	0	0

SMF 70-1: RMF Processor Activity report

- Interval Start -- Date	Time	System Name	- %CPU Busy - LPAR	MVS	IO Rate
2010-08-17	23:45:00	FTS1	68.75	87.42	2282.4
		FTS2	4.07	4.50	9.4
		FTS3	4.03	4.39	12.6
2010-08-18	00:00:00	FTS1	61.15	72.16	1934.8
		FTS2	4.15	4.72	8.4
		FTS3	3.88	4.41	11.7

CPU constraints are one of the most common causes of a slowdown in performance, and often has flow-on effects including contention.

CPU Busy and ***IO Rate*** are the classical system performance indicators.

Look for spikes that might indicate a slowdown.

---------- Number of Address Spaces ----------							
---- In ---		-In Ready-		-Out Ready-		-Out Wait-	
Avg	Max	Avg	Max	Avg	Max	Avg	Max
151	156	7	86	0	1	0	0
77	80	1	15	0	0	0	0
69	72	1	9	0	0	0	0

Out Ready identifies the number of address spaces waiting for dispatching on the CPU

SMF 75: RMF Page Data Set Activity report

Date: 2010-08-17 Time: 23:45:00 SID: FTS1

Page Type	Slots Used Alloc	Slots Used Min	Slots Used Max	Slots Used Avg	% Full	Bad Slots	In Use	Trans Time	Number I/O Req	Pages Xferd	VIO
PLPA	44999	20078	20078	20078	45%	0	0	0	0	0	
Common	89999	3129	3129	3129	3%	0	0	0	0	0	
Local	1080K	101K	101K	101K	9%	0	0	0	10	10	Y
Local	1080K	102K	102K	102K	9%	0	0	0	10	10	Y
Local	1080K	103K	103K	103K	10%	0	0	0	6	6	Y
Local	1080K	109K	109K	109K	10%	0	0	0	13	13	Y

With the advent of large amounts of cheaper memory, Page data set performance is often less of a problem today, but none the less should be monitored occasionally for constraints.

Data Set Name

FUNDI1.FTS1.PAGE.PLPA
FUNDI1.FTS1.PAGE.COMMON
FUNDI1.FTS1.PAGE.LOCAL1
FUNDI1.FTS1.PAGE.LOCAL2
FUNDI1.FTS1.PAGE.LOCAL3
FUNDI1.FTS1.PAGE.LOCAL4

SMF 78-2: RMF Virtual Storage Activity report

- Interval Start -- Date	Time	System Name	Type	Size	Usage ---------- Min Time	Max Time
2010-06-13	23:45:00	FTS1	CSA	3364K	612K 23:44:59.60	612K 23:44:59.60
			ECSA	384M	131M 23:44:59.60	131M 23:48:49.24
			SQA	1744K	444K 23:44:59.60	444K 23:44:59.60
			ESQA	47772K	22120K 23:47:19.06	22212K 23:44:59.60
		FTS2	CSA	3364K	376K 23:44:59.60	376K 23:44:59.60

IMS and CICS still use large amounts of CSA and ECSA for common storage. In the event that storage cannot be obtained, subsystems can stop or worse.

---------- Avg	Pct
612K	18.2
131M	34.1
444K	25.5
22177K	46.4
376K	11.2

SMF 79-15: IRLM Long Lock Detection report

Time	Cycle Number	Entry Type	IMS ID	Trancode	PSBname	PST	Reg Typ	Duration	Max Locks
08:51:47.440	25853771	Wait	ISA2	CI1CSAC3	PCM0F0	49		11.534336	0
08:51:47.440	25853771	Block	ISA3	CI1ESAE1	PCM0F0	127		111.149056	44
08:54:36.250	25854107	Wait	ISA3	CI1ESAE5	PCM0F0	102		11.534336	0
08:54:36.250	25854107	Block	ISA4	CI1FSAF3	PCM0F0	40		98.566144	44
15:25:31.580	25900783	Wait	ISA1	CI1ASAA2	PRE0F0	90		11.534336	26
15:25:31.580	25900783	Block	ISA1	CI1ASAA1	PSA0F0	60		11.534336	2

IMS database locks that are held by transactions for an extended period (several seconds) are logged to SMF; and can be analyzed to determine if there is an application problem.

Recovery Token	Resource	CICS Task
CI1CSAC3/C5BF632F08B62783	HNMTRM01	00088603
CI1ESAE1/C5BF62D0456F8085		00036462
CI1ESAE5/C5BF63D077B36503	HNMTRM01	00088040
CI1FSAF3/C5BF637DEF1A2001		00032398
CI1ASAA2/C5BFBB316C472003	SHSECN08	00013029
CI1ASAA1/C5BFBB3166E1F584		00048273

SMF 88-1: System Logger Log Stream Summary report

```
Logstream name              MVSID   Structure name    Group
STC@CICS.CICSPR1.DFHLOG     FTS1    *DASDONLY*
            ----------- IXGWRITES ----------
                                                    Bytes
                                                  Writn to
                         Total      Average       Interim
              Count      Bytes        Bytes       Storage
            --------    --------    --------    --------
Total         29862       19177K        642       122692K
Rate(/Sec)        0            5                        35
Minimum           0            0                         0
Maximum        1322       862741                   5480448
```

CICS and IMS both rely on log streams for critical services; including message handling and journaling.

Problems can be avoided by monitoring their I/O and offload activity.

```
      First interval start    Last interval stop      Total Interval
      14:30:00.00  3/04/2011  16:00:00.00  4/14/2011      0985:30:00
---------------- DELETIONS -----------------
   Count       Count       Bytes       Bytes
    With     Without       After    Int Stor
    DASD        DASD     Offload    w/o DASD
   Write       Write     w. DASD       Write
--------    --------    --------    --------
   24950        4075      102547K      16691K
       0           0          29           5
       0           0           0           0
    1685         839     7032832     3436544
```

SMF 101: DB2 Thread Accounting Summary report

```
DB2    Plan       ---------- Connection -----------   Thread
SSID   Name       Name     Type                        Count

DB3A   CEXTPGM    IADG     IMS MPP                        68
```

All transactions that use DB2 cut accounting records that show how DB2 performed in the application and across into DB2.

```
                                                          Start: 2010-06-24 15:27:39
                                                          End:   2010-06-24 16:44:00
Class1: Thread Time    Avg: Elapsed=70.43305  CPU= .011006          Interval:         01:16:20
                       Max: Elapsed=2045.732  CPU= .013724          Rate/sec:              < 1
Class2: In-DB2 Time    Avg: Elapsed= .015108  CPU= .006035
                       Max: Elapsed= .033537  CPU= .008234
Class3: Suspend Time   Avg: Total  = .008709  I/O= .000000  Lock/Latch= .002404  Other= .006305
                       Max: Total  = .017377  I/O= .000000  Lock/Latch= .007199  Other= .010178
Buffer Manager Summary Avg: GtPgRq=     7.0  SyPgUp=     3.0
                       Max: GtPgRq=       7  SyPgUp=       3
Locking Summary        Avg: Suspnd=      .0  DeadLk=      .0  TmeOut=       .0  MxPgLk=     1.0
                       Max: Suspnd=       0  DeadLk=       0  TmeOut=        0  MxPgLk=       1
SQL DML Query/Update   Avg: Sel=       .0  Ins=     1.0  Upd=     1.0  Del=     1.0
                       Max: Sel=        0  Ins=       1  Upd=       1  Del=       1
SQL DML 'Other'        Avg: Des=       .0  Pre=      .0  Ope=     1.0  Fet=     9.0  Clo=     1.0
                       Max: Des=        0  Pre=       0  Ope=       1  Fet=       9  Clo=       1
```

SMF 116: WebSphere MQ Accounting reports

```
MQACCT4  Printed at 10:50:30  2/03/2011  Data from 09:00:40 03/03/2010 to 09:59:52 03/03/2010


SSID: SYSB  Type: CICS     Name: CICSSYSP  Tran: TRTI      Threads:          2
  Other     Avg Count                6.0   Avg Elapsed    0.000116  Avg CPU      0.000112

  In-MQ Time (Total)      Elapsed:  0.000233   CPU:   0.000224
  In-MQ Time (Average)    Elapsed:  0.000116   CPU:   0.000112

SSID: SYSB  Type: CICS     Name: CICSSYSP  Tran: TRTL      Threads:          4

  In-MQ Time (Total)      Elapsed:         0   CPU:          0
  In-MQ Time (Average)    Elapsed:         0   CPU:          0

  Queue: APPLICATION_A_REQUEST
  QType: LOCAL    IType: NONE       GDisp: Q_MGR    QCount:          4

              Count     Elapsed      CPU      Susp Elp  JnlWrt Elp   PS Req's  PS Rd Elp   Ex
            _________  _________  _________  _________  __________  _________  _________  ___
    OPEN         15.0   0.000019   0.000009
    CLOSE        15.0   0.000002   0.000002
    INQ          15.0   0.000009   0.000008

    In-MQ Time (Total)     Elapsed: 0.001861   CPU: 0.001222
    In-MQ Time (Average)   Elapsed: 0.000465   CPU: 0.000305
```

Detailed MQ accounting can be requested to show the impact of MQ on transaction performance.

OPERLOG report: JCL

```
  File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
VIEW       FUW110.WTWM.REPORTS(OPERLOG) - 01.03            Columns 00001 00072
Command ===> _                                               Scroll ===> CSR
****** ***************************** Top of Data ******************************
000001 //OPERLOG  JOB ,CLASS=A,NOTIFY=&SYSUID
000002 /*JOBPARM SYSAFF=FTS1
000003 //FUWBATCH EXEC PGM=FUWBATCH
000004 //STEPLIB  DD  DISP=SHR,DSN=FUW.SFUWLINK
000005 //SYSPRINT DD  SYSOUT=*
000006 //SYSIN    DD  *
000007 LOGSTREAM OPERLOG:SYSPLEX.OPERLOG
000008 START 2011-04-06-08.40.00.00   STOP 2011-04-06-09.00.00.00
000009 REPORT OPERLOG
000010 CODE(OPERLOG)
000011 COND TEXT(2) EQ 'DFS'
000012 COND TEXT(*) EQ 'BACKOUT'
000013 /*
****** **************************** Bottom of Data ****************************
```

OPERLOG report: output

```
FTS3     2011096 08.41.42.57 STC36951  DFS2484I JOBNAME=IBB1#ARC
                                                 GENERATED BY LOG AUTOMATIC ARCHIVING IBB1
FTS2     2011096 08.41.48.71 STC37128  DFS058I 08:41:48 START COMMAND IN PROGRESS   ICDZ
FTS2     2011096 08.41.49.80 STC37128  DFS551I IFP  REGION ICDZIFP1 STARTED
                                                 ID=00001 TIME=0841  ICDZ
FTS2     2011096 08.41.49.89 STC37128  DFS551I MESSAGE REGION ICDZMPP1 STARTED
                                                 ID=00002 TIME=0841 CLASS=001,000,000,000 ICDZ
FTS2     2011096 08.41.52.04 STC37128  DFS551I IFP  REGION ICDZIFP3 STARTED
                                                 ID=00003 TIME=0841  ICDZ
FTS3     2011096 08.47.36.05 STC36951  DFS554A FUWTCIC  00002 FUWTCIC  DFHTWM04(3)
                                                 000,0777   2011/096  8:47:36
                                                 RTKN=FUWTCIC C79459EA853EFB03 IBB1
FTS3     2011096 08.47.51.05 STC36951  DFS968I  DBD=DI21PART WITHIN PSB=DFHTWM04
                                                  SUCCESSFULLY BACKED OUT IBB1
FTS3     2011096 08.47.51.05 STC36951  DFS980I BACKOUT PROCESSING HAS ENDED FOR DFHTWM04 IBB1
```

From the previous JCL request, it is simple to identify the IMS subsystem messages associated with the transaction failure.