

# DevOps Tooling for a Modern Mainframe

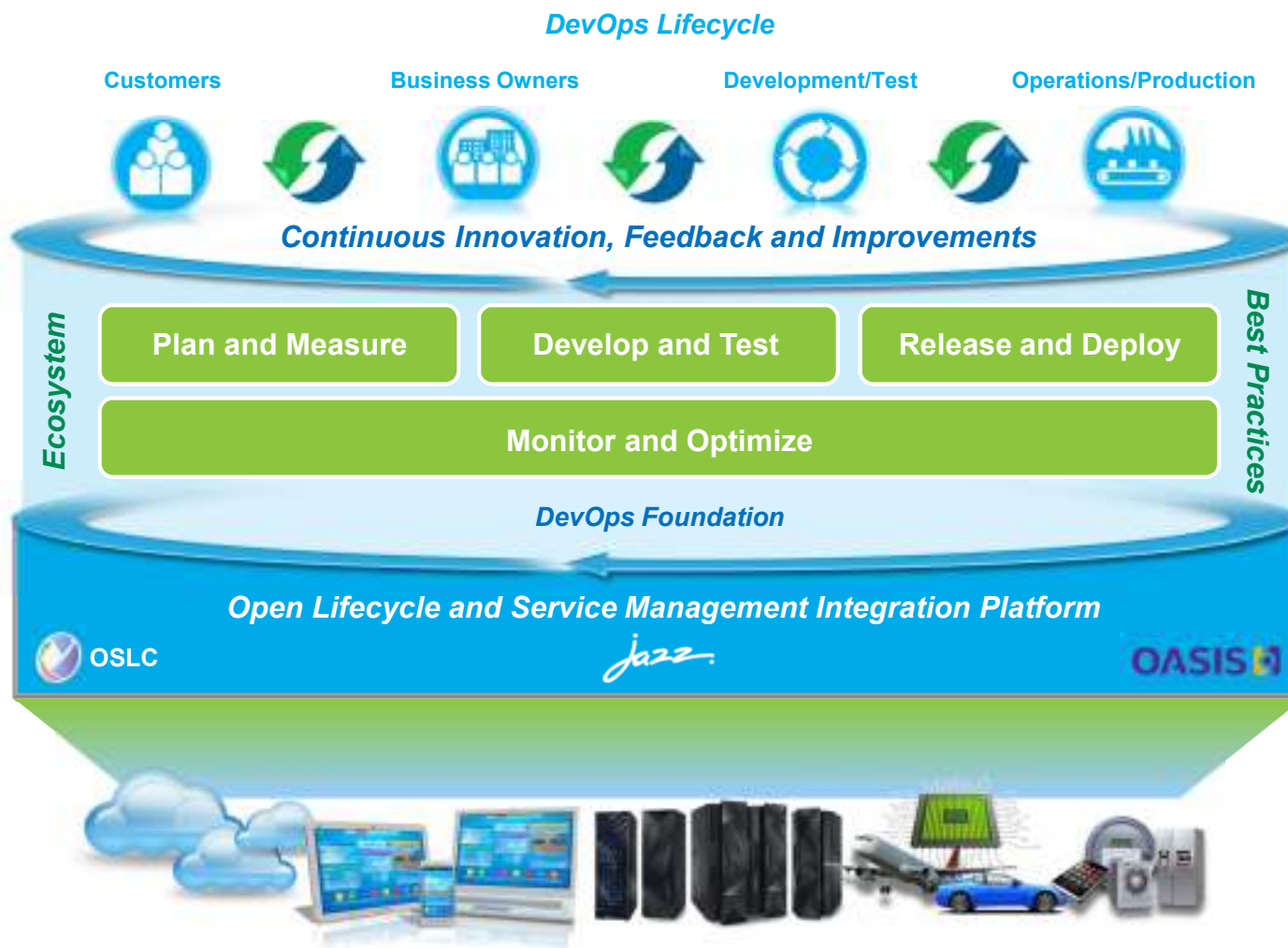
**From Traditional zOS tooling  
to a Modern Interactive Development Environment**

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System z Software I/T Architect

February, 2014



# IBM DevOps: A software delivery lifecycle for continuous software delivery



## Software delivery drives competitive advantage

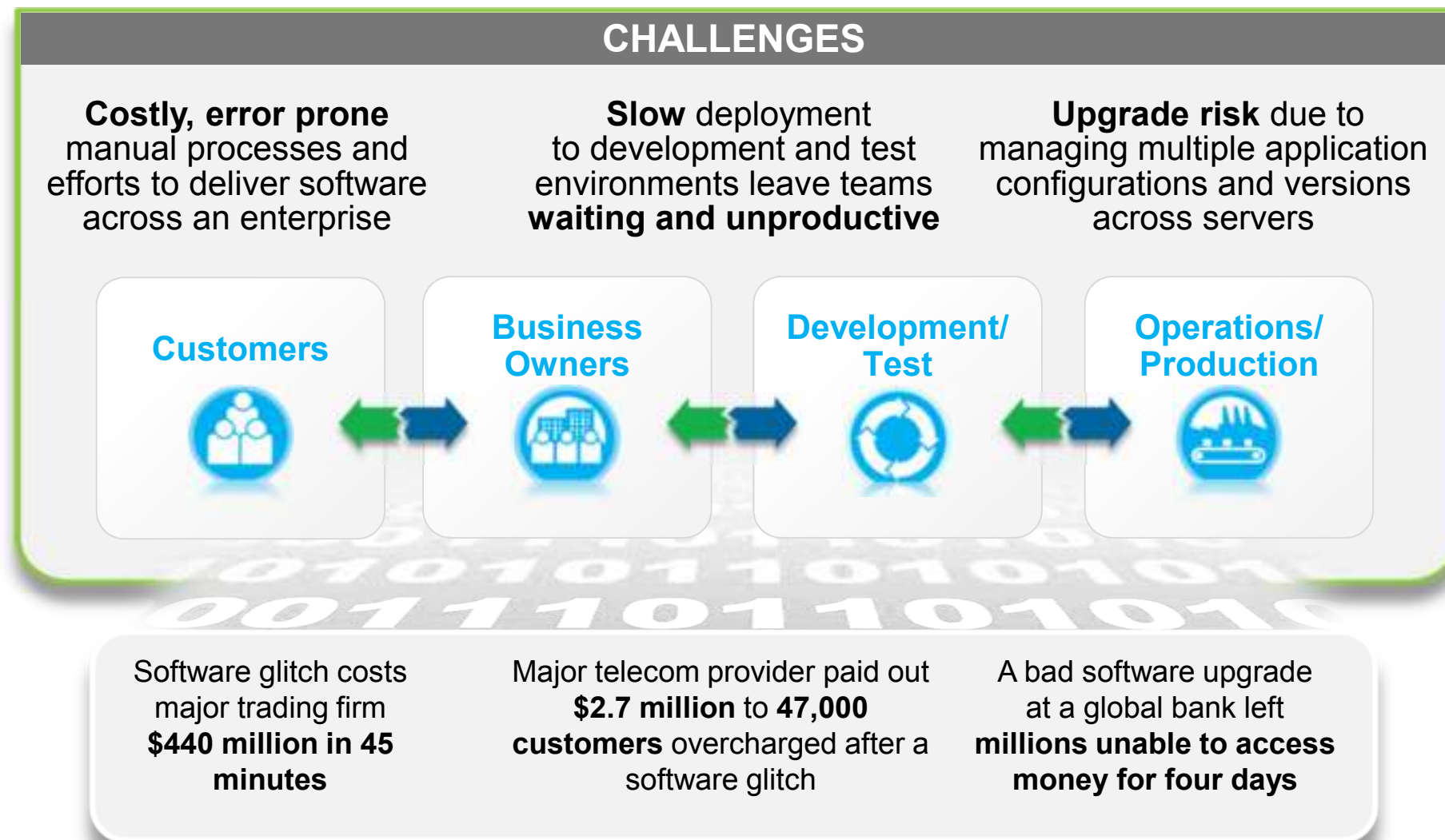
Yet few are able to deliver it effectively



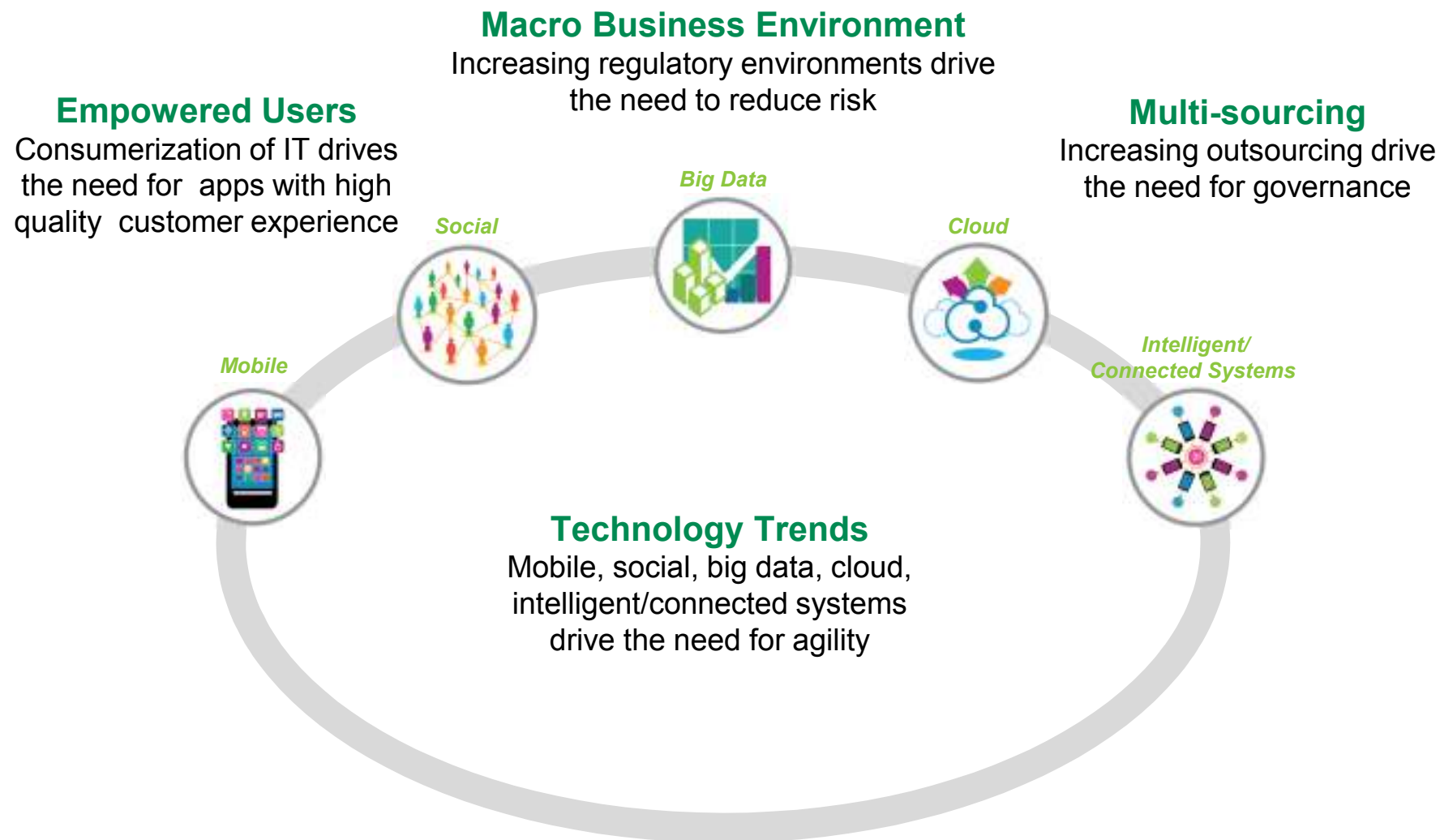
*But only...*



## And a lack of effective software delivery impacts the entire business

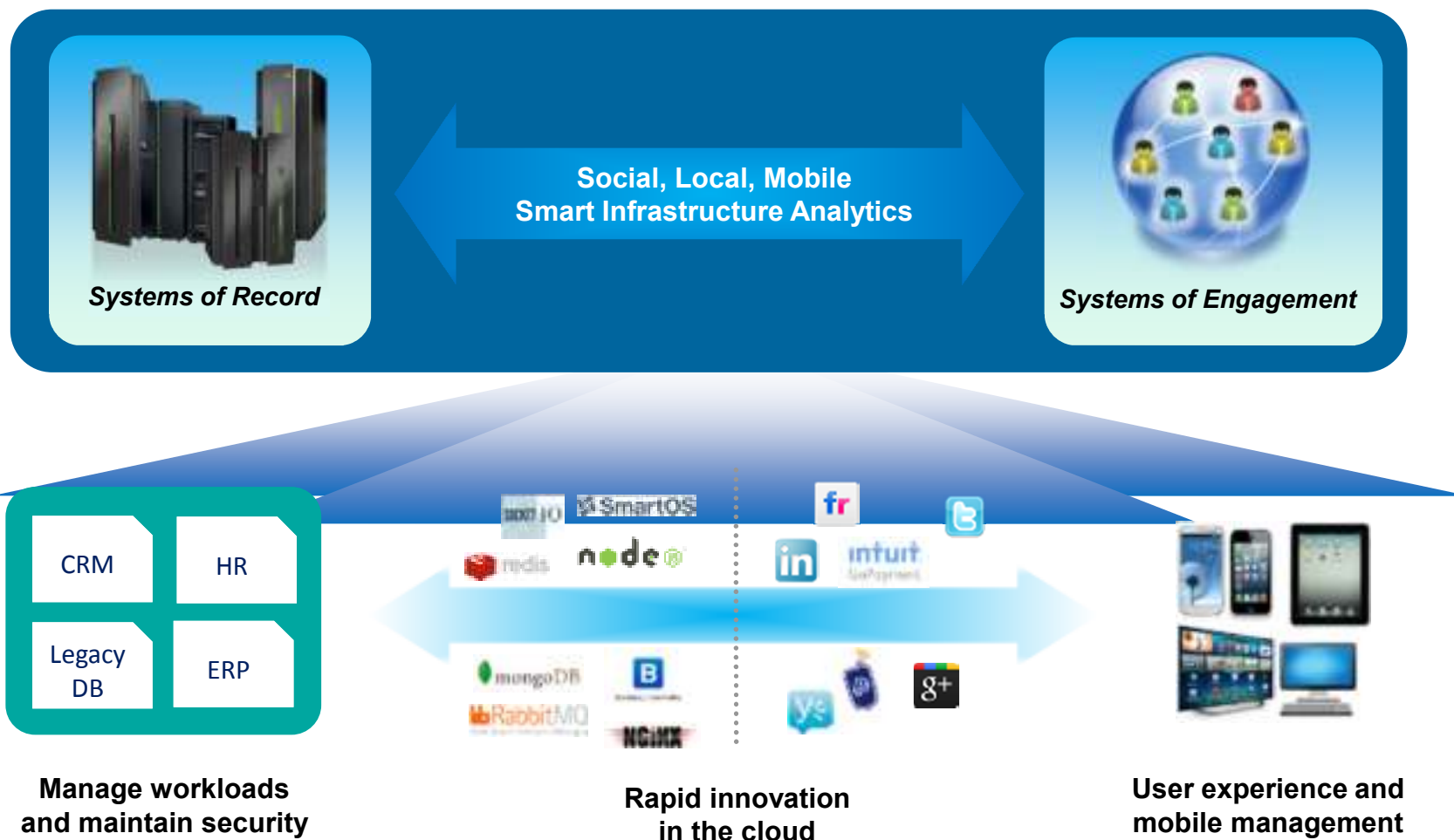


# Market shifts are fundamentally changing the way businesses approach software driven innovation...



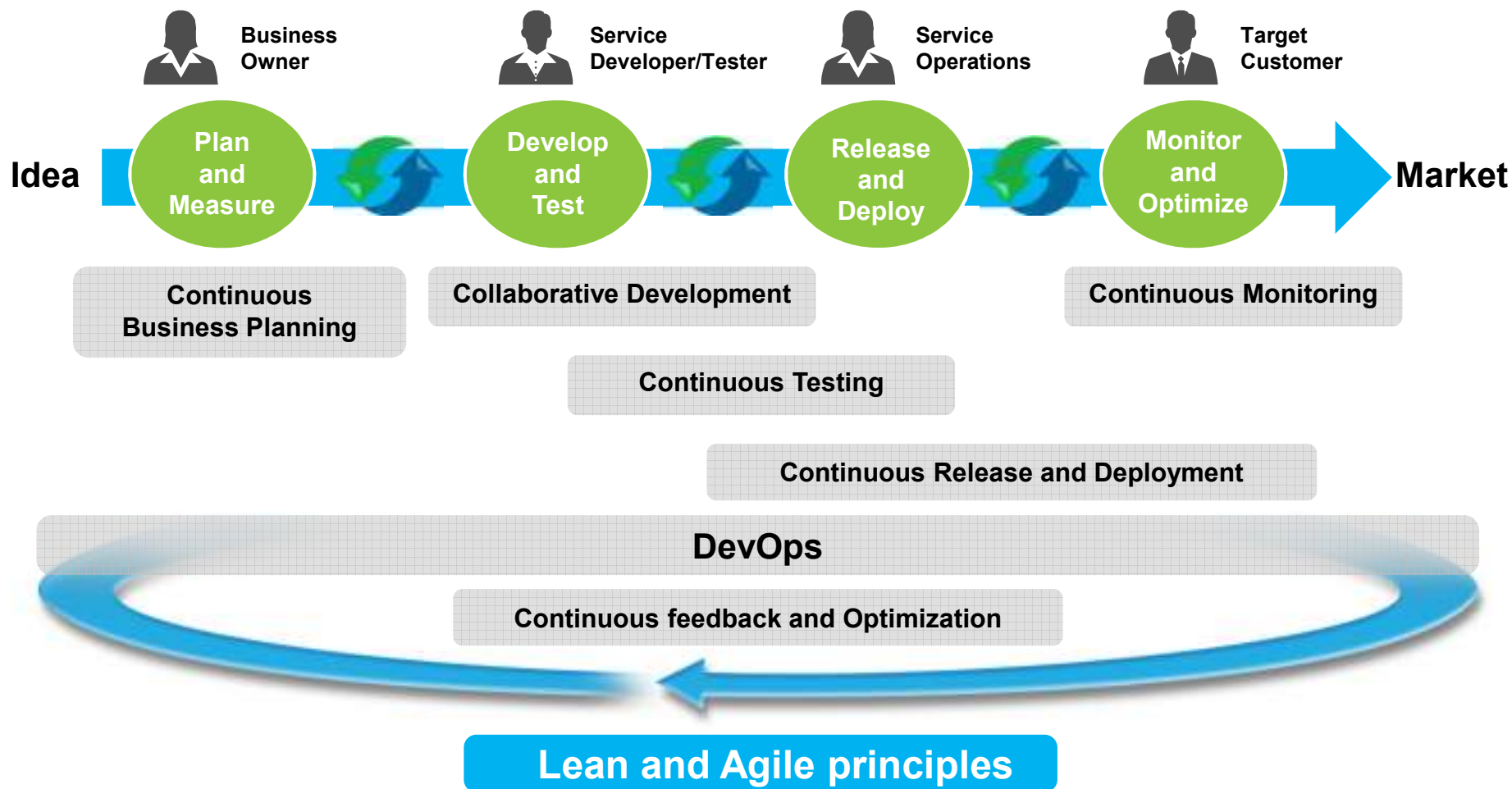
# New era systems integrate operational systems

Utilizing the rapid delivery of new client-facing apps



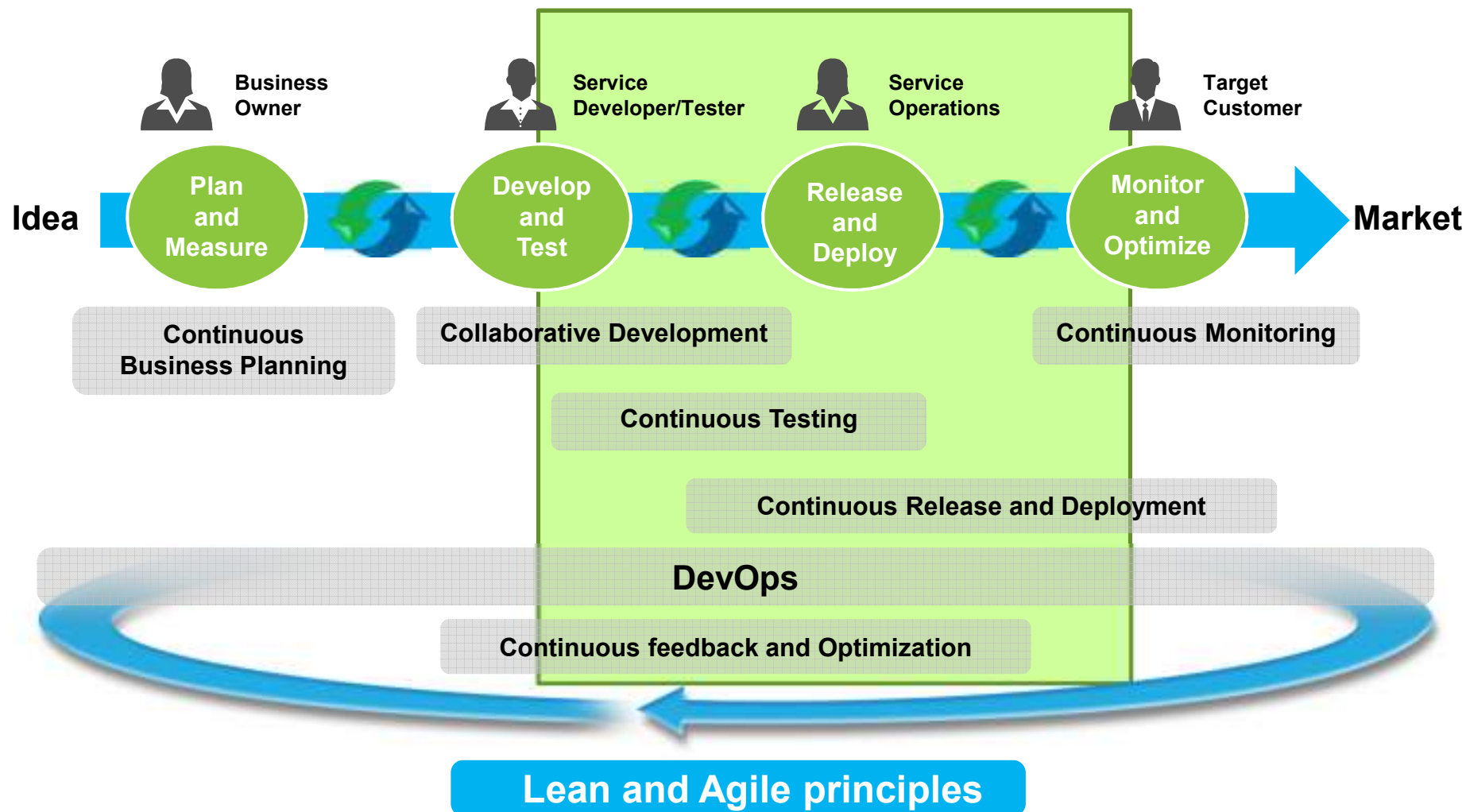
# Effective continuous delivery requires a whole-team approach

*Extends Lean and Agile practices across the entire software value chain*





# From Traditional zOS tooling .... ....to a Modern Interactive Development Environment





## Multiplatform Development - Integrated Development Environment

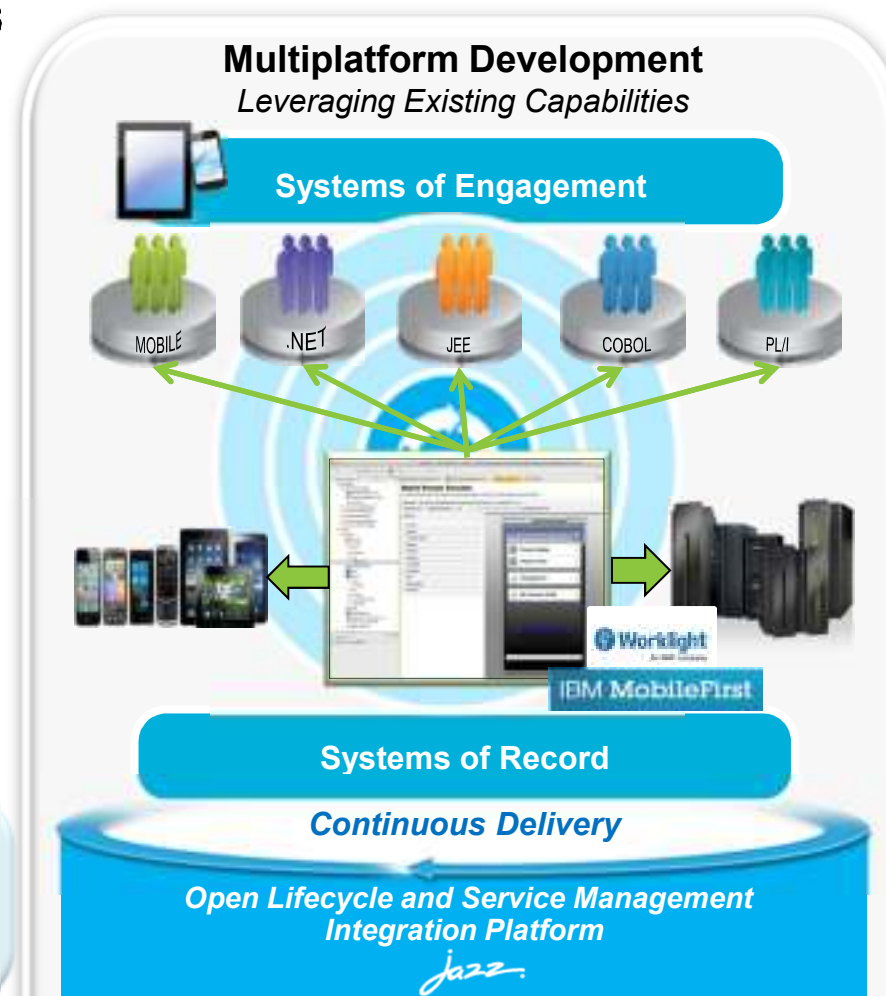
A Common **Integrated** platform for all types of development

- Common Eclipse-based IDEs
- Broad coverage of technologies, languages, and platforms
- Connect systems of record to systems of engagement and apply talent across boundaries while keeping the focus on innovation

- ✓ **Modern tools attract new talent**
- ✓ **22-37% improvement in developer productivity<sup>1</sup>**

- **Rational Developer for the Enterprise\***
- **Rational Developer for System z**
- **Rational Asset Analyzer**

*\* Includes IBM Worklight*



<sup>9</sup> <sup>1</sup> Aggregation of results from a productivity study conducted by IBM System z customers.



# Rational Developer for the Enterprise: The premier IDE for System z and Multi-Platform Development

**Integration** with Team  
Concert for Lifecycle and  
Source Management



## Rational Developer for System z

A modern IDE for productive development of cross-platform applications written in COBOL, PL/I, ASM, Java, EGL or C/C++ in System z CICS, IMS, DB2, Batch applications

**Integration** with System z  
sub-system functionality in  
z/OS, CICS, IMS, DB2, WAS



**Integration** with IBM  
Worklight for Robust Mobile  
Development



**Integration** with Debug Tool  
for interactive code debug



**Integration** with Fault  
Analyzer for Dump Analysis



**Integration** with Asset Analyzer  
for Application Understanding and  
Impact Analysis



**Integration** with File  
Manager for file and test  
data handling



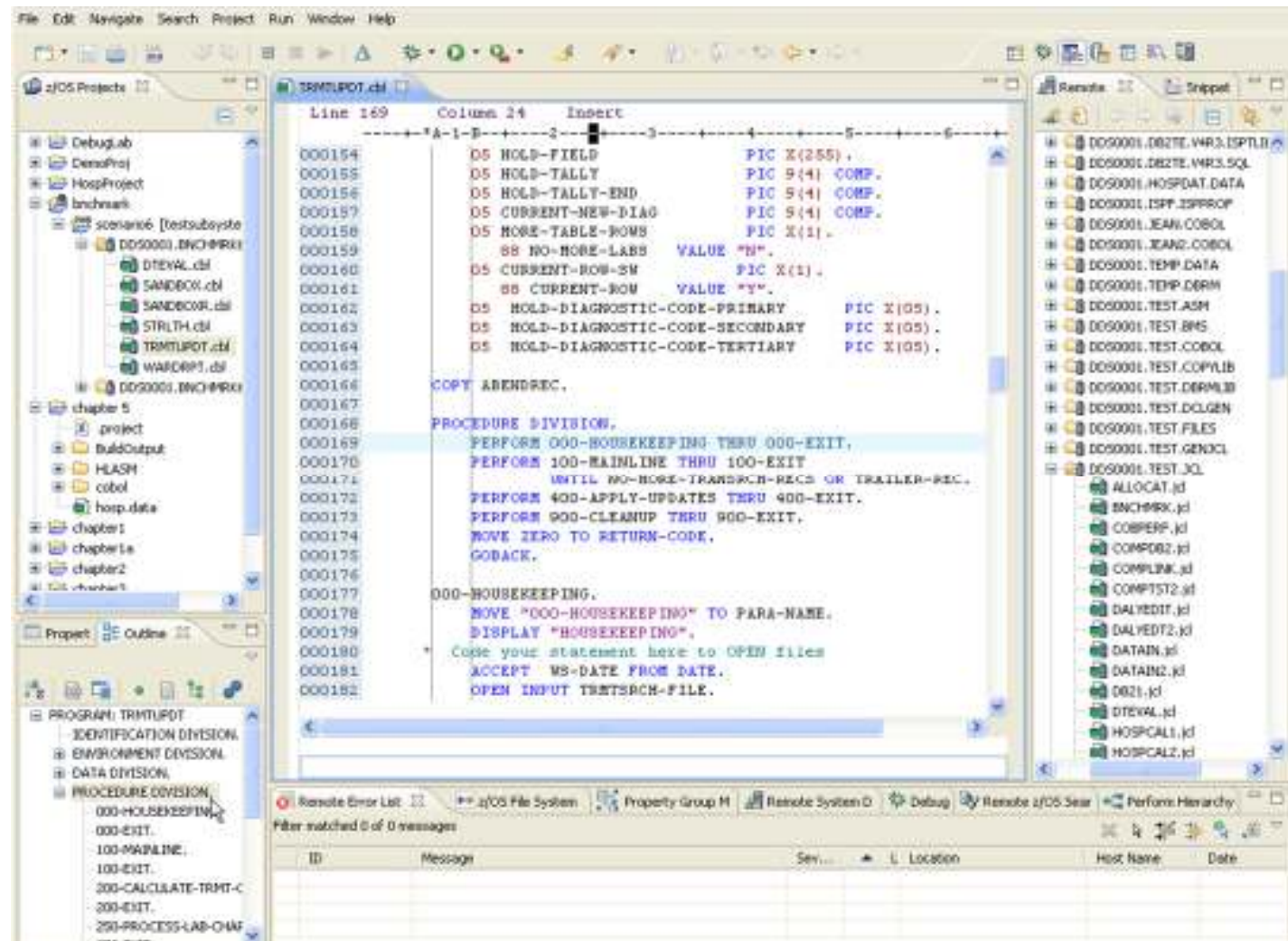




## Crossing the Chasm – From ISPF to RDz

Using RDz the development paradigm changes to ....

- ▶ A Complete Integrated Development Environment for Traditional Applications
  - ▶ Windows & Views
  - ▶ Context Actions
  - ▶ Intelligent Editing
  - ▶ Easy Navigation



# A Complete development environment for Enterprise Modernization

.... that scales to the complexity of your z/OS development tasks

## ▶ A Complete Integrated Development Environment for Traditional Applications

- ▶ Common IDE for: COBOL, PL/I, C, C++, HLASM, Java, EGL, Web Services  
CICS, IMS, Batch, USS, DB2, DB2 SP, WAS, zOS Tools
- ▶ Enables CICS and IMS applications for web services and SOA
- ▶ Support for JEE, JCA, XML, web services
- ▶ Transform UML to COBOL source code

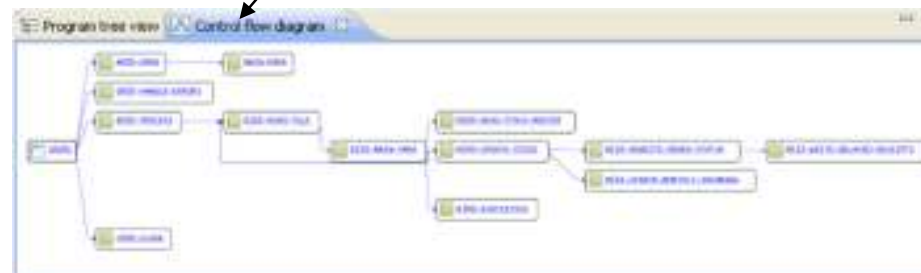
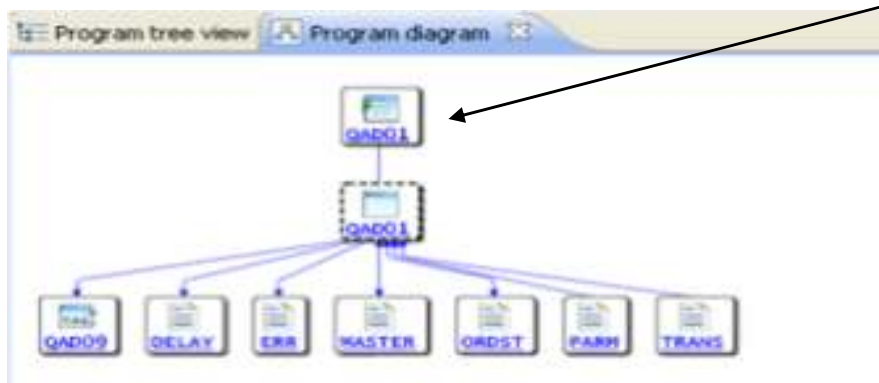
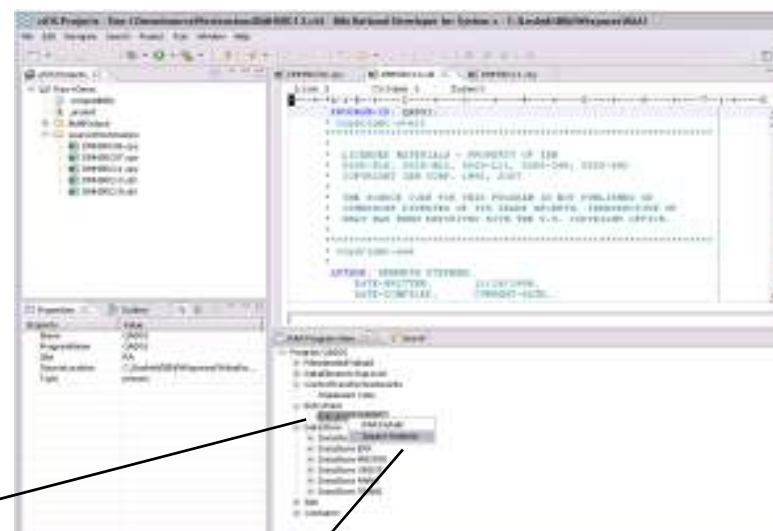
**Web Service Orchestration**

```

COBOL CODE:
*****
      PERFORM LOG-INITIALIZER.
      PERFORM LOG-POGCODE.
      PERFORM LOG-GENERATION.
      MOVE ZERO TO RETURN-CODE.
      CALL "XIT0000" USING PERSON-NAMES-RECORD, WS-OLD-WF-KEY,
      CALL "XIT0000" USING WS-PROD-LINE-KEY,
      WORK.
*****
LOG-INITIALIZER.
      DISPLAY '***** LOG INITIALIZER *****'.
      DISPLAY ' '.
      OPEN OUTPUT LOG-HEADER-FILE-DB
      OPEN INPUT LOG-ACT-FILE-DB
      OPEN FILE-LOGS-FILE-DB
      OPEN TEND-IT-LOGS-FILE
      OPEN WS-STARTS-WF-OUT
      OPEN WS-REPORT-FILE-OUT.
      PERFORM LOG-PROD-FRMS.
      MOVE 'ADDEND' TO PERSON-POSTFIX-NAME OF PERSON-NAMES-RECORD.
  
```

## Integration with Enterprise Asset and Impact Analysis

- Rational Asset Analyzer plugin for RDz
  - ▶ Develop in the context of heterogeneous artefacts across the Enterprise
  - ▶ Combine productivity gains of RDz with the enterprise-level insight in RAA
  - ▶ Bring enterprise analysis directly into the Developer workspace
  - ▶ Rapidly understand impact of changes in complex applications
  
- ▶ Understand the Application E2E
- ▶ Visualise, Navigate
  - Internal relationships
  - External relationships
  - Impact of Changes

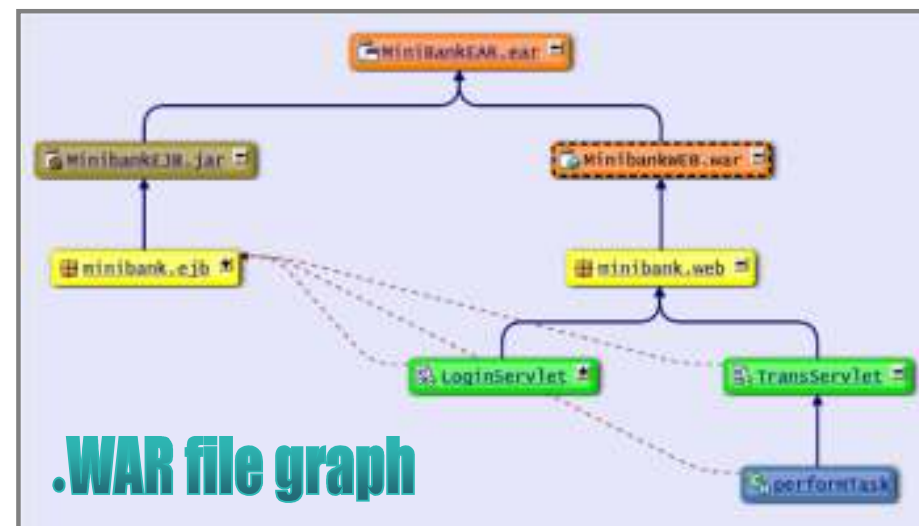
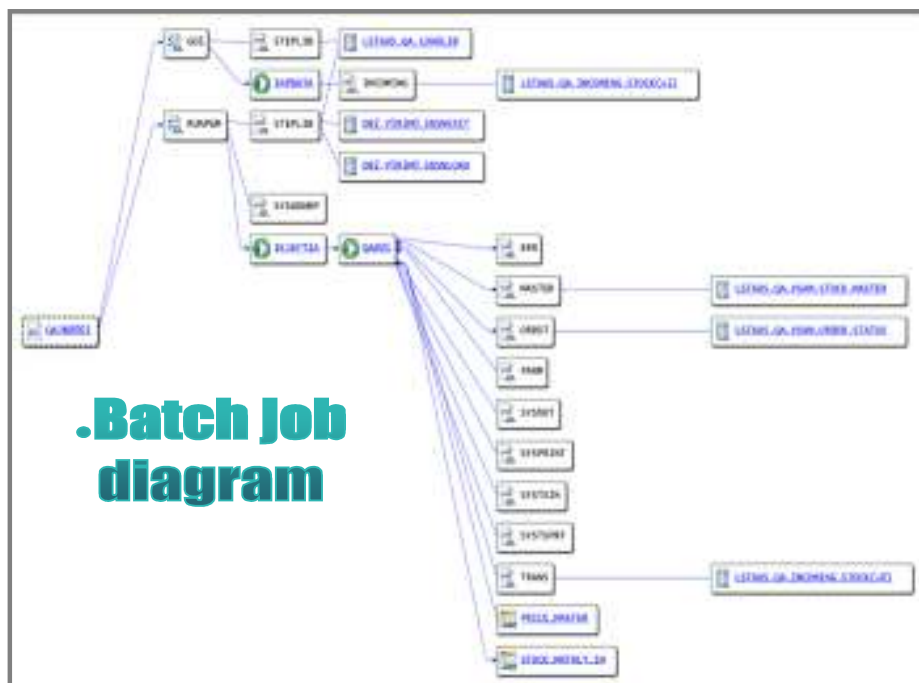




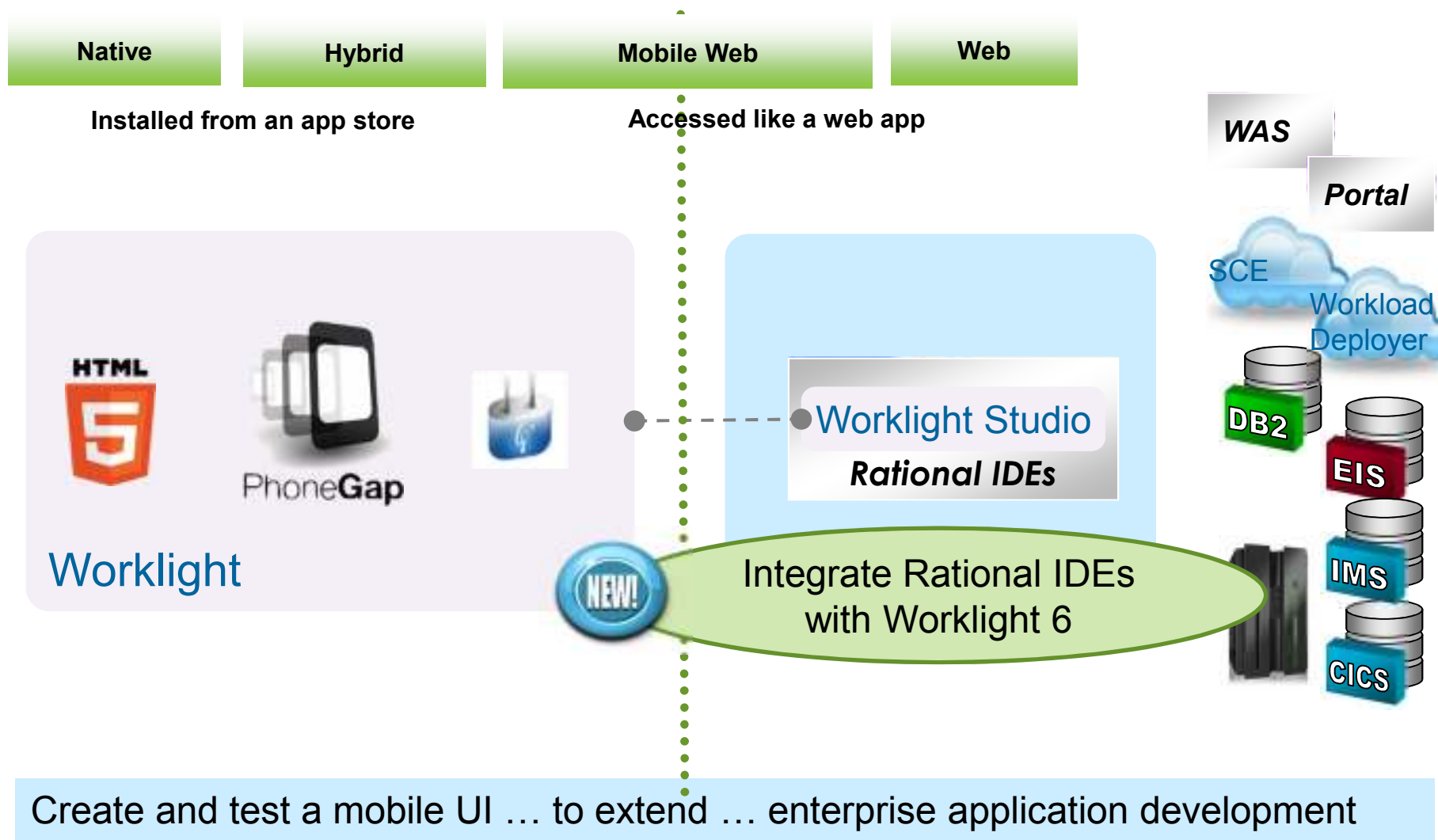
## Rational Asset Analyzer - Intelligent Application Understanding



- ▶ Analyze, understand, and navigate complex application code across the enterprise with little or no documentation
  - COBOL, PL/I, Assembler, C/C++, Java/JEE, etc..
- ▶ Inventory Business Rules artefacts
  - Business Rules Mining
- ▶ Reduce risk, understand the impact of change upfront
  - Analyze impact of code or database changes
  - Find “dead code” for deletion



# Worklight Studio included with Rational Developer Enterprise v9.0



## Worklight Studio included with Rational Developer Enterprise v9.0

The screenshot displays the IBM Worklight Studio interface. On the left, the Project Explorer shows a project named 'MyMobileApp' with a hierarchical structure including folders like 'WL Server Library', 'JRE System Library', 'JavaScript Resources', 'adapters', and 'apps'. The 'apps' folder contains a sub-folder 'MyMobileApp' with further sub-folders like 'common', 'css', 'images', 'js', and 'legal', along with various files such as 'MyMobileApp.css', 'icon.png', 'thumbnail.png', and 'MyMobileApp.html'.

In the center, the 'New Worklight Environment' dialog is open. It prompts the user to 'Create application folders for new environments.' The 'Project name' and 'Application/Component' are both set to 'MyMobileApp'. Under the 'Create folders for:' section, there are three categories: 'Mobile', 'Desktop', and 'Web'. Under 'Mobile', 'iPhone' and 'Android phones and tablets' are checked. Under 'Desktop', 'Windows 8 desktop and tablets' is checked. Under 'Web', 'Mobile web app' is checked. A note at the bottom of the dialog states: '\* These environments will not be supported in the...'.

On the right, a preview window shows a mobile application interface. The title bar reads 'MyMobileApp' with a 'Profile' button. The main content area displays a message: 'This is a sample application built on the IBM Worklight Platform.' The preview window includes a toolbar with various icons and a 'Device:' dropdown menu. At the bottom of the preview window are 'Finish' and 'Cancel' buttons.

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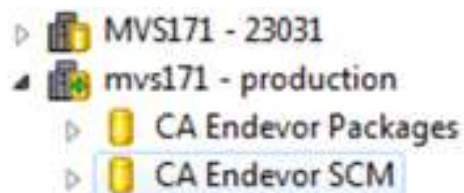
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## Crossing the Chasm – From ISPF to RDz

- It's not 'Rocket Science'
  - ▶ Ackin to the transition from DOS to Windows
    - ...and how much easier, productive and fun life became!
  
  - ▶ Integrates Traditional zOS tooling into the IDE
    - Source Code Management: IBM SCLM/RTC, CA Endevor, Serena ChangeMan
    - Data Provisioning and Analysis: IBM File Manager
    - Interactive Code Debug: IBM Debug Tool
    - Failure Diagnosis: IBM Fault Analyzer
    - Application Performance Analysis: IBM Application Performance Analyzer
  
  - ▶ Some of the benefits of RDz include:
    - Raised productivity (ask for IBM IDE Efficiency Benchmarks)
      - 22-37% improvement in developer productivity<sup>1</sup>
    - Addition of new professional skills (Eclipse-based development platform)
      - Modern tools attract new talent
    - Lowered development costs through development LPAR workload reduction
    - Improved job satisfaction

<sup>1</sup> Aggregation of results from a productivity study conducted by IBM System z customers.

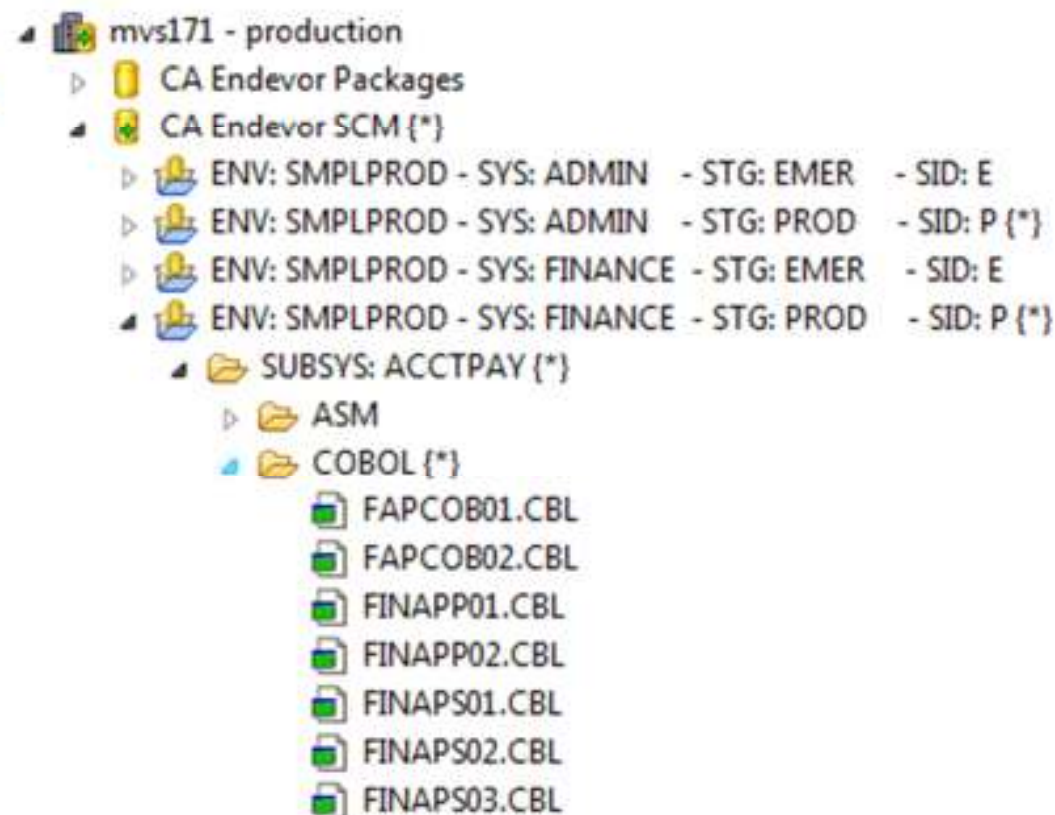
## Integrate with zOS SCMs - CA Endeavor Carma Interface



Carma is the interface to view Endeavor contents

- View lists of Element or packages
- Set up filters to narrow down the content selections
- Main interface to take action on Endeavor content

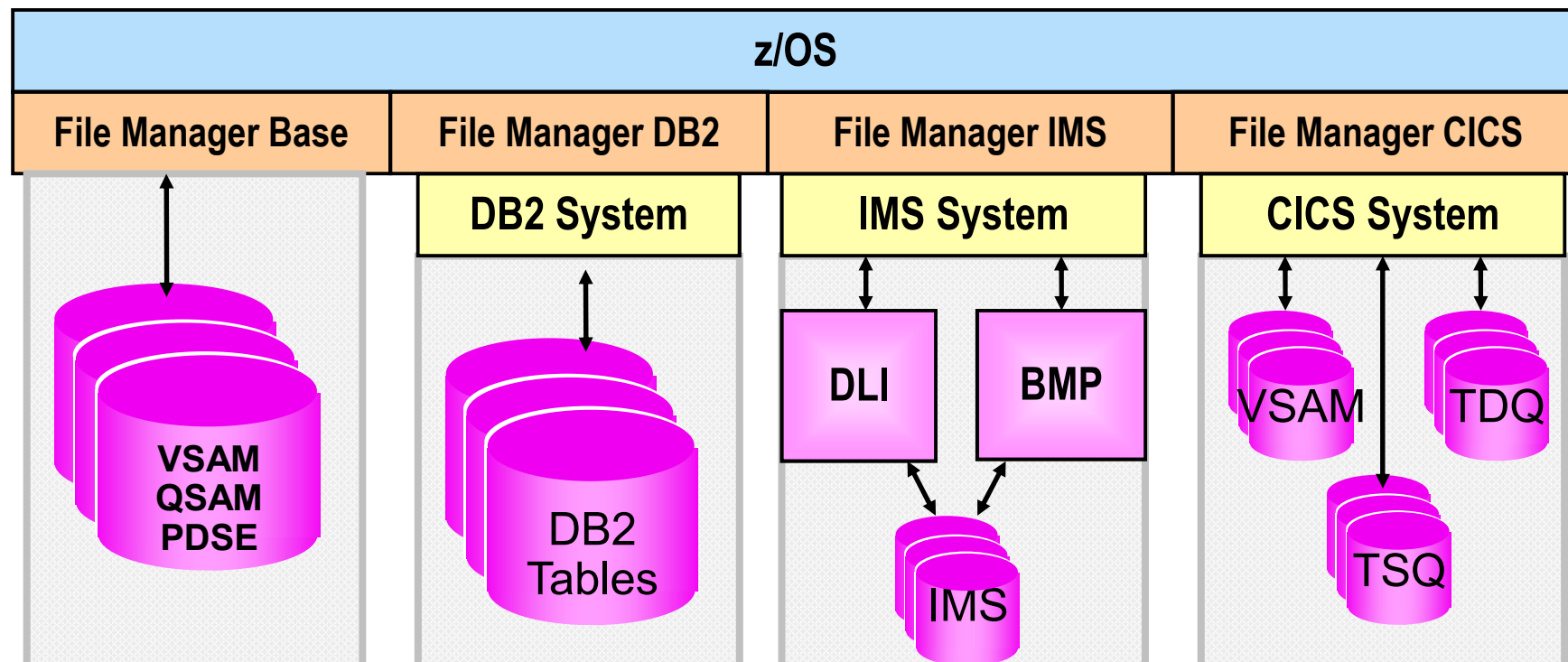
- Drill down into subsystems
- Retrieve elements to z/OS projects
- ADD/UPDATE elements with single click
- Fast Edit elements from Endeavor
- Integration with existing GENERATE configuration
- Support for Endeavor PACKAGE actions
- Filter and search through environments, systems, subsystems, elements, stages based on queries





## Integrate Data Provisioning and Analysis – IBM File Manager zOS

- File Manager zOS is a set of editors and utilities to work with files and databases on z/OS systems
- It is one product with four features:
  - ▶ File Manager Base - to access z/OS files and MQ queues
  - ▶ File Manager DB2 - to access DB2 tables and objects
  - ▶ File Manager IMS - to access IMS databases
  - ▶ File Manager CICS - to access CICS files and queues



# IBM File Manager Base ISPF Interface - Edit

```

Process  Options  Help
-----
Edit          TSS05.TESTDATA (FMNCDATA)          Top of 40
Command ==> te
Record AT TOP
Format TABL
-----
REC-TYPE NAME          EMPLOYEE-NO    AGE    SALARY    MONTH(1)
#2          #3          #4          #5          #6          #7
AN 1:2     AN 3:20     BI 23:2    BI 25:2    PD 27:4     BI 31:4
<>         <-----1----->    <---->    <---->    <---->    <-----1>
***** **** Top of data ****
000001 01      Grant Sutherland      7712      96      75000      6
000002 01      Andrew Astle          6612      21      75000      30
000003 01      Graham Purdie         5512      94      68000      7
000004 02      Bndrew Bstle          50309     42373   *****   2571124800
000005 02      Jim Blexander         54401     38273   *****   1077952576
000006 01      Bill Soper            4412      28      68000      5
000007 02      Graham Purdie         50309     42373   *****   2571124800
000008 01      Tyrone Dalais         3312      21      60000      14
000009 01      Rod Turner            5612      100     100000     28
000010 01      Clive Nealon          2212      100     100000     44
000011 01      Jim Blexander         1112      110     125000     47
000012 01      Silvano Prez          2312      50      60000      1
000013 02      Rod Turner            54401     38273   *****   1077952576
000014 02      Clive Nealon          54401     38273   *****   1077952576

```



# zOS Data Editor - IBM File Manager

The screenshot displays the IBM File Manager interface for z/OS. The main window is titled 'DNET074.ADLAB.CUST1' and shows a 'Formatted editor' view of a data set. The data is presented in a table format with columns: CUST-ID, NAME, ACCT-BALANCE, ORDERS-YTD, and ADDR. The current record is highlighted, showing CUST-ID 01001, NAME 'Lynn, Amanda', ACCT-BALANCE 610.05, ORDERS-YTD 10, and ADDR '89 Clay Springs Rd'. Below the table, the layout is set to 'CUST-REC' and the template is 'DNET074.ADLAB.COPYLIB(CUST1)'. A callout box labeled 'Formatted editor' points to the table area.

In the bottom right corner, there is an 'IMS Segment Editor' window showing a 'Single record mode editor' view. This window displays the same data set in a structured format with columns: Field, Picture, Type, Start, Length, and Data. The current record is shown with CUST-ID 01001, NAME 'Lynn, Amanda', ACCT-BALANCE 610.05, and ORDERS-YTD 10. A callout box labeled 'Single record mode editor' points to this window.

On the left side, there is a 'Systems Information' pane showing a 'File lists' view of the data set structure. The console window at the bottom left shows the following output:

```
z/OS
DSN=DNET074.ADLAB.BLAHTEST - created
DSN=DNET074.ADLAB.BLAHTEST - deleted
DSN=DNET074.ADLAB.CUST1 - saved
```

The interface also includes a menu bar (File, Edit, Navigate, Search, Project, Run, File Manager, Window, Help), a toolbar, and a status bar at the bottom showing 'DEMOMVS'.

# MQ Data Editor - IBM File Manager

The screenshot displays the IBM File Manager MQ Data Editor interface. The main window shows the definition of a channel named 'MQ:WMQT:SYSTEM.CHANNEL.SYNCQ'. The channel is defined with the following parameters:

1	BROKER1	WMQT_BROKER1	BROKER1
2		DEM31LNK_QM.WMQT	DEM31LNK_QM
3	DEM31LNK_QM	WMQT.DEM31LNK_QM	DEM31LNK_QM
4	HLIU	WMQT.TO.HLIU	.....

Below the definition, the 'CHARACTER' section is visible. The bottom pane shows a hex dump of the channel data:

Offset	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
+0	C2	D9	D6	D2	C5	D9	F1	40	40	40	B	R	O	K	E	R	1									
+10	40	40	40	40	40	40	40	40	40	40																
+20	40	40	40	40	40	40	40	40	40	40	W	M	Q	T	_	B	R	O	K	E	R	1				

The interface includes a menu bar (File, Edit, Navigate, Search, Project, File Manager, Run, Window, Help), a toolbar, and a left-hand pane showing a tree view of the system structure. The status bar at the bottom indicates the current system is 'DEMOMVS'.

# CICS Data Editor - IBM File Manager

The screenshot displays the IBM File Manager interface for editing CICS data. The main window shows a table of customer records with columns for CUST-ID, NAME, ACCT-BALANCE, ORDERS-YTD, ADDR, and CITY. The current record selected is CUST-ID 01001, NAME Lynn, Amanda.

	CUST-ID	NAME	ACCT-BALANCE	ORDERS-YTD	ADDR	CITY
1	01001	Lynn, Amanda	610.05	10	89 Clay Springs Rd	Atwon
2	02200	Graham, Anna	67.68	9	119 North Lake Road	Spirit
3	02202	Major, Art	999.95	5	1512 Pine Bluff	Harmor
4	03003	Prentice, Anna	0.00	7	33 Renshaw	Larami

Below the table, the layout is set to 'CUST-REC' and the template is 'DNET074.ADLAB.COPYLIB(CUST1)'. The 'FORMATTED' section is visible.

The bottom pane shows a detailed view of the selected record (CUST-ID 01001) with the following field structure:

Field	Picture	Type	Start	Length	Data
CUST-ID	X(5)	AN	1	5	01001
NAME	X(17)	AN	6	17	Lynn, Amanda

The interface includes a menu bar (File, Edit, Navigate, Search, Project, File Manager, Run, Window, Help), a toolbar, and a left-hand pane for navigating through CICS systems and files. The status bar at the bottom shows 'Insert' mode and the current system 'DEMOMVS'.



# DB2 Data Editor - IBM File Manager

The screenshot displays the IBM File Manager interface for editing a DB2 table. The main window shows the table data in a grid format. The table has columns: DEPTNO, DEPTNAME, MGRNO, ADMRDEPT, and LOCATION. The data is as follows:

	DEPTNO	DEPTNAME	MGRNO	ADMRDEPT	LOCATION
1	A00	SPIFFY COMPUTER SERVICE DIV.<	000010	A00	
2	B01	PLANNING<	000020	A00	
3	C01	INFORMATION CENTER<	000030	A00	
4	D01	DEVELOPMENT CENTER<	000040	A00	

Below the main table, there is a 'FORMATTED' section and a 'Key' table. The 'Key' table shows the primary key structure:

Ref#	Key	Column Name	Data Type (Length)	Data
1	PU	DEPTNO	CHARACTER(3)	A00
2		DEPTNAME	VARCHAR(36)	SP:
3	NF	MGRNO	CHARACTER(6)	000

The interface also includes a 'Systems Information' pane on the left showing the tree structure of the DB2 subsystem, and a 'Properties' pane at the bottom left. The main window title is 'DB2:TBL:DSNA:FMNDB2.DEPT' and the status bar shows 'View Mode: DB2 Single Mode' and 'Insert Mode: Insert'.

# IMS Segment Editor - IBM File Manager

The screenshot displays the IBM File Manager interface for editing an IMS segment. The main window shows a tree view on the left with the path: IMS > IMB1: System IMB1 > Databases: DJ1\* > DJ1E. The main area displays a table of segments for the selected database.

Level	Segment	Concatenated key value	Additional information
1	SHIRE	BROOME	
2	SHIRENP	BROOME	
2	LINKSUB	BROOME	BROOME SHIRE
1	SHIRE	DENMARK	
2	SHIRENP	DENMARK	
2	LINKSUB	DENMARK	BOW BRIDGE
2	LINKSUB	DENMARK	DENMARK
2	LINKSUB	DENMARK	DENMARK SHIRE

Below the table, the layout is set to 'SHIRE-TOWN' and the template/view is 'DELAHAY.FMN.VIEW(DJ1E)'. The 'Single Mode Editor' shows the current segment details:

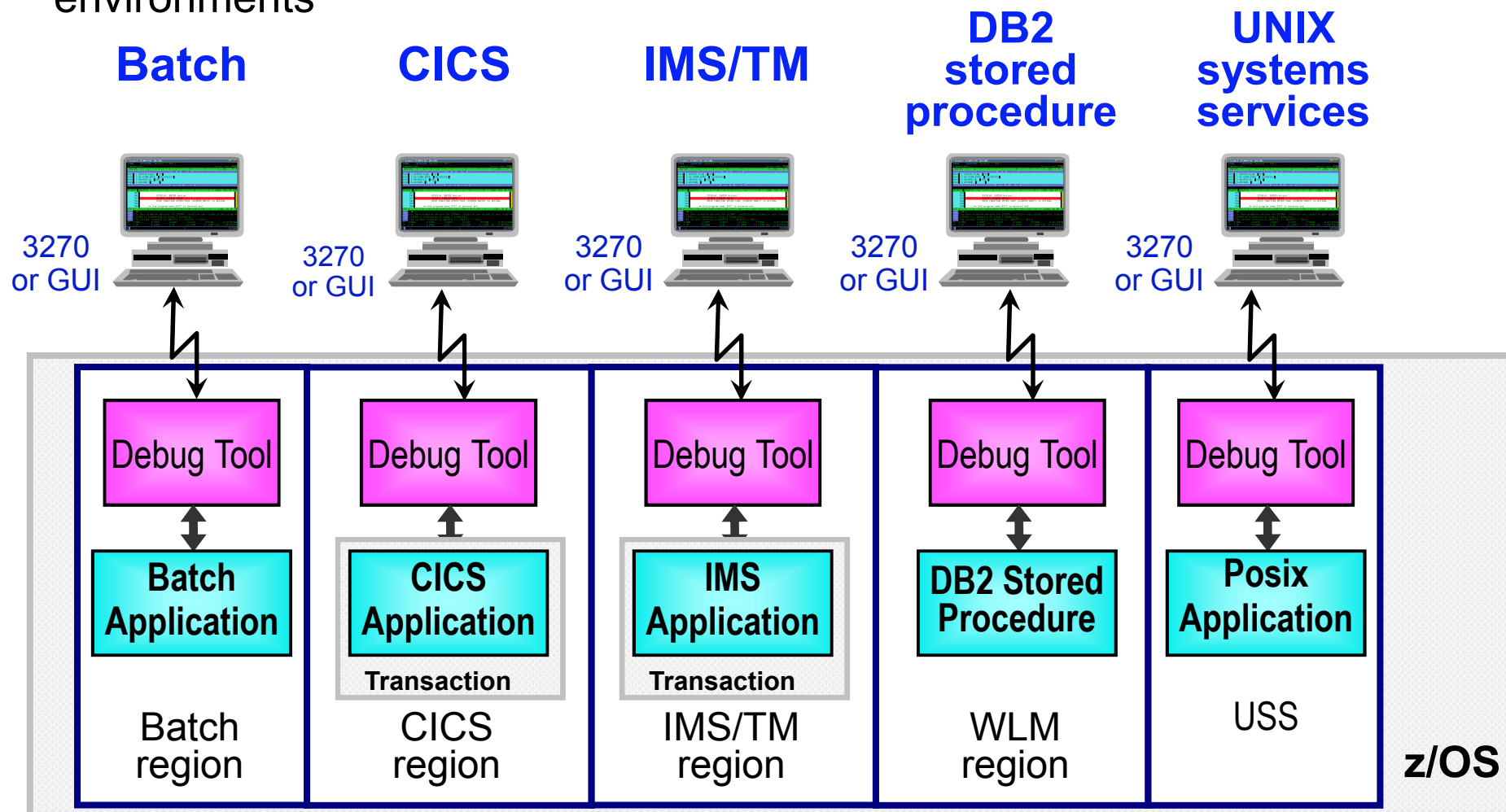
Segment: SHIRE    Level: 1    Layout: SHIRE-TOWN  
Concatenated key value: BROOME

Field	Picture	Type	Start	Length	Data
SHIRE-NAME	X(20)	AN	1	20	BROOME
SHIRE-TYPE	X(1)	AN	21	1	1
SHIRE-CODE1	9(3)	ZD	22	3	1
SHIRE-CODE2	9(5)	ZD	25	5	998

The 'Insert Mode' is currently set to 'Insert'. The status bar at the bottom indicates the connection to 'MOP.ZT01 blue'.

## Integrate Interactive Debug – IBM Debug Tool zOS

- Debug Tool zOS is One debugging engine, with support for many environments



# IBM Debug Tool Terminal Interface

```

COBOL   PBK<LOC:  ADSTAT  :> 55.1
Command ==> █                               Scroll ==> CSR
MONITOR  +-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6- LINE: 1 OF 7
          -----+-----1-----+-----2-----+-----3-----+-----4-----
0001  1 SUB-A                               +0000000005
0002  2 ACCUM-A                             +0394
0003  4 ***** AUTOMONITOR *****
0004  02 ACCUM-A                             +0394
0005  02 NUM ( SUB-A )
0006  SUB (5)                               +0000000115
SOURCE:  ADSTAT  ---1---+---2---+---3---+---4---+---5---+ LINE: 53 OF 95
53      PERFORM VARYING SUB-A FROM 1 BY 1
54      UNTIL SUB-A > ARRAY-SIZE
55      COMPUTE ACCUM-A = ACCUM-A + NUM(SUB-A)
56      END-PERFORM.
57      MOVE ACCUM-A TO RESULT-SUM.
58      COMPUTE RESULT-AVERAGE = ACCUM-A / ARRAY-SIZE.
LOG 0---+---1---+---2---+---3---+---4---+---5---+ LINE: 42 OF 45
0042  STEP 9 ;
0043  PLAYBACK START ;
0044  STEP ;
0045  STEP ;
PF  1: ?           2: STEP           3: QUIT           4: LIST           5: FIND           6: AT/CLEAR
PF  7: UP          8: DOWN           9: GO            10: ZOOM          11: ZOOM LOG      12: RETRIEVE

```



# IBM Debug Tool GUI Interface

The screenshot displays the IBM Debug Tool GUI interface for a debug session. The main workspace shows the source code for the program SAM1, with line 92 highlighted. The variables window shows the current values of BALANCE-AVERAGE and BALANCE-COUNT. The console displays the program's execution flow, including a breakpoint at line 92. The task list shows the current task is 'at entry sam2'.

**Menu Bar:** File, Edit, Navigate, Search, Project, Run, Window, Help

**Toolbar:** Debug, File Manager, Breakpoints, Modules, Registers

**Debug Session:** SAM1 [Incoming Remote Debug Session]  
 Platform: zOS 390X Connection: stlabf6.svl.ibm.com:1030  
 Thread:1 (Runnable)  
 SAM2:02  
 SAM1:01  
 Process: 320914248 Program: SAM1

**Source Code Editor:**

```

Line 92      Column 1      Insert      Browse
-----
86          *          *** Increment Record Count ***
87          *          ADD +1 TO BALANCE-COUNT
88          *          *** Add this customer's BALANCE to the grand total ***
89          *          COMPUTE BALANCE-TOTAL =
90          *          BALANCE-TOTAL + CUST-ACCT-BALANCE
91          *          *** Calculate Average ***
92          *          COMPUTE BALANCE-AVERAGE =
93          *          BALANCE-TOTAL / BALANCE-COUNT
94          *          *** Calculate Minimum ***
95          *          IF WS-FIRST-TIME-SW = 'Y'
  
```

**Variables Window:**

Name	Value
BALANCE-AVERAGE	+0000067.68
BALANCE-COUNT	+0000002.00

**Console:**

```

Program was stopped due to line/statement breakpoint at statement 92.
at entry sam2
Program was stopped due to entry/function breakpoint on SAM2.
  
```

**Task List:**

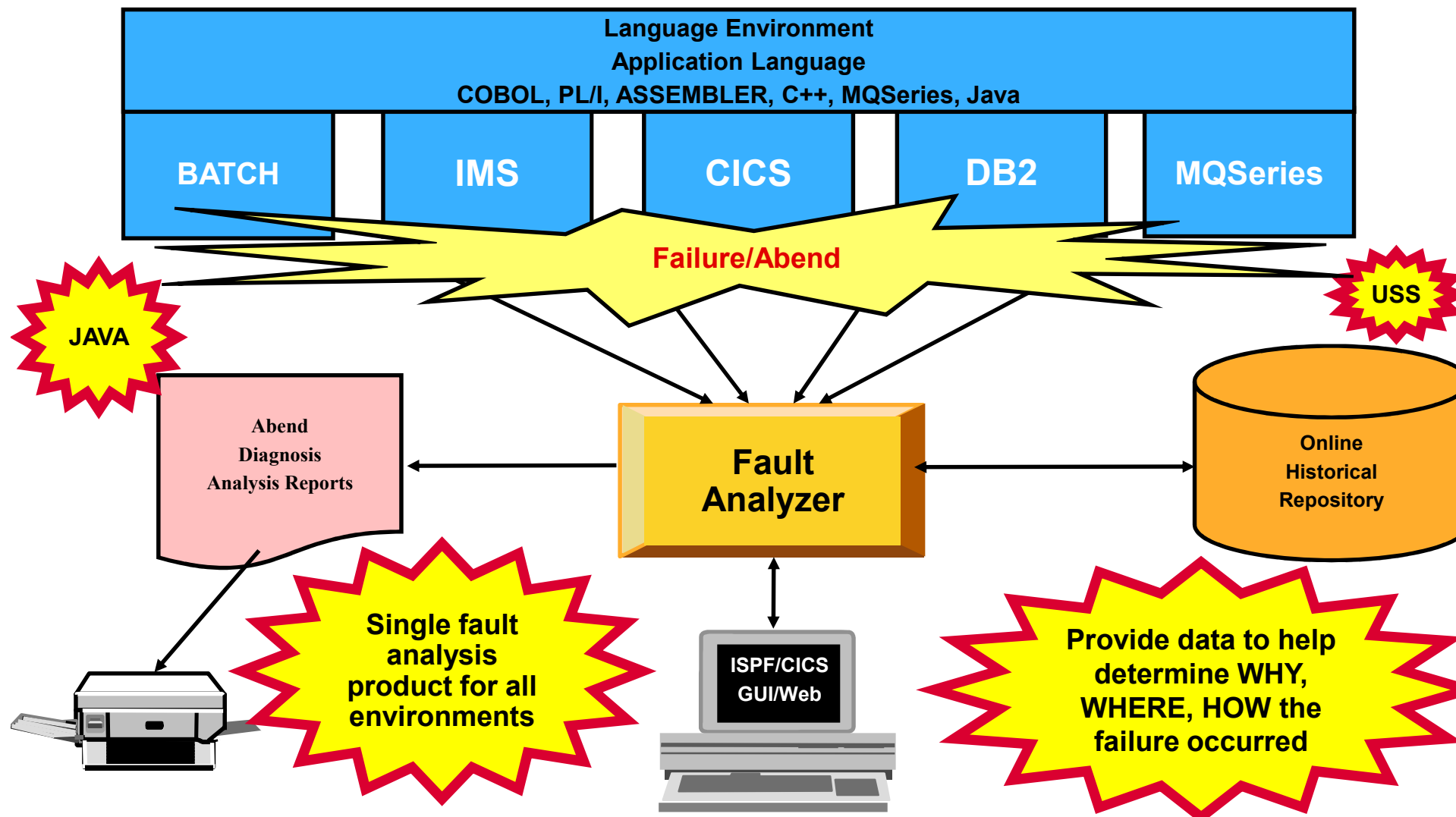
- 0 at entry sam2

**Debug Engine Command:**  Enter Commands...

**Status Bar:** Building workspace: (0%)

# Integrate Failure Diagnosis – IBM Fault Analyzer zOS

## Pinpoint why and where an enterprise application failed



## IBM Fault Analyzer ISPF Interface

```

File View Services Help
-----
Synopsis                                         Line 1 Col 1 80
Command ==> |                                     Scroll ==> CSR
JOBNAME: DNET246S  SYSTEM ABEND: 0C7           DEMOMVS  2007/10/30  20:00:12

A system abend 0C7 occurred in module SAM2 program SAM2 at offset X'39A'.

A program-interruption code 0007 (Data Exception) is associated with this
abend and indicates that:

    A decimal digit or sign was invalid.

The cause of the failure was program SAM2 in module SAM2.  The COBOL source
code that immediately preceded the failure was:

Source
Line #
000088      *   *** Add this customer's BALANCE to the grand total ***
000089          COMPUTE BALANCE-TOTAL =
000090              BALANCE-TOTAL + CUST-ACCT-BALANCE

The COBOL source code for data fields involved in the failure:

```

# IBM Fault Analyzer GUI Interface

The screenshot displays the IBM Fault Analyzer GUI interface with several key components:

- Top Menu and Toolbar:** Includes File, Edit, Navigate, Search, Project, Run, Window, and Help menus, along with a Quick Access toolbar and buttons for File Manager, Debug, and Fault Analyzer.
- Left Panel (System Tree):** Shows a tree view of the system configuration, including 'Fault Analyzer for z/OS' and 'Browse History Files'.
- Top-Left Panel (Fault history files):** A callout box pointing to the 'Browse History Files' section in the system tree.
- Top-Right Panel (Reports):** Displays a report titled '9.30.128.24:3960/IDLHIST(F00836)-Report'. The report text includes:
 

```

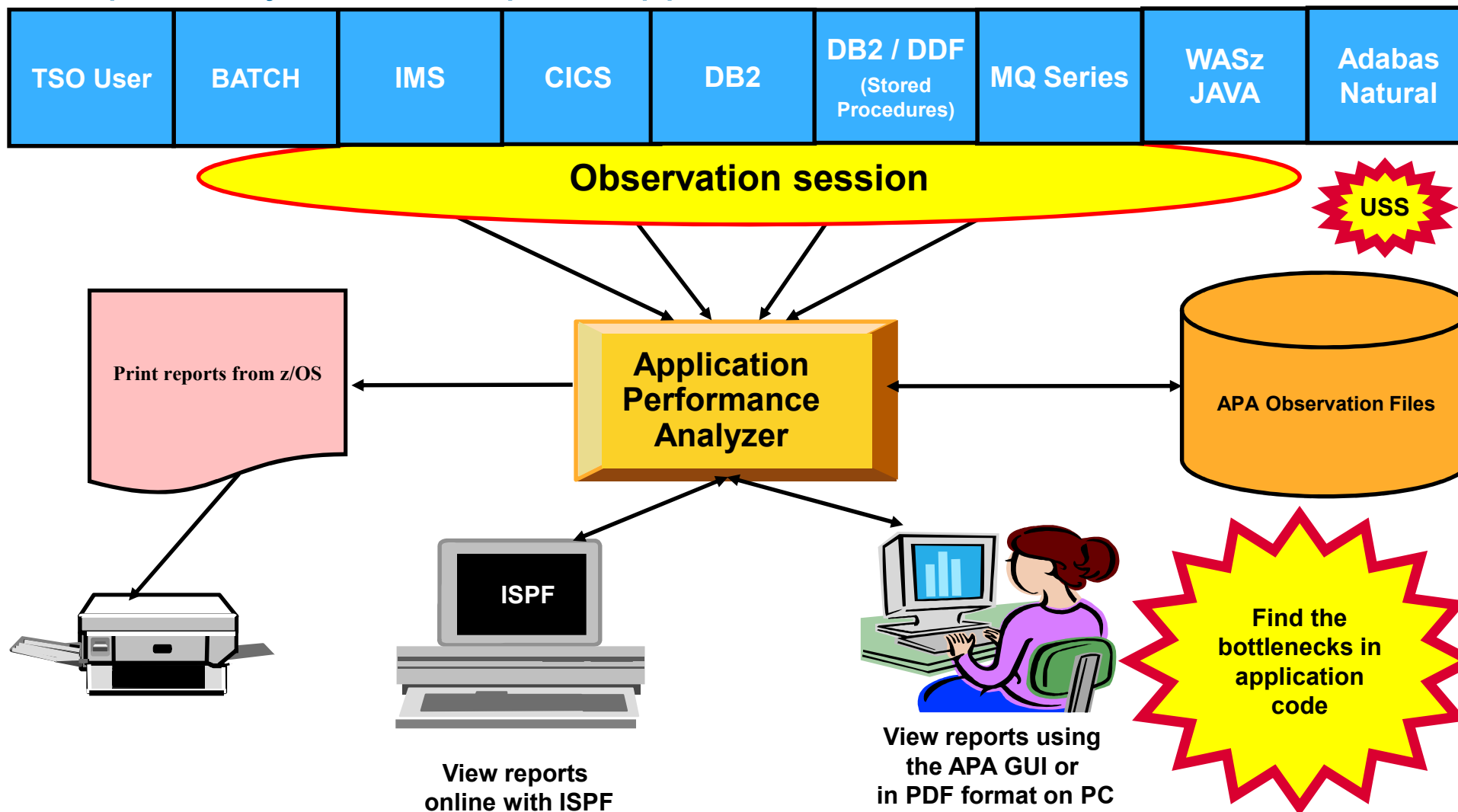
11
12 A decimal digit or sign was invalid.
13
14 The cause of the failure was program SAM2 in module SAM2. The COBOL source code
15 that immediately preceded the failure was:
16
17 Source
18 Line #
19 -----
20 000088 * *** Add this customer's BALANCE to the grand total ***
21 000089 COMPUTE BALANCE-TOTAL =
22 000090 BALANCE-TOTAL + CUST-ACCT-BALANCE
23
24 The COBOL source code for data fields involved in the failure:
25
26 Source
27 Line #
      
```

 A callout box labeled 'Reports' points to this section.
- Bottom-Left Panel (Report outline):** Shows an outline of the report with sections like Summary, Synopsis, Event summary, and Event details. A callout box labeled 'Report outline' points to this panel.
- Bottom-Right Panel (List of fault entries):** Displays a table of fault entries with columns: FAULT\_ID, JOB/TRAN, USER\_ID, SYS/JOB, ABEND, I\_ABEND, JOB\_ID, JOBNAME, and USERNAME. A callout box labeled 'List of fault entries' points to this table.
 

FAULT_ID	JOB/TRAN	USER_ID	SYS/JOB	ABEND	I_ABEND	JOB_ID	JOBNAME	USERNAME
F00056	CICSC41F/PSC1	KPHUME	STLABF6 /CICSC41F	DHTJ	DHTJ	STC02738	CICSC41F	
F00055	CICSC41F/PSC1	KPHUME	STLABF6 /CICSC41F	DHAI	DHAI	STC02738	CICSC41F	
F00054	CICSC41F/PSC1	KPHUME	STLABF6 /CICSC41F	ADCI	ADCI	STC02738	CICSC41F	
F00053	CICSC41F/PSC1	KPHUME	STLABF6 /CICSC41F	ADCI	ADCI	STC00997	CICSC41F	
F00052	CICSC41F/PSC1	KPHUME	STLABF6 /CICSC41F	FLT2	AEXZ	STC09911	CICSC41F	
F00051	CICSC41F/PSC1	MACHIND	STLABF6 /CICSC41F	ADCI	ADCI	STC09636	CICSC41F	
- Bottom Status Bar:** Shows the connection status: 'IIZE01001 Connected to 9.30.128.24:3960 - TSS16'.

# Integrate Performance Analysis - Application Performance Analyzer

## Rapid analysis of enterprise application bottlenecks





# IBM Application Performance Analyzer ISPF Interface

The screenshot displays the IBM Application Performance Analyzer (APA) ISPF interface. It is divided into several panels:

- Job List Panel (Left):** A table listing jobs with columns: ReqNum, Owned By, Description, Job Name, Date/Time, Samples, and Status.
 

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
2684	MACHIN2	- test	-	Dec-9 7:53	155	Ended
2682	MACHIN2	V10	CICSC41F	Dec-8 11:11	11,111	Ended
2681	MACHIN2	v10ref				
2680	MACHIN2	v9ref				
2679	MACHIN2	v9-uc3				
2678	MACHIN2	v10ref				
2677	MACHIN2	v10ref				
2671	MACHIN2	v10ref				
2542	MACHIN2	v10ref				
2541	MACHIN2	v10ref				
2540	MACHIN2	v10ref				
2539	MACHIN2	vq10ref				
2538	MACHIN2	v10ref				
2537	MACHIN2	v10ref				
2534	MACHIN2	v10ref				
2533	MACHIN2	v10ref				
2532	MACHIN2	v10ref				
- Measurement Profile Panel (Middle-Left):** Shows 'SD1: Measurement Profile (2711/CHIDGEYA)'. It includes a bar chart for 'Overall CPU Activity' with the following data:
 

Category	Samples	Percentage
Samples	2,000	100.0%
CPU Active	1,893	94.6%
WAIT	93	4.6%
Queued	14	0.7%
- CPU Usage Distribution Panel (Middle-Left):** Shows the breakdown of CPU usage:
 

Category	Samples	Percentage
CPU Active	1,893	100.0%
Application	925	48.8%
System	804	42.4%
DB2 SQL	0	0.0%
Data Mgmt	6	0.3%
Unresolved	158	8.3%
IMS DLI Call	0	0.0%
- Source Program Attribution Panel (Middle-Right):** Shows 'P01: Source Program Attribution (3310/CHIDGEYX)'. It displays a list of source statements with their line numbers, offsets, counts, and source statements.
 

LineNo	Offset	Count	Source Statement
000094	000384		MOVE 8 TO LODP-COUNT.
000095	00038E	159	PERFORM 100-CRUNCH-LOOP
000096			UNTIL LODP-COUNT > CRUNCH-CPU-LOOPS .
000097			100-CRUNCH-LOOP:
000099	0003C2	83	MOVE 'CALCULATING BALANCE STATS' TO WS-PROGRAM-
000100			* *** Increment Record Count ***
000101	0003D2	448	ADD +1 TO BALANCE-COUNT
000102			* *** Add this customer's BALANCE to the grand tot
000103	0003EA	982	COMPUTE BALANCE-TOTAL =
000104			BALANCE-TOTAL + CUST-ACCT-BALANCE
000105			* *** Calculate Average ***
000106	000412	1256	COMPUTE BALANCE-AVERAGE =
		4321	<- CPU time attributed to above statement
000107			BALANCE-TOTAL / BALANCE-COUNT
000108			* *** Calculate Minimum ***
000109	00045A	211	IF WS-FIRST-TIME-SM = 'Y'
000110	00046A		MOVE CUST-ACCT-BALANCE TO BALANCE-MIN.



**Use APA to answer the question:**  
 "Where is the application spending its time?"  
 "What is the application waiting for?"  
 Can a change be made to make it run faster?

# IBM Application Performance Analyzer GUI Interface

The screenshot displays the IBM Application Performance Analyzer (APA) GUI interface. The main window is titled "APA Observations List (CAZ0) - Remote" and contains a table of observations. The table has columns for ReqNum, Owned By, Description, Job Name, Date/Time, Samples, Status, and Del Days. The data is as follows:

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status	Del Days
0028	DNET074		DNET074B	Nov-15 08:54	3,844	Ended	Keep
0027	DNET074	Dougs XSAMA...	DNET074A	Nov-15 07:26	10,000	Steps	Keep
0026	DDS1256	NKK51A with ...	HRKDREP2	Oct-28 22:09	163	Ended	Keep
0025	DNET187	CPU Example	DNET187C	Oct-25 13:02	20,000	Ended	Keep
0016	DNET187	CPU Example	DNET187C	Oct-25 12:51	20,000	Steps	Keep
0015	DDS1256	NKK51A	HRKDREP2	Oct-23 10:13	220	Ended	Keep

Below the table, there are several panels:

- STC View:** Shows a tree view with "DEMOMVS" and "CAZ0 (default)".
- System...:** A table showing system properties:
 

Property	Value
System N...	DEMOMVS
OS Name	z/OS ...
Version	01
Release	13
Mod	00
- Details (D...):** A tree view showing "S - Statistics/Storage" and "C - CPU Usage Analysis" with sub-items like "C01 - CPU Usage by Category", "C02 - CPU Usage by Module", etc.
- C02: CPU Usage by Module (0028/DNET074B):** A detailed view of CPU usage for a specific module. It shows a table with columns for Name, Description, and Percent of CPU Time \* 10.00%. The data is as follows:
 

Name	Description	Percent of CPU Time * 10.00%
SAM2V	Application Program	51.73
- SAM2V	CSECT in SAM2V	51.73
IGZCPAC	COBPACK	35.40
22891xxx	Unresolved Address	12.11
IOA019L1	virtual i/o (VIO) and VSAM	0.22
TGG001NA	Data Management	0.14

The bottom right corner of the interface shows the system name "DEMOMVS".



## The Problem Determination Tools GUIs

Product	Plug-in for Rational Developer for System z (Eclipse)	All-in-one PD Tools Studio (Eclipse)	Plug-in for CICS Explorer (Eclipse)	Plug-in for IMS Explorer (Eclipse)	Plug-in for zOS Explorer (Eclipse)
<b>File Manager features Base/DB2/CICS/IMS</b>	✓	✓	✓	✓	✓
<b>Debug Tool inc. Profile Managers</b>	✓	✓	✓	✓	✓
<b>Fault Analyzer</b>	✓	✓	✓	✓	✓
<b>Application Performance Analyzer</b>	✓	✓	✓	✓	✓

# Example of PD Tools Eclipse GUI Integration and RDz (FA / FM / DT)

The screenshot displays the IBM Rational Developer for System z (RDz) GUI integrated with Eclipse. The interface is divided into several panes:

- Project Explorer:** Shows a project structure for 'TS009.ADLAB.DEMO1' and its sub-projects.
- Source Editor:** Displays COBOL source code for 'TS009.ADLAB.FEES(CUST3FA)'. A red vertical bar highlights a section of code. A callout box labeled 'Fault Analyzer Analysis' points to this section.
- Outline:** Shows the program structure for 'PROGRAM SAM1' with various divisions and procedures.
- Debug Console:** Shows the execution flow and data field declarations.
- System View:** Displays system information, including a table of job status.
- File Manager Views:** A callout box labeled 'File Manager Views' points to a table of file fields.
- Debug Tool View:** A callout box labeled 'Debug Tool View' points to the source code in the Source Editor.
- FA Reports:** A callout box labeled 'FA Reports' points to a table of fault history.

**File Manager Views Table:**

Field	Pictorial	Type	Start	Length	Date
CUST-ID	X(8)	AN	3	3	9/22
RECORD-TYPE	X(8)	AN	8	1	C
FILLER	X(7)	AN	7	1	
NAME	X(17)	AN	14	17	James, Dea
CUST-ACCT-BALANCE	99(7)F99	SD	31	3	*****

**FA Reports Table:**

Fault_ID	Job/Tran	User_ID	Sys/Job	Abend	L-Abend	Job_ID	Jobname
R05124	TS003R02	TS003	STLABP6	S52	S52	J0885657	TS003R02
R05126	TS003R02	TS003	STLABP6	S52	S52	J0885659	TS003R02
R05127	TS003R02	TS003	STLABP6	S9C8	S9C8	J0885666	TS003R02
R05136	TS003R02	TS003	STLABP6	S52	S52	J0885665	TS003R02
R05135	TS003R02	TS003	STLABP6	S52	S52	J0885664	TS003R02

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Development



**Integration** with Debug Tool  
for interactive code debug



**Integration** with Fault  
Analyzer for Dump Analysis



**Integration** with Asset Analyzer  
for Application Understanding and  
Impact Analysis



**Integration** with File  
Manager for file and test  
data handling

