

IBM PD Tools
win top spot
in Software
Strategies
analyst
report



IBM Software Group



z/OS Problem Determination Tools

Version 8



ON DEMAND BUSINESS™

© 2007 IBM Corporation

October, 2007

Agenda

- **Introductions**
- Overview
- Fault Analyzer for z/OS
- File Manager for z/OS
- Debug Tool Utilities and Advanced Functions for z/OS
- Application Performance Analyzer for z/OS
- Application Performance Analyzer Automation Assistant for z/OS
- Workload Simulator for z/OS
- Migration Utility
- Application Time Facility
- ISPF Productivity Tool
- Advantages



Why Customers Are Migrating?

Business:

Vendor Issues

- **Business Practices**
- **Pricing Issues**
 - Upgrade Fees
 - Rising Maintenance Fees
 - Unplanned budget overages
 - Long Term Contracts

Technical:

Product Issues

- **Ongoing Enhancements**
- **Integration With Other Products And Hardware Enhancements**
- **Product Support**
- **Administrative Complexity**

Application Development Environment

- **Unable to deploy new applications on the platform that best meets business needs (S/390)**
- **Forced to consider other platforms for application hosting or affordable tools and utilities**
- **Reuse traditional assets in the Internet world**
- **Demand for more sophisticated tools to develop and deploy e-business runtime like WebSphere & MQ**

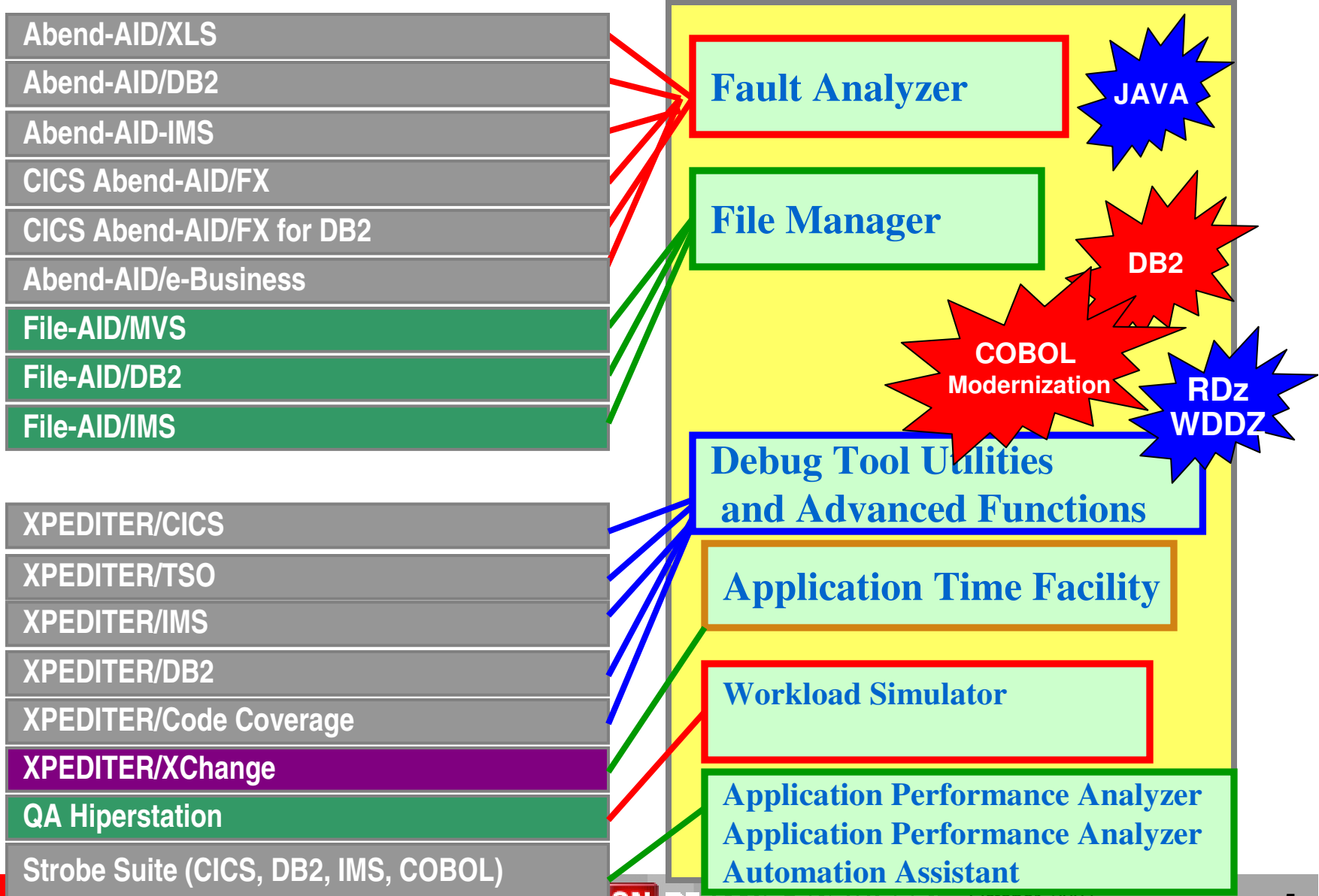


IBM's Solution

- Offer a set of tools that:
 - ▶ Exploits IBM's latest software and processor technology
 - ▶ Offer wide array of key features and functions
 - ▶ Can enhance the Application Development Lifecycle
 - ▶ Provide opportunity for increased user productivity
 - ▶ Are affordably priced
 - ▶ Have flexible terms and conditions
 - ▶ Have no license keys



Switching from Compuware to IBM



z/OS Problem Determination and Deployment Tools

- **Fault Analyzer for z/OS**

- ▶ Captures and analyzes abend information about application and environment

- **File Manager for z/OS**

- ▶ Manages production, test, and development data across multiple file formats and storage media

- **Debug Tool Utilities and Advanced Functions for z/OS**

- ▶ Interactive source level debugging for multiple languages

- **Application Performance Analyzer for z/OS**

- ▶ Helps maximize application performance

- **Application Performance Analyzer Automation Assistant for z/OS**

- ▶ Provides automation and integration of Application Performance Analyzer and its reports

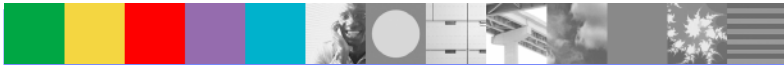
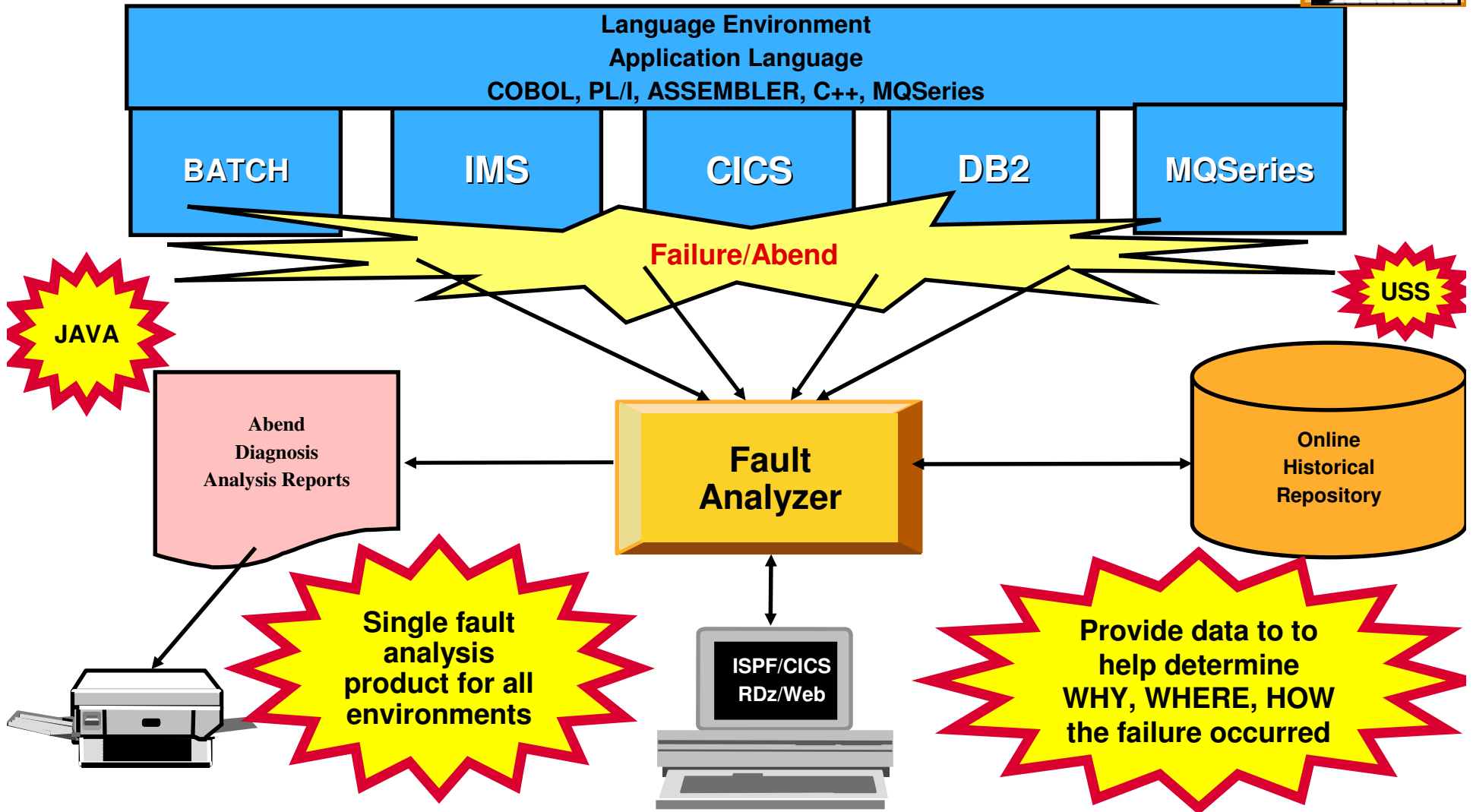


z/OS Problem Determination and Deployment Tools

- **Workload Simulator for z/OS and OS/390**
 - ▶ Regression, performance, stress, function, and capacity testing
- **Migration Utility**
 - ▶ Replaces CA-Easytrieve Plus® run-time and development tools with standard IBM COBOL programs
- **Application Time Facility**
 - ▶ Provides date and time manipulation for time sensitive applications
- **ISPF Productivity Tool**
 - ▶ Integrates with ISPF providing improved access to key functionality, reducing time-consuming navigation steps



Fault Analyzer - Helps you rapidly pinpoint why and where an enterprise application failed - and offers suggestions on how to resolve

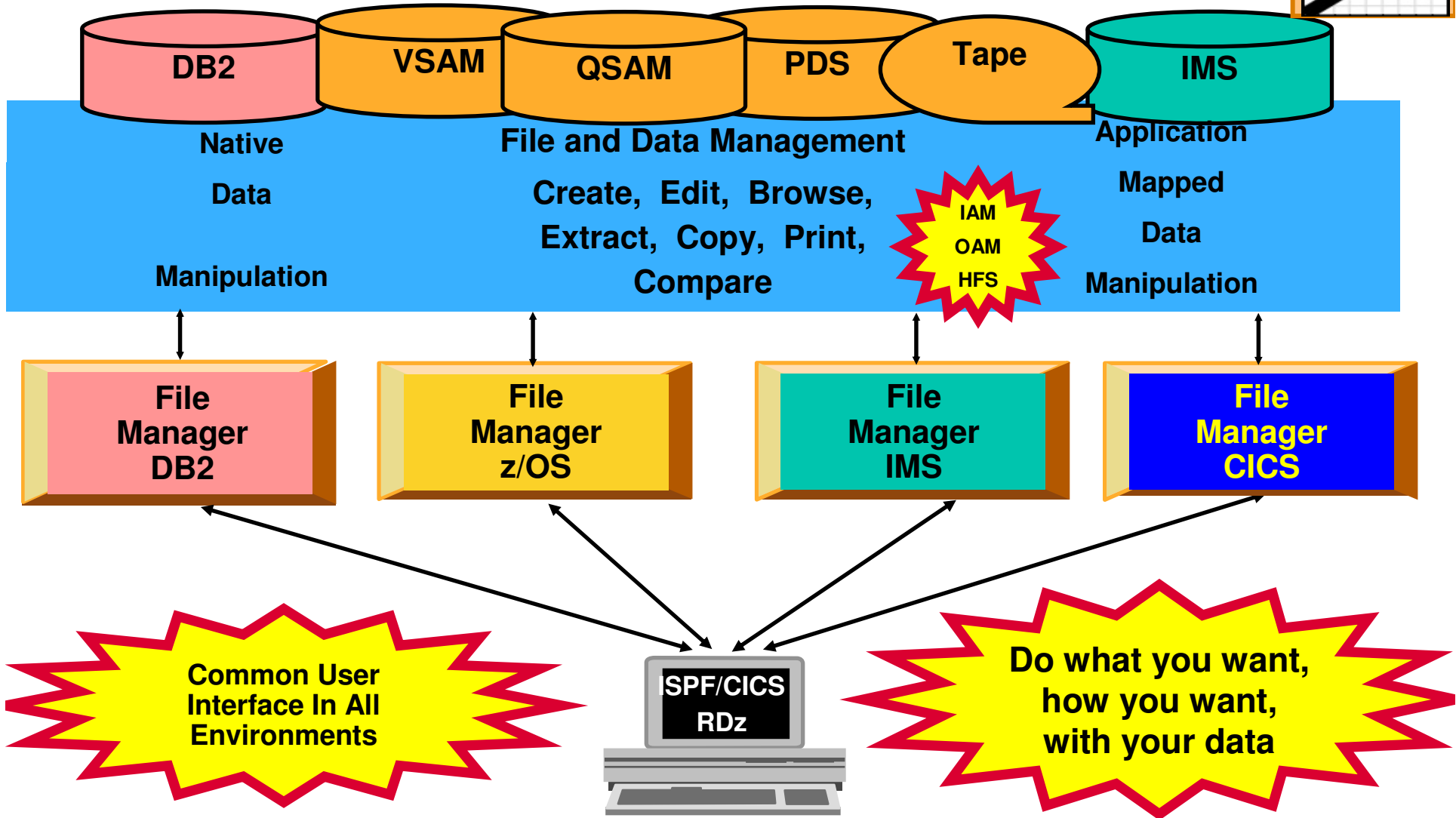
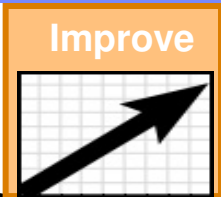


Fault Analyzer Features

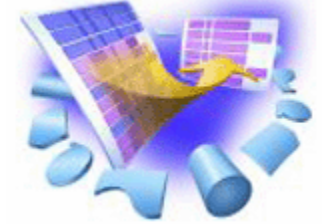
- Analysis at application level
- Information gathered at time of abend
- Translates low-level dump information into application-level information
- Expands abend code and message descriptions
- No recompile of applications
- No JCL changes
- No performance overhead
- Integrated 64-bit DB2 support
- Interface to File Manager for z/OS
- Modes Of Operation
 - ▶ Real-time analysis
 - ▶ Batch dump re-analysis
 - ▶ Interactive dump re-analysis
- Interfaces
 - ▶ ISPF
 - ▶ CICS
 - ▶ RDz
 - ▶ Web
- Support for IBM software
 - ▶ CICS TS 3.2
 - Channels and containers in 64-bit storage
 - Containers with XML data
 - ▶ DB2 V9
 - ▶ IMS V10



File Manager - *Manage a variety of enterprise data file structures*



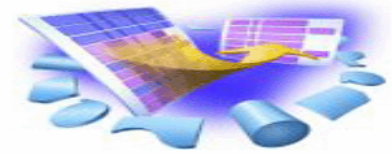
File Manager z/OS Features



- Full function edit and view
 - ▶ Table
 - ▶ Single
- Flexible selection criteria
 - ▶ Work with copybooks or templates
- Edit any file regardless of size
- Create data
- Print data
- Copy data
 - ▶ File reformatting
 - ▶ Scramble fields
- Catalog services
- Work with VTOC
- Compare
 - ▶ Data
 - ▶ Load Modules
- Search for and change data
 - ▶ Insert continuation JCL statement
- View or print
 - ▶ Copybooks
 - ▶ Templates
- Modes Of Operation
 - ▶ Interactive
 - ▶ Batch
- Interfaces
 - ▶ ISPF
 - ▶ CICS
 - ▶ RDz



File Manager CICS Features



- ISPF-like panels
- Full function edit and view
 - ▶ Table
 - ▶ Single
- Flexible selection criteria
 - ▶ Work with copybooks or templates
- CICS Resource
 - ▶ File
 - ▶ Temporary Storage
 - ▶ Transient Data
- Print data
- List Resources
- Support for extended addressability ESDSs
- Interface to File Manager z/OS
- Interface to File Manager IMS
- Modes Of Operation
 - ▶ Interactive
- Interfaces
 - ▶ CICS
- Support for IBM Software
 - ▶ CICS TS V3.2



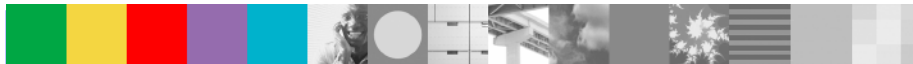
File Manager DB2 Features

- Edit and View data
 - ▶ Edit a DB2 Table or View
 - ▶ select rows and columns displayed
- Print
 - ▶ Table or Single format
 - ▶ select rows and columns
- Create and Drop DB2 objects
- Copy data
 - ▶ Select rows
 - ▶ Map columns from an input table to an output table
 - ▶ Reformat and generate data while copying
 - ▶ Scramble columns
- Work with a list of DB2 objects
 - ▶ Use line commands to initiate functions
- Generate JCL for DB2 utilities:
 - ▶ COPY, LOAD, REBUILD, RECOVER, REORG, and RUNSTATS
- Relational Edit
- Grant and Revoke DB2 privileges
- Import and Export data
 - ▶ Select Rows
 - ▶ Export to a file in default FM/DB2 format, a format defined by a copybook, or a comma-delimited file
 - ▶ Import from a file generated by the Export function, or a file described by a copybook
 - ▶ Scramble columns
- Execute SQL Statements
- Create and test new SQL statements
 - ▶ Two methods: Basic and Advanced
- Modes of Operation
 - ▶ Interactive
 - ▶ Batch
- Interfaces
 - ▶ ISPF
- Support for IBM software
 - ▶ DB2 V9

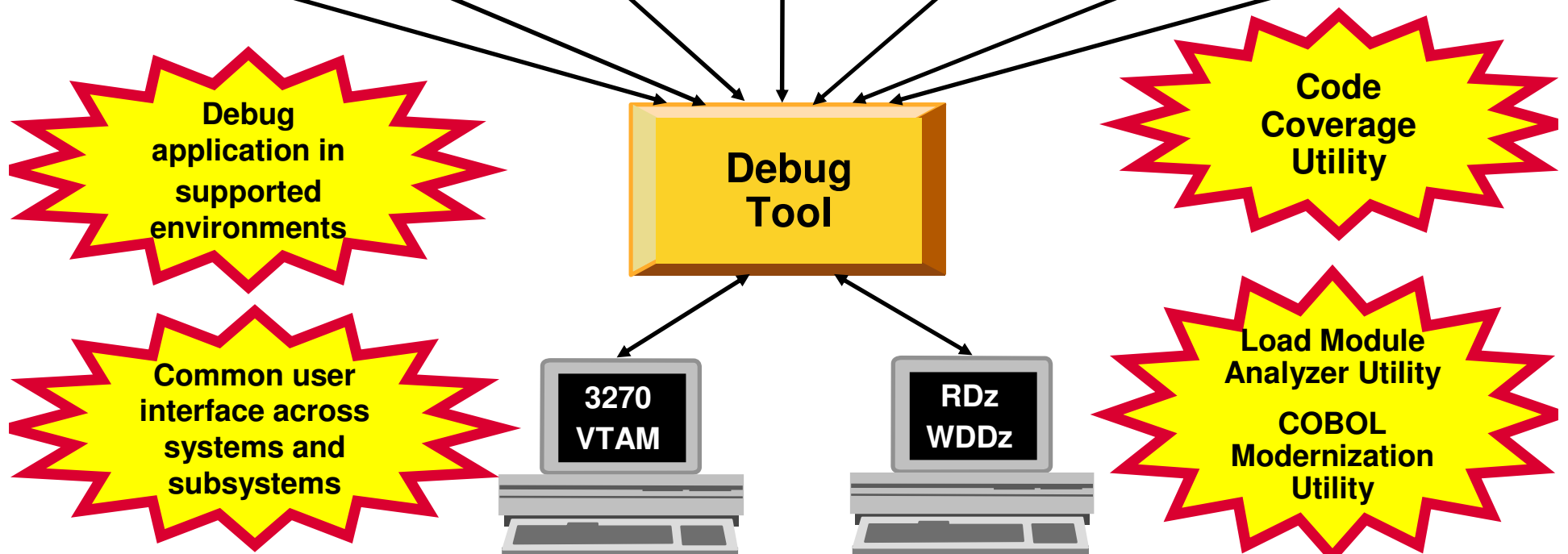
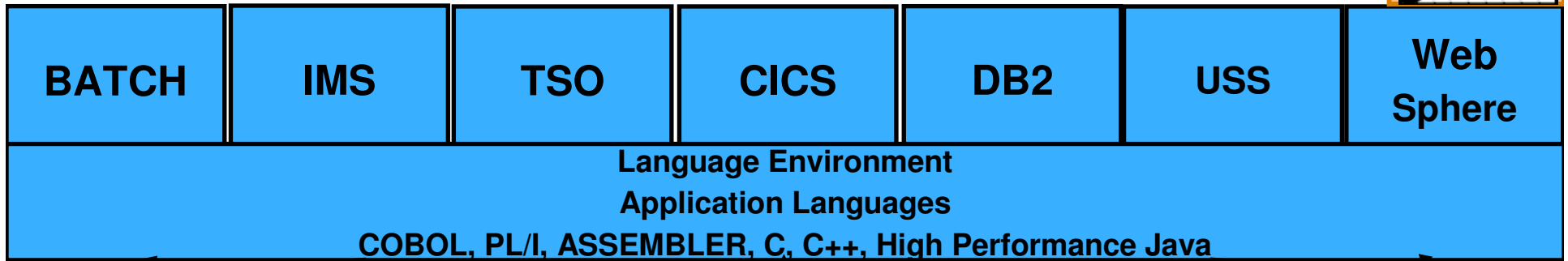


File Manager IMS Features

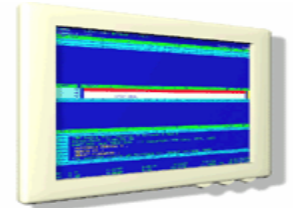
- Online utilities for IMS databases
 - ▶ Edit and Browse data
 - ▶ Extract segments from a database
 - ▶ Load segments into a database
- Support for processing databases using either:
 - ▶ physical DBD
 - ▶ logical DBD
- Access databases using either:
 - ▶ Static (existing) PSBs
 - ▶ Dynamic PSBs
- Process databases in alternate sequences using secondary indexes
- Support for HDAM, HIDAM, HISAM, HSAM, DEDB, MSDB
- Optional audit trail to record database updates
- Work with segments that have multiple layouts
- Optionally use COBOL or PL/I segment layouts to format data into fields
 - ▶ Edit and Browse segments in tabular or character format
 - ▶ Access source in PDS, PDSE, or Panvalet libraries
- Use flexible criteria to select segments for browse, edit, and extract processing
- Change segment selection criteria and formatting “on the fly”, while browsing or editing
- Modes of Operation
 - ▶ Interactive
 - ▶ Batch
- Interfaces
 - ▶ ISPF
 - ▶ CICS
- Support for IBM Software
 - ▶ IMS V10



Debug Utilities and Advanced Functions – *Debugging of enterprise applications to isolate coding issues*



Debug Tool Utilities and Advanced Functions Features



- Source-level debugging
- Multiple breakpoints
 - ▶ Conditional
 - ▶ Unconditional
- Step mode debugging
- Dynamic patching
 - ▶ Modify variables
 - ▶ Insert statements
- Command logging of debugging session
- Frequency sampler
- Programmable command entry
- Utilizes LE services
 - ▶ Breakpoints at LE conditions
 - ▶ Recovery of program abends
- Interactive playback support
- Automonitor support for COBOL, PL/I, and Assembler programs
- Save and restore sessions settings
- An interface to the Fault Analyzer
- Commands to query, allocate, and free files
- Object level disassembly debugging
- CICS
 - ▶ Detect storage violations
 - ▶ Memory editor and browser
 - ▶ Display channel and containers
 - ▶ Pattern-matching breakpoints
- 64-bit register support Assembler



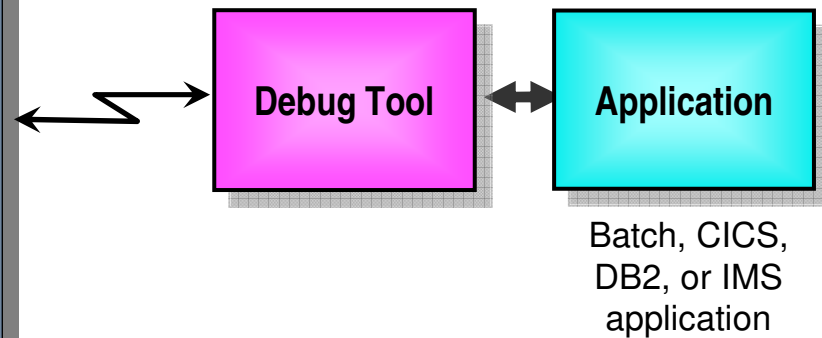
How do I interface with Debug Tool?

```

Session A - STLMVS1.WS - [24 x 80]
COBOL LOCATION: CBLATP2 :> 543.1
Command ==> Scroll ==> PAGE
MONITOR -----1-----2-----3-----4-----5-----6 LINE: 1 OF 4
***** TOP OF MONITOR *****
0001 1 OUTPUT-FLAG 'D'
0002 2 H1-CURR-DATE '01/05/03'
0003 3 GM-MSG-ID '01I'
0004 4 ACTION ' '
***** BOTTOM OF MONITOR *****

SOURCE: CBLATP2 --1-----2-----3-----4-----5--- LINE: 541 OF 939
541
542 DISPLAY 'ENTER Action:'.
543 ACCEPT SCREEN-INPUT.
544 MOVE FUNCTION UPPER-CASE (SCREEN-INPUT) TO ACTION.
545
546 ** End program when EXIT is entered and

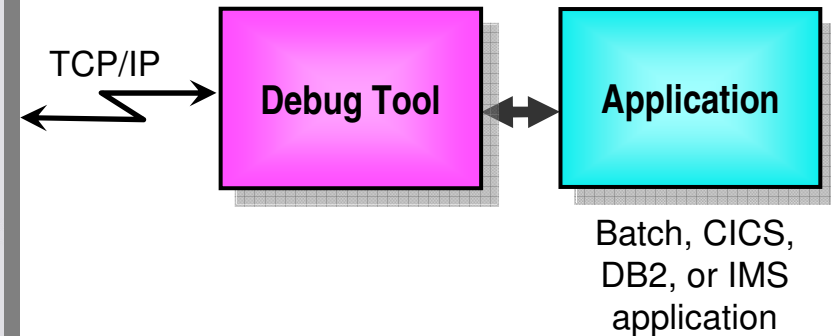
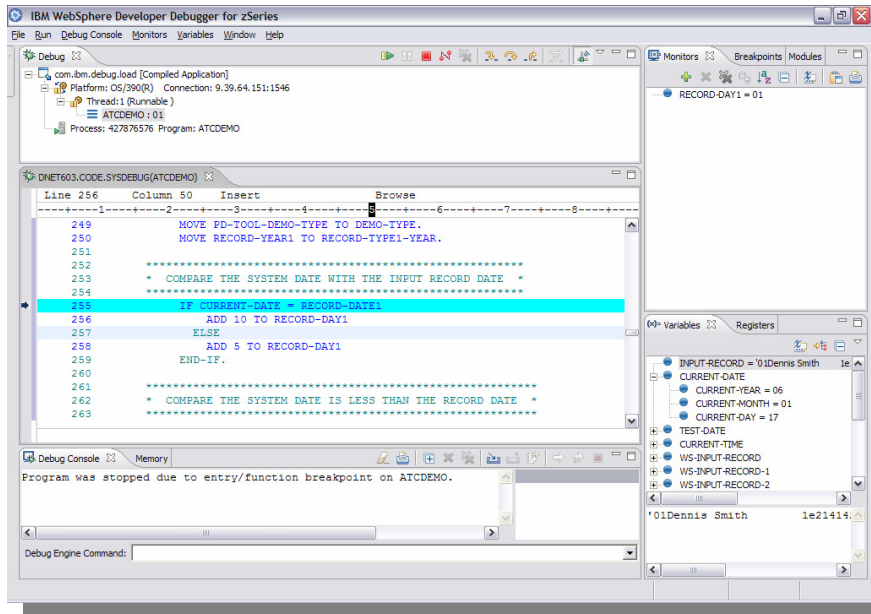
LOG 0-----1-----2-----3-----4-----5----- LINE: 36 OF 39
0036 GO ;
0037 You were prompted because the IGZ00H condition was raised in your program
0038 IGZ00H is a severity or class 3 condition.
0039 The current location is CBLATP2 :> CBLATP2 :> 543.1
PF 1:MON 2:STEP 3:QUIT 4:LIST 5:FIND 6:AT/CLEAR
PF 7:UP 8:DOWN 9:GO 10:ZOOM 11:ZOOM LOG 12:RETRIEVE
MA a A 03/002
  
```



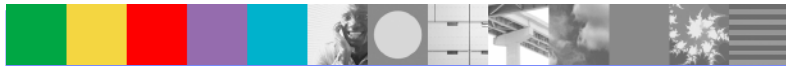
■ Full-screen mode

- ▶ 3270 interface
- ▶ Work with Debug Tool from a VTAM terminal
- ▶ Common interface for all z/OS runtimes, CICS, JES, IMS TM, DB2 Stored Procedures, etc.
- ▶ Debug Tool uses a terminal that you specify... your CICS or TSO terminal can be used

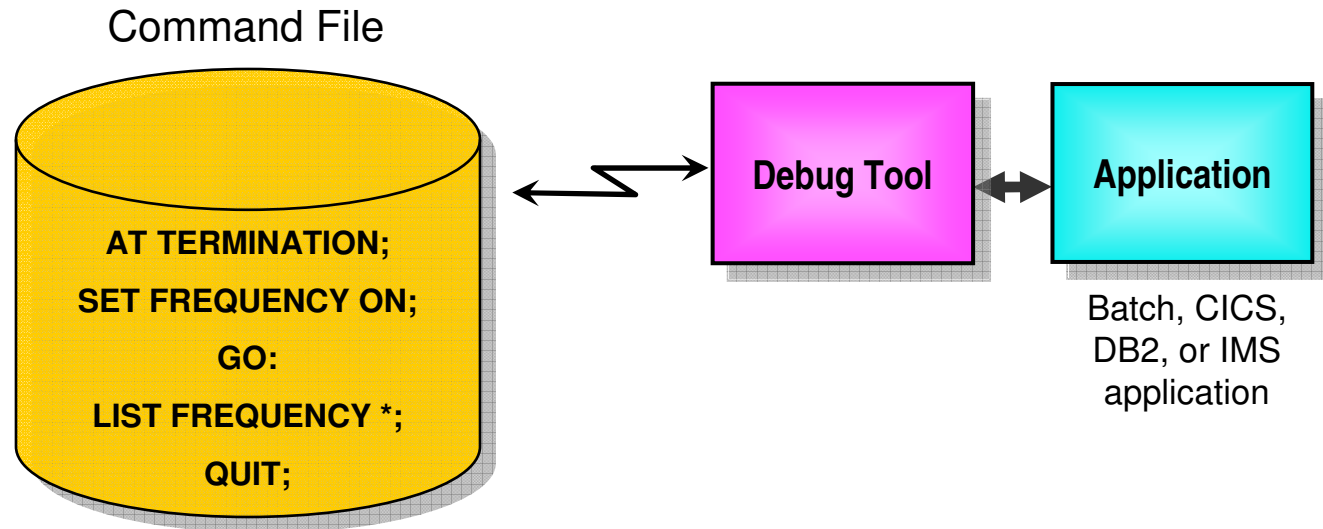
How do I interface with Debug Tool?



- *WebSphere Developer Debugger for zSystems (WDDz):*
 - ▶ the host application starts Debug Tool, which connects to a remote debugger on your workstation
 - ▶ Point and Click ease of use
 - ▶ Uses the GUI debug interface built into products such as:
 - *Eclipsed based Rational Developer for zSystems (RDz)*



How do I interface with Debug Tool?



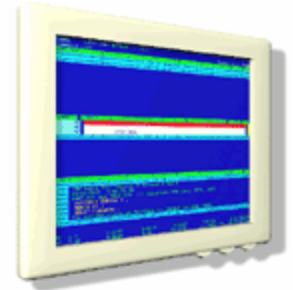
■ Debug Tool “Batch” Command File mode

- ▶ Invoke the application in the **background** under the control of Debug Tool commands
- ▶ Can drive the program to exception conditions and log runtime results for later diagnosis
- ▶ For creation of:
 - Regression Test cases
 - Production Runtime problem diagnosis

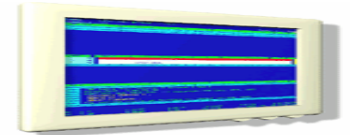


Code Coverage Utility Features

- Does not require any updates to the test case runtimes
- Supports any number of testers running multiple executions
- Accumulates coverage statistics across multiple runs
- Reports statement coverage
- Reports statement frequency
- Reports branch execution
- Provides 1403 reports for coverage
- Generates XML report output for migration



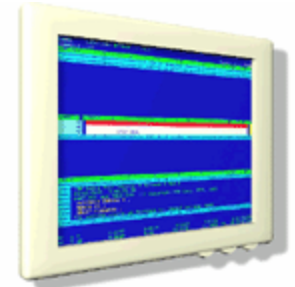
Load Module Analyzer Utility Features



- Reports compiler versions for all CSECTs that make up a load module
- Reports compile dates for all CSECTs that make up a load module
- Can be executed interactively from ISPF panels
- Can be submitted to run in batch
- Report display options are configurable:
 - ▶ Utility report features
 - ▶ Filter compiler versions reported
 - ▶ Filter CSECTs that are part of the LE runtime
 - ▶ Filter CSECTs that are part of the compiler



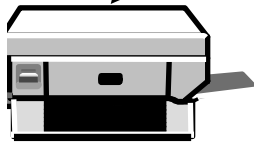
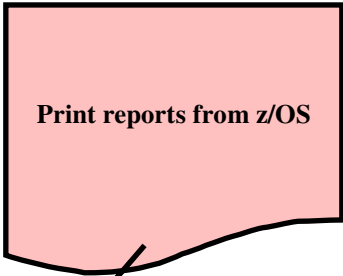
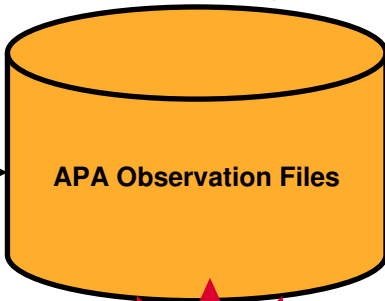
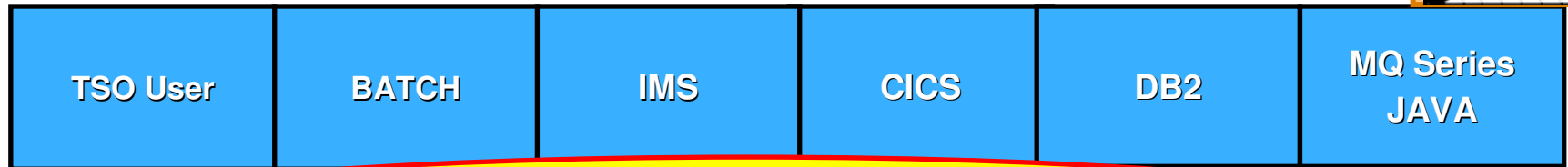
COBOL Modernization Utility Features



- Supports reporting and converting COBOL
- Converts standard 68 and 74 standard to 85
 - ▶ Reviews, reports, and converts COBOL source (including copybooks)
- Identifies COBOL language elements and CICS commands in the input source programs that are:
 - ▶ Not supported by the target language
 - ▶ Supported in a different manner
- Converts COBOL 74 & 68 elements to the equivalent in the target language
- Reports identification of source requiring conversion for COBOL 68 & 74 to COBOL 85
- Converts any COBOL compiler to current version fixing new KEYWORDS, etc
- Converted Source
 - ▶ Converted COBOL program source
 - ▶ Converted COBOL copy files



Application Performance Analyzer - Provides rapid pinpointing of enterprise application bottlenecks



View reports online with ISPF



View reports in PDF format on PC



Application Performance Analyzer Features



- Summary/Profile reports with drill down into detailed levels via an ISPF interface or PDF hardcopy
- CPU, Load Module, and CSECT analysis of all modules in the address space
- Source statement (COBOL or PL1) or instruction utilization in each CSECT
- Supports Fault Analyzer / Debug Tool Sidefiles
- Wait time analysis by category, task/module, or attribution
- DASD I/O analysis by device, DDNAME, dataset and dataset attributes, EXCP's, VSAM with buffer pool, I/O wait, over time
- SYSPLEX coupling facility reports
- CICS session statistics, transaction analysis by CPU usage, mean and total service time, and waits by transaction



Application Performance Analyzer Features



- DB2 SQL analysis – static and dynamic – service times
- DB2 analysis by DBRM, statement, and plan
- IMS CPU and service time analysis
- MQSeries analysis by queue, request, and transaction
- JAVA
- Unix System Services support
- Performance comparison
- Interval reporting
- Adjustable sampling rate
- Repeated observation sessions
- Internal (APA) and external (RACF, etc) security



Application Performance Analyzer Features



- Types of Observation Sessions
 - ▶ Real-Time
 - ▶ Scheduled
 - ▶ Via batch submission
- Non-intrusive performance analyzer for applications and systems programmers to
 - ▶ Improve response time in online applications
 - ▶ Improve batch turn around time
 - ▶ Identify excessive I/O activity
 - ▶ Identify excessive CPU usage
 - ▶ Test the effects of increasing workload
 - ▶ Isolate performance problems in new and existing applications
- Support for IBM Software
 - ▶ CICS TS V3.2
 - ▶ DB2 V9
 - ▶ IMS V10



Application Performance Analyzer Report Summary

CICS

Session Statistics
 CPU Usage by Txn
 Mean Service Time by Txn
 Total Service Time by Txn
 Service Time by Task Id
 Wait Time by Txn

Storage & Statistics

Measurement Profile
 Load Module Attributes
 Load Module Summary
 TCB Summary
 Memory Usage Timeline
 Data Space Usage Timeline
 TCB Execution Summary
 Processor Utilization Summary

DB2

Measurement Profile
 SQL Wait Time by Statement
 SQL Activity Timeline
 SQL Wait Time by Plan
 SQL Activity by DBRM
 SQL CPU/Svc Time by DBRM
 SQL Activity by Statement
 SQL CPU/Svc Time by Stmt
 SQL Activity by Plan
 SQL CPU/Svc Time by Plan
 SQL Statement Attributes
 SQL Threads Analysis
 SQL Wait Time by DBRM
 CPU by Plan/Stored Proc

Wait

Time by Task/Category
 Time by Task/Module
 Time Referred Attribution

CPU

Usage by Category
 Usage by Procedure
 Usage by Module
 Referred Attribution
 Usage by Code Slice
 Usage Timeline
 Usage Task/Category
 Usage Task/Module

IMS

Measurement Profile
 DL/I Call Timeline
 DL/I Transaction Timeline
 Transaction Activity Timeline
 Usage by PSB
 Usage by Transaction
 Usage by DL/I Call
 Transaction Service Times
 Transaction DL/I Counts

MQSeries

Activity Summary
 Serv Time by Txn
 CPU Usage by Queue
 Wait Time by Queue
 CPU Usage by Request
 Wait Time by Reque
 CPU Usage by Txn
 Wait Time by Txn
 Serv Time by Queue
 Serv Time by Request

DASD

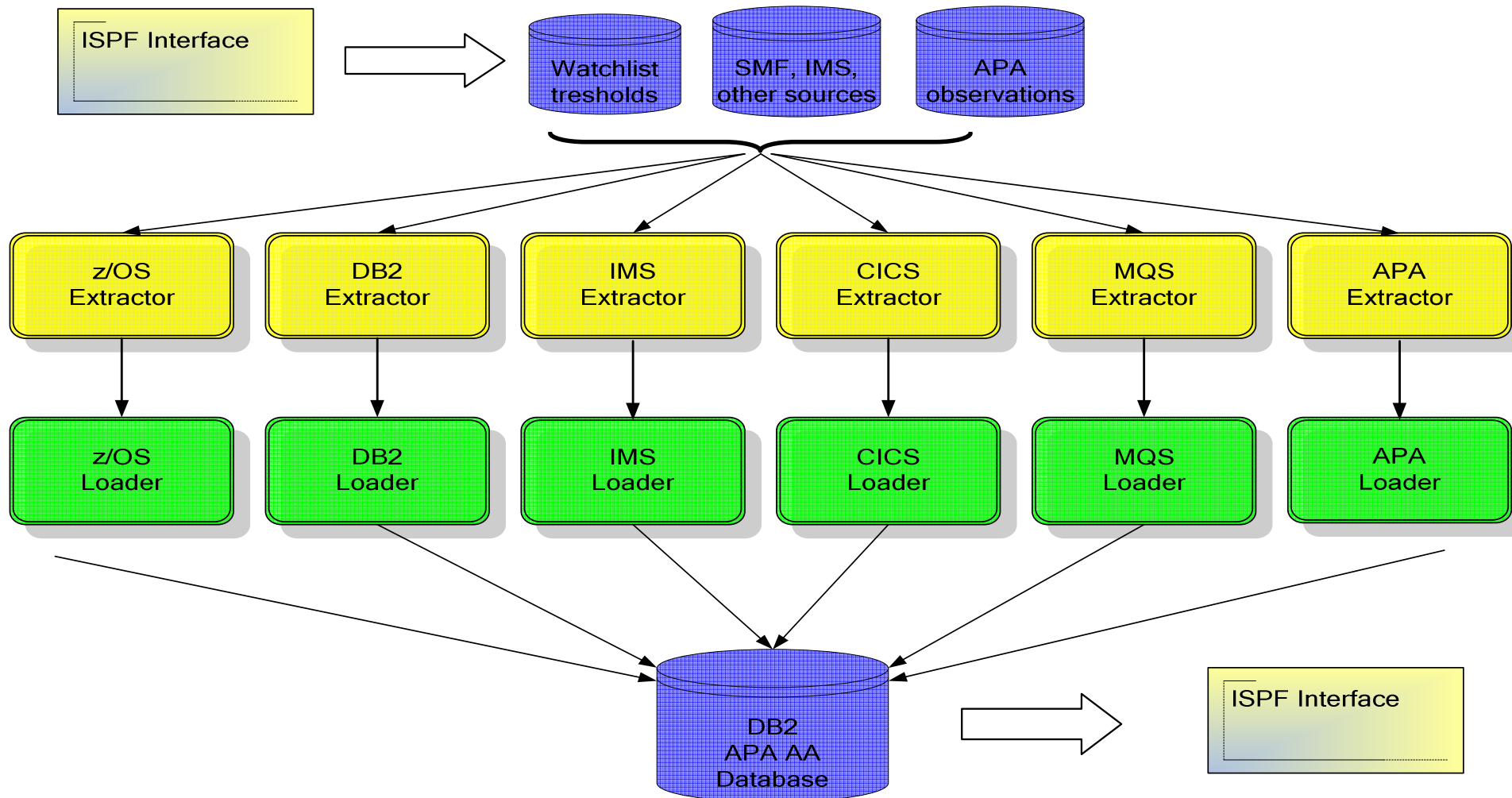
Usage by Device
 Activity Timeline
 Usage by DDNAME
 I/O Wait Time
 Usage by Dataset
 VSAM Buffer Pool Usage
 Dataset Attributes
 Summary
 DASD VSAM Statistics

Coupling Facility

Summary
 Mean Times
 Facility Total Times

Application Performance Analyzer

Automation Assistant - *Provides automation and integration of Application Performance Analyzer and its reports*



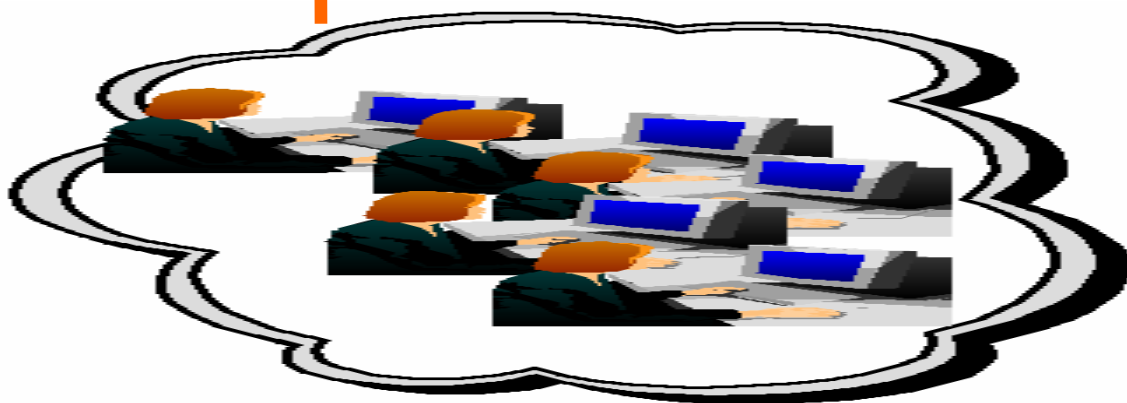
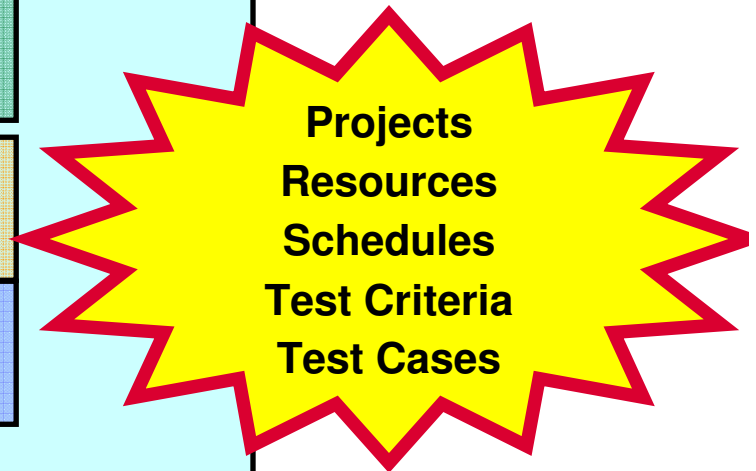
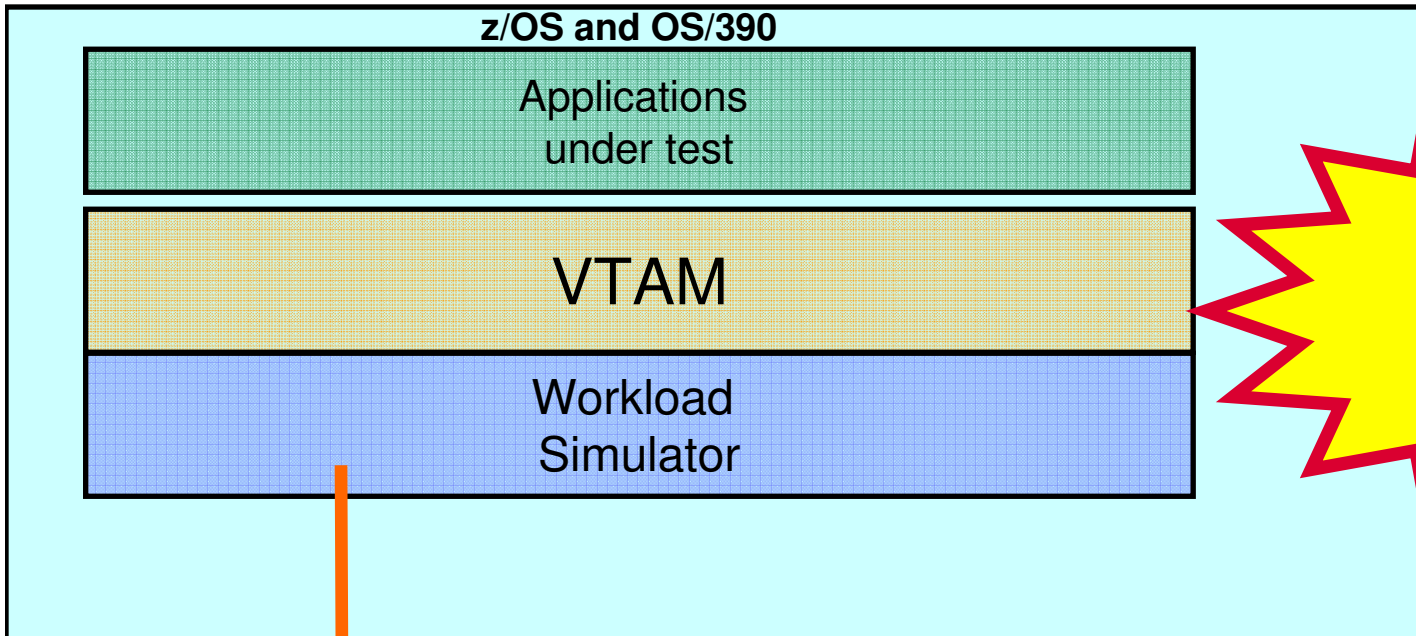
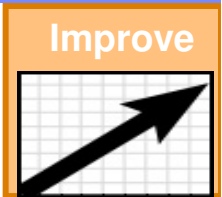
Application Performance Analyzer Automation Assistant Features



- Can eliminate up to 90% of the manual effort to manage application performance
- Reduces CPU utilization by definition of threshold values
- Allows customer to focus tuning efforts on jobs with the greatest CPU and runtime savings potential with user-defined thresholds
- Automatically identifies tuning opportunities across your entire batch and online mainframe environment, including Parallel Sysplex
- Provides measurement results that can be analyzed and stored
- Monitors program changes
- Provides performance history
- Environment and Threshold definitions (Watchlist)
 - ▶ Environment: Sysplex and Subsystem description
 - ▶ Threshold: To determine the candidates for a deeper analysis, two types available:
 - Absolute field values (CPU time, number of I/O, ...)
 - Relative performance fields (CPU consumption per second, I/O per second, ...)
- Include / Exclude Lists
- Filtering candidates in batch
- ISPF Interface
 - ▶ To retrieve data from the APA AA DB2 Performance Data Warehouse and show the candidates on Watchlists.



Workload Simulator - *Conducts Reliable Stress, Performance, Regression, Function And Capacity Planning Tests*



Workload Simulator Features

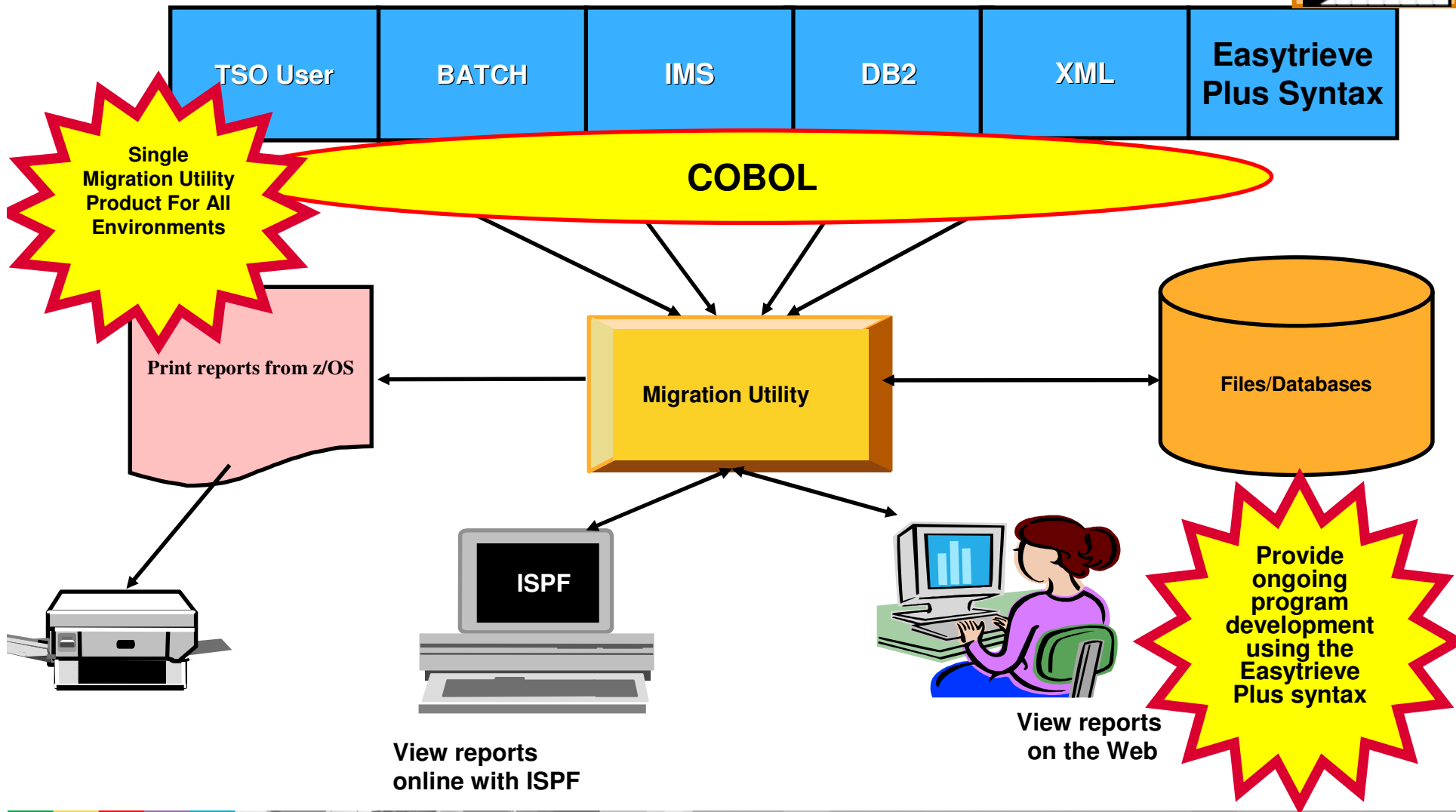


- Auto Generation Of Scripts
- Auto Generation Of Networks
- Controls Resource During Runs
- Simulates Different Terminals, Terminal Features And Terminal Operator Actions
- Executes Independently Of The System Under Test
- Provides utilities for post-test analysis
- REXX-like scripting language
- Conducts Reliable Stress, Performance, Regression, Function And Capacity Planning Tests
- Consistent Across Protocols
 - ▶ SNA, CPI-C, TCP/IP
- Consistent Across Operating Systems
 - ▶ z/OS & OS/390, MVS/ESA, VM/ESA



Migration Utility - Provides rapid development for adhoc requests

Improve



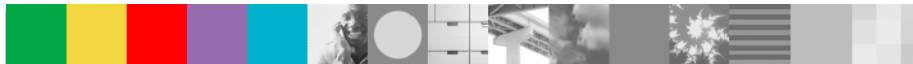
Migration Utility Features

- ▶ Existing and new Easytrieve Plus programs using Easytrieve Plus language can be processed by the Migration Utility product
 - Source code, written in Easytrieve Plus,
 - can continue to be maintained
- ▶ Programs written using Easytrieve Plus language can be converted to standard IBM COBOL
- ▶ Creates IBM standard COBOL syntax from Easytrieve Plus language statements without Easytrieve Plus installed
- ▶ Discovery Utility
- ▶ Batch Conversion Utility
- ▶ Parallel Testing and Electronic Output Comparison Utility
- ▶ Enables re-use of existing compiler JCL with only minor changes
- ▶ Enables re-use of existing application JCL with only minor changes

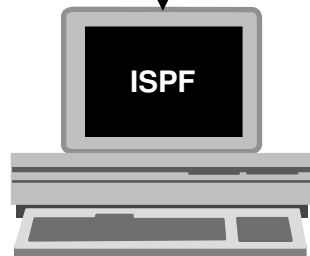
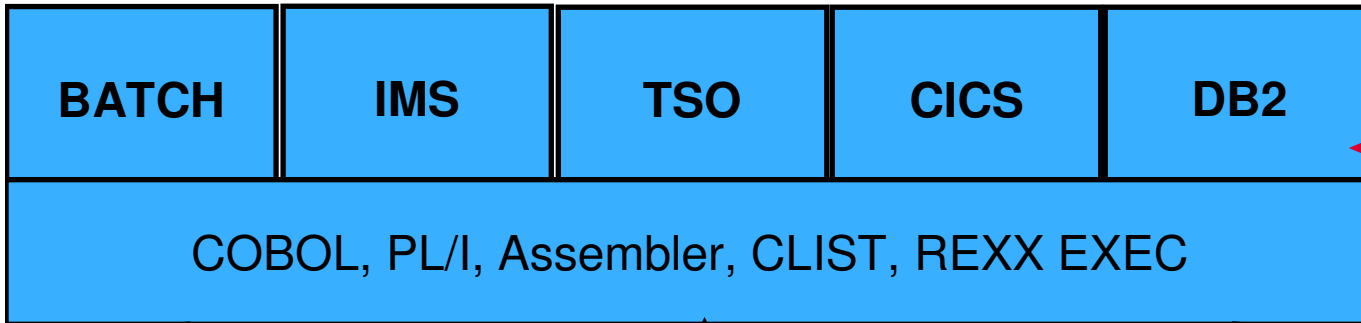
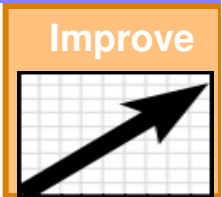


Migration Utility Features

- Provide automated conversion of Easytrieve Plus programs to COBOL
- Provide ongoing program development using the Easytrieve Plus syntax
- Provide an affordable high level development tool for COBOL Environment
- Provide a tool that will keep up with the changes in hardware technology
- Enables User to retain Easytrieve ease of use at a much lower cost
 - ▶ Lower annual cost
 - ▶ Possible machine cycle savings at run time



Application Time Facility – *Easy for programmers to specify the jobs to receive simulated dates*

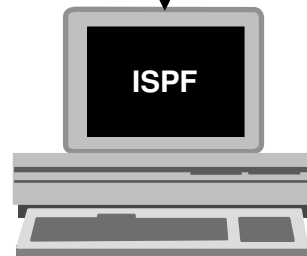
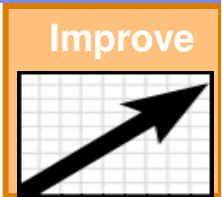


Application Time Facility Features

- Shifts time zones for on-line regions so users will see their local time or, so dated application file updates will have the local time
- Restarts a failing job at the date/time it failed, ensuring that file update and reports are not affected
- Allows jobs that, due to unavoidable circumstances, run over a deadline to finish "on time"
- Handles all clock formats including decimal, binary, timer units, microseconds and TOD clock format
- On-line ISPF interface makes it easy for programmers to specify the jobs to receive simulated dates on an individual basis, or as generic groups by using a wild card
- Allows testing of applications that are reliant upon timing, time zones, or time and date formatting without changing z/Series system date / time settings



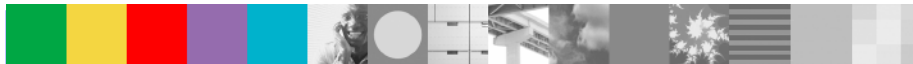
ISPF Productivity Tool – *Enhances TSO ISPF productivity*



Increases the productivity of ISPF users by packing various ISPF functions into the areas in which programmers most frequently work

ISPF Productivity Tool Features

- Consolidates commands within a single panel
- Presents a comprehensive, object-oriented, project-related list of data sets
- Provides extensive point & shoot capabilities
- Extended TSO command execution
- Automatic PDS compression
- Reduces keystrokes and EXCP counts
- Enhanced print and clipboard capabilities
-
- Improves ISPF navigation
- SCLM, Librarian, Panvalet Library support
- IPT increases the productivity of ISPF users by packing various ISPF functions into the areas in which programmers most frequently work, such as browse, edit ,member lists, and dataset lists.
- New commands and functions reduce the need to navigate to additional panels to perform utility functions. This results in reduced keystrokes and increase productivity.



Advantages

- z/OS Problem Determination and Deployment Tools that:
 - ▶ Exploits IBM's latest software and processor technology
 - ▶ Offer wide array of key features and functions
 - ▶ Can enhance the Application Development Lifecycle
 - ▶ Provide opportunity for increased user productivity
 - ▶ Are affordably priced
 - ▶ Have flexible terms and conditions
 - ▶ Have no license keys



For More Information

- **z/OS Problem Determination and Deployment Tools**

- ▶ www.ibm.com/software/awdtools/deployment
- ▶ www.ibm.com/software/awdtools/faultanalyzer
- ▶ www.ibm.com/software/awdtools/filemanager
- ▶ www.ibm.com/software/awdtools/debugtool
- ▶ www.ibm.com/software/awdtools/apa
- ▶ www.ibm.com/software/awdtools/apaaa
- ▶ www.ibm.com/software/awdtools/workloadsimulator
- ▶ www.ibm.com/software/awdtools/migration
- ▶ www.ibm.com/software/awdtools/tictoc/
- ▶ www.ibm.com/software/awdtools/ispfproductivitytool



For more information

- **Help Center**

- <http://publib.boulder.ibm.com/infocenter/pdthelp/v1r1/index.jsp>

- **Redbooks**

- www.redbooks.ibm.com/abstracts/sg247372.html



For More Information

- **Training**

- ▶ Services

- Mentor Workshops

- ▶ Free Web-based

- **Application Performance Analyzer**

- <http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp>

- **Debug Tools Utilities and Advanced Functions**

- <http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp>

- **Fault Analyzer**

- <http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp>

- **File Manager**

- <http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp>

- **Workload Simulator**

- <http://www-128.ibm.com/developerworks/websphere/education/enablement/wbt/sw747.html>

- **z/OS Problem Determination and Deployment Tools Can Be Ordered From Your IBM z/Series Sales Representative**



IBM PD Tools Product Identification

- Fault Analyzer for z/OS (5655-S15)
- File Manager for z/OS (5655-S14)
- Debug Tool Utilities and Advanced Functions for z/OS (5655-S16)
- Application Performance Analyzer for z/OS (5697-N63)
- Application Performance Analyzer Automation Assistant for z/OS (5799-HGC)
- Workload Simulator for z/OS & OS/390 (5655-I39)
- Migration Utility (5697-N44)
- Application Time Facility (5697-N42)
- ISPF Productivity Tool (5698-A81)





© Copyright IBM Corporation 2007. All rights reserved.

The information contained in these materials is provided for informational purposes only, and is provided AS IS without warranty of any kind, express or implied. IBM shall not be responsible for any damages arising out of the use of, or otherwise related to, these materials. Nothing contained in these materials is intended to, nor shall have the effect of, creating any warranties or representations from IBM or its suppliers or licensors, or altering the terms and conditions of the applicable license agreement governing the use of IBM software. References in these materials to IBM products, programs, or services do not imply that they will be available in all countries in which IBM operates. Product release dates and/or capabilities referenced in these materials may change at any time at IBM's sole discretion based on market opportunities or other factors, and are not intended to be a commitment to future product or feature availability in any way.

IBM, the IBM logo, the on-demand business logo, Rational, the Rational logo, and other IBM products and services are trademarks of the International Business Machines Corporation, in the United States, other countries or both. Other company, product, or service names may be trademarks or service marks of others.

