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# CICS Tools Overview

## May 2006



CICS Tools | IBM UK Laboratories

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## Preface

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## Agenda

- Overview of IBM eServer zSeries tools strategy
- CICS Tools - features and benefits:
  - ▶ **CICS Application Transformation**
    - CICS Business Event Publisher for MQSeries
    - CICS Interdependency Analyzer
    - CICS VSAM Transparency
  - ▶ **CICS Subsystem Management**
    - CICS Configuration Manager
    - OMEGAMON XE for CICS
    - CICS Performance Analyzer
    - Managing VSAM
      - CICS VSAM Recovery
      - CICS VSAM Copy
      - CICS Batch Application Control
    - Improving end-user access to CICS applications
      - Session Manager
      - CICS Online Transmission Time Optimizer
- How CICS Tools can aid CICS version migration and improved auditability
- Bibliography



This presentation will give you an overview of the CICS Tools portfolio.

## CICS for On Demand Business

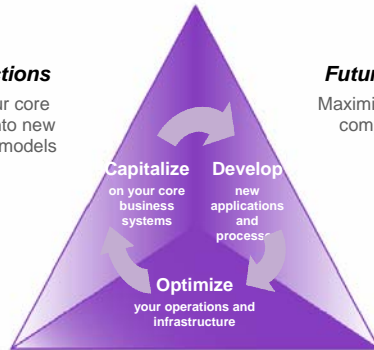
### ***CICS is the foundation of your business***

#### **High-value transactions**

Extend the value of your core business transactions into new and profitable business models

#### **Future-directed development**

Maximize the value of your assets for composite applications and new business models



#### **Cost-effective operations**

Match the time-proven integrity of CICS with lower overall cost per transaction

**CICS associated with**  
**WebSphere** software



## CICS/zSeries tools ....



### High-value transactions

- ... for even faster access to new business models built on your CICS transactions
  - ▶ App modernization tools *To align your existing CICS assets with latest technology*
  - ▶ Integrity/security tools *To maintain the value of your CICS assets*



### Future-directed development

- ... to help you develop even more value for your assets in applications of the future
  - ▶ Integration tools *To help you compose new business models with CICS assets*
  - ▶ App development tools *To build new CICS applications with latest technology*
  - ▶ Test/QA tools *To speed your new CICS applications to production*



### Cost-effective Operations

- ... for managing every aspect of CICS systems for lower overall cost per transaction
  - ▶ Systems Mgmt tools *To gain simpler management of resources and relationships*
  - ▶ VSAM Data tools *To manage your CICS data resources for optimum utility*
  - ▶ Performance Mgmt tools *To maximize throughput in your CICS systems*





## High-value transactions

Tools for even faster access to new business models built on your CICS transactions

- **App modernization tools**      *To align your existing CICS assets with latest technology*
  - ▶ CICS Business Event Publisher ... enables CICS applications to drive new business processes via WMQ
  - ▶ Host On Demand ... provides secure access to host applications and data from a Java-enabled Web browser
  - ▶ HATS ... enables rapid migration of CICS applications to the Web, with no programming needed
  - ▶ CICS VSAM Transparency ... enables migration of data from VSAM to DB2 without modification applications
  
- **Integrity tools**      *To maintain the value of your CICS assets*
  - ▶ CICS VSAM Recovery ... to recover CICS VSAM data from physical and logical corruption





## Future-directed development

Tools to help you develop even more value for your assets in applications of the future

■ **Integration tools**      *To help you compose new business models with CICS assets*

- ▶ WD4z ... to help you rapidly integrate WebSphere and CICS traditional transactional environments
- ▶ WD4z and Service Flow Modeler ... to help you build new process flows with CICS applications

■ **App development tools**      *To build new CICS applications with latest technology*

- ▶ WebSphere Developer for z/OS ... simplifies the skills needed to develop component-based CICS apps for the Web
- ▶ WS Asset Analyzer ... to help you modernize and integrate your existing application assets
- ▶ CICS Interdependency Analyzer ... helps you understand runtime behaviour of CICS applications
- ▶ Application Transformation Workbench ... to help restructure and align applications with business needs

■ **Test/QA tools**      *To speed your new CICS applications to production*

- ▶ WS Application Monitor ... helps improve application availability with real-time problem detection and repair
- ▶ File Manager ... comprehensive development tool for working with databases and OS/390 data sets
- ▶ Fault Analyzer ... helps developers analyze and fix CICS application and system failures
- ▶ Debug Tool and Advanced Utilities ... provides extended debugging capability for maximizing the availability of CICS apps
- ▶ Application Performance Analyzer ... Optimize the performance of your existing application
- ▶ Workload Simulator ... to reduce costs associated with manual load and performance testing





## Cost-effective operations

Tools for managing every aspect of CICS systems for lower overall cost per transaction

■ **Systems Mgmt tools** *To gain simpler management of resources and relationships*

- ▶ CICS BAC ... simplifies managing batch processes that share resources with CICS online transaction systems
- ▶ CICS Configuration Manager ... to manage creation of, deployment and changes to resource definitions
- ▶ Session Manager ... secure single point access to multiple zSeries systems
- ▶ CICS OTTO ... to improve network response time and limit impact on critical, routine operations

■ **VSAM Data tools** *To manage your CICS data resources for optimum utility*

- ▶ CICS VSAM Recovery ... to recover CICS VSAM data from physical and logical corruption
- ▶ CICS VSAM Copy ... creates non-disruptive copies of VSAM datasets, vital for an on-demand environment
- ▶ Catalog Recovery Plus ... provides VSAM catalog backup and forward recovery capability, diagnosis & repair facilities

■ **Performance Mgmt tools** *To maximize throughput in your CICS systems*

- ▶ CICS Performance Analyzer ... reports all the information you need to maintain optimum service levels
- ▶ OMEGAMON XE for CICS ... monitor and manage CICS transactions at the big picture and granular levels
- ▶ Application Performance Analyzer ... provides the information to help find problem areas in an application
- ▶ CICS Interdependency Analyzer ... helps you automatically collect, manage and analyze information for workload balancing







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## CICS Tools Overview

## CICS Application Modernization



**ON** DEMAND BUSINESS™

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## Transform your CICS applications

Extend and modernize  
CICS applications  
efficiently

Improve programmer  
productivity

Increase customer  
satisfaction

Enable IT for SOA

### CICS Application Modernization Tools

#### CICS Business Event Publisher for MQSeries®

- Create and manage outbound events using WebSphere MQ without changing existing CICS applications

#### CICS VSAM Transparency

- Enable VSAM to DB2 migration without rewriting applications

#### CICS Interdependency Analyzer

- Understand your active application inventory for efficient maintenance and upgrades

#### Also critical:

#### WebSphere Studio Enterprise Developer

- Efficiently develop and maintain a new generation of CICS COBOL or JAVA applications

These CICS tools are especially useful in speeding “time to value” in an application transformation project.

They speed up new application development and application changes, or enable integration of CICS applications and data unchanged into the new on demand processes.

## Today's Business Challenges

- **Unconnected infrastructure investments**

- Provide seamless integration with new business units
- Link packaged applications with legacy systems

- **Accelerated costs of managing disparate systems**

- Integrate across heterogeneous islands of automation
- Mitigate people and skill shortages

- **Increased industry and government regulations**

- Industry standards - Example: Walmart driving consistency across supply chain with UCCNeT

- **Reaching new markets with critical speed**

- Support new standards like process automation
- Maintain system and asset security

*IT projects can take too long and cost too much*

*Achieving 'Time to Value' is critical to business success*



## What is CICS Business Event Publisher for MQSeries?

- CICS Business Event Publisher for MQSeries (CICS BEP)
  - ▶ Creates MQPUT messages for MQSeries queue from events and associated information
  - ▶ Based on user-specified message content rules, Queue names and MQPUT options
  - ▶ Provides easy to use workstation GUI for selection and rules creation
- Helps integrate legacy applications and data to new environments (CICS, IMS and DB2 events)
  - ▶ Real time action and results
  - ▶ Offers low cost, low risk integration strategy
- Current version - CICS Business Event Publisher for MQSeries V1.2
  - ▶ GA May 2004

CICS Business Event Publisher for MQSeries, V1.2 enables extension and re-use of existing CICS applications and mainframe based data, through events, to drive new business processes and utilize new technology. This can be done quickly and without changes to existing applications or data.

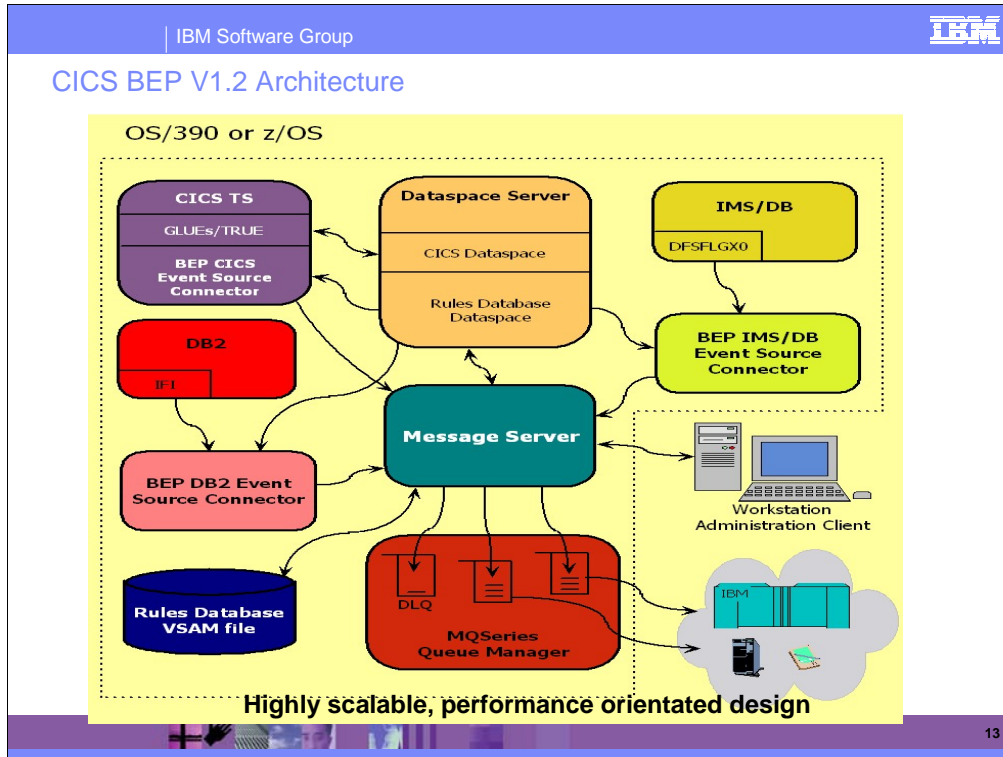
The tool generates user-defined WebSphere MQ messages as a result of certain EXEC CICS commands being executed by an application, or when VSAM, DB2 or IMS data is modified. This message generation is transparent to the application program, which remains unchanged when CICS BEP V1.2 is used. Rules control the generation of the WebSphere MQ messages, which are defined using a Microsoft Windows-based GUI. The rules allow the user to determine which events are published and also the content of the resulting messages.

CICS Business Event Publisher for MQSeries V1.2 can be used to quickly and efficiently extend your applications and data to new environments without programming change.

The uses for CBEP are numerous and varied. The obvious uses are the tighter integration of existing mainframe applications into “Enterprise Application Integration” and “Business to Business” projects.

The key concept to understand and remember is that if 1) you can “see” all of the events (and their associated data) occurring within an application, 2) you know the format of the data, and 3) you can selectively create messages based on the events and data, the possibilities are endless. For Example:

**Event notification:** New customer added. Old customer dropped. New orders,



This diagram is the “minimum” configuration for using CICS BEP. In addition to this configuration, the message server can receive messages from multiple event sources, and can put messages to multiple MQSeries queue managers.

**CICS BEP consists of five major components:**

- ▶ **Data space server** - “owns” persistent data spaces used by the message server and event source connector,
- ▶ **Message server** - responsible for writing messages to MQSeries message queues,
- ▶ **Event source connectors (CICS/IMS/DB2)** - responsible for monitoring events, matching events to rules, and creating messages when appropriate,
- ▶ **Rules database** - repository for rules on the mainframe, and
- ▶ **Workstation administration client** - used to create and maintain all of the objects (rules, rule groups, and group lists) in the rules database.

**Performance**

CICS BEP was designed with scalability and performance in mind. It has optimized its communication between its own components and uses EXCI between CICS components. All eligibility determinations are done by field level comparisons for speed. The DB2 and IMS support uses asynchronous process and so has virtually no impact on existing application or database operations. The Message Servers provides for scalability and high performance with multiple TCBS, load balancing and security. During testing no appreciable impact on performance was measurable. However, as expected, CPU utilisation has increased.

## CICS BEP Workstation Client

The image displays two screenshots of the CICS Business Event Publisher for MQSeries workstation client interface.

**Left Screenshot: Rule Type Selection**

The window title is "The current rule is NEW ORDER". The "Rule Type" tab is selected. The interface prompts the user to "Select one of the resource types on this page". A caution message states: "CAUTION: Changing the Resource Type for a Rule will cause all Resource-dependent values in the Rule to be reset to their default values resulting in the loss of the existing values." The "CICS Resources" section is circled in red, with "File Control (VSAM)" selected. Other resources listed include Temporary Storage Queues, Transient Data Queues, Interval Control, and Program Control. The "CICS Transaction Include/Exclude" section has "Transaction Include" selected.

**Right Screenshot: Selection Criteria**

The "Selection Criteria" tab is selected. The "File Name" field is set to "ORDRFILE". The "Enter Selection Criteria" section has "Selection Criteria Enabled" checked. A note states "All fields below are case sensitive". Under "Select by Transaction ID", "Include" is checked and "ORDR" is entered. Under "Select by User ID", "Include" is checked. Under "Select by Terminal ID", "Include" is checked. Under "Select by APPLID", "Include" is checked. An "Advanced Selection Criteria" button is visible. The "Intercept These Request Types" section has "WRITE" checked, and "REWRITE", "READ", "READ With Update", "STARTBR", "RESETBR", "READNEXT", "READNEXT With Update", "READPREV", "READPREV With Update", "ENDBR", "DELETE", and "UNLOCK" are unchecked.

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Left – define rule types, what CICS resource and I trying to have intercepted. We have chosen file control as type we want to intercept

Right – selection criteria is specific for file control. First field is file name.

Same screen, tabs at top allow you to define different parts of the rule.

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## Workstation Client: DB2 Example

### Rule Type Tab

- CICS, DB2 and IMS categories
- For DB2;
  - ▶ User should select DB2 Database Changes
  - ▶ Then click on Selection Criteria tab

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### Rule Type Tab

The Rule Type tab on the Rule Definitions panel lets you specify the type of resource you want to monitor for events matching certain criteria. To select the appropriate resource, click on it. Only one choice is allowed for each rule that you define. If you want to monitor more resource types, simply create more rules (after you have finished filling out all tabs for the current rule).

The following resource types are available for selection:

**CICS Resources:** You can monitor CICS resources and requests such as VSAM files, Temporary Storage Queues, Transient Data Queues, Interval control requests, and Program Control Link requests.

**CICS Transactions:** You can define transaction IDs to include or exclude. If you select either of these options, the last three tabs will disappear and only the Rule Type tab and Selection Criteria tab will be available.

**DB2 Events:** You can define DB2 events to be published. These are based upon DB2 tables and the type of table change (INSERT, UPDATE and/or DELETE).

**IMS Events:** You can define IMS events to be published. These are based upon IMS database and segment changes such as REPLACE, INSERT or DELETE database calls.

**Warning:** Changing the Resource Type for an existing rule will cause all resource-dependent values in the rule to be reset to their default values, discarding your selections.

## CICS Business Event Publisher – Possible Uses

- Event notification – new customer added, account = zero
- Activity Audits – who, what, when is accessing the file?
- Error notification – create message when error detected
- Threshold notification – stock running low
- Automation – removal of manual activity or latency in business process
- Data source for Message Brokers
- Data transfer
- External logging or notification

### Value:

- No change to existing application programs or data
- Extends legacy to new environments



The uses for CBEP are numerous and varied. The obvious uses are the tighter integration of existing mainframe applications into "Enterprise Application Integration" and "Business to Business" projects.

The key concept to understand and remember is that if 1) you can "see" all of the events (and their associated data) occurring within an application, 2) you know the format of the data, and 3) you can selectively create messages based on the events and data, the possibilities are endless. For Example:

**Event notification:** New customer added. Old customer dropped. New orders, new purchases, new sales, past due notification, etc.

**Activity audits:** Answer questions such as: Who uses what files and fields, when are they used, from what location and by which programs? Help Generate test plans. Help in design of new system - what is important in the legacy system and should be included in the new system? What is never used? In many cases no one remains in the company who really understands the legacy application. BEP can be used to help model the application access patterns.

**Error notification:** CICS BEP to generate a message when an application error occurs.

**Threshold notification:** Stock on hand falls below a certain value, stock on hand exceeds a certain value. Message sent to notify that action needs to be taken or cause action to happen via electronic supplier notification.

**Automation - Replace Batch Operations (7X24 world):** Traditionally, many activities are deferred until the files are taken off line and processed in batch. For example, generate customer letters and E-mails, post other files, etc. With CICS BEP, the changed information can be fed real time to an asynchronous process where the same batch activities can be done in near real time. Timeliness is improved without effecting online response time.

**Data Source:** Another key use of CICS BEP is to allow mainframe application to become a "data source" for message brokers. WebSphere MQ Integrator can perform wondrous feats with messages, once it receives them. However, for the most part, if mainframe applications are to be the source of messages for MQI, existing code must be changed or new code must be written. CICS BEP lessens the changed/new code requirement by allowing existing applications to create MQ messages without changing code.

Because CICS BEP honors the CICS unit-of-work, it can be used as the "send side" of a real-time data propagation application.

There are many other uses for CICS BEP, limited only by one's imagination.

There are two key values inherent in CICS BEP:

1. Using its event publication capability using the MQSeries transport, host applications and data can be easily extended to new non mainframe environments
2. This can be done without change to the original application or data



## What is CICS Interdependency Analyzer ?

- **CICS Interdependency Analyzer for z/OS (CICS IA)**
  - ▶ Run-time and batch reporting tool
  - ▶ Captures resource relationships such as
    - what programs have potential affinities due to the CICS API commands within them
    - which resources (Programs, Files, TSQs TDQs etc) are required by a transaction
    - what resources are no longer used
    - which transactions have affinities to other transactions and the type and lifetimes of these affinities
    - the sequencing of transactions within an application
    - which transactions have affinities to particular CICS regions
    - Includes CICS, DB2, WebSphere MQ and IMS DB resources
  - ▶ Relationship data loaded onto a DB2 data base
    - Query interface and sample queries provided for comprehensive analysis
- **Product Number - 5697-J23**
- **CICS IA 2.1 GA - November 2005**
- **Releases Supported ...**
  - ▶ CICS Transaction Server for z/OS, Version 3.1 and 2.3
  - ▶ CICS Transaction Server for OS/390, Version 1.3

IBM CICS Interdependency Analyzer for z/OS™ is a powerful tool that automates detection of runtime resource relationships within your CICS system, records this data in a DB2® database, and provides flexible reports to help you analyse the collected information, build a relationship roadmap and use this data in your daily operations. Resources identified include those associated with transactions, programs, Basic Mapping Support (BMS) maps, files, temporary storage (TS) queues, transient data (TD) queues, 3270 Bridge facility, Web Services, CorbaServer, and Enterprise JavaBeans(5) (EJBs). It also reports on DB2(R), IMS(TM), and MQ resources which are used by CICS. The on-line queries CICS IA provides, enable you to perform detailed resource relationship analysis (e.g. what transactions run in which regions, what affinities were found for a program), as well as resource comparison (e.g. comparison of applications across regions).

IBM CICS Interdependency Analyzer helps you to:

Improve your ability to maintain, enhance, and migrate your business applications

Make an informed decision on the best way to split workload and move applications to more CICS regions

Minimize the impact of routine application maintenance for the end user

Unlock potential for improved application design

Helps implement workload balancing across CICSplex and Sysplex to provide continuous availability

Implement faster application reuse and integration with on demand processes

## Why do you need CICS Interdependency Analyzer?

*Maintaining, extending and enhancing your CICS applications more efficiently*

### Does any of this apply to you?

- CICS systems and applications evolved over many years (as many as 30!)
- Many changes to the applications went undocumented
- Some documentation went missing
- Source code is missing
- Even if the source code and documentation are available, the runtime application behavior differs from the original design (e.g. changed by use of exits)
- You have been through a merger/acquisition, so the information about inherited CICS systems is not available, or, if some available, time spent on the discovery process is critical to avoid business disruption
- You are providing outsourcing services, and need a complete picture of CICS resource relationships in your customer systems
- You are implementing workload balancing and need to identify affinities
- You need to minimize impact of CICS application maintenance for your customers

### Potential problems:

- Costly and lengthy manual investigation
- Errors during the application changes
- High application maintenance costs
- ...even outages

### Information provided by CICS IA can help to:

- Use CICS resources more efficiently
- Balance application workload for continuous availability
- Improve the speed and reduce cost of application maintenance
- Reduce time of problem resolution
- Improve CICS systems and application design
- Minimize the impact of routine application maintenance for the end user

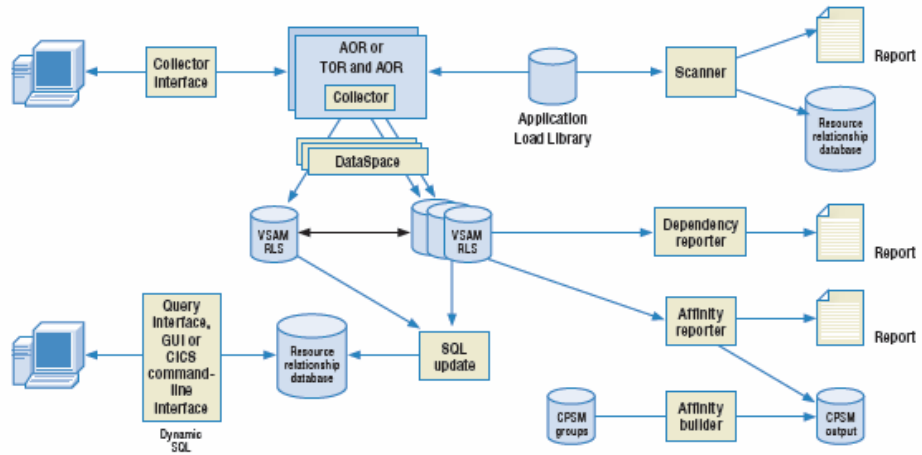
CICS customers are looking to reuse and maintain their core asset, CICS applications, more efficiently, at a lower cost. As you can see from this chart, CICS Interdependency Analyzer offer the capabilities CICS customers need to reduce time and effort of application reuse and maintenance. CICS IA helps our customers to understand their CICS applications (some over 30 years old! With documentation lost or incomplete) in order to maintain and update these applications with the full knowledge of resource relationships involved.

## How do customers use CICS IA

- **Large retail company**
  - ▶ Complex business applications handling POS terminals, high number of regions
  - ▶ DB2 skills
  - ▶ Need to allow any transaction to run in any CICS region to improve availability
    - all of the transactions must be examined to eliminate restrictions or affinities that may exist today
  - ▶ Time pressure
  - ▶ Solution – CICS IA
    - Automates collection of the data they need
    - Loads data in a DB2 database for ease of processing
    - Helps create CSD definitions when applications are moved to a different region
    - Post-change 'health check'
    - Also, help speed problem determination
      - E.g. Easily determining the logical flow of programs within a transaction
- **Large bank**
  - ▶ Need to consolidate data centres following mergers/acquisitions
  - ▶ Hundreds of CICS regions, transactions not following naming conventions
  - ▶ Solution – CICS IA
    - Used to define applications to clarify the picture of transaction and resource flow
- **Large outsourcing company**
  - ▶ Incorporate the workloads of their customers into their data centers
  - ▶ These workloads are often not documented well and need 'cleaning up' following acquisitions/mergers and other changes
  - ▶ CICS IA is used to understand the workloads and identify potentially dead code



# CICS Interdependency Analyzer architecture



## CICS Interdependency Analyzer – Overview

- **Collector**
  - ▶ Gathers information on resource interdependencies and affinities
  - ▶ Staged to VSAM file through Dataspaces for reduced overhead
  - ▶ Option to reload Dataspace from VSAM file at CICS restart
- **Resource Relationship Database**
  - ▶ Contains accumulated data about all your applications and the resources that they use.
  - ▶ Contains affinity data
  - ▶ Updated from VSAM files under operator control
  - ▶ Contains user-defined Applications using SQL statements
- **The Query Interface**
  - ▶ A comprehensive set of Structured Query Language (SQL) queries allows you to use the collected data to gain a detailed level of understanding of end-to-end resource relationships
    - By resource type, for example
      - All files used by application AP1
      - All transactions started by transaction TRN1



## CICS Interdependency Analyzer – Overview (continued)

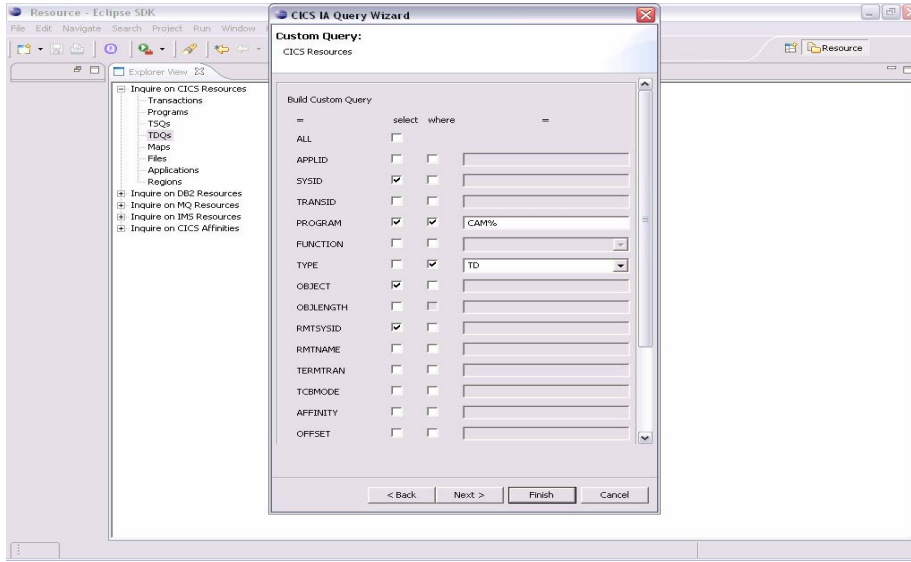
- Scanner
  - ▶ Analyzes the members in the Application LoadLib (both, affinities and interdependencies) to produce
    - Summary Reports
      - Shows Module name, length, Language, number of dependency commands
    - Detailed Reports
      - Shows details including offset, storage content, possible command and dependency type
  - ▶ Provides an option to load this data into a DB2 table for further analysis
  
- Reporter
  - ▶ Analyzes the interdependency data stored on VSAM
    - Selectable by Resource type
    - Shows Tran, Program, Offset, Command, Resource name, SYSID and Usage



## New in CICS Interdependency Analyzer for z/OS V2.1

- An Eclipse-based graphical user interface and improved query management facilities
  - make it easy for you to access the collected data and use it in the day-to-day analysis.
  - The GUI is based on the XML application programming interface (API), so automated processes can query the database as well.
- ▶ Timer based Collector control,
  - allows the user to start the collector for a given time of day to enable targeted data collection
    - For example, you can set the tool to schedule collection in different regions throughout the data collection process.
  - Helps you to
    - work around high volume time periods
    - target collection for when an application is active.
- ▶ Enhanced single point of control capabilities
  - You can turn data collection for multiple CICS regions on and off with a single CINT command to speed selection.
- A selective program and transaction Exclude list to eliminate extraneous data and reduce overhead during data capture.
- Provision of CSD dataset name and group-list information
- ▶ Automation of tracking of runtime impact on application change by providing program version information, enabling removal of old data by version and comparison of data by program version.
- ▶ Improved installation and customisation, as well as other enhancements

# The CICS IA client – build custom query





## Why use CICS IA?

- Helps you understand your active Application Inventory
  - Documentation lost or incomplete
  - Time pressure
  - Merger / Acquisition
- Helps you maintain or enhance Applications
  - Identifies the resources that are affected directly and indirectly
    - Transactions, programs, data elements:
      - Files , Queues , Screens, ...
  - Helps formulate the request for change
    - What to change, what to build, what to test, what needs to be communicated to roles involved
  - Looks across boundaries, including through shared data - files, databases or queues
- Need to balance CICS work across regions for greater availability?
  - CICS IA helps quickly identify resource relationships which need to be changed to enable transactions run anywhere
  - CICS IA helps quickly clone regions
- Version to version migration assistance
  - Build a database of application topology knowledge to reference throughout the migration process
  - Make applications threadsafe
    - CICS IA provides information needed to understand which applications conform to threadsafe standards
  - Identify OS/VS COBOL programs
- CICSplex SM enablement
  - CICS IA identifies system and transaction affinities



## CICS Interdependency Analyzer - Summary

- ▶ Information provided by IBM CICS Interdependency Analyzer can help you to:
  - Use CICS resources more efficiently
  - Make an informed decision on the best way to split workload and move applications to more CICS regions
  - Improve the speed and reduce cost of application maintenance
  - Reduce time of problem resolution
  - Improve CICS systems and application design
  - Implement the workload management capabilities of CICSplex System Manager
  - Gain better understanding of how CICS components can be aggregated to form services for SOA implementations.



## What is CICS VSAM Transparency?

- CICS VSAM Transparency (CICS VT)
  - ▶ Tool to migrate legacy VSAM files to DB2 without changing application programs
    - Single copy of the data
  - ▶ CICS and batch programs access data in DB2 under the control of CICS VT
  - ▶ Data migrated to DB2 can be accessed natively by new programs
  - ▶ Existing programs enhanced using SQL
- Lower risk migration strategy
- Current release – CICS VT V1.2
  - ▶ GA June 2005



CICS VSAM Transparency V1.1 will be generally available from March 26, 2004. It's a tool that allows customers to migrate data from VSAM files to DB2 **without having to re-write the CICS/VSAM application** – this is a major benefit to customers whose data migration strategy has been halted or delayed due to concern over the cost of application rewriting and testing.

With CICS VT there is only ever a single copy of the data. After it's been migrated to DB2, it no longer exists as a VSAM file.

The primary reason for migrating data to DB2 is the elimination of the “batch window” that exists in VSAM – in DB2, data can be accessed by both online CICS and batch applications simultaneously – this is essential for e-business applications.

In summary, CICS VT offers a lower cost and lower risk approach to migration of data from VAM to DB2.

## CICS VT components

- Mapping component
  - ▶ Establishes relationship between VSAM record and DB2 row
  
- Data migration component
  - ▶ Utilities to migrate data and re-engineer if required
  
- Run time component
  - ▶ Intercepts application calls to VSAM data sets migrated to DB2

Here's how CICS VT actually works. The tool consists of 3 components:

### Mapping Component

The Mapping Component establishes the relationship between the VSAM record to be migrated and the DB2 row.

This component captures the meta data from the VSAM file. It's a ISPF dialog driven process - usually DBA or application programmer would be involved here. Mapping is a one time activity for each data set and alternate index. The Mapping Component provides both Manual and automated mapping methods - automated method should handle at least 70% of all data sets (there are exceptions that need to be mapped manually such as data fields). Finally the Mapping component generates the Run-time driver module.

### Data Migration Component

This component provides the utilities to migrate the VSAM data and re-engineer if required. There are three steps in data migrations:

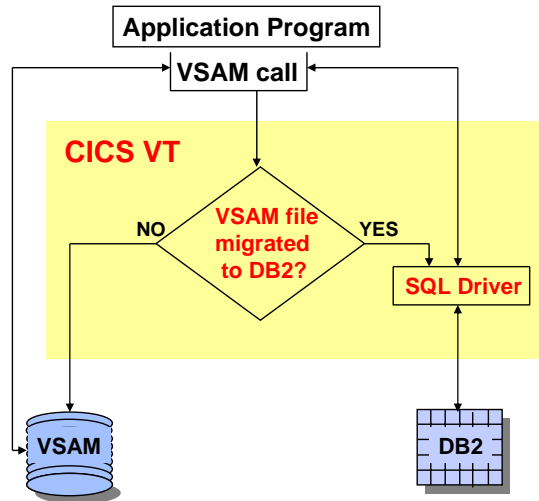
1. Unload existing data from VSAM data set
2. Convert data to DB2 format
3. Load DB2 data

The data migration component provides utilities for steps 1 and 2

### Run time component

This component operates during runtime and intercepts VSAM calls for VSAM datasets that have been migrated to DB2. CICS VT intercepts calls using a global user exit in CICS, and after JCL changes in batch. After the call has been processed by CICS VT (converted to SQL, converted back to VSAM), Data and RESP codes are returned to CICS program. If a batch program, Data and return and reason codes are passed back.

## CICS VT – the Runtime Component



This diagram shows the flow of calls and data when CICS VT has been deployed. The CICS application at the top issues its usual VSAM call. This call is intercepted by the runtime component of CICS VT which is represented here by the red box. CICS VT checks whether the data that the call is trying to access has been migrated to DB2 or still resides in VSAM. If still in VSAM, CICS VT allows the call to proceed – data is returned to the calling app outside CICS VT. If the VSAM file has been migrated to DB2, CICS VT converts the call to static SQL and directs it to DB2. The returned data is converted back to VSAM by CICS VT's SQL driver and returned to the calling app. The fact that this VSAM data has been migrated to DB2 is transparent to the calling app.

## DB2 highlights

### *why migrate data to DB2?*

- 24x7 data availability – batch and online sharing
- Integration with new applications based on DB2 technology, such as online and e-business systems
- Running ad hoc queries
- Ability to perform data analysis
- Creating visual information, such as executive dashboards
- Exploitation of database maintenance tools



Here are the reasons why customers are migrating VSAM data to DB2. The two primary reasons are

1. the ability to share data between batch and online applications
2. To accommodate new CICS/DB2 based applications

## How CICS VT adds value to a data migration

- Completely separate from application program
- Transparent access to data in DB2
- An ability to access a single source of production data
- Migration of individual VSAM files as required
- Enabling new applications to be fully DB2 technology-based
- Preserving investments in legacy applications



This chart shows how CICS VT adds value to a VSAM to DB2 data migration:

Key points:

- It's totally separate to the CICS app
- It provides a CICS/VSAM app completely transparent access to DB2 data
- It's not all or nothing – you can select individual VSAM files to be migrated, and leave others as they are

## New in CICS VT V1.2

CICS VT V1.2 adds the following features:

- Dual Mode Facility — To assist with testing of migrated data and in the development of user exits
- Enhancements to the mapping component — To add support to the Auto Mapper feature for PL/I and Assembler copybooks
- Performance enhancements — To enable the CICS VT-generated SQL driver modules to be re-entrant







IBM Software Group

## CICS Tools Overview

### CICS System, Performance and Data Management Tools



**ON** DEMAND BUSINESS™

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## Manage your CICS performance and availability

Reduce down time

Use CICS resources  
more efficiently

Control software cost

Improve end-user  
productivity

### CICS System, Performance and Data Management tools

#### CICS Configuration Manager

- Manage, replicate, and deploy CICS system definitions

#### CICS Performance Analyzer

- Comprehensive off-line performance reporting and analysis for tuning and capacity planning

#### OMEGAMON XE for CICS

- Real-time and historical performance monitoring and troubleshooting solution for CICS TS

#### CICS VSAM Recovery

- Automate recovery of lost VSAM data

#### CICS VSAM Copy

- Create point-in-time copies of VSAM files concurrent with business-critical online processing activity

#### CICS Batch Application Control

- Simplify and automate batch access to CICS resources

#### IBM Session Manager

- Provide secure, reliable, and easy access to multiple z/OS and OS/390 applications from a single terminal

#### CICS Online Transmission Time Optimizer

- Optimize 3270 data streams to increase your system performance

CICS Subsystem Management tools help you improve performance of your CICS systems, use resources more efficiently, reduce operational costs and improve productivity.

## What is CICS Configuration Manager?

- CICS Configuration Manager for z/OS
  - ▶ Provides the ability to manage CICS resource definitions including
    - Create, Update, Delete, Copy, Replicate
  - ▶ Provides the ability to "change manage" definitional change through the various user environments (e.g. Development, Test, Production)
  - ▶ Provides the ability create customized reports, enabling users to identify redundant definitions, resource relationships, change management history
  - ▶ Provides audit, back-out and change authorization capabilities
- Helps IT Managers, System Programmers and Application Developers to be more productive, as it:
  - ▶ Greatly simplifies the task of managing new application development through test and deployment
  - ▶ Speeds version to version migrations of both CICS and CICS apps
  - ▶ Simplifies CICS systems administration thus lowering costs and reducing downtime due to administrative errors
- Current release – CICS Configuration Manager for z/OS V1.1
  - ▶ GA April 2005
  - ▶ **CICS Configuration Manager V1.2 announced 2 May** in plan for GA 9 June
  - ▶ Product number - 5697-I78



(\*) Unannounced as of SWU '05, but Statement of Direction was made in the CICS TS V3.1 announcement letter November 2004

## What's the problem?

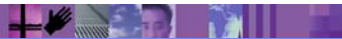
- Configuring CICS systems consists of
  - ▶ Server configuration
  - ▶ Resource provisioning
  - ▶ Application deployment
- All three require creation/modification of CICS resource definitions
- Definitions must be migrated from development, to test, to production environments
- Topology of CICS regions can be complex; different topologies in each environment can require changes to the definitions
- Definitions can be stored in CSD files or CICSplex SM data repositories
- Migration to a new version of CICS Transaction Server adds an extra dimension of complexity



## Requirements

- **Managers** need to control, approve, and audit how definitions are migrated
- **Technical staff** need an easy-to-use and flexible tool to update and migrate definitions, undo migrations, and report to management

*CICS Configuration Manager provides all this and more...*

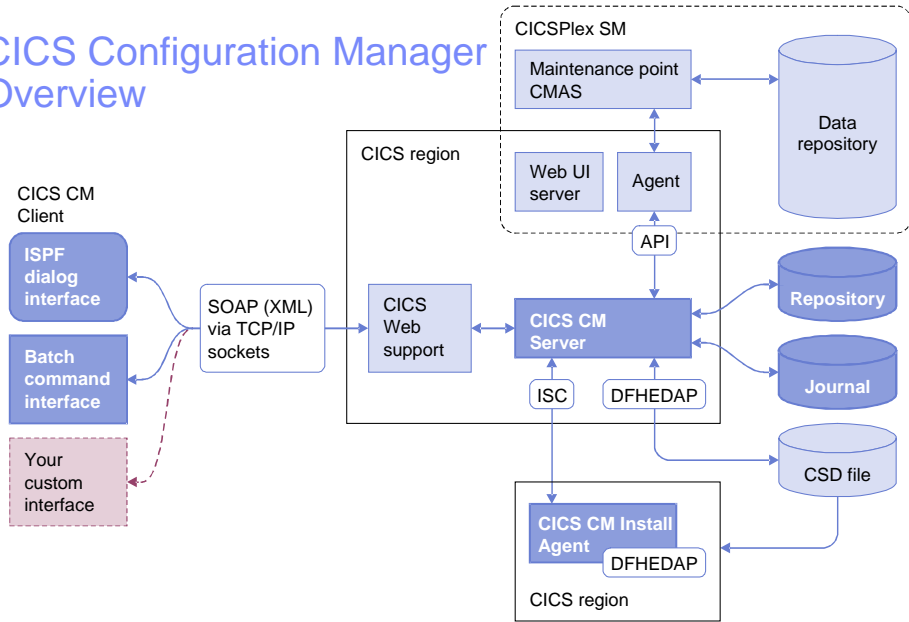


## CICS Configuration Manager Benefits

- Provides comprehensive facilities to define, update, move and remove resource definitions individually or groups of definitions, either manually or using automated processes
- Transparently supports both base CICS resource definition online (RDO) and CICSplex System Manager definition repositories
- Provides detailed reporting facilities to analyse resource definitions and their interrelationships
- Helps control or back out any change if necessary through an integrated approval-management process and audit trail
- Enables you to offer controlled access to multiple users, making resource definition management easier for both, System Programmers and Application Developers
- Offers optional automation capabilities with transformation rules
- Helps ease migration between releases of CICS Transaction Server, especially to the CICS Transaction Server, Version 3.1
- Provides an XML and SOAP-based programmable interface, so that you can include definition management in your automation processes



# CICS Configuration Manager Overview



## CICS Configuration Manager end user interface provides easy way of managing resource definitions

- TSO ISPF interface to manage CICS resource definitions across the enterprise:
  - ▶ Edit resource definitions while the regions that use them are inactive.
  - ▶ Edit definitions in CSD files or CICSplex System Manager data repositories transparently
  - ▶ Use the extensive field-sensitive help for all resource-definition attributes
  - ▶ View and compare histories of definitions
  - ▶ Filter definitions using a combination of list, group, type, and name
  - ▶ Copy or move definitions across configurations.
  - ▶ Install resource definitions in an active CICS region





The screenshot displays the IBM CICS EIT (Enterprise Information Tools) interface. The main window is titled "Eite Settings Help" and shows a list of CICS Resources. The resources are organized into columns: Name, Type, Group, Prompt, and a timestamp. The resources listed include PJC1, cor1, PJOB2, pjent, pjtrn, pjar, pjdoc, pjenn, PJFILE, PJJOURN, PJLSR1, PJMAP, PJPARTIT, PJPARTNR, pjproc, pjprof, and pjreq.

A secondary window, also titled "Eite Settings Help", shows the details for a specific transaction. The transaction name is "ABCD". The Group is "PJGROUP2" and the Location is "CICSTOOL.BFHCSO". The Description field is expanded to show various attributes:

- Program: First program name
- INWsize: Transaction Work Area size in bytes
- Profile: Transaction profile
- PartitionSet: Default application partition set
- Status: Enabled status
- TaskDataLoc: Task data location
- TaskDataKey: Task data key
- StorageClear: Storage clearance status
- Runaway: Runaway timeout value
- Shutdown: Shutdown run status
- Isolate: Transaction isolation option
- BRexit: Bridge exit name

Under "Remote Attributes", the following are listed:

- Dynamic: Dynamic routing option
- Routable: Dynamic routing status
- RemoteSystem: Remote system name
- RemoteName: Remote transaction name

Navigation keys are provided at the bottom of the transaction details window: F1=Help, F3=Exit, F4=Prompt, F5=Relocate, F6=Zoom, F7=Backward, F8=Forward, F10=PrevPage, F11=NextPage, F12=Cancel.

At the bottom of the screen, there is a status bar with the date "04/015" and a small icon of a hand.

## Managing resource definitions

## CICS Configuration Manager Reporting Facilities

- Extensive reporting capabilities are provided to
  - ▶ View a list of definitions from one or more CICS configurations, filtered by name, type, and group, with a checksum column: identical checksums means identical definitions
  - ▶ Find definitions that match typical search criteria, such as “transactions using program *program-name*”
  - ▶ Scan for definitions whose attributes match your custom criteria
  - ▶ Compare attribute values of two definitions side-by-side, with differences highlighted



The screenshot shows a terminal window with the following content:

```

IBM
File Settings Help
Scan Reports
Command ==>
Enter criteria and press Enter to process
Resource type . . . TRANSACTION
1st Scan Criterion
Attribute . . . PROGRAM
Operator . . . EQ
Value . . . pay*
2nd Scan Criterion
Attribute . . .
Operator . . .
Value . . .
3rd Scan Criterion
Attribute . . .
Operator . . .
Value . . .
F1=Help F3=Exit F4=Prompt F5=R
F8=Forward F12=Cancel

Scan Report CICS1 CICS Resources Row 1 to 3 of 3
Command ==> Scroll ==> Page
Filter *
/ Name Type Group Program
-----
pay1 TRANSACTION UTAPVR PAVR1
pay2 TRANSACTION UTAPVR PAVR2
pay3 TRANSACTION UTAPVR PAVR3
***** Bottom of data *****
F1=Help F3=Exit F4=Prompt F5=Relocate F6=Zoom F7=Backward
F8=Forward F10=PrevPage F11=NextPage F12=Cancel

```

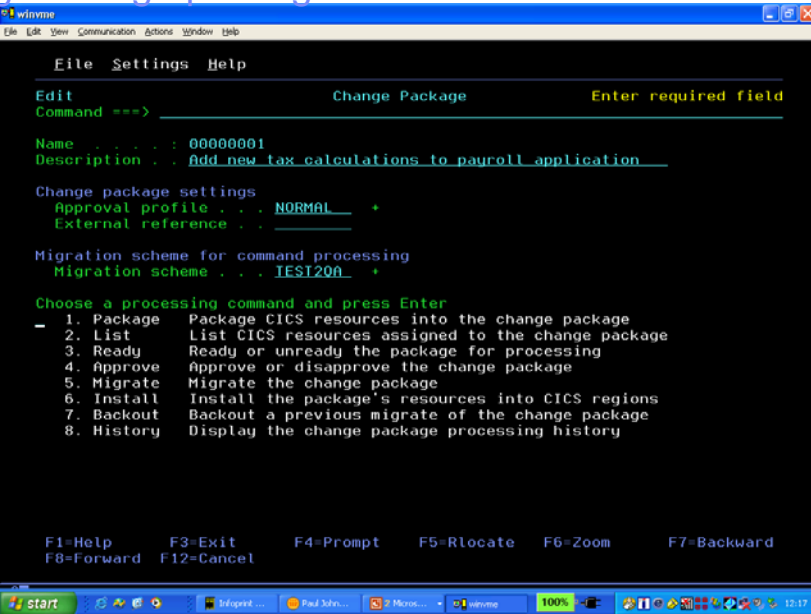
Reporting facilities

## Gaining more control over movement of definitions

- CICS Configuration Manager enables you to gain more control on the movement of definitions through
  - Packages
    - What to move
  - Migration schemes
    - Source and target configurations described for packages
  - Transformation rules
    - How attributes are to be transformed
    - Enable automation
  - Approval processing and audit trail
    - Approval requirements can be defined for each package
    - All approvals need to be met before changes are implemented
    - Audit trail of changed resources, dates and times, and the list of approvers is kept, with reporting capabilities included
    - Ability to reverse changes
- Additional interfaces:
  - SOAP XML API to integrate with your existing processes
  - A batch interface for managing migration and approval of change packages



# Manage change packages



```
winme
File Edit View Communication Actions Window Help

File Settings Help

Edit Change Package Enter required field
Command ==>

Name . . . . . : 00000001
Description . . : Add new tax calculations to payroll application

Change package settings
Approval profile . . . . . : NORMAL +
External reference . . . . . :

Migration scheme for command processing
Migration scheme . . . . . : IESI200 +

Choose a processing command and press Enter
- 1. Package Package CICS resources into the change package
  2. List List CICS resources assigned to the change package
  3. Ready Ready or unready the package for processing
  4. Approve Approve or disapprove the change package
  5. Migrate Migrate the change package
  6. Install Install the package's resources into CICS regions
  7. Backout Backout a previous migrate of the change package
  8. History Display the change package processing history

F1=Help F3=Exit F4=Prompt F5=Rlocate F6=Zoom F7=Backward
F8=Forward F12=Cancel
```

## CICS Performance Management

### Why do customers invest in performance management?

- Business processes rely on IT infrastructure for availability and performance
- Risk of missing service levels is increasing
  - ▶ Environment increasingly complex to manage due to technology and workload changes
- Capacity planning is critical to meet peak performance levels required to support e-business evolution
- Rising costs of managing the zSeries investment
  - ▶ Systems Management software cost increases disproportionate to MIPS or workload volume growth rates
- Critical Skills shortages
  - ▶ Skill requirements are diversifying within a constrained budget



In the increasingly complex IT environments, risk of missing SLAs is increasing. Missed SLAs equal lost revenue and customer dissatisfaction.

## Performance and Availability Management Solutions for CICS

*Managing system performance and plan capacity for the future*

### OMEGAMON XE for CICS

- provides a real-time and historical performance management, monitoring and troubleshooting solution for CICS
- helps you to detect performance problems early, identify cause and change system and resource parameters to avoid problems

### CICS Performance Analyzer

- Provides ongoing system management and measurement reports on all aspects of CICS application performance
- Enables deep-dive CICS performance analysis and understanding of usage trends
- Aids capacity planning and tuning
- Helps quickly identify and eliminate trends leading to online performance problems

•Plan capacity to reduce MIPS cost

•Proactively analyze performance trends to reduce down time and increase customer satisfaction

•Reduce cost of outages

•Reduce risk of missing the service level commitments

•Reduce time and cost of managing system performance and availability

For many customers, CICS is the backbone of the enterprise. Run-time system performance optimization, performance problem-determination and capacity planning are critical to meet the peak performance levels to support an on demand business evolution. IBM CICS Performance Analyzer for z/OS is a CICS system performance reporting and analysis solution built to address the needs of those involved in CICS performance analysis, CICS systems tuning and capacity planning. It helps build, manage and deploy complex CICS applications, while maintaining high levels of performance.

CICS Performance Analyzer provides a high level of detail and flexibility to help you easily find new ways to improve CICS system performance, lower maintenance costs and strategically plan IT investments. CICS Performance Analyzer provides a wide range of systems management and measurement reports about all aspects of CICS systems. These reports can be easily tailored to your specific requirements.

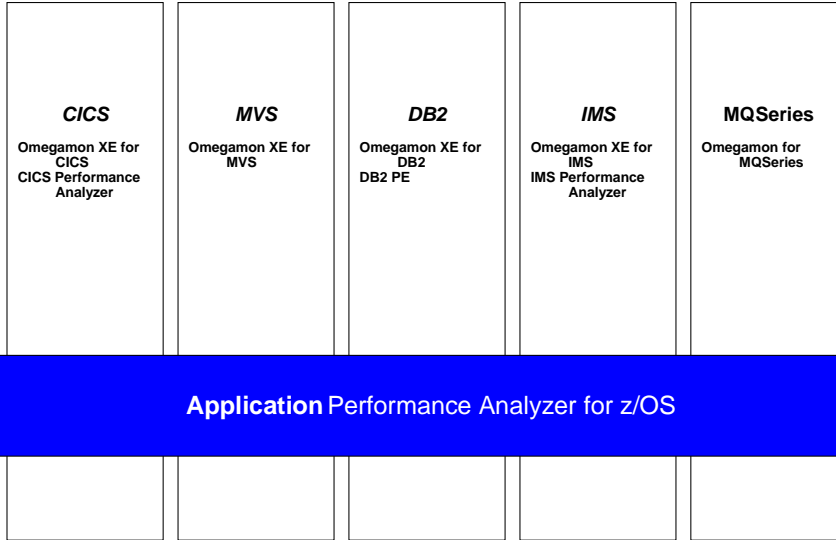
The tool's robust reporting capabilities and flexible historical database facilities make it an essential tool to help in trend analysis and capacity planning, as well as to help ensure optimal resource utilization within your CICS systems. CICS Performance Analyzer complements online monitoring tools, such as the Omegamon suite of products, because it can help you quickly respond to online performance issues by drilling down into CICS performance data to identify the cause of the problem. CICS

Performance Analyzer also complements the enterprise-wide historical performance capabilities of IBM Tivoli® Decision Support for z/OS.

CICS Performance Analyzer can help you:

- Reduce the cost of tuning and capacity-planning analysis.
- Take a proactive approach to CICS systems tuning.

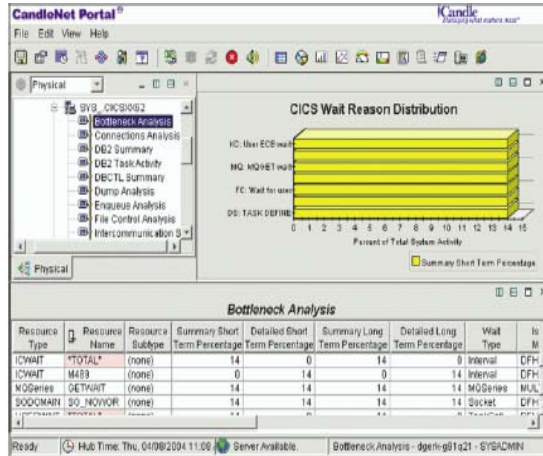
## Application Performance Analyzer & IBM Performance Tools





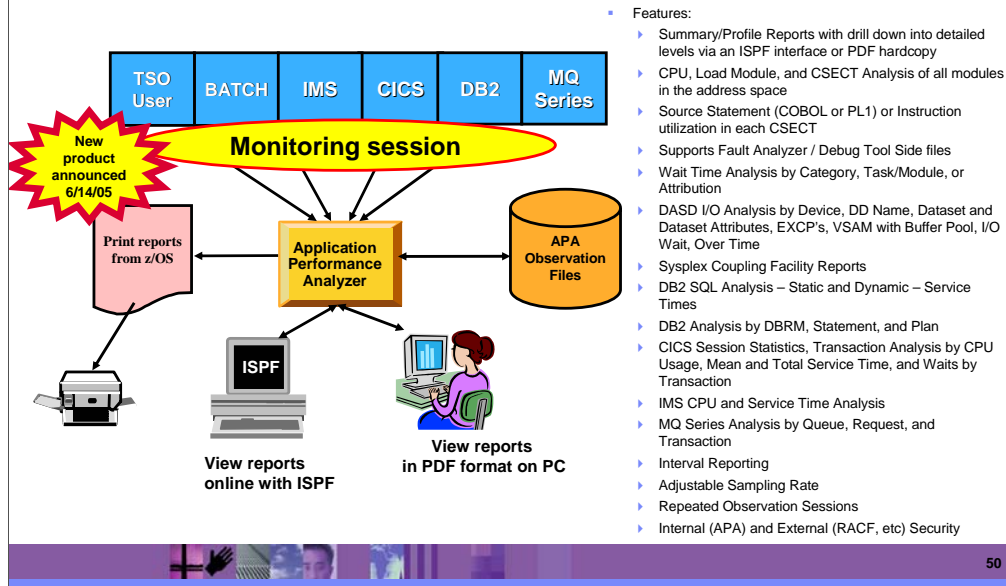
## OMEGAMON XE for CICS on z/OS

- Real time CICS monitoring
  - ▶ Single portal for all OMEGAMON XE monitors
  - ▶ CICS subsystem monitoring at the Region level
  - ▶ Quickly identify and fix problems within CICS
  - ▶ Provides critical CICS performance data including:
    - CICS Region Overview
    - Transaction Analysis
    - Temporary Storage Usage
    - Connections Analysis
    - DB2 Summary and Task data
    - VSAM Analysis



## Application Performance Analyzer Functional Overview

### Application performance analysis tooling for application developers



APA was announced this past June and provides developers with a performance analysis tool.

### Key Features:

- Intuitive online ISPF interface
- Monitor application programs at the source level
- Support for batch, CICS, DB2, IMS, MQ

APA Supports Fault Analyzer / Debug Tool Side files

### Types of Observation Sessions

- Real-Time
- Scheduled
- Via Batch Submission

### Environments Supported

- CICS, DB2, IMS, JES/Batch, Sysplex, MQ Series
- Assembler, COBOL, PL/I

On chart, we can discuss how APA works.

After APA is installed, we direct APA to monitor specific workloads or applications.

So based on the sampling rate we define, key application performance information is collected and stored in observation files.

These files can be viewed online in ISPF, printed from z/OS, and/or PDF files created for viewing with PDF reader software.

### Use it to:

- Monitor an application while it is running
- Pinpoint the cause(s) of bad application performance, right down to the line of source code

## CICS PA Overview

- CICS Performance Analyzer for z/OS
  - ▶ Comprehensive Performance Reporting and Analysis for CICS
    - Including DB2, WebSphere MQ, and MVS System Logger
  - ▶ Extensive Tabular Reports and Extract Data Sets
  - ▶ Historical Database (HDB)
    - Trending and Capacity Planning
  - ▶ ISPF Dialog to build, maintain, and submit reports and extracts
- Part of IBM systems management strategy
  - ▶ Complements IBM online monitors for a complete solution
    - Tivoli OMEGAMON XE for CICS on z/OS
  - ▶ Complements other IBM batch performance analysis tools (e.g. IMS PA)
  - ▶ Complements IBM enterprise wide historical trend analysis solution (Tivoli Decision Support for z/OS) with detailed CICS analysis for fast online problem resolution, CICS tuning and capacity planning

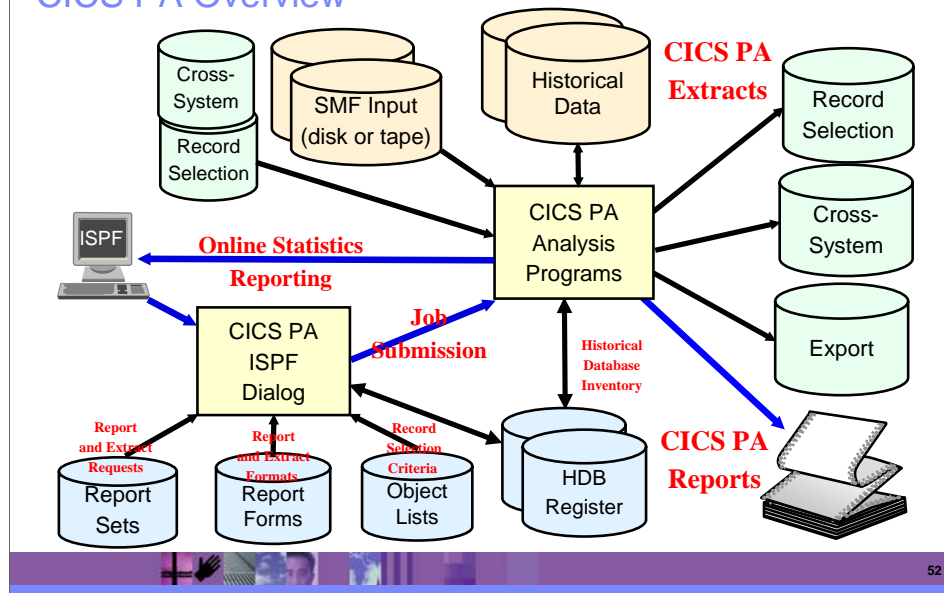
IBM CICS® Performance Analyzer for z/OS V1.4 is a powerful off-line reporting tool that analyzes the System Management Facilities (SMF) records created by the CICS Monitoring Facility (CMF), CICS Statistics, CICS Server Statistics, as well as SMF data from the related subsystems (DB2 and WebSphere® MQ®), to produce a wide range of reports and extracts that will help you tune and manage your CICS systems. CICS PA also provides z/OS system logger reports using the system logger data.

CICS Performance Analyzer for z/OS V1.4 is built to address the needs of everyone involved in CICS performance analysis, and CICS system tuning and planning capacity for future use, including those who build, manage, and deploy complex mainframe CICS applications.

CICS Performance Analyzer provides the level of detail and flexibility that easily helps you find new ways to improve CICS system performance, lower maintenance costs, and strategically plan IT investments.

CICS PA complements your online monitoring tools, like [IBM Tivoli® OMEGAMON® XE for CICS® on z/OS®](#), as it can help to respond quickly to online performance issues by drilling down deeply into CICS performance data to identify the cause of the problem. CICS PA also complements the enterprise-wide historical performance capabilities of [IBM Tivoli Decision Support for z/OS](#) with the additional deep and detailed CICS-related performance data, which can be used for focused CICS performance problem determination, bottleneck analysis, tuning and capacity planning.

## CICS PA Overview



This visual shows the main components of CICS PA; including the TSO Interactive System Productivity Facility (ISPF) dialog, it's related data sets and the CICS PA batch analysis, reporting programs and data sets.

## CICS PA at a Glance

- ISPF Dialog to build, maintain, submit reports
  - ▶ Tailor your reports easily using Report Forms
  - ▶ Extensive online help available, field descriptions, ...
- CICS PA reports and data extracts analyze all aspects of your CICS systems, including ...
  - ▶ CICS application performance
  - ▶ CICS system resource usage
  - ▶ Cross-System performance
  - ▶ Transaction Resource Usage
  - ▶ External Subsystems used by your CICS applications ...
    - including WebSphere MQ, DB2 and IMS (DBCTL)
  - ▶ MVS Workload Manager (WLM)
  - ▶ Exception events that cause performance degradation
- CICS PA Statistics online reporter provides comprehensive reporting of CICS Statistics data
- CICS PA Historical Database
  - ▶ Flexible and easy-to-use facility for collecting and managing historical performance data for your CICS systems
  - ▶ Data can be exported into DB2 or CSV format
  - ▶ Helps trending and capacity planning
- Extract Data Sets
  - ▶ Cross-System Work
  - ▶ Export for further processing using PC tools
  - ▶ Record Selection for faster processing

Here are some of the types of reports and extracts that can be produced using CICS PA.

The flexibility of CICS PA allows you to easily tailor your report and extract requests to meet your specific performance reporting and analysis requirements. CICS PA allows you to keep pace with the ever-changing nature of CICS by providing a flexible and easy to use dialog that allows you to report on all aspects of your CICS system's performance.

CICS Transaction Server for z/OS Version 2.2 collects over 239 specific performance data fields in 17 groups. Also, if the monitoring MCT options APPLNAME=YES and RMI=YES are specified, an additional 10 performance data fields in 2 groups are collected. And, if used, DBCTL adds a further 32 specialized fields. With the advent of CICS Transaction Server Version 2 and EJB support, the number of groups and data fields within existing groups continues to grow.

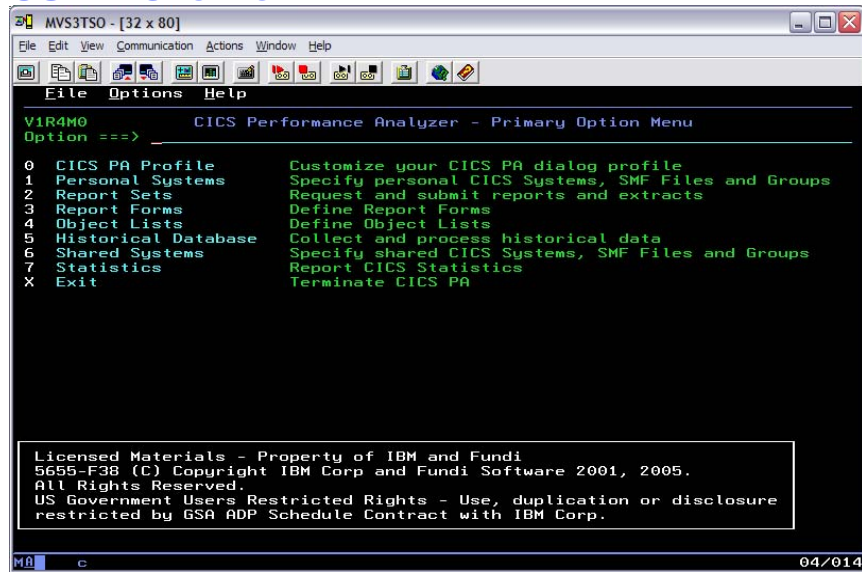
CICS PA can process CMF data from a single CICS system, or from multiple CICS systems that share the transaction workload by using MRO or ISC. Using the **Cross-System report** provides a consolidated report showing the complete transaction activity across connected CICS systems.

The **Transaction Resource Usage reports** provide a detailed analysis of the Resource class records collected by the CICS Monitoring Facility (CMF).

The **Workload Activity report** provides a detailed and/or summary report highlighting the MVS Workload Manager (WLM) Service Class and Report Class, and reporting phase for each transaction.

The **CICS Business Transaction Services (BTS) report** is a detailed report that shows the correlation of the transactions performed by the same or different CICS systems on behalf of a single CICS Business Transaction Services (BTS) process.

## CICS PA Overview



```
MVS3TSO - [32 x 80]
File Edit View Communication Actions Window Help
File Options Help
V1R4M0 CICS Performance Analyzer - Primary Option Menu
Option ==>
0 CICS PA Profile Customize your CICS PA dialog profile
1 Personal Systems Specify personal CICS Systems, SMF Files and Groups
2 Report Sets Request and submit reports and extracts
3 Report Forms Define Report Forms
4 Object Lists Define Object Lists
5 Historical Database Collect and process historical data
6 Shared Systems Specify shared CICS Systems, SMF Files and Groups
7 Statistics Report CICS Statistics
X Exit Terminate CICS PA

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M0 c 04/014
```

## CICS Statistics and CICS Server Statistics Support

```

MVS2CTSO - [32 x 80]
File Edit View Communication Actions Window Help
Menu Utilities Compilers Help

BROWSE CBAKER.DSMODE.STATS Line 00000000 Col 001 080
Command ==> Scroll ==> PAGE
***** Top of Data *****
V1R4M0 CICS Performance Analyzer
CICS Statistics - Dispatcher TCB

System: IYK320F6/MV2C VRM: 640 Type: INT Interval: 2004/11/09 02:10:00 Tuesda
TCB Mode TCB TCB TCB TCB Current Peak
Name Mode Open Pool Attaches Attach Failures Attached TCBS TCBS
-----
QR NOTOPEN NA 0 0 0 1 1
RO NOTOPEN NA 0 0 0 1 1
CO UNKNOWN NA 0 0 0 0 0
SZ UNKNOWN NA 0 0 0 0 0
RP UNKNOWN NA 0 0 0 0 0
FO NOTOPEN NA 0 0 1 1
SL NOTOPEN NA 0 0 1 1
SO NOTOPEN NA 0 0 1 1
SP NOTOPEN NA 0 0 1 1
D2 UNKNOWN NA 0 0 0 0
JM NOTOPEN NA 0 0 0 0
SB UNKNOWN NA 0 0 0 0
LB OPEN OPEN 0 0 1 1
L9 UNKNOWN NA 0 0 0 0
J8 UNKNOWN NA 0 0 0 0
J9 UNKNOWN NA 0 0 0 0
X8 UNKNOWN NA 0 0 0 0
X9 UNKNOWN NA 0 0 0 0
    
```

## CICS PA 1.4 –Complements your online monitor

- ▶ Ensure quick response to online performance issues identified by an online monitor
  - drilling down into CICS and its related subsystems performance data to identify the cause of the problem
- ▶ Tuning of the CICS systems for optimal performance
- ▶ Trend analysis for capacity planning
- ▶ Detailed performance bottleneck analysis
- ▶ Identification of usage trends leading to reduced CICS performance or even outages.
- ▶ Review performance before applications go into production
- ▶ CICS PA also complements the enterprise-wide historical performance capabilities of IBM Tivoli ® Decision Support for z/OS





## OMEGAMON XE and CICS PA and APA Sample Scenario

- Use **OMEGAMON** online alert to detect a performance problem, e.g. a 'bottleneck' transaction
- Since it is a CICS transaction, use **CICS Performance Analyzer** to go deeper and understand the root cause of the problem, e.g. contention problems by holding lock, resources held, interaction from cross systems (**cross system reports to show CICS, DB2, IMS, MQ resources used by the transaction ...**)
- To go to the application level, use **Application Performance Analyzer** to step through the application code and fix the root cause of the performance problem caused by the application

The most obvious way to use OMEGAMON and CICS PA together is to use OMEGAMON to identify performance problems in the short-term, and fix the situation, so that user can continue to be productive. Then you can use CICS PA to thoroughly understand the reasons for the problem and put in place actions to prevent that situation happening again.

But the value of CICS PA goes way beyond the resolution of immediate problems – it's an excellent solution for longer-term monitoring too. You can analyse historical data, looking for trends, so that you can reduce bottlenecks, maximize capacity and tune your CICS systems for best performance. The two products together, CICS and OMEGAMON, give you a full-spectrum solution for all of your CICS performance problems.

In this presentation, we'll show you just one of the ways in which the two products work together, for a long-term resolution of the type of problem that many of you may have seen before .... it's in two parts: the first shows a scenario with OMEGAMON tracking a VSAM record level sharing deadlock between two CICS regions – a typical situation that can have a drastic impact on the productivity of your users, who're unable to process their own transactions while the resources they need are unavailable. Here, you and OMEGAMON will resolve the situation allowing your users to be fully productive as soon as possible.

The second half shows how you can use CICS PA to do a deeper analysis of the situation to minimize the chances of similar situations happening in the future.

## CICS Performance Analyzer – Unique capabilities

- Part of IBM systems management strategy
  - ▶ Complements IBM online monitors for a complete solution
  - ▶ Complements other IBM batch detailed performance analysis tools (e.g. IMS PA)
  - ▶ Complements IBM enterprise wide historical trend analysis solution (Tivoli Decision Support for z/OS) with detailed CICS analysis for fast online problem resolution, CICS tuning and capacity planning
- Ease of use
  - ▶ No additional setup or customization required – will process your existing SMF data
  - ▶ Familiar CICS terms and concepts
  - ▶ No additional overhead – SMF data collection overhead only
- Powerful and flexible analysis capabilities
  - ▶ ISPF Dialog to build, maintain, submit reports
    - Over 130 sample reports provided to meet your analysis requirements
  - ▶ Tailor your reports easily to meet your analysis needs
  - ▶ Extensive online help available, including field descriptions
- Comprehensive data coverage and a variety of reports
  - ▶ Extensive Tabular Reports and Graph Reports
  - ▶ Cross-System Work for complete transaction performance tracking
- Historical database capability to aid trend analysis and capacity planning
- Customizable extracts capability to improve speed of processing

CICS PA is easy to use:

- No additional setup or customization required
- Familiar CICS terms and concepts

CICS PA reports on all aspects of CICS system activity and resource usage. The flexibility of CICS PA allows you to easily tailor your report requests to meet your specific requirements. You can use the ISPF dialog to generate your report and extract requests. The dialog assists you in building reports and extracts specific to your requirements without you having to understand the complexity of the CMF data.

CICS PA's ISPF dialog interface can be used to create the command language and JCL that is used to run the reporting program in batch.

CICS PA has extensive online help facilities and a powerful command language that is used to select, sort and customize the report formats and data extracts.

CICS PA provides a comprehensive suite of reports and data extracts for use by:

System Programmers - to track overall CICS system performance, evaluate the effects of CICS system tuning efforts, ...

Applications Programmers - to analyze the performance of their applications and the resources they use.

DBAs - to analyze the usage and performance of CICS Resource Managers and database systems such as IMS and DB2.

Managers - to ensure transactions are meeting their required Service Levels and measure trends to help plan future requirements and strategies.

## Why use CICS PA?

- Improves tuning and capacity planning analysis
- Helps take proactive approach to CICS systems tuning
- Provides detailed performance bottleneck analysis
- Uncovers trends leading to poor CICS performance or even outages
- Helps plan capacity for optimal performance
- Helps review application performance and identify potential to improve application design



CICS Performance Analyzer can help:

Improve CICS system resource usage

Evaluate the effects of CICS system tuning efforts

Improve transaction response times

Analyze CICS application performance

Provide ongoing system management and measurement reports

Increase availability of resources

Increase the productivity of system and application programmers

Provide awareness of usage trends, assisting in future growth estimates



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## CICS Tools Overview

### Managing VSAM



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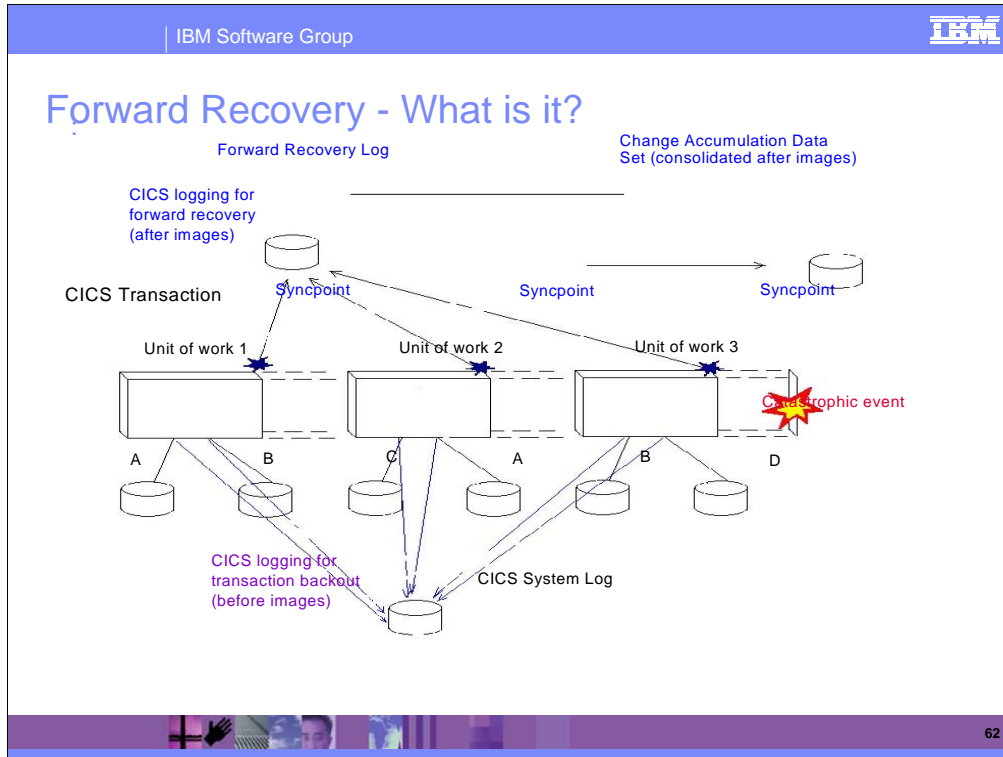
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## What is CICSVR V4?

- Latest release V4.1
  - ▶ GA 9 December 2005
- For: VSAM files updated by CICS and batch applications
  - ▶ For CICS TS
    - Forward recovery for VSAM files updated through CICS
  - ▶ For batch applications
    - Logging and forward recovery for VSAM files updated by batch applications
- New function in CICS VR 4.1
  - ▶ Function to enhance Automated recovery
  - ▶ Improved operation to allow easier day-to-day use
  - ▶ Forward recovery and back out enhancements
  - ▶ Disaster recovery enhancements
  - ▶ Additional enhancements



The latest release of CICSVR is V3.3, announced on 17 August, and GAing on September 24. This new release provides even more enhancements to the forward recovery process, primarily with the introduction of a batch backout feature, which allows users to back out the updates made to VSAM datasets by failed batch job steps.



CICSVR mitigate the effects of catastrophic failure by being ready to repair any damage quickly; that is, by:

Storing information, during normal operation, about changes to data - in a forward recovery log

Taking control when invoked following events that result in catastrophic loss of data.

Updating earlier copies (backups) of data with information about committed changes (from forward recovery logs).

### Recovering from 'softer' failures

Although much focus for forward recovery is on hardware failure and software errors, the same facilities can be used to protect against damaging updates - wilful or accidental - made to VSAM data. Selective forward recovery allows you to recover VSAM data without applying the damaging updates based on the terminal, transaction, or file ID that caused the damage. Therefore, the resulting data set would have all of the damaging updates removed.

This facility may be of value even if you have extensive failure protection through disk mirroring and other technologies.”

## Other CICS VR Features

- Change accumulation
  - ▶ can reduce the time that will be needed to perform forward recovery
- Export and Import commands
  - ▶ enable you to copy data from the recovery control data set to a copy on a remote site
- Batch support allows you to log forward recovery data during batch runs
  - ▶ Can subsequently run forward recovery of data sets updated by CICS, batch applications, or both
- Support for NOTIFY
- Supports backups created by the Backup-While-Open (BWO) facility



## Why use CICSVR?

- Reduce risk associated with managing VSAM files
  - ▶ Reduce the impact for VSAM data users against the effects of physical loss or incorrect update
- Reduce business cost of VSAM errors
  - ▶ Helps you detect and reverse errors
- Reduce cost of down time
  - ▶ Helps you minimize recovery time
- Ease of use
  - ▶ User-friendly interface
  - ▶ Automatic recovery capability





## What is CICS VSAM Copy?

- CICS VSAM Copy for z/OS V1.1
  - ▶ Creates CONSISTENT copies of VSAM data sets
    - While they remain online and open to CICS applications for update
    - While they are closed to CICS
- CICS VSAM Copy helps to:
  - ▶ Create ad-hoc copies of VSAM data sets
    - Without affecting current performance of running CICS applications
    - Produced copies are consistent (no incomplete units of work)
  - ▶ Work towards 24\*7 VSAM availability
    - No need to take the data set offline from CICS before creating copy
- Generally available June 25, 2004



This new tool is unique – it creates CONSISTENT copies of VSAM datasets while they are open to and being updated by CICS applications. There is no interruption to the online user and negligible effect on performance times. As I said, the copies are consistent (no in flight units of work) – there is no further processing required to make them consistent. Other solutions in this space either require you to close down the CICS region altogether, or at least allow no CICS application to be updating the VSAM data while the copy is being made. Other solutions allow online processing to occur, but require the resulting “fuzzy” copy to be put through a batch process afterwards to make the copy consistent. The following charts explain this a little further.

## Currently available offline copy tools



- Advantages
  - ▶ Consistent copies produced (no incomplete units of work)
  - ▶ Often fast and robust (multiple copies in one run)
  
- Disadvantages
  - ▶ Must take data sets offline from CICS to make a copy
  - ▶ Usually must be scheduled in advanced



## Currently available online copy tools



- **Advantages**

- ▶ Data sets remain online to CICS for update

- **Disadvantages**

- ▶ Produced copy may be fuzzy (incomplete units of work included)
- ▶ Fuzzy copies require forward recovery to make them consistent



## CICS VSAM Copy for z/OS advantages

- Provides the best of both worlds
  - ▶ Create consistent copies of VSAM data sets
  - ▶ Create copies of data sets while online to CICS for update
  - ▶ Copy multiple VSAM data sets in one run
  - ▶ No degradation to performance of running CICS transactions
  
- Supports KSDS, ESDS, RRDS, and VRRDS VSAM
- Supports copying a VSAM KSDS base cluster with alternate indices
  
- Automatically determines if the data set is online or offline to CICS before copy
  - ▶ no additional user intervention required

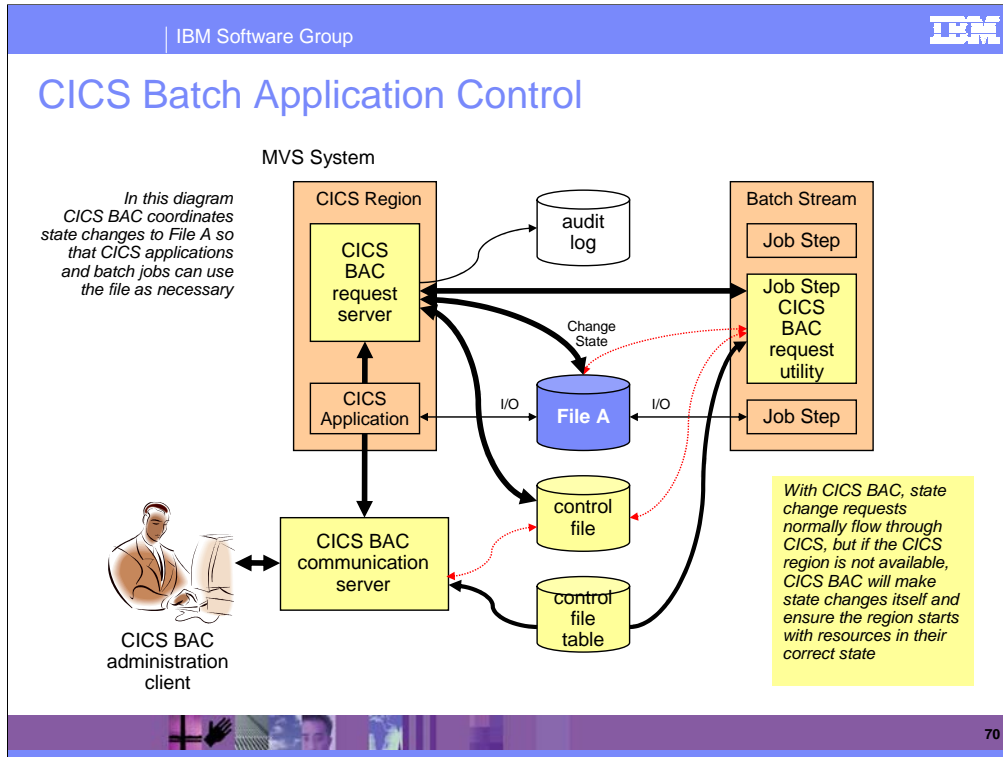


This chart summarizes the advantages of CICS VSAM Copy which have been explained in the previous few charts.

## What is CICS Batch Application Control?

- New CICS tool
  - ▶ Announced November 2, 2004
  - ▶ Generally available November 26, 2004
- What does it do?
  - ▶ Enables a batch-job step to change the state of relevant CICS resources
  - ▶ Tracks resource state change requests across participating CICS systems and batch stream
  - ▶ Ensures resources are in their correct state when CICS regions start
  - ▶ Powerful “group” feature enables a job step to change the state of all resources associated with an application
- Why do I need it?
  - ▶ Reduces errors and abends related to batch processing
  - ▶ Reduces manual interventions by operators and system programmers
  - ▶ Moves your CICS applications closer to 24x7 availability





## Components of CICS BAC and what they do

### 1. Workstation-based administration client

Provides graphical user interface for defining and configuring objects that CICS BAC will control

Not used during runtime processing

### 2. CICS BAC communication server (runs in its own address space)

Receives configuration requests from administration client

Sends configuration requests to the relevant CICS region

If a region is unavailable, the communication server makes configuration changes itself in the CICS region's CICS BAC control file

### 3. CICS BAC request server

Runs in each CICS region

Receives requests from the CICS BAC batch request utility to change the state of CICS resources

Makes CICS BAC configuration changes to the region's the control file

Monitors and tracks state change requests issued within and from outside in the region

### 4. CICS BAC batch request utility

Runs as one or more job steps in a batch job stream

Issues state change requests to the CICS BAC request server(s) in the relevant CICS region(s)

If the region is not available, makes state changes itself and records proper state for region startup

### 5. CICS BAC control file

one per CICS region

each one is a VSAM keyed sequential dataset (KSDS)

### 6. CICS BAC control file table

associates CICS regions and CICS BAC control file datasets

a partition dataset member



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## CICS Tools Overview

### Improving User Access to CICS Applications



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## What is IBM Session Manager?

- A secure and user-friendly method of accessing multiple OS/390 or z/OS systems from a single 3270 terminal - SNA and TCP/IP
  - ▶ Password-protected menu gives access all applications in network
  - ▶ Log-off procedures, security checking, audit logging and centralized administration, operations, and monitoring
  - ▶ Benefits to helpdesk and operations personnel - Spy function
  - ▶ Benefits in training staff – Demo function
  - ▶ Centralized user ID admin and the ability to broadcast messages to end users
- Current version IBM Session Manager for z/OS V1.3
  - ▶ GA December 16, 2005

IBM Session Manager for z/OS V1.2 is a session manager for VTAM® and TCP/IP that provides a secure and user-friendly method of accessing multiple OS/390 or z/OS systems from a single 3270 terminal:

- Provides a password-protected single menu from which users can access all applications running on any z/OS or OS/390 machine in the network
- Provides log-off procedures, security checking, audit logging and centralized administration, operations, and monitoring
- Reduces cost and effort associated with network administration and brings benefits to helpdesk and operations personnel who can easily view user problems
- Offers centralized user ID administration and the ability to broadcast messages to end users

Value of IBM Session Manager :

- Improve user productivity
- Reduce training requirements
- Enhance system usage
- Provide increased security



## Session Manager V1.3 – new and enhanced function

- Self administration
  - ▶ Online panels for add, delete, update, and copy applications, profiles, and users
- Dynamic menus
  - ▶ ability to dynamically build user menus based on definitions in External Security Manager, e.g. RACF, ACF2, or TopSecret.
  - ▶ easier path for customers migrating users to Session Manager from other products providing comparable functions
  - ▶ profile management can be done via security
- Hide menu entries
  - ▶ Sessions can be hidden – user cannot start them
- Batch admin
  - ▶ Ability to administer profiles via a batch job
- Other enhancements
  - ▶ NLS support (German and Japanese)
  - ▶ Multiple signon
  - ▶ Command and application output exits
  - ▶ Clear key as escape
  - ▶ Passing escape sequence to an application
  - ▶ Disable startscript
  - ▶ New escape sequence or program function key
  - ▶ Multiple profiles
  - ▶ Duplicate session removal

New function provided in V1.2:

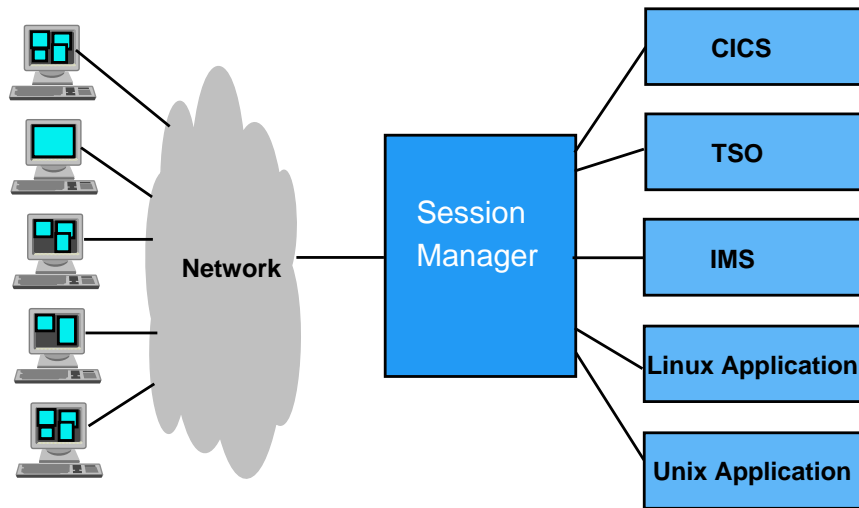
- On-line administration - the ability for authorized users to add, delete, or update applications, profiles, and users
- Dynamic menus - allows users and applications to be administered by way of definitions in an External Security Manager, including RACF
- Hide sessions - administrators can now hide menu entries from end users
- Batch administration - IBM Session Manager can now be administered by a batch job, easing the potential administration overhead for mass updates for large sites

## V1.3 - major new or enhanced features

- **Online Administration**
  - ▶ Online panels for add, delete, update, and copy applications, profiles, and users
- **Batch Administration**
  - ▶ Ability to administer profiles via a batch job
- **External Security Administration**
  - ▶ ability to dynamically build user menus based on definitions in External Security Manager, e.g. RACF, ACF2, or TopSecret.
  - ▶ easier path for customers migrating users to Session Manager from other products providing comparable functions
  - ▶ profile management can be done via security
- **System Management Menu**
  - ▶ Easier access to a range of IBM SM commands
- **Usability**
  - ▶ Enhancements to online admin function making it easier to use
- **Globalisation**
  - ▶ New language support (Canadian French, German, and Japanese)



## Session Manager for z/OS: Overview



This chart is here to show that IBM Session Manager acts as a gateway for the user, using a variety of terminal types, to access a range of applications – and not just mainframe sessions (like other session management products restrict you to), but also non mainframe applications such as Linux and UNIX.

## IBM Session Manager advantages

- Greater user productivity
- Enhanced system usage
- Increased security
- Reduced costs
- Simplified access to mainframe apps from workstations
- Reduced cost of network administration
- Help desk and operations personnel can easily view user problems
- Reduced training costs
- Centralized userid administration
- Ability to broadcast messages



The advantages of IBM Session Manager can be seen on this chart – most customers will be aware of what a session manager is and does – they will be interested in IBM Session Manager because of its functional advantages of many competitors (TCP/IP support), and its TCO advantages.

## IBM's Session management products

- For historical reasons, IBM has three VTAM session management products
  - ▶ NetView Access Services
  - ▶ IBM Session Manager for z/OS
  - ▶ IBM CL/SUPERSESSION
- IBM continues to support all three products
  - ▶ All products have large, stable user bases; users that want to continue using them should do so - there is no need for existing users of any IBM-offered session management product to migrate to another
  - ▶ IBM currently has no plans or intentions
    - to withdraw any of these products from the market
    - to discontinue service or support for any of them
- IBM Session Manager for z/OS is IBM's recommended replacement product for an installed non-IBM tool



## Session management migration recommendations

- IBM recommends that you substitute components of your system *only* for good business reasons
  - ▶ Complete a cost/benefit analysis and a business case
  - ▶ Understand all the costs of migration
- There are good reasons (cost, currency of product and support) for migrating away from some vendors' products
  - ▶ But you should always follow the principles of Bullet 1 above
- IBM does *not* recommend migrating between IBM's session manager products unless you have compelling cost/benefit reasons
  - ▶ You should not to incur the cost of migration unnecessarily
  - ▶ IBM continues to support all three products



## What is CICS OTTO ?

- CICS Online Transmission Time Optimizer for z/OS
  - ▶ CICS OTTO optimizes
    - Data streams directed to 3270-type display stations and/or printers
    - Data streams directed to SCS-type printers
    - Data streams directed to banking terminals 3600/4700
  - ▶ CICS specific solution (not VTAM)
  - ▶ Product Number - 5655-I05
- CICS OTTO optimization techniques
  - ▶ Repetitive character elimination for 3270-type terminals and printers
  - ▶ Transmission of only changed data for 3270-type terminals
    - Keeps an image of the actual screen layout in virtual storage
  - ▶ Blank elimination for 3270 SNA Character Set (SCS) printers
  - ▶ String Control Byte (SCB) compression for 3600/4700 type terminals
    - outbound and inbound

IBM CICS Online Transmission Time Optimizer (CICS OTTO) improves 3270 network resources utilization and response time and increases end-user productivity by identifying and removing repetitive data and compressing 3270 data streams. CICS OTTO operates efficiently and transparently to applications and users and supports both, local and remote users.

CICS Online Transmission Time Optimizer for z/OS helps identify and remove repetitive data by examining and dynamically compressing outgoing data streams. Repetitive characters - typically as much as 25 percent of all characters sent to terminals and other 3270 network devices - are reduced to only four bytes, reducing transmitted message size considerably.

CICS OTTO also minimizes outbound data transmission to the terminals by keeping screen layout in memory and removing data fields already present on the screen.

Blank spaces are eliminated to improve print speed.

## CICS OTTO - Operation

```

PRIMARY OPTION MENU          Otto for CICS V1R1          OTTOM01

OPTION ==> _____

      1. START / STOP Otto for CICS Optimization
      2. Display and Control Otto Image Pool Size
      3. 3270 Component Based Optimization Control
      4. 3600/SCS Component Based Optimization Control
      5. LU Based Optimization Control
      6. Module Based Optimization Control
      7. EXCLUDE LU's from Optimization
      8. EXCLUDE Modules from Optimization
      9. SELECT LU's for Optimization
     10. Trace
     11. System Options
     12. Statistics Control
     13. Display Statistics
     14. Otto Commands (Compatibility Mode)
      X. Exit

-----
F1=Help   F3=Exit

-----
04/014

```

This is the Primary Option Menu which is used to access other menus and panels that allow you to control all optimization features, run traces, and manage system statistics.

Available controls enable you to:

Start or stop CICS OTTO for each component type

Display and control the image pool size

Select or exclude specific terminals or modules to optimize

Dynamically add or remove terminals or modules from optimization in runtime

Start and stop trace

Display statistics

The exclude list is used to say that optimisation should not be performed on certain logical units because, for example, they are using the session to do a file transfer.

Statistics can be displayed to show how well optimisation is being performed.

Also, by utilizing the provided user exits it is possible to:

Use return codes to process specific messages unchanged

Keep and reinsert message parts after optimization

Change characters for specific countries



## CICS OTTO Benefits

- Reduces network load
  - ▶ Better response time and printer speed
  - ▶ End-user response time improvement
- Use device characteristics to create output quicker
  - ▶ Tab characters on printers, for example
- Better use of existing network resources and devices
  - ▶ Reduces the need for new communications equipment
- Easy to install, customize and use
  - ▶ Interface, familiar to any CICS systems programmer
- Statistics maintained
- Optimization features are easily controlled

### CICS Online Transmission Time Optimizer for z/OS

- helps to increase the productivity of the network without rewriting applications
- improves productivity of the system and end users
- enables application programmers to concentrate on functionality, rather than performance
- minimizes the need for new communications equipment by efficiently utilizing your existing current lines, modems, and controllers

CICS Online Transmission Time Optimizer is easy to install, setup and use. System administrators can use built-in controls to temporarily or permanently customize the way CICS Online Transmission Time Optimizer works when it launches with your CICS system at startup.

CICS OTTO monitors its own operations and tells you how effective its optimization is in your environment by continually monitoring operations and reporting its own progress on demand. Operational statistics may be displayed on a screen or written to the console. At system shut down, statistics can be optionally written to the console or a file.

CICS OTTO is an attractively priced product helping to drive down costs of enterprise computing.

## Why CICS Tools from IBM?

- **Increase** CICS systems efficiency and flexibility
- **Improve** system integrity
- **Control** your MIPS cost
- **Leverage** your investment in the latest releases of CICS TS
- **Minimize** your time to exploitation
  - ▶ easy to learn and use
  - ▶ migration support is available

IBM offers a comprehensive portfolio of zSeries tools to help IBM customers significantly reduce the total cost of ownership of zSeries platform



CICS tools are designed to help you implement best practices to grow your CICS systems effectively and efficiently. They are based on standard APIs and best of breed technologies. CICS tools are developed and tested by the same team which develops and tests CICS. CICS tools customers take the advantage of IBM service and support mechanisms, like telephone support for the customers who purchase Subscription and Support license.



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## CICS Tools Overview

How CICS Tools can help with version migrations and improved auditability



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## CICS Transaction Server V3.1

- CICS is IBM's premier transaction processor for the z/OS that provides:
  - ▶ An efficient and optimized runtime for the extension and reuse of existing CICS applications
  - ▶ Services to easily develop applications that exploit new technologies by building on CICS skills
  - ▶ First class management and support of mixed application types and workloads
- CICS TS V3.1 will be available 25 March 2005

### *Increased ease of CICS Integration*

- Web Services capabilities to extend CICS applications to a Services Oriented Architecture
- Support for industry-leading SSL and TLS protocols

### *Enhanced Application transformation*

- Ability to leverage single development tool for application transformation and integration
- Optimized CICS data exchange capabilities

### *Improved performance & Enterprise Management*

- Extension of CICSplex SM Web User Interface
- Improved workload throughput
- Enhanced C/C++ programs performance



CICS has a proven track record of successfully delivering new technology and allowing customers progressively to gain advantage at a pace which makes sense for the enterprise while minimizing the risks inherent in the adoption of new technologies.

The focus of CICS TS V3.1 is to deliver a set of capabilities which provide customer value by enabling business flexibility through IT simplification. These capabilities are represented in the following themes:

- CICS Integration enables re-use of CICS applications, within flexible IT infrastructure, via standard APIs and protocol
- Application Transformation enables enhancement of existing applications and construction of new applications, using contemporary programming languages, constructs and tools
- Enterprise Management enables effective management of large runtime configurations via modern user interfaces, so that demanding service level objectives can be met.

CICS Tools are a part of the CICS strategy. They support and exploit CICS Transaction Server functionality.

## CICS Tools Support for Version to Version Migration

- All tools exploit CICS TS 3.1 functions where relevant
  - ▶ Support and new function exploitation at General Availability
- Improved speed of version to version migration projects
  - ▶ Prepare for migration: prioritize and optimize
    - Application understanding
      - CICS Interdependency Analyzer and WebSphere Studio Asset Analyzer/ATW
    - Performance and application analysis to improve design and performance
      - CICS Performance Analyzer
  - ▶ Improve speed of migration
    - Migrate through Test, Quality Assurance regions and into production faster
      - CICS Configuration Manager for improved productivity and control of CICS resource definitions
      - CICS Interdependency Analyzer for improved quality of testing

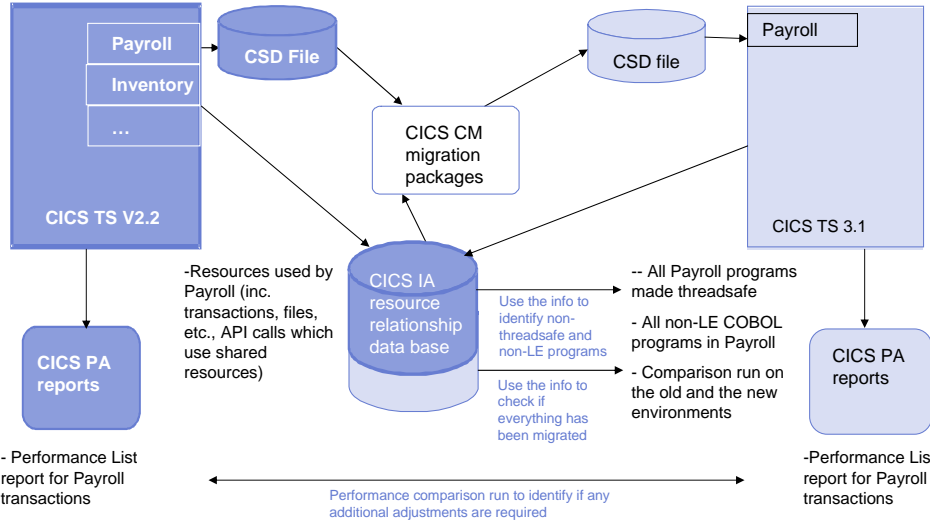


## CICS Tools Support New Function Exploitation

- Identify candidate applications for new function exploitation
  - ▶ Make applications thread safe
    - CICS Interdependency Analyzer helps understand applications that conform to thread safe standards
    - CICS Performance Analyzer reports can show CPU usage by your thread safe CICS applications
  - ▶ Enable CICSplex SM
    - CICS Interdependency Analyzer identifies affinities
    - CICS Configuration Manager can simplify management of resource definitions in a CICSplex environment
  - ▶ Convert OS/VS COBOL programs into Enterprise COBOL
    - CICS Interdependency Analyzer identifies OS/VS COBOL programs
- Improved efficiency to support SOA implementations
  - ▶ Use CICS IA, PA and CM to help implement web services
  - ▶ CICS Operations management tools help move closer to 24/7 operation, a key requirement for SOA.



## Migration to CICS TS 3.1 - CICS resource definitions remain on CSD in target environment



## CICS IA - Affinity analysis

- ▶ What are transaction affinities and why do we care?
  - Exist when persistent state data is created in a CICS Application Owning Region.
  - Subsequent instances **MUST** execute in the same AOR.
  - Need to be resolved when implementing workload balancing projects.
- ▶ How does CICS IA help?
  - Single point of data collection for both, interdependencies and affinities
  - Single point of access to interdependency and affinity data in DB2
  - Flexible and easy to use interface and printed reports for managing affinity data, to help you answer questions like:
    - show me all Inter Transaction Affinities by region
    - show me all ENQ/DEQ type affinities by application
    - show me all affinities for program ABCD
    - show me Transaction System Affinities for transaction XXXX
    - show me all affinity groups which have CPSM groups built.
  - Cross-region data presentation, enabling to look at affinities by application
  - Affinity transaction group definitions, as required by CICSplex SM
    - Easy way to create and maintain definitions in DB2
  - Replaces the Transaction Affinities Utility (TAU) in CICS, which is no longer available from V3.1 on





## How CICS IA can help with making programs threadsafe ?

### A threadsafe program

- Must be written to threadsafe standards.
  - ▶ Must use appropriate serialization techniques when accessing any shared resources.
- Must be Language Environment-conforming or assembler programs.
- Must be capable of executing concurrently on multiple TCBs
- Cannot rely on QR to serialize access to shared resources and storage.
  - ▶ Use serialization techniques
    - Compare and swap
    - Enqueue/Dequeue
  - ▶ All programs accessing a shared resource must be threadsafe.



## What are the shared resources ?

- Typical examples of shared resources are the CICS CWA, global user exit global work areas and storage acquired explicitly by the application program with the shared option.
- You can check whether your application programs use these types of shared storage by looking for occurrences of the following EXEC CICS commands:
  - ▶ ADDRESS CWA
  - ▶ EXTRACT EXIT GASET
  - ▶ GETMAIN SHARED



## How can CICS IA help ?

- Currently the CICS IA run time collector only reports on the ADDRESS CWA command.
- EXTRACT EXIT GASET & GETMAIN SHARED will be added as part of the CICS TS 3.1 exploitation.
- These new commands/resources will be added to the DB2 load program so SQL queries can be performed. For example,.
  - ▶ Show me all programs which execute an 'ADDRESS CWA' command.
- The commands are added to the CICS IA scanner and the info is loaded into DB2.



## What else can CICS IA do ?

- CICS IA reports the current TCB mode for each EXEC CICS (or DB2, MQ, DLI) call.
- Users who are converting their programs to threadsafe can use this during testing to assist in finding out which TCB modes their program runs in. This helps to identify programs that have CICS API calls that are not threadsafe and cause TCB mode swapping.
- Users can run a query on the relationship DB2 database for the list of API calls that are not threadsafe to identify programs that use these calls.



## Language Environment

- CICS TS 2.2 announcement:
  - ▶ *Translator support for the earlier (pre-Language Environment) compilers is withdrawn in this release*
  - ▶ *"It is planned that run-time support for OS/VS COBOL programs, regardless of run-time library used, and for any other programs running under pre-Language Environment run-time libraries will be withdrawn in the next release."*
- CICS TS 3.1
  - ▶ CICS interfaces for the VS COBOL II, OS PL/I and C/370 runtimes are removed
    - Will need run-time libraries distributed with LE to execute current load modules
  - ▶ CICS interfaces for the OS/VS COBOL are removed
    - CICS will terminate any OS/VS COBOL program with an APCE abend



## Identifying OS/VS COBOL programs

### What the CICS IA scanner provides for is as follows :-

- It attempts to find the language type from the Language byte in the API call. if it has not identified it from the API call then it checks the prologue (stub) for DFHYA for Assembler etc.
- It reports the following types
  - ▶ ASSEMBLER - Assembler language constant
  - ▶ COBOL II - COBOL II language constant (or any COBOL after OS/VS, COBOL FOR MVS etc.)
  - ▶ C/370 - C/370 language constant
  - ▶ COBOL - COBOL language constant (OS/VS COBOL)
  - ▶ PL/I - PL/I language constant
- We also identify if the program is runnable under LE/370.
- The IA scanner will identify OS/VS COBOL programs and informs you whether they have been linked with LE or not.



## How can CICS PA help with migration?

- **Growing CICS usage, need to ensure greater availability:**
  - ▶ CICS PA helps discover trends leading to poor performance
  - ▶ CICS PA helps identify causes of online problems
  - ▶ CICS PA assists capacity planning
- **V-V migration assistance**
  - ▶ Prepare for migration: prioritize and optimize
    - Performance and application analysis to improve application design and performance
    - Prioritize work depending on application usage
  - ▶ Make applications threadsafe
    - CICS PA reports can show CICS TCB usage by your threadsafe CICS applications

IBM CICS Interdependency Analyzer for z/OS™ is a powerful tool that automates detection of runtime resource relationships within your CICS system, records this data in a DB2® database, and provides flexible reports to help you analyse the collected information, build a relationship roadmap and use this data in your daily operations. Resources identified include those associated with transactions, programs, Basic Mapping Support (BMS) maps, files, temporary storage (TS) queues, transient data (TD) queues, 3270 Bridge facility, Web Services, CorbaServer, and Enterprise JavaBeans(5) (EJBs). It also reports on DB2(R), IMS(TM), and MQ resources which are used by CICS. The on-line queries CICS IA provides, enable you to perform detailed resource relationship analysis (e.g. what transactions run in which regions, what affinities were found for a program), as well as resource comparison (e.g. comparison of applications across regions).

IBM CICS Interdependency Analyzer helps you to:

Improve your ability to maintain, enhance, and migrate your business applications

Make an informed decision on the best way to split workload and move applications to more CICS regions

Minimize the impact of routine application maintenance for the end user

Unlock potential for improved application design

Helps implement workload balancing across CICSplex and Sysplex to provide continuous availability

Implement faster application reuse and integration with on demand processes

## CICS Transaction Server for z/OS Version 3.1 Support

- CICS Performance Analyzer provides customize reports ...
  - ▶ Custom reports are provided which enables extensive performance analysis of the many new functions introduced in CICS Transaction Server V3.1
  - ▶ Detailed and summary reports provided include ...
    - Transaction CPU Analysis – including CICS TCB usage for ...
      - OPENAPI Applications, XPLink, ...
    - Web services applications
    - CICS Web support and Secure Sockets Layer (SSL) enhancements
    - Application Transformation - inter-program data transfer ...
      - Channel Container usage, Program request channel activity, ...
  - ▶ Online Statistics Reporting is available for all CICS statistics data ...
    - Including the new statistics data on the CICS resources for Web services ...
      - PIPELINE, URIMAP, and WEBSERVICE
    - And the CICS Web support enhancements to TCP/IP Services





## How can CICS Configuration Manager help?

- **Application change**
  - ▶ Automation of CICS resource definition changes associated with application upgrades
- **V-V migration assistance**
  - ▶ Improve speed of migration – move through Test, Q&A and into production faster
    - Initial productivity gains using CICS CM to migrate your existing definitions to the new test system
    - CICS Configuration Manager provides full support for the new definitions introduced in CICS TS V3.1
- **CICSplex SM enablement**
  - During the migration phase, you will have a mixed environment of CSDs and CICSplex System Manager data repositories
  - CICS Configuration Manager provides a view of your resources that is completely independent and transparent to the underlying repository, enabling you to easily move, copy and migrate definitions between these two environments.



## CICS BEP – Sarbanes-Oxley Solution

- Perform internal auditing across the CICS enterprise
  - ▶ CICS BEP can be customized to report on CICS activities
  
- Report on any data changes in CICS/VSAM, DB2 and/or IMS
  - ▶ CICS BEP can report on VSAM, DB2 and/or IMS access
  
- Be adopted quickly for SOX compliance
  - ▶ CICS BEP has very user friendly GUI
  - ▶ CICS BEP "rule" can be quickly authored
  - ▶ No changes to source CICS; DB2 and/or IMS source programs using CICS BEP
  
- Be configured to ensure efficient allocation of resources and identify highest cost and risk areas
  
- Be configured to report an alarm to identify potential compliance issues within CICS TS; CICS/VSAM; DB2; IMS
  
- Be configured to produce reporting controls across CICS TS; DB2 and/or IMS management systems using WAS MQSeries
  
- Leverage other CICS TS; DB2 and/or IMS based compliance initiatives to reduce cost of SOX compliance
  - ▶ All achieved by creating a CICS BEP "rule"



## CICS Interdependency Analyzer – help with Sarbanes-Oxley Compliance

- Perform internal auditing across the CICS enterprise
  - Help document CICS TS programs to achieve SOX compliance
  - Be adopted quickly for SOX compliance
  - Leverage other CICS TS; DB2 an/or IMS based compliance initiatives to reduce cost of SOX compliance
- 
- ▶ CICS IA reports on all resources (CICS programs; VSAM, DB2, IMS files; etc.) that occur within the CICS TS enterprise
  - ▶ CICS IA information is stored in a DB2 table (defined during CICS IA installation)
  - ▶ Users can quickly produce ad-hoc SQL reports (using the CICS IA DB2 table as input) for documentation



## CICS Configuration Manager – help with Sarbanes-Oxley Compliance

- Perform internal auditing across the CICS enterprise
- Be adopted, easily configured and quickly report on any CICS TS SOX compliance program(s)
- Helps document CICS SOX programs and provides “change management” of SOX compliance CICS TS programs
  - ▶ CICS CM provides audit trail and reporting
  - ▶ CICS CM also provides back-out function
  - ▶ Provides XML interface
  - ▶ CICS CM allows users to compare CICS TS definitions/attributes across the CICS TS enterprise
  - ▶ CICS CM can be configured for change authorization capabilities
    - Must be approved by (up to 5 users/administrators - optional) prior to performing “change management”



## Further information

### **CICS Tools site**

[www.ibm.com/cics/tools](http://www.ibm.com/cics/tools)

### **Program numbers (licence):**

CICS Configuration Manager	5697-I78
IBM Session Manager	5655-K01
CICS VSAM Recovery	5655-H91
CICS VSAM Copy	5655-L66
CICS VSAM Transparency	5655-I76
CICS Batch Application Control	5697-I94
CICS Performance Analyzer	5655-F38
CICS Interdependency Analyzer	5697-J23
CICS Business Event Publisher	5655-J99
CICS OTTO	5655-I05
CICS Performance Monitor	5655-I46



More information on CICS Tools and other IBM tools can be found on the following web sites.

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  - ▶ CICS Interdependency Analyzer for z/OS V2.1 User Guide and Reference SC34-6685
  - ▶ CICS Interdependency Analyzer for z/OS V2.1 Program Directory GI10-2598
  - ▶ DB2 Application Programming and SQL Guide, SC26-4377
  - ▶ DB2 Administration Guide, SC26-4374
  - ▶ Redbook: CICS Interdependency Analyzer, SG24 -6458-00
  - ▶ White paper: CICS Interdependency Analyzer for z/OS V1.3 - Discovering resource relationships and affinities within your CICS environment, G224-9129
- CICS Business Event Publisher
  - ▶ CICS Business Event Publisher User Guide, GC34-6295
  - ▶ CICS Business Event Publisher Getting Started, GC34-6296
  - ▶ CICS Business Event Publisher Program Directory, GI10-2564
- CICSVR
  - ▶ CICSVR V4.1 User's Guide and Reference, SH26-4127
  - ▶ CICSVR V4.1 Implementation Guide, SH26-4126
  - ▶ CICSVR V4.1 Program Directory, GI11-1232
  - ▶ CICSVR V4.1 Messages and Problem Determination, SH26-4128
  - ▶ Redbook: CICSVR Usage Guide, SG24-6563-00



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- CICS OTTO:
  - ▶ CICS Online Transmission Time Optimizer for z/OS User's Guide, SC34-6104
  - ▶ Systems Network Architecture: Sessions Between Logical Units, GC20-1868
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  - ▶ CICS VSAM Transparency for z/OS V1.2 User Guide and Reference, SC34-6343
- ▶ CICS VSAM Copy
  - ▶ CICS VSAM Copy for z/OS V1.1 User's Guide, SC34-6339
  - ▶ CICS VSAM Copy for z/OS V1.1 Program Directory, GI10-2579
- CICS Batch Application Control
  - ▶ CICS Batch Application Control for z/OS V1.1 Program Directory, GI10-2574
  - ▶ CICS Batch Application Control for z/OS V1.1 User's Guide, SC34-6321
  - ▶ CICS Batch Application Control for z/OS V1.1 Workstation User's Guide, SC34-6322



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- CICS PA
  - ▶ CICS Performance Analyzer for z/OS V1.4 User's Guide SC34-6307
  - ▶ CICS Performance Analyzer for z/OS V1.4 Report Reference SC34-6308
  - ▶ CICS Performance Analyzer for z/OS V1.4 Program Directory GI10-2570
  - ▶ Redbook - CICS Performance Analyzer Release 3, SG24-6063
  - ▶ z/OS MVS System Management Facilities (SMF), SA22-7630
  - ▶ DFSORT Application Programming Guide, SC33-4035
  - ▶ CICS Performance Guide, SC33-1699
  - ▶ CICS DB2 Guide, SC33-1939
- CICS Configuration Manager
  - ▶ CICS Configuration Manager for z/OS V1.1 User's Guide GC34-6646
  - ▶ CICS Configuration Manager for z/OS V1.1 Program Directory GI10-2588





## Bibliography (*continued*)

- Session Manager
  - ▶ Session Manager for z/OS - Program Directory, GI10-2562
  - ▶ Session Manager for z/OS - Installation and Getting Started, GC34-6285
  - ▶ Session Manager for z/OS - Technical Reference, SC34-6286
  - ▶ Session Manager for z/OS - Facilities Reference, SC34-6287
  - ▶ Session Manager for z/OS - Panels, Scripts and Variables, SC34-6288
  - ▶ Session Manager for z/OS - Messages and Codes, GC34-6289
  - ▶ Session Manager for z/OS - Quick Reference, SC34-6290

