



IBM Software Group

# CICS Tools Overview

## March 2005



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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
- Bibliography



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

## eServer zSeries tools

## Servers

- WebSphere Application Server for zSeries
- CICS
- IMS

## Transformation tools

- WebSphere Application Monitor
- WebSphere Workload Simulator
- WebSphere Asset Analyzer
- WebSphere Enterprise Developer
- WebSphere Host On-Demand Connector
- WebSphere Host Access Transformation Server

## Problem determination tools

- File Manager
- Fault Analyzer
- Debug Tool
- Application Monitor
- Workload Simulator

## CICS tools

- CICS Business Event Publisher
- CICS Interdependency Analyzer
- CICS VSAM Transparency
- OMEGAMON XE for CICS
- CICS Performance Analyzer
- IBM Session Manager
- CICS VSAM Recovery
- CICS VSAM Copy
- CICS OTTO
- CICS Batch Application Control
- CICS Configuration Manager

## Development management

- Requisite Pro
- ClearQuest
- ClearCase
- SCLM



4

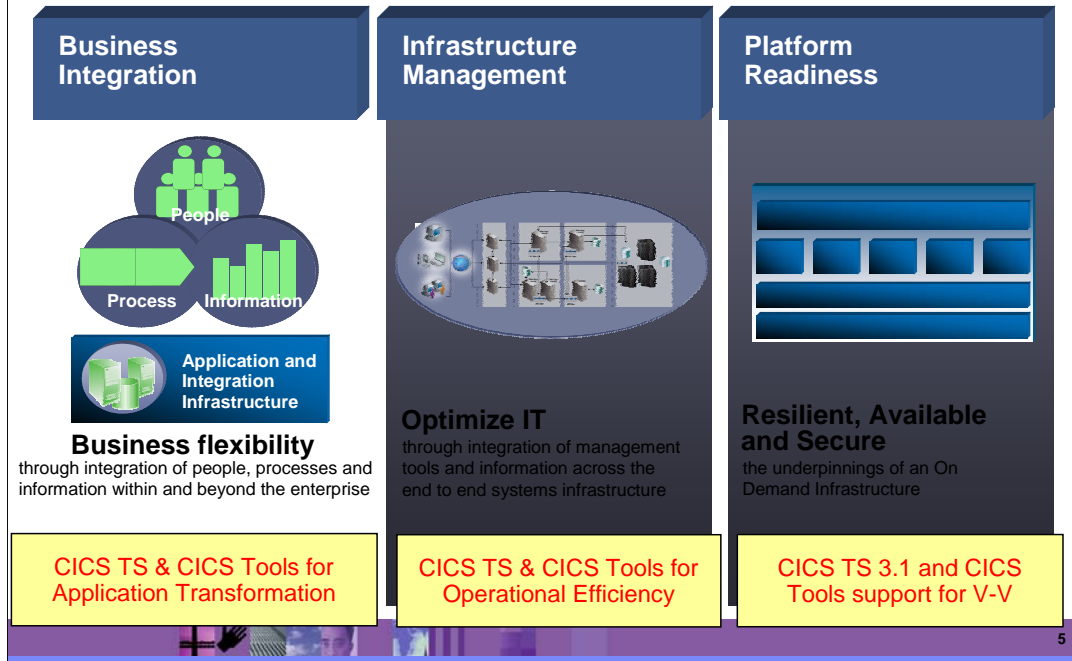
IBM eServer™ zSeries® customers have unique business requirements. Their commitment to the highest-availability platform in the IBM product family reflects the need for an environment that can support high-volume transaction processing with demanding batch windows and large, mission-critical application portfolios. Organizations with IBM eServer zSeries systems typically have large numbers of developers with broad skill sets in varying areas of business and technology, as well as great diversity in applications, processes and standards. In addition, they have the highest expectations as to the quality of service (QoS) and value they deliver to their corporations and to their customers.

IBM WebSphere® and zSeries tools enable you to Discover, Develop, Deploy and Run composite applications and meet these business requirements

For example, our integrated solution can help you:

- Begin by understanding “As is” and modeling “to be” business processes – with WebSphere Business Integration Modeler
  - Turn “To Be” processing into application models – Then generate core application objects - where Rational Rose and XDE modeler fit
  - Understand existing application architectures and processing with WebSphere Studio Asset Analyzer and CICS interdependency analyzer
  - Write and test your business transactions with support for WebSphere, CICS, IMS, Batch, Java, COBOL and PL/I applications with WebSphere Studio Enterprise Developer including Host Integration solutions.
  - Create and manage a test and production data environment with IBM File Manager
  - Test, debug, and profile (performance) and validate coverage – with IBM Debug Tool and Rational Purify
  - Create and execute test cases and automatically verify functionality with Rational XDE Functional Tester and WebSphere Studio Workload Simulator
  - Append test results to problem (bug) reports - and save hours of time trying to recreate user errors.
  - Identify faults and performance problems with WebSphere Studio Application Monitor, CICS and IMS Performance Monitors and manage failures with Fault Analyzer
  - Monitor and support business processes across the enterprise integrated with WBI monitor and Tivoli overall application management solutions
- It all adds up to more automation and less time attending to tedious administration. All of which helps our customers get a handle on the complexity of software development – enables quality evaluation earlier in the process, and enables heterogeneous skills and manageable infrastructures delivered supporting the process

This presentation discusses in further detail tools which help our CICS customers move applications, skills, and processing forward to the future.

zSeries Software *for the On Demand World*

This chart shows IBM's CICS Tools in the context of the On Demand message. As the business world moves to an on demand environment, Business Flexibility is essential. Flexible enough to respond to customer demand, agile enough to react and compete effectively with competition Business Flexibility is best supported through the integration of a companies **people, processes** and **information**.

CICS Transaction Server V3.1 and the CICS Tools help our customers achieve this flexibility, as well as effectively manage their CICS enterprises to optimize their IT environments.

## 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 CICS Transaction Server Version to Version Migration

- All tools exploit CICS TS 3.1 functionality where relevant
  - ▶ Exploitation and support at GA
- Improved speed of version to version migration projects
  - ▶ Prepare for migration: prioritize and optimize
    - Application understanding
      - CICS IA and WSAA
    - Performance and application analysis to improve application design and performance
      - CICS PA
  - ▶ Improve speed of migration – move through Test, Q&A and into production faster
    - CICS Configuration Manager for improved productivity and control of CICS resource definitions
    - CICS IA for improved quality of testing
  - ▶ Make applications threadsafe
    - CICS IA provides information needed to understand which applications conform to threadsafe standards
    - CICS PA reports can show CICS TCB usage by your threadsafe CICS applications
  - ▶ Enable CICSplex SM
    - CICS IA identifies affinities
    - CICS Configuration Manager simplify resource definitions management in CICSplex SM environments
- Improved efficiency to support SOA and Web Services implementations
  - ▶ CICS Subsystem management tools help move closer to 24/7 operation, a key requirement for SOA.
  - ▶ CICS VT enabling the move of data from VSAM to DB2, which opens the data up to WebSphere based services.

CICS Tools not only support and exploit CICS TS 3.1, but they can also be helpful throughout the process of migration from earlier releases on to CICS TS 3.1. More detail on that later in this presentation. First, let's have a look at the portfolio and its value to the CICS customers.



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## CICS Tools Overview

## CICS Application Transformation



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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 Transformation 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

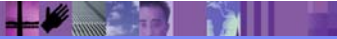
#### **CICS Interdependency Analyzer**

- 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, 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.

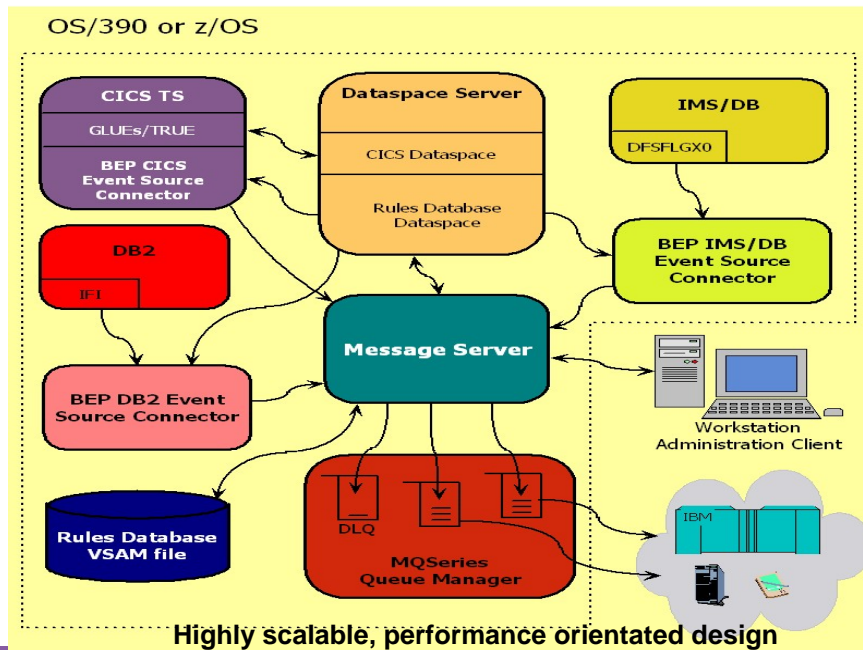
**Automation - Replace Batch Operations (7X24 world):** Traditionally, many activities are deferred until the files are taken off line and processed in batch. For example, generate customer letters and E-mails, post other files, etc. With CICS BEP, the changed information can be fed real time to an asynchronous 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.

## CICS BEP V1.2 Architecture



12

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.

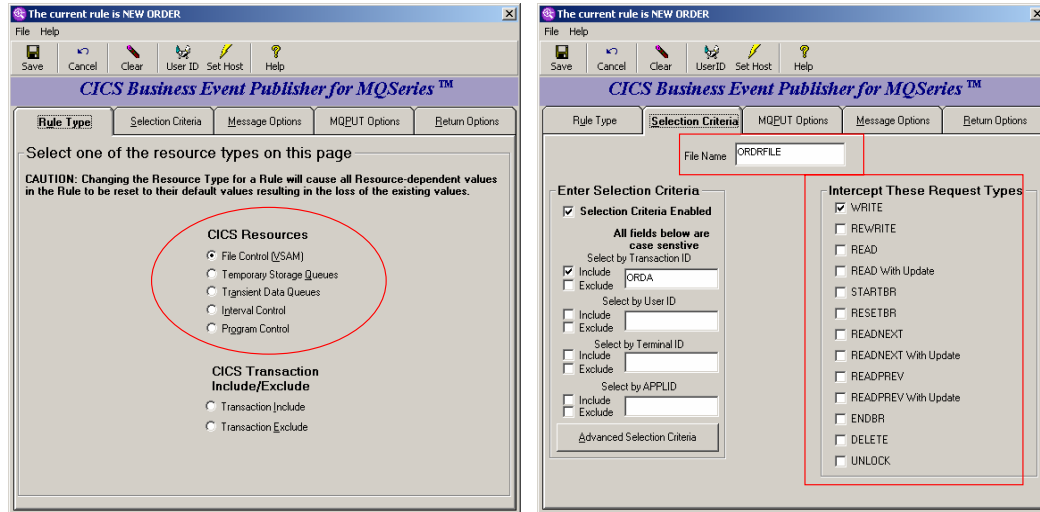
#### CICS BEP consists of five major components:

- ▶ **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



13

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

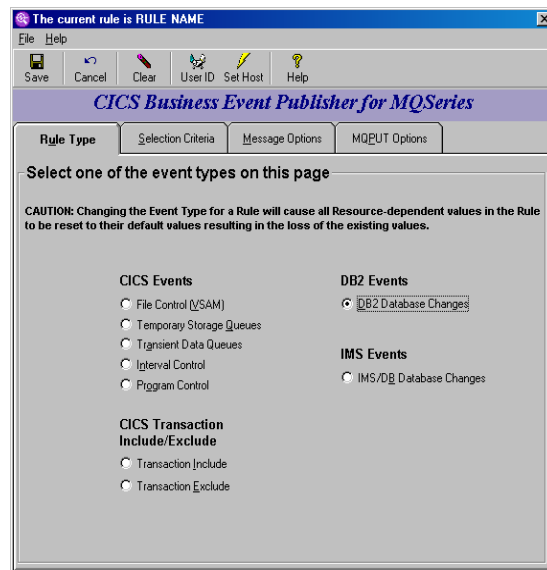
Right – selection criteria is specific for file control. First field is file name.

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

## 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



14

### 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

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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)
  - ▶ Provides run-time capture of CICS resource relationships
  - ▶ Captures resource relationships such as
    - which resources (Programs, Files, TSQs TDQs etc) are required by a transaction
    - the sequencing of transactions within an application
    - what resources are no longer used
    - which transactions have affinities to other transactions and the type and lifetimes of these affinities
  - ▶ 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
- Current release - CICS IA 1.3
  - ▶ GA - September 2003

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 went 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

### CICS IA helps 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



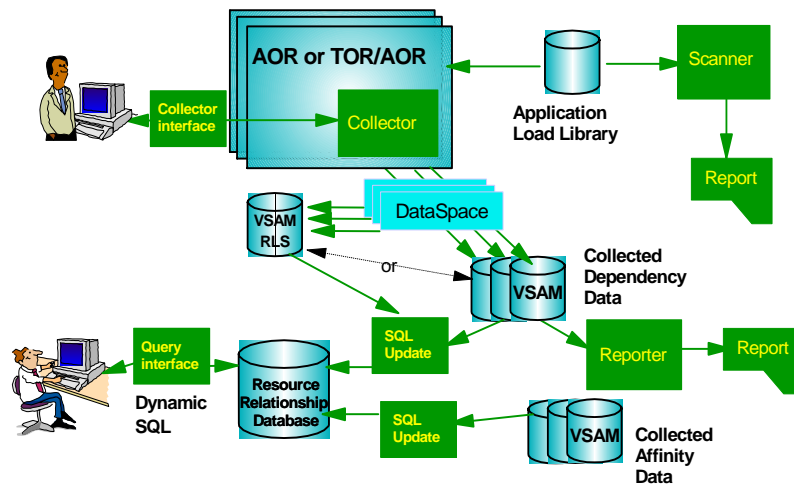
CICS customers are looking to reuse and maintain their core asset, CICS applications, more efficiently, at a lower cost. As you can see from this chart, CICS Interdependency Analyzer offer the capabilities CICS customers need to reduce time and effort of application reuse and maintenance. CICS IA helps 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 IA - Overview



## Collector

- Gathers information on resource relationships
- 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.
  - Updated from VSAM files under operator control
- Contains user-defined Applications using SQL statements
- Contains Affinities data captured by the Transaction Affinities utility in CICS, if this data has been loaded into the DB2 database using supplied utilities

## The Query Interface

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

## Scanner

- Analyzes the members in the Application LoadLib 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

## Reporter

- Analyzes the interdependency data stored on VSAM
  - Selectable by Resource type
  - Shows Tran, Program, Offset, Command, Resource name, SYSID and Usage

## 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



## CICS Interdependency Analyzer

### *Helping Maintain and Enhance CICS Applications*

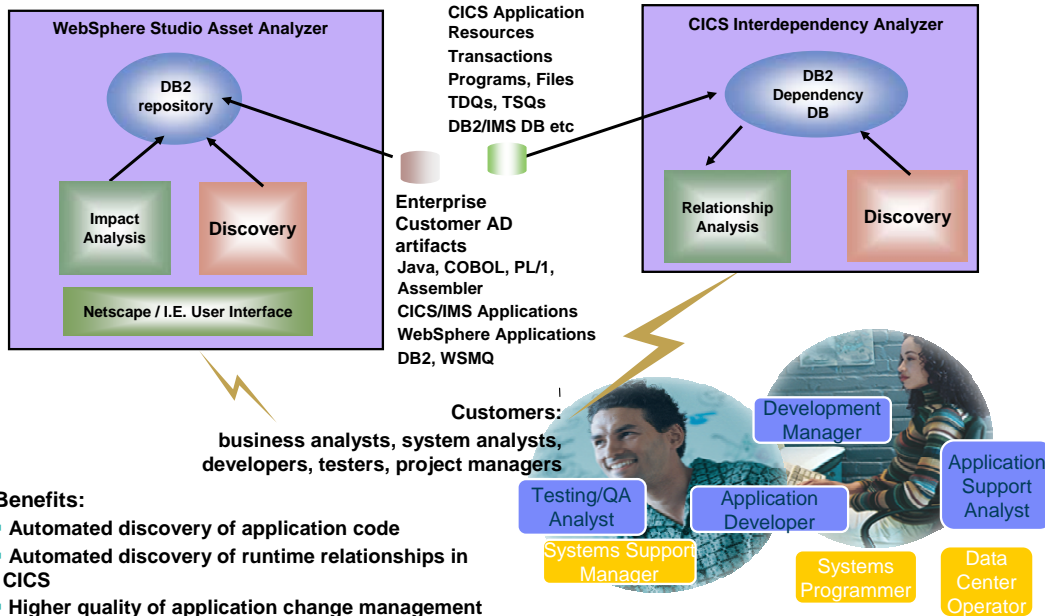
- Understand Active Application Inventory quickly and efficiently
  - ▶ Merger / Acquisition / Outsourcing
  - ▶ Lost or incomplete documentation
  - ▶ Vendor Applications
  - ▶ Need to enable transactions run in any CICS region
- Maintain or Enhance Applications more easily, e.g.
  - Understand cross-system applications and dependencies
  - Know the resource topology within a particular CICS region
  - Identify the resource flow following a transaction abend
  - Look across boundaries, including through shared data
- Change or upgrade an application quickly and efficiently
  - ▶ identify resources that are affected directly and indirectly
    - ▶ Transactions, programs, data elements: Files, Queues, Screens, ...
    - ▶ What to change, what to build, what to test, what needs to be communicated to roles involved
- Identify affinities when planning to enable CICSplex System Manager

The interdependency data collected by CICS IA, gives you the information about what programs are used by a transaction, what Files get read or updated by a transaction, the sequencing of transactions within an application, what transactions run in which regions or address spaces, etc. The online reports provided by CICS IA, can help you to improve your ability to maintain, enhance, and migrate your business applications.

So CICS IA usage scenarios range from simple application maintenance scenarios (e.g. identifying what's involved in extending a file off-line) to more complex scenarios, which can be relevant to your CICS V-V migration processes.

E.g. during the migration you might use a performance analysis tool like CICS PA to analyze existing CICS regions before migration and their ability to meet SLAs. If you identify an opportunity to improve, you can use CICS IA to identify the resource relationships within a particular region, along with PA to identify bottlenecks in this region. Then you can use this information to either clone the regions to run this workload across multiple regions (IA will provide the information for cloning), or you might decide to actually split the workload. Again, IA, in conjunction with CICS utilities, will help you do this.

## Responding to change - Understanding Applications Speeds Time to Market



If you are planning to exploit the capabilities of the latest CICS TS releases to develop new applications, there are two tools which can help in the following way: automate your current application code discovery (WSAA) and also automate the discovery of runtime interrelationships in your CICS systems (CICS IA).

WSAA provides up to date information about application components and their relationships based on the source code information. It helps create new components and provides impact analysis to ensure thorough understanding of proposed changes.

When documentation is lost or incomplete, source code is unavailable, CICS Interdependency Analyzer provides you with additional information to help you understand RUN-TIME cross-system applications and dependencies for CICS and CICS calls to DB2, IMS and WebSphere MQ and know the resource topology within a particular CICS region.

Combined information provided by WSAA and CICS IA can help you manage application change more effectively, while maintaining and even improving the high level of back-end system performance.

Lets take web-enabling of an existing application as an example. There is a number of ways to drive existing applications from the web e.g. via COMMAREA. WSAA can be used to identify for your selected programs, the COMMAREA for inclusion in the application development tools for your new application. And also, as part of planning for the change, we will need to understand the make-up of the current application we are changing: any queues used, types of data accessed, types of business integration this application is involved in. e.g. integration with another piece of business logic via WS MQ.

There might not be enough information in the shape of the source code or documentation to help you identify these things, or you might not have enough time to perform the work manually, so this is when CICS IA can help.

## 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 V1.1
  - ▶ GA March 2004

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:

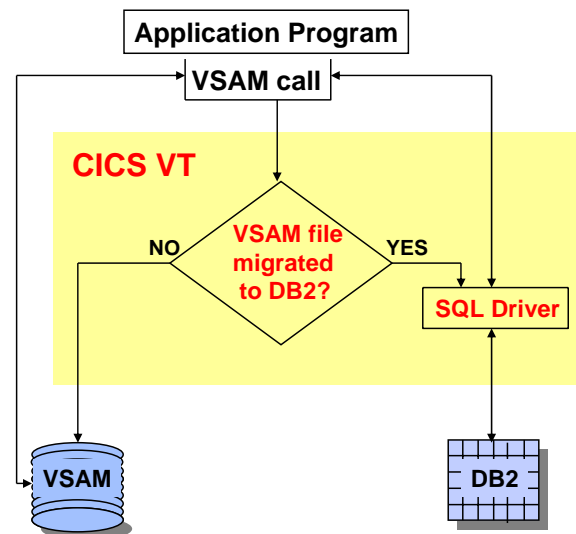
1. Unload existing data from VSAM data set
2. Convert data to DB2 format
3. Load DB2 data

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



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CICS Tools Overview

CICS Subsystem Management



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## Manage your CICS subsystem

Reduce down time

Use CICS resources  
more efficiently

Control software cost

Improve end-user  
productivity

### CICS Subsystem 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

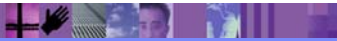
- Simplify and automate batch access to CICS resources

#### 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

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

## Requirements

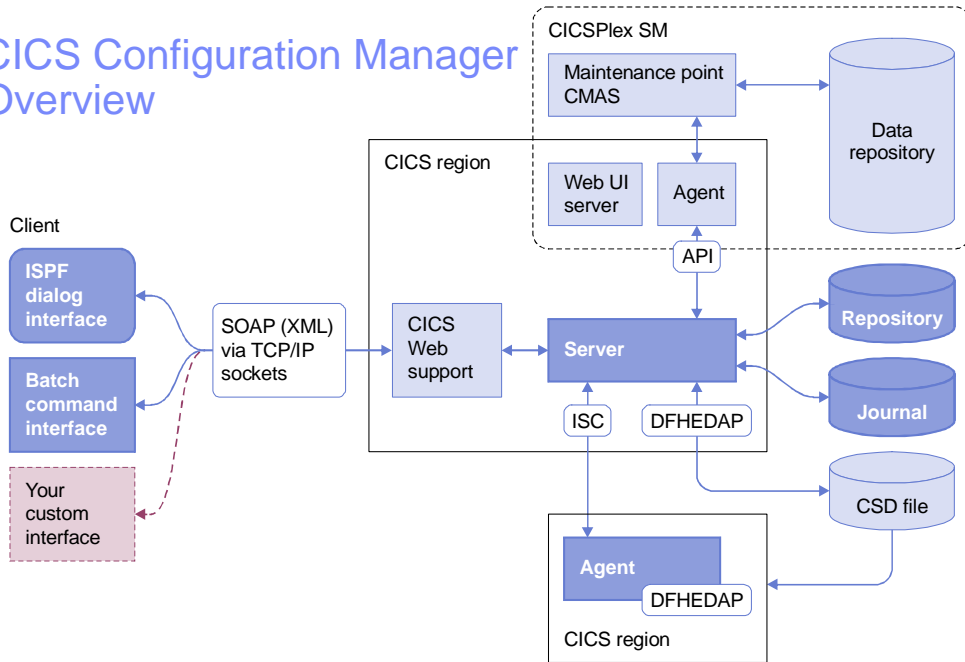
- **Managers** need to control, approve, and audit how definitions are migrated
- **Technical staff** need an easy-to-use and flexible tool to update and migrate definitions, undo migrations, and report to management

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





# CICS Configuration Manager Overview



## CICS Configuration Manager Benefits

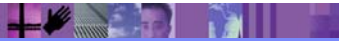
- Can be used by both, System Programmers and Application Developers
- Provides single point of remote control over definitions in multiple systems
- Resource definitions can be managed across multiple CICS regions, including regions that are controlled by CICSplex SM
- Linkage to customer's source code management system
- Powerful copy capabilities with transformation rules
- Supports CICS TS 3.1



## 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

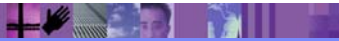
•Plan capacity to reduce MIPS cost

•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



36

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

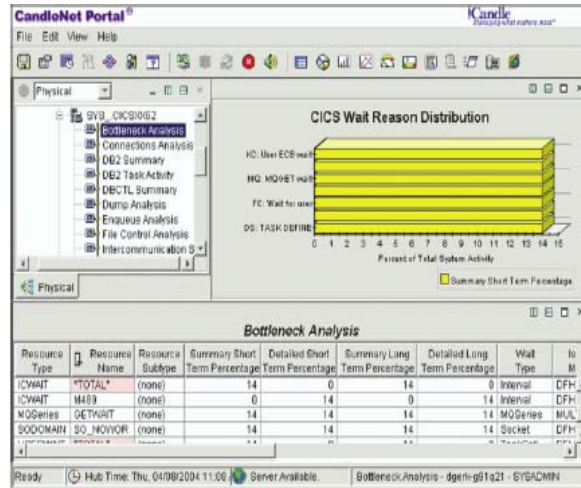
Performance Analyzer also complements the enterprise-wide historical performance capabilities of IBM Tivoli® Decision Support for z/OS.

CICS Performance Analyzer can help you:

- Reduce the cost of tuning and capacity-planning analysis.
- Take a proactive approach to CICS systems tuning.
- Provide detailed performance bottleneck analysis.
- Uncover trends leading to reduced CICS performance or even outages.
- Enable capacity planning for optimal performance.
- Identify the potential to improve application design and review performance before applications go into production.

## 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



## 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

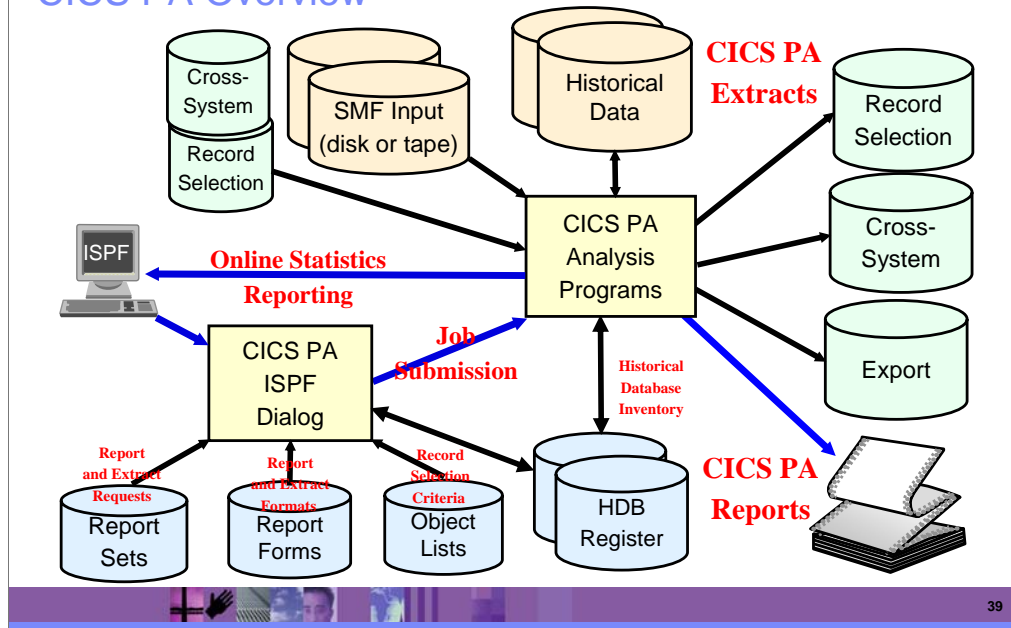
IBM CICS® Performance Analyzer for z/OS V1.4 is a powerful off-line reporting tool that analyzes the System Management Facilities (SMF) records created by the CICS Monitoring Facility (CMF), CICS Statistics, CICS Server Statistics, as well as SMF data from the related subsystems (DB2 and WebSphere® MQ®), 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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M.A. 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: IYK3Z0F6/MV2C VRM: 640 Type: INT Interval: 2004/11/09 02:10:00 Tuesda
TCB TCB TCB Current Peak
Mode Mode Open TCB Attaches Attach Failures Attached TCBs TCBs
Name Name Open Pool Attaches Failures Attached Attached Attached

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 0 1 1
SL NOTOPEN NA 0 0 0 1 1
SO NOTOPEN NA 0 0 0 1 1
SP NOTOPEN NA 0 0 0 1 1
D2 UNKNOWN NA 0 0 0 0 0
JM NOTOPEN NA 0 0 0 0 0
SB UNKNOWN NA 0 0 0 0 0
LB OPEN OPEN 0 0 0 1 1
L9 UNKNOWN NA 0 0 0 0 0
J8 UNKNOWN NA 0 0 0 0 0
J9 UNKNOWN NA 0 0 0 0 0
X8 UNKNOWN NA 0 0 0 0 0
X9 UNKNOWN NA 0 0 0 0 0

MA b 04/015
    
```

## 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



## 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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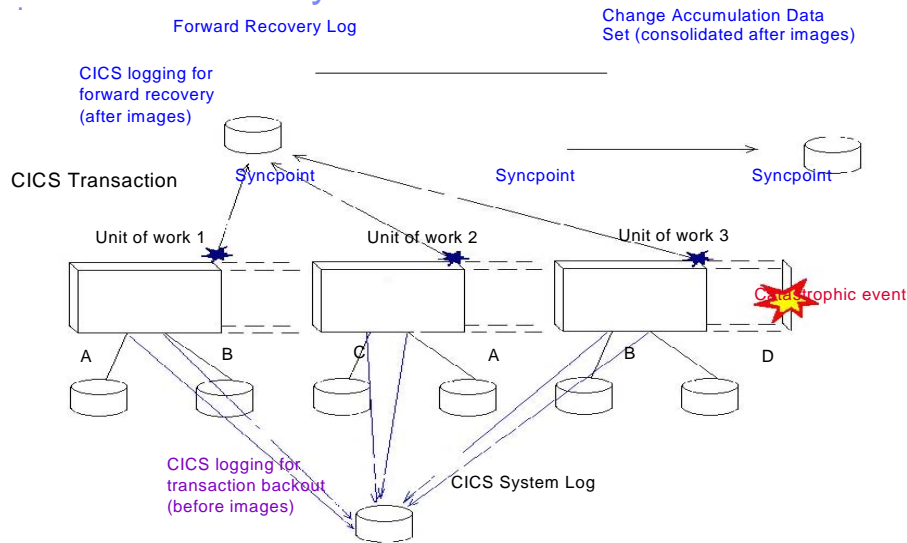
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## What is CICSVR V3?

- Latest release V3.3
  - ▶ GA 24 September 2004
  - ▶ OTC (value unit) vs. MLC pricing
- 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 3.3 - overall recovery capability enhanced,
  - ▶ Batch backout: Removing VSAM updates made by failed batch job steps
  - ▶ Better integration with other backup products (IBM or non-IBM).
  - ▶ Usability enhancements to the CICS VR panel interface and server address space.

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.

## Forward Recovery - What is it?



48

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 CICSVR V3 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
- Range of functional and usability improvements in CICSVR 3.2



## 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

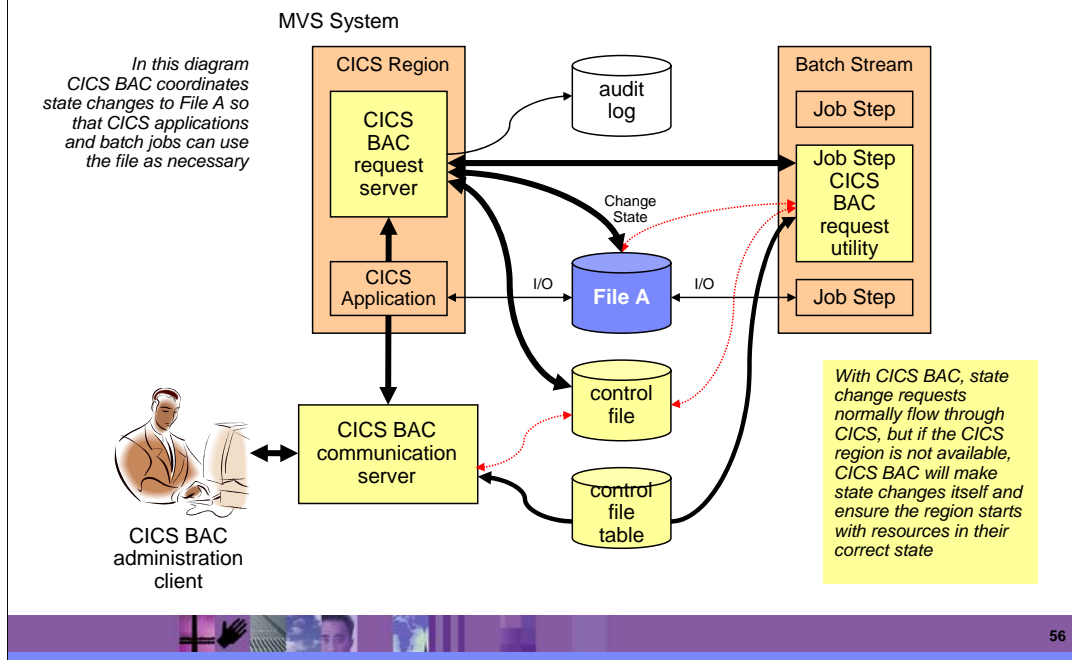
This chart summarizes the advantages of CICS VSAM Copy which have been explained in the previous few charts.

## 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



## CICS Batch Application Control



### 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 V1.2
  - ▶ GA August 2004



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

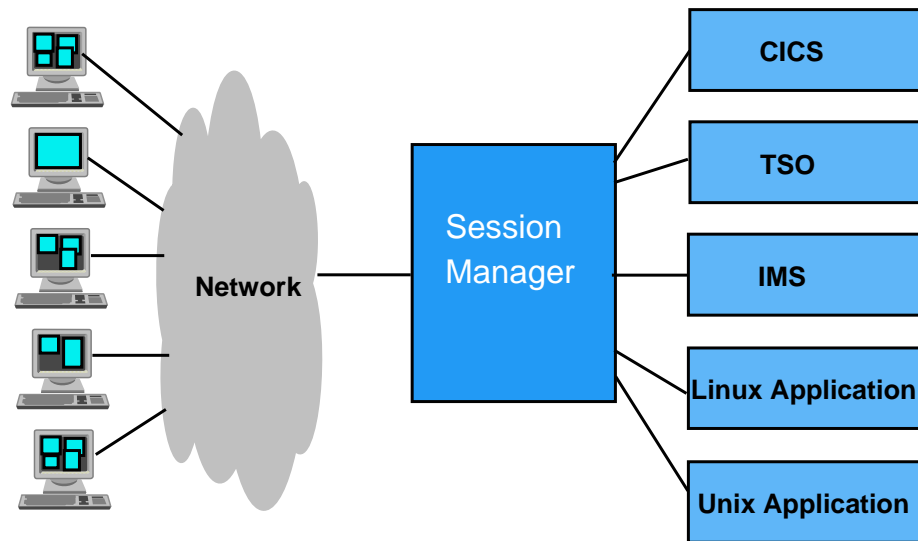
## Session Manager V1.2 – new function

- 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

## 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.

## 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

MR  C                               04/014
Connected to remote server/host wemvrs20 using port 23

```

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



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## CICS Tools Support for CICS Transaction Server V3.1 at GA

CICS Tool	Support for CICS TS 3.1	APAR number	Comments
CICS Performance Analyzer V1.4	Support/exploitation	In CICS PA 1.4	Exploitation at 3.1 GA
OMEGAMON XE for CICS	Support		Support at 3.1 GA
CICS Interdependency Analyzer V1.3	Support/exploitation, PTF required	PQ95065	Separate exploitation PTF
CICS VSAM Recovery V3.3 and V3.2	Support	None	Exploitation is not applicable
Session Manager V1.2 and V1.1	Support	None	Exploitation is not applicable
CICS Business Event Publisher V1.2	Support/exploitation, PTF required	TBD	Separate exploitation PTF 2Q
CICS OTTO V1.1	Support	None	Exploitation is not applicable
CICS VSAM Transparency V1.1	Support	None	Exploitation is not applicable
CICS VSAM Copy V1.1	Support, PTF required	TBD	Exploitation is not applicable
CICS Batch Application Control V1.1	Support, PTF required	TBD	Exploitation is not applicable
Earlier releases of these tools do not support CICS TS V3.1			

All the CICS tools covered in this presentation support and, where appropriate, exploit the latest function introduced in CICS Transaction Server V3.1.

## How can CICS IA help?

- **Growing CICS usage, need to balance work across regions:**
  - ▶ CICS IA helps quickly identify resource relationships which need to be changed to enable transactions run anywhere
  - ▶ CICS IA helps quickly clone regions
- **Application change (e.g. web enablement)**
- **V-V migration assistance**
  - ▶ Improve speed of migration – move through Test, Q&A and into production faster
    - CICS IA for improved quality of testing by enabling comparison of regions contents
  - ▶ 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 affinities



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 IA 1.3 - Affinity analysis

- ▶ You can now load data captured by the CICS Transaction Affinities utility (CICS TAU, part of CICS TS) into CICS IA DB2 tables for analysis
- ▶ What are transaction affinities ?
  - Exist when persistent state data is created in a CICS Application Owning Region.
  - Subsequent instances MUST execute in the same AOR.
- ▶ What is Transaction Affinities Utility in CICS
  - for those users planning to use CICS workload management
  - Can be used to create basic CPSM definitions

Function	Currently in CICS TAU	New analysis offered by CICS IA 1.3
Data collection	By region	By region
Data presentation	By region, no application view	Cross-region, can look at affinities by application
Data base	No, VSAM files	DB2
Online query facility	No, printed reports only	Extensive query interface and printed reports
Affinity transaction group definitions, as required by CICSplex SM	Created definitions are in a file Definition names change (e.g. if data collection is run again, a new definition with a new name is created)	Created definitions in the DB2 database Definition names are permanent (e.g. if data collection is run again, the information is added to the same group)



## CICS IA 1.3 - Affinity analysis

- ▶ CICS Interdependency Analyzer V1.3 adds value for affinity analysis today:
  - Single point of access to interdependency and affinity data
  - Flexible and easy to use interface for managing affinity data
- ▶ PTF 2Q 2005
  - Single point of data collection for both, interdependencies and affinities
    - Reduced overhead
    - Exits made threadsafe



## 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?

- **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).

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- 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**
  - ▶ Supports CICS TS 3.1
  - ▶ Improve speed of migration – move through Test, Q&A and into production faster
    - CICS Configuration Manager for improved productivity and control
- **CICSplex SM enablement**
  - CICS CM manages CICSplex SM definitions

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## 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	5655-G76
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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  - ▶ 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

