IBM System z Technology Summit

CICS - Strength throughout the ecosystem. Are you tooled up?

Presenter: Eric Higgins, Joe Gailey

Date: 1Q12

Agenda

- **Scenario introduction**
  - Business needs
  - Technical solution

- **The scenarios**

- **Summary**

- **Reference material**

Business view

- **JK Insurance**

  – Regional insurance company - planning to go national

  – Extending its current reach with web and Smartphone access

  – 24/7 availability needed for consumer buying patterns

  – Fast and consistent response times needed to avoid leakage

  – PCI DSS (Payment Card Industry Data Security Standard) compliance is essential

IT view

- **Policy trading app (GENAPP) runs in single CICS region**
  - Clone region to improve availability and scalability
  - Implement CICSPlex SM for SPOC and workload management

- **Current team unfamiliar with GENAPP**
  - Use appropriate tooling to meet aggressive launch date
  - Analyze application to understand resource interdependencies and affinities

- **VSAM files require batch window for reporting, backups, and maintenance**
  - Migrate files to DB2 without modifying application
  - Encrypt credit card and key customer data

- **Application has some performance issues**
  - Conduct a performance analysis and tuning project

The scenarios

Understanding the application

- **Analyze resource interdependencies**

CICS Interdependency Analyzer

Understanding the application

- **Analyze application and system affinities**

Understanding the application

- **Analyze application and system affinities**

```
11/15/2011 - CICS INTERDEPENDENCY ANALYZER (CIU) - Version 310      Page: 08
 INTER-TRANSACTION AFFINITIES REPORT FOR APPLID: IYDZEJ07 - TEMPORARY STORAGE

Trangroup     :   TS.0000004
Affinity      :   Background
Lifetime      :   PERMANENT
Queue         :   GENACUSTNUM              (C7C5D5C1C3E4E2E3D5E4D44040404040)
Recoverable   :   Yes              TSQ MAIN
Tranid     Program     Offset       Usage      Command                  Terminal
--------   --------    --------     -------    ------------------------ --------
SSC1       LGACDB01    00000A76          1     READQ                          No
SSC1       LGACDB01    00000CEA          2     WRITEQ                         No
SSC1       LGACDB01    00000C84          1     DELETEQ                        No
           Total Transactions    :       1
           Total Programs        :       1
```

- **and generate affinity-transaction-group definitions**
  - suitable for input to CICSPlex SM

CICS Interdependency Analyzer for z/OS (CICS IA)

▪**Key features**

  –Captures CICS application relationships:

  •Programs, Files, TSQs, TDQs, Events, Web services, etc, plus DB2, MQ, IMS plus Web services, Natural and Adabas

  –Intuitive CICS Explorer plug-in integrates with CICS run-time and other tools

  –Centralized data access using DB2® database

  –See *uses* and *where used* relationships

  –Powerful comparison feature

  –Command Flow gives advanced program analysis

  –Business application analysis

  –Identify threadsafe / non-threadsafe programs

  –Isolate and remove affinities

  –Speed CICSPlex® SM workload management

  –Highlight CICS web service candidates

  –Track Task Control Block (TCB) switches

▪**CICS support**

  –CICS Transaction Server for z/OS, V3 and V4

New in CICS IA V3.2

•**Support for CICS TS V4.2**

•**Improved CICS Explorer views**

•**Plug-in control for data collection**

•**Command Flow self-service**

•**CICS Business Events support**

•**Enhanced business application analysis**

•**CICS user exit detection and mapping**
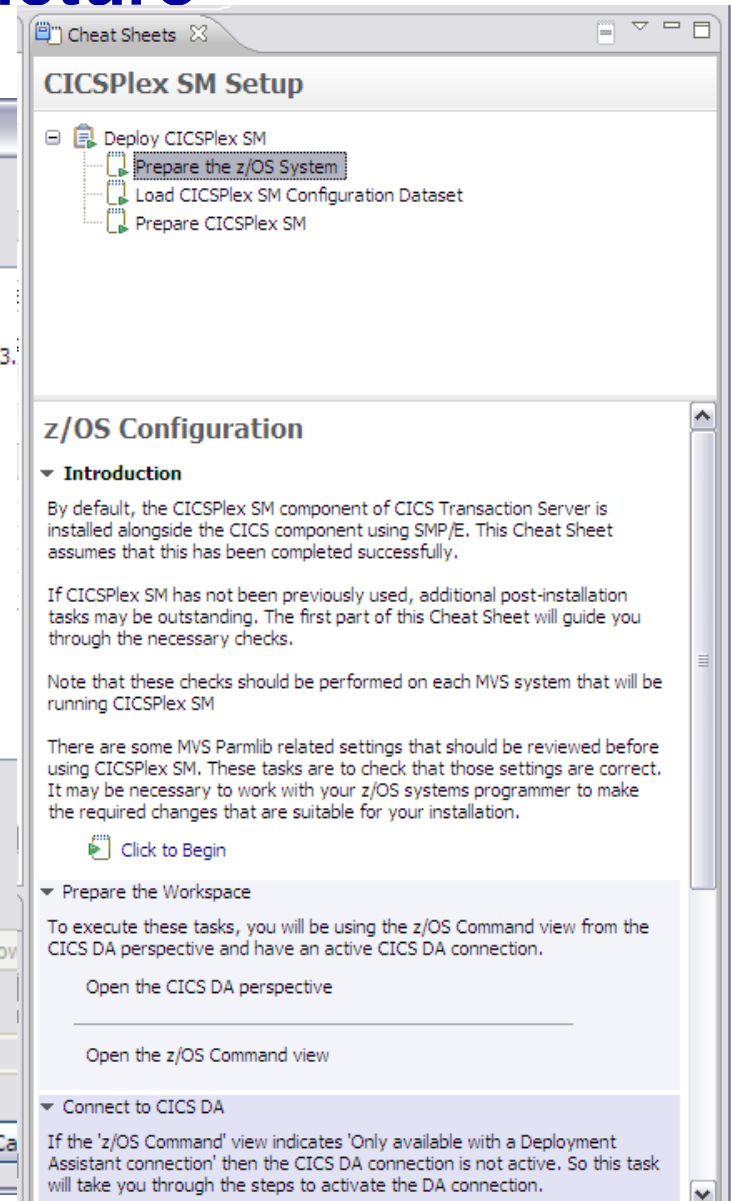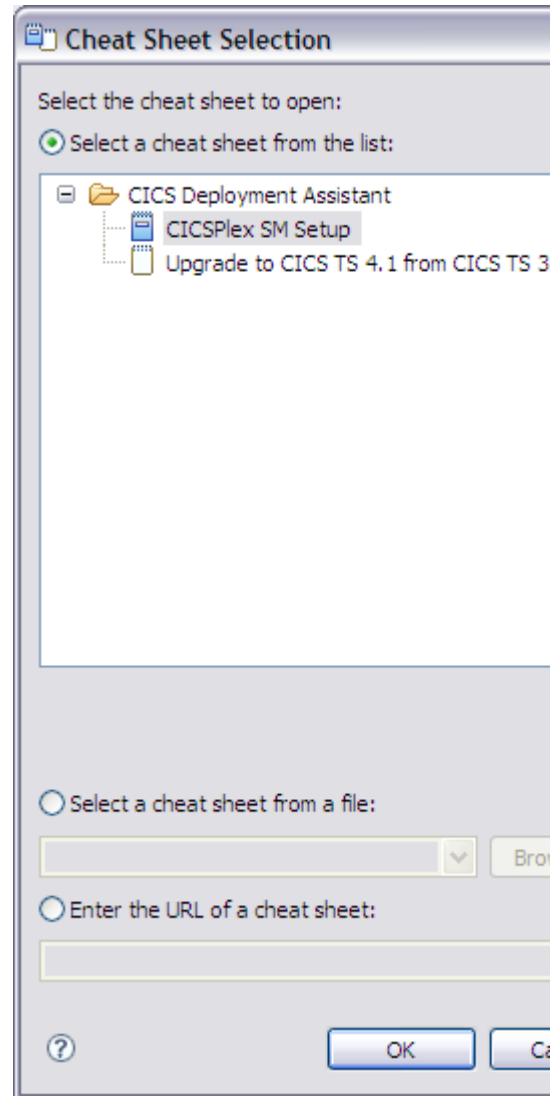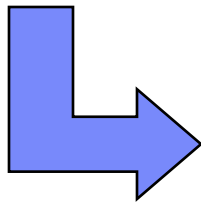
•**Data life-cycle management**

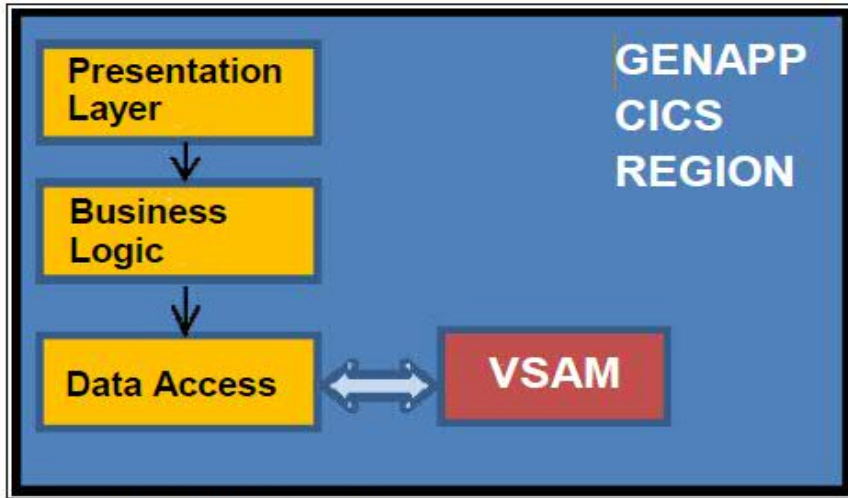# Building the CICSplex infrastructure

Two approaches

- CICSPlex SM commands

```
CONTEXT REDMAS42
  DEFINE CICSPLEX GNAPPLEX
  *
  CONTEXT GNAPPLEX
  *
```
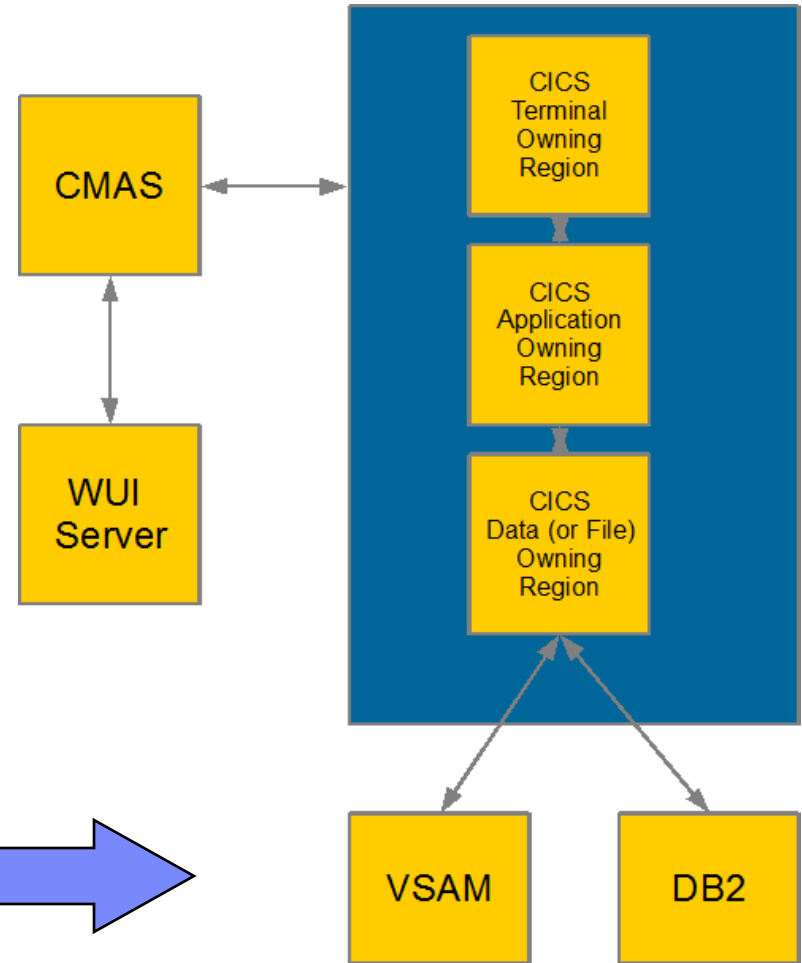
- CICS DA wizard

Cheat Sheet Selection

Select the cheat sheet to open:

⦿ Select a cheat sheet from the list:

- 📂 CICS Deployment Assistant
  - 🗎 CICSPlex SM Setup
  - 🗎 Upgrade to CICS TS 4.1 from CICS TS 3.

○ Select a cheat sheet from a file:

[   ] ⌄   Brow

○ Enter the URL of a cheat sheet:

[   ]

⑦   OK   Ca

Cheat Sheets ✕

CICSPlex SM Setup

- 📖 Deploy CICSPlex SM
  - Prepare the z/OS System
  - Load CICSPlex SM Configuration Dataset
  - Prepare CICSPlex SM

z/OS Configuration

▼ **Introduction**

By default, the CICSPlex SM component of CICS Transaction Server is installed alongside the CICS component using SMP/E. This Cheat Sheet assumes that this has been completed successfully.

If CICSPlex SM has not been previously used, additional post-installation tasks may be outstanding. The first part of this Cheat Sheet will guide you through the necessary checks.

Note that these checks should be performed on each MVS system that will be running CICSPlex SM

There are some MVS Parmlib related settings that should be reviewed before using CICSPlex SM. These tasks are to check that those settings are correct. It may be necessary to work with your z/OS systems programmer to make the required changes that are suitable for your installation.

   📄 Click to Begin

▼ Prepare the Workspace

To execute these tasks, you will be using the z/OS Command view from the CICS DA perspective and have an active CICS DA connection.

   Open the CICS DA perspective

   Open the z/OS Command view

▼ Connect to CICS DA

If the 'z/OS Command' view indicates 'Only available with a Deployment Assistant connection' then the CICS DA connection is not active. So this task will take you through the steps to activate the DA connection.
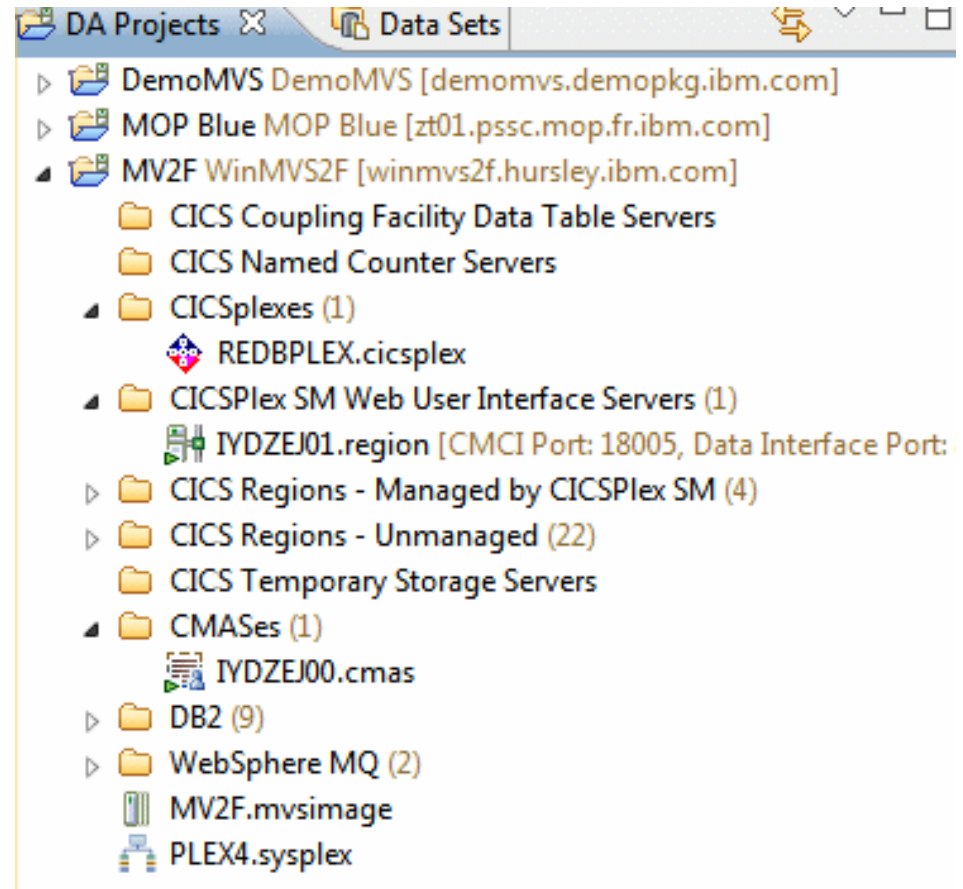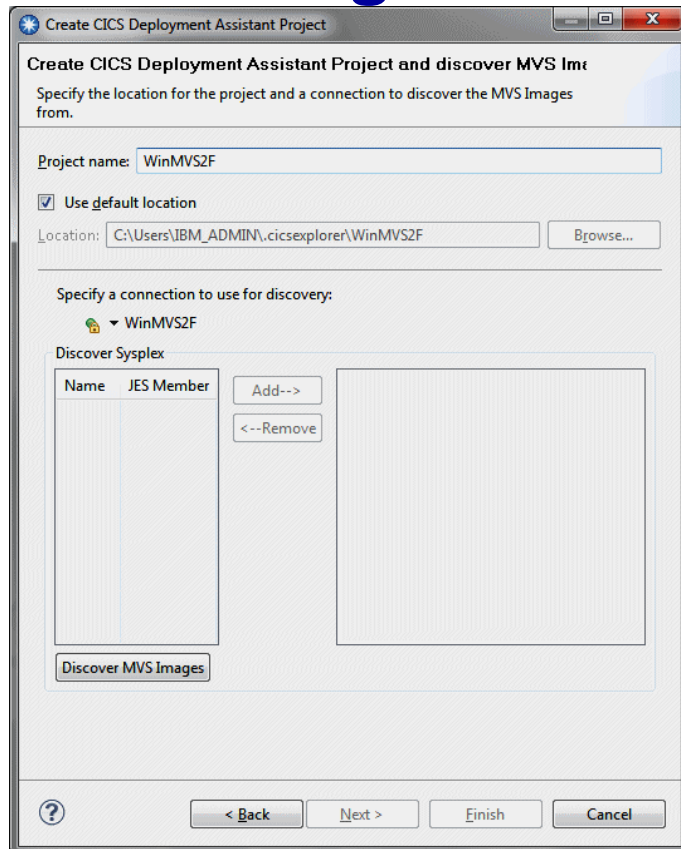
Create the new regions

Single region structure

CICSplex structure

Discovering CICS and other sub-systems

CICS Deployment Assistant
discovery wizard

Add CICS regions to the CICSplex

CICS Deployment Assistant

Clone an existing CICS region

CICS Deployment Assistant clone wizard
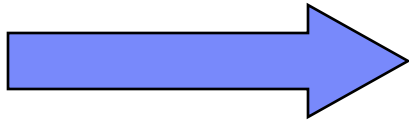
Clone a CICS Region

Clone a CICS region

Specify attributes and start policy for your new region, based on those from IYDZEJ07

New CICS Applid:	REDDVC42
New CICS Sysid:	EJ0B
New MAS Name:	REDDVC42
New Description:	Region cloned from REDDVA42 by CICS DA

Specify the start policy for your new CICS region.
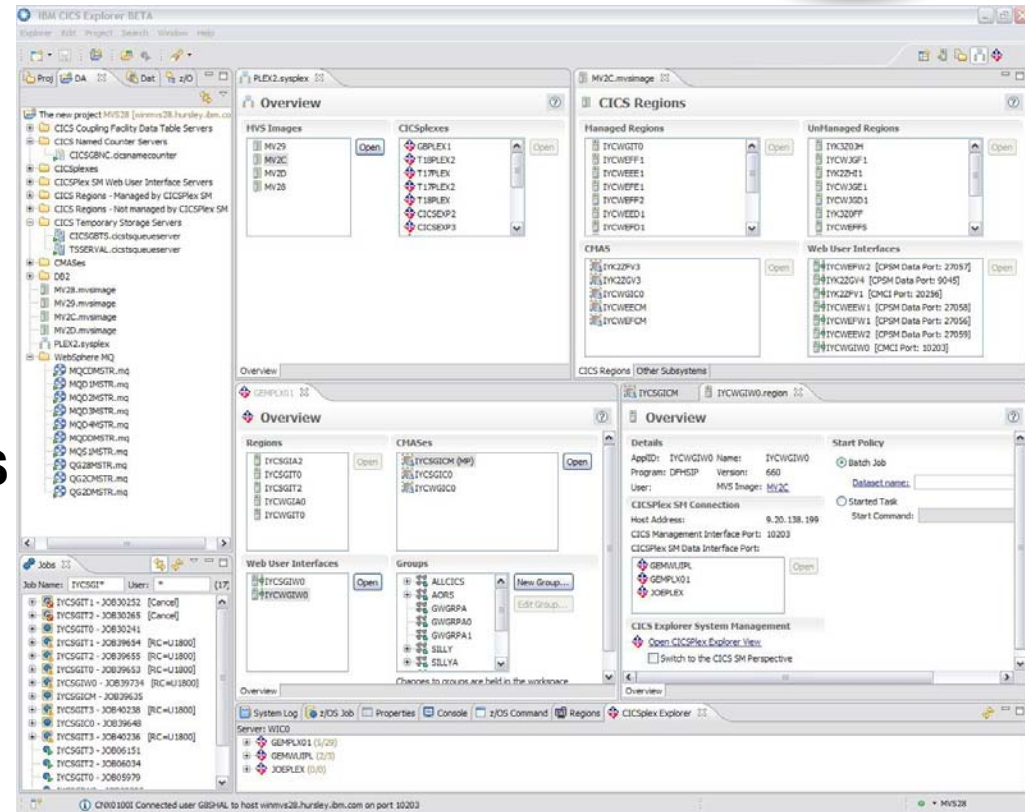
Start Command: S REDDVC42

< Back   Next >   Finish   Cancel

Accelerating return on your CICS investments
IBM CICS Deployment Assistant for z/OS

- **New Deployment perspective integrates with CICS Explorer**

- **Discovery, Modelling and cloning CICS Systems**

- **Topology Visualization**

- **Automated creation, deployment, customization, and control of CICS regions**

- **Edit files, submit JCL, view output**

- **Simplify tasks, save time, and reduce risk**

- **More info at http: ibm.com/software/htp/cics/deployment/**

  – Features and benefits, data sheet, announcement letter …

Single point of control

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Build a change package and migration scheme

```
 File  Menu  Settings  Help

Package               Change Package GENAPP        Row 1 to 16 of 41
Command ===> _____  Scroll ===> PAGE

Filter *_____ *_____ +  GENA*_____        REDDVA42 *_____

/    Name     Type        Group    Prompt     Config   --- Changed ----
____ GENAMOD  ENQMODEL    GENA                REDDVA42 2011/11/09 15:47
____ GENASTSQ TSMODEL     GENA                REDDVA42 2011/11/09 15:47
____ GENLIB   LIBRARY     GENALIB             REDDVA42 2011/11/10 15:08
____ IM2D     DB2CONN     GENASAD
____ IM2DLU2  DB2ENTRY    GENASAD      File  Menu  Settings  Help
____ KSDSCUST FILE        GENASAF
____ KSDSPOLY FILE        GENASAF _____
____ LGACDB01 PROGRAM     GENASAP  Edit              Migration Scheme          Row 1 to 1 of 1
____ LGACUS01 PROGRAM     GENASAP  Command ===> _____  Scroll ===> PAGE
____ LGACVS01 PROGRAM     GENASAP
____ LGAPDB01 PROGRAM     GENASAP
____ LGAPOL01 PROGRAM     GENASAP  Name  . . . . : GENAPP
____ LGAPVS01 PROGRAM     GENASAP  Description . . Migration Scheme for the GENAPP application
____ LGCF     TRANSACTION GENASAT
____ LGDPDB01 PROGRAM     GENASAP
____ LGDPOL01 PROGRAM     GENASAP  Approval Processing
                                   _  Activate


                                   Choose a view for related options
                                   1  1. Migration paths
                                      2. Transform variables


                                   Define the migration path source and target CICS Configurations

                                                                     Delete at
                                   / Source +  Target +  Transform Rule +    Source
                                   _ REDDVA42  REDDVB42  GENAPP_              NO_
                                   **************************** Bottom of data ********************************
```

CICS Configuration Manager for z/OS (CICS CM)

▪**Key features**

–Create, Update, Delete, Copy, Replicate CICS resource definitions

–Change management through the life-cycle stages, e.g. development, test, production

–Create customized reports to identify redundant definitions, show resource relationships and change management history

–Audit, back-out and change authorization capabilities
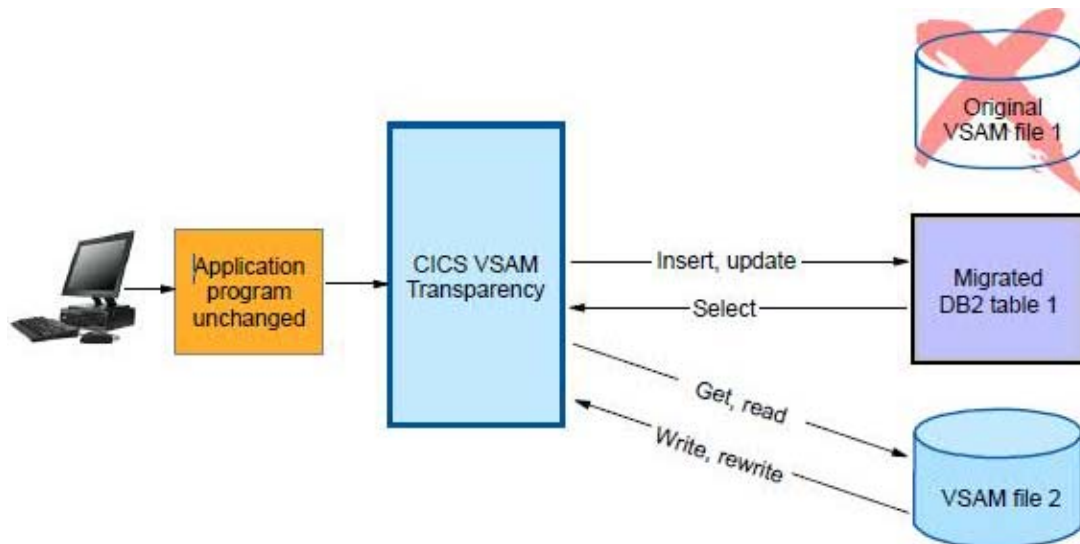
▪**CICS Support**

–CICS Transaction Server for z/OS, V3 and V4

New in CICS CM V2.1

- **CICS TS V4 support**

- **Deployment Analysis Reports**

- **Fully supported CICS Explorer plug-in**

- **Full-function BAS definition support**

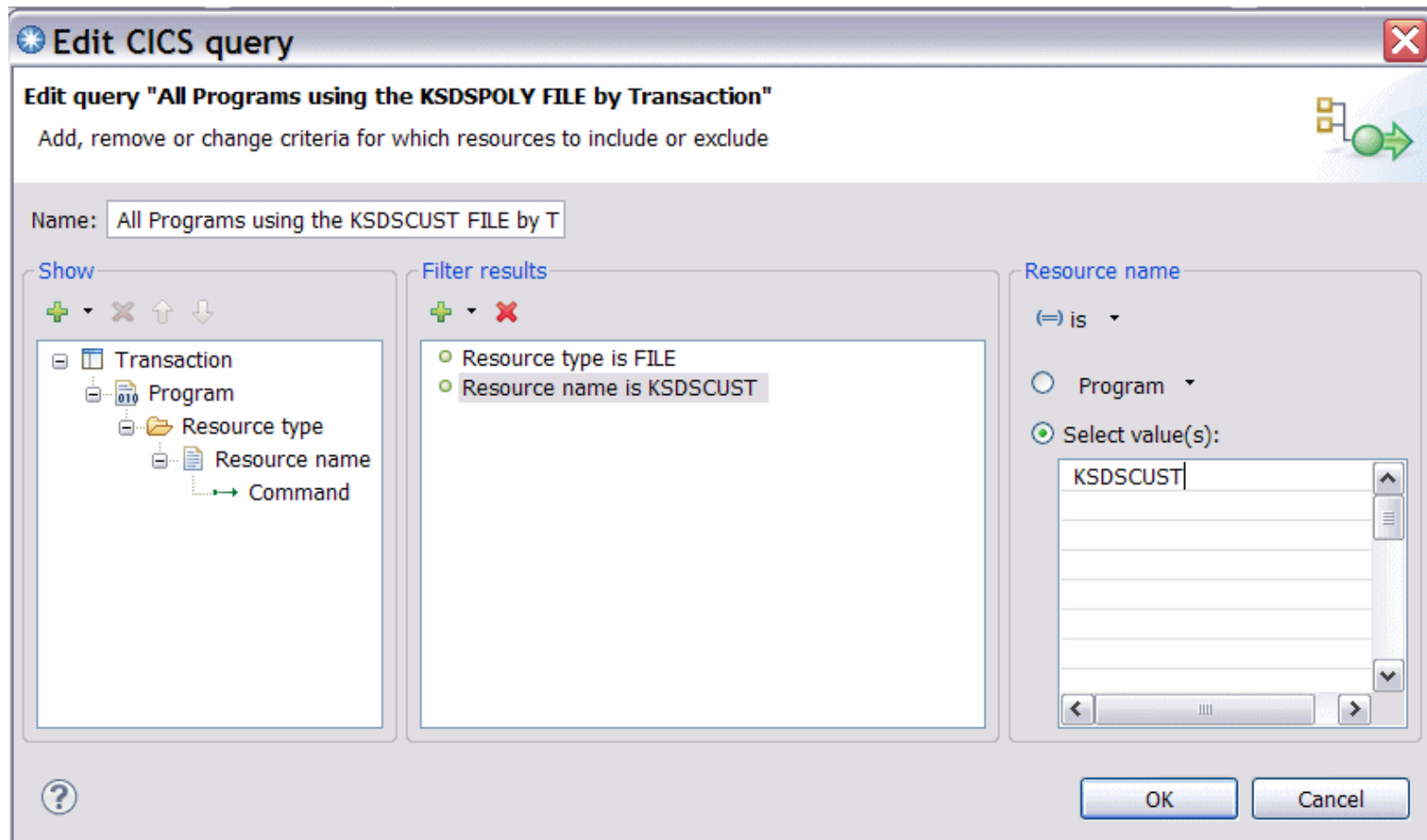- **Change Package 'Command Stack'**

- **Diagnostic Collection**

Migrating VSAM data to DB2

- Migrate files transparently - without application change

Migrating VSAM data to DB2

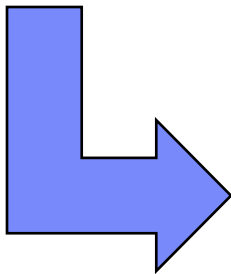- Determine where the KSDSCUST file is used

Migrating VSAM data to DB2

- **Convert KSDSCUST file from VSAM to DB2**
  - Mapping – to create the database schemas

```
01     LG-CUSTOMER-INFO.
       05  LG-CUST-NUMBER        PIC 9(10).
       05  LG-FIRST-NAME         PIC X(10).
       05  LG-LAST-NAME          PIC X(20).
       05  LG-DOB                PIC X(10).
       05  LG-HOUSE-NAME         PIC X(20).
       05  LG-HOUSE-NUM          PIC X(4).
```
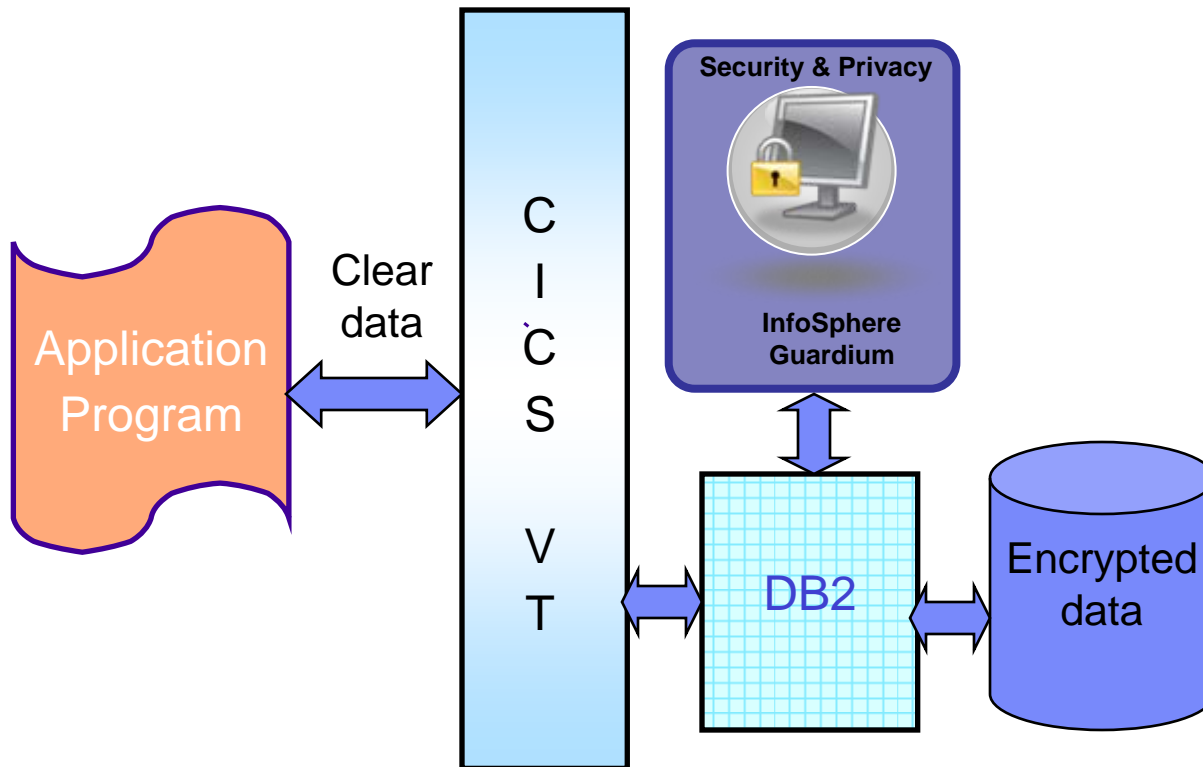
```
CREATE TABLESPACE KSDSCUS
       IN CVTDB
       USING STOGROUP CVTSG
       PRIQTY 65862
       SECQTY 2
       SEGSIZE 4
       BUFFERPOOL BP0
       ;
       COMMIT;
CREATE TABLE DMUSERS.KSDSCUS
       (
        LG_CUST_NUMBER              CHAR(10)        NOT NULL,
        LG_FIRST_NAME               CHAR(10)        NOT NULL,
        LG_LAST_NAME                CHAR(20)        NOT NULL,
        LG_DOB                      CHAR(10)        NOT NULL,
        LG_HOUSE_NAME               CHAR(20)        NOT NULL,
        LG_HOUSE_NUM                CHAR(4)         NOT NULL,
        LG_POSTCODE                 CHAR(8)         NOT NULL,
       PRIMARY KEY (
                   LG_CUST_NUMBER
                   )
       )
       IN CVTDB.KSDSCUS;
       COMMIT;

CREATE UNIQUE INDEX DMUSERS.IX_KSDSCUS
       ON DMUSERS.KSDSCUS
       (
        LG_CUST_NUMBER                ASC
       )
```

Migrating VSAM data to DB2

- **Test the conversion**

  - Testing Data Format

  - Testing program code changes (if any)

  - Testing Data Access

RUN TIME CALL INTERCEPTION - CICS

Application Program

Clear data

C I C S V T

Security & Privacy

InfoSphere Guardium

DB2

Encrypted data

Encrypt credit card and key customer data

- **InfoSphere Guardium Data Encryption for DB2 and IMS Databases**

  – DB2 edit routines and IMS exit routines that invoke the z/OS Integrated Cryptographic Service Facility (ICSF), which exploits the Crypto Hardware for data encryption and decryption

  – Sample implementation jobs

  – An ISPF front end to build implementation jobs

  – The capability to specify unique encryption keys

- **Use in conjunction with CICS VT to encrypt key credit card data to meet PCI-DSS requirements**

Application Program

Clear data

C I C S V T

Security & Privacy

InfoSphere Guardium

DB2

Encrypted data
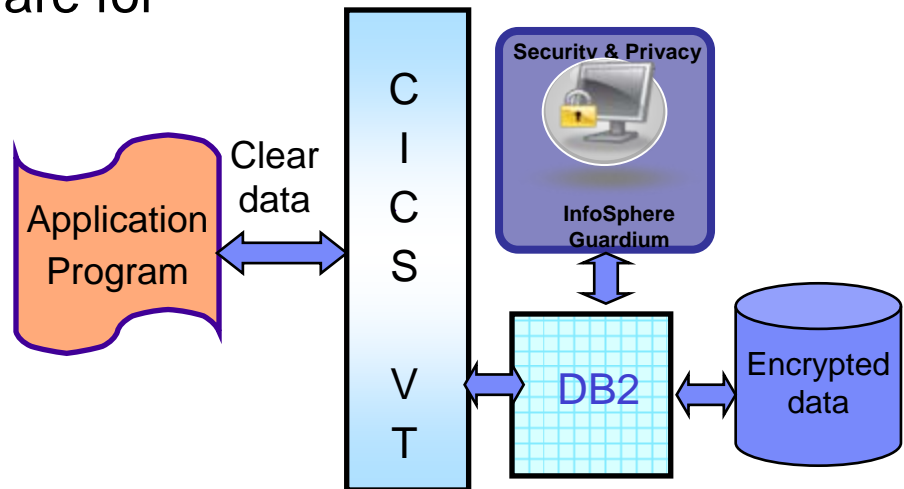
CICS VSAM Transparency for z/OS (CICS VT)

Key features

- Migrate 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

New in CICS VT V2.1

- **Auto-generate customized data migration JCL**

- **Enhanced IDCAMS REPRO support**

- **New migration tracking report**

- **Improved diagnostic facilities**

- **Support for CICS® Transaction Server V4.2 and DB2® 10**

- **Other functional enhancements**
  - **Long column name support**
  - **HLL support for user exits**
  - **RRS support in batch**
  - **Read-only DDM**
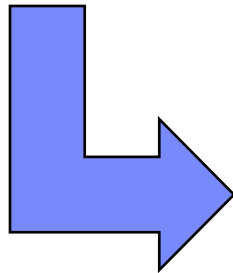 - **Dynamic DST update**

Performance analysis

- **Respond to user feedback to help desk**

High response time

SLA says <=1 sec
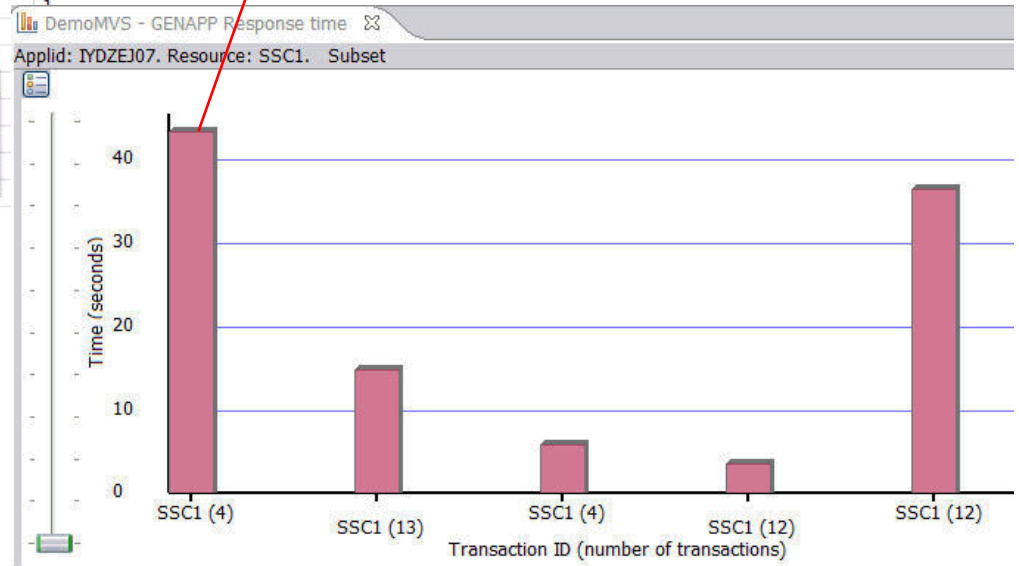
Performance analysis

- ## Drill down into problem
  - Long terminal waits suggest not pseudo-conversational

Performance analysis

- **Gather further evidence**
  - Statistics alerts indicate TCLASS problem

Performance analysis

- **Implement changes**

  – Update programs to remove terminal waits

  – Increase TCLASS limit for more parallelism

- **... and validate the results**

```
V3R2M0                                          CICS Performance Analyzer
                                                  Transaction Profiling

PROF0001 Printed at 23:01:30 11/17/2011    Report   Data from 17:32:42 11/17/2011 to 17:45:53 11/17/2011          Page 1
                                           Baseline Data from 10:16:33 11/16/2011 to 12:19:45 11/16/2011
SSC1 Transaction Profiling: Pseudo Conversational

                  Avg      Avg      Avg      Avg      Avg      Avg      Avg      Avg      Avg      Avg
Tran       #Tasks Response Dispatch User CPU Suspend DispWait FC Wait  FCAMRq   IR Wait SC24UHWM SC31UHWM
                  Time     Time     Time     Time     Time     Time    Count    Time     Count    Count
SSC1  Report    53  .7972   .0036    .0009   .7936    .0001    .0002       0    .0000        0   254117
SSC1  Baseline 101 9.5843   .0035    .0008  9.5808    .0000    .0017       0    .0000        0   234009
      Delta    -48 -8.7871  +.0001   +.0001 -8.7872   +.0001  -.0015      +0    .0000        0   +20108
      Change% -47.52 -91.68 +2.28    +8.04  -91.72  +395.11  -87.25   +12.39    .00      .00    +8.59

Total Report    53  .7972   .0036    .0009   .7936    .0001    .0002       0    .0000        0   254117
      Baseline 101 9.5843   .0035    .0008  9.5808    .0000    .0017       0    .0000        0   234009
      Delta    -48 -8.7871  +.0001   +.0001 -8.7872   +.0001  -.0015      +0    .0000        0   +20108
      Change% -47.52 -91.68 +2.28    +8.04  -91.72  +395.11  -87.25   +12.39    .00      .00    +8.59
```

CICS Performance Analyzer for z/OS (CICS PA)

■**Key features**

–Comprehensive Performance Reporting and Analysis for CICS including DB2, WebSphere MQ, and MVS System Logger

–Extensive Tabular Reports and Extract Data Sets

–CICS Explorer

–Historical Database (HDB)

–Trending and Capacity Planning

–ISPF Dialog to build, maintain, and submit reports and extracts

–Comprehensive reporting of CICS Statistics and Statistics Alert data

■**CICS Support**

–CICS Transaction Server for z/OS, V3 and V4

New in CICS PA V3.2

•CICS TS and CICS TG statistics data viewable using the CICS PA plug-in to the CICS Explorer

•Capture Statistics Alerts in HDB and viewable using the CICS PA plug-in

•Output batch reports as Portable Document Format (PDF) files

•Support for CICS Transaction Gateway V8.0

•Simplified data source set-up and housekeeping

•Documentation update: New CICS PA Getting Started Guide

Follow-on activities

- **Remove affinities from the applications**
  - Use IBM Debug Tool for source level debug
  - Rerun CICS IA affinity query to validate all removed

- **Performance analysis**
  - Use IBM Application Performance Analyzer for deep dive into GENAPP performance
  - Threadsafe analysis using CICS IA and CICS PA

- **Event-enable GENAPP to gain insight from Analytics**
  - Using WODM, WBM, Cognos, etc

- **Rule-enable GENAPP to reduce IT latency and return some control to the LOB**
  - WODM rules server runs inside CICS TS

Debug Tool

▪**Key features**

–Debugs applications in CICS, IMS, DB2 Stored Procedures and UNIX System Services

•Source-level debugging, Multiple Conditional Unconditional breakpoints, Step mode debugging, Dynamic patching (Modify variables and Insert statements), log commands, Frequency sampler, Programmable command entry, etc etc

–**Identify** old OS/VS COBOL & VS COBOL II source code and **upgrade** it to IBM Enterprise COBOL or ANSI 85 standard

–One tool debugs batch, TSO, CICS, DB2, DB2 stored procedures and IMS applications written in COBOL, PL/I, C/C++ and Assembler

–Integrated development, test and debugging environment with CICS Explorer and Rational Developer for System z

–Code coverage tools

New in DT V11

• **Plug-in for CICS Explorer**

• **Explicit debug mode**

• **New UI for Terminal Interface Manager**

• **IBM zEnterprise 196 support**

• **Numerous customer requirements**

Application Performance Analyzer for z/OS (APA)

Key features

– Measure and report resource use in virtually any IBM z/OS® address space

– Isolates application performance problems across entire application – subsystems (DB2, IMS, CICS, MQ, USS, WAS), languages, and DASD

– Identify constraints

– Non-intrusive

– Helps with design, development and maintenance

– Shares side files with Fault Analyzer and Debug Tool

IBM Product Support

– Supports C/C++, Assembler, COBOL, PL/I, Java and CICS, DB2, IMS, WebSphere MQ and WebSphere Application Serve

New in APA V11

- **Plug-in for CICS Explorer**

- **64-bit Java support**

- **Enhanced CICS, DB2, and IMS support**

- **NATURAL and ADABAS support**

IBM CICS Explorer® V1.1

New!

Session and user views, Configuration, Broadcast, User and Admin commands

ISM

Daemon & Connection Status & Test

TG

Threadsafe, File, CPU, Response Time, Statistics, Alerts, Graphical and Sheet views

PA

Deployment, Discovery, Visualization, Cloning, Automation & Control

DA

Execution Tree Dependencies Queries Command Flow

IA

CRUD/Install History, Audit Backout Search, Compare

CM

Develop Test Etc

RDz

CRUD/Install, Control, Filter, Sort, Topology, Events, ATOM. Java z/OS, Txn Tracking WLM

SM

Configuration Status Control, Test

MQ

Status Situations Topology

XE

New!

Manipulate, browse z/OS data sets, z/FS, MQ

FM

CICS, IMS, DB2, & z/OS Abend Reporting & Diagnosis

FA

CICS, IMS, DB2, & z/OS Application Debugging

DT

CICS, IMS, DB2, & z/OS Observation Requests & Reporting

APA

Enhanced!

ibm.com/cics
ibm.com/cics/tools
ibm.com/cics/explorer

CICS TS

SM	CICS Transaction Server
IA	CICS Interdependency Analyzer
PA	CICS Performance Analyzer
CM	CICS Configuration Manager
DA	CICS Deployment Assistant
TG	CICS Transaction Gateway
ISM	IBM Session Manager

APA	Application Performance Analyzer
FA	
DT	Fault Analyzer
FM	Debug Tool
	File Manager
MQ	WebSphere MQ
XE	OMEGAMON XE for CICS
RDz	Rational Developer for System z

GENAPP – SupportPac and Redpaper

- **GENAPP is available to customers as SupportPac CB12, at no extra cost**

  - Download from http://www-01.ibm.com/support/docview.wss?rs=1085&uid=swg24031760

- **This presentation is based on GENAPP and the scenarios in this new IBM Redpaper**

  - Download from http://www.redbooks.ibm.com/abstracts/redp4824.html?Open
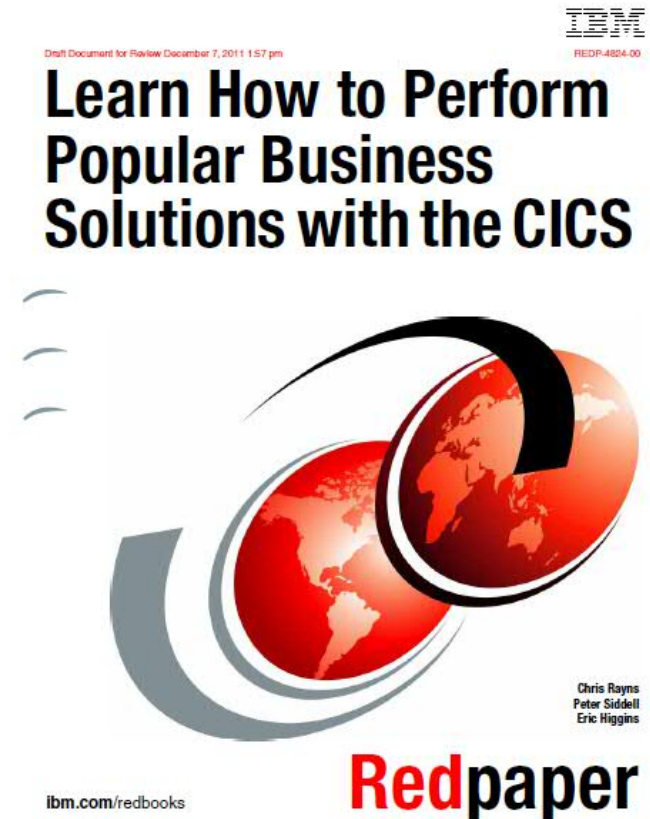
Summary

- **IBM CICS Tools and Problem Determination Tools can help you to be more effective**

  – Architects designing extensions to existing CICS applications

  – Developers diagnosing problems and packaging up code changes

  – System programmers deploying new regions and tracking performance

- **CICS Explorer delivers an integrated solution**

  – Meets the needs of beginners **and** experienced professionals

Reference material

CICS Communities and Information

- **Web pages**
  - Transaction Server V4.2 http://ibm.com/cics/tserver/v42
  - CICS Tools ibm.com/cics/tools
  - PD Tools ibm.com/software/awdtools/deployment/
  - CICS Explorer ibm.com/cics/explorer
- **CICS Explorer Forum**
  - http://tinyurl.com/68bndw
  - IBM developerWorks forum with FAQs, Links and resources, ISV Contributions, etc. Ask questions, suggest improvements, report problems, chat
- **CICSdev community**
  - Public community with blog, forum etc aimed at application developers
  - https://www.ibm.com/developerworks/connect/cicsdev
- **Twitter**
  - Subscribe to the IBM_System_z channel and the ibm_cics channel to get System z and CICS news flashes
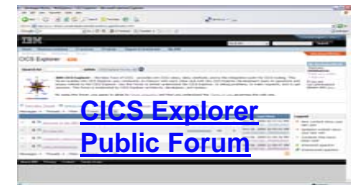- **CICS Blog**
  - Information, comment and opinion at TheMasterTerminal.com
- **CICS eNews**
  - Subscribe for news about CICS and related products – share with your clients
- **YouTube channels**
  - CICS Explorer - Videos, demos and other cool stuff
  - CICSFluff - Other CICS videos

Home page

CICS Explorer Public Forum

Twitter

Blog

eNews

**YouTube**

Key documents

- **Analyst papers**

  - Lustratus Research - New project platform section for CICS Users
    ftp://public.dhe.ibm.com/software/htp/cics/pdf/Lustratus_Research_Paper_New_project_platform_selection_for_CICS_users.pdf

  - Branham Group: IBM CICS Tools: Unrealized Productivity Gains and True Cost Savings
    ftp://public.dhe.ibm.com/software/htp/cics/tools/IBM_CICS_Tools_Whitepaper_2009.pdf

  - Software Strategies: IBM z/OS Problem Determination Tool Suite Leads Again
    https://www14.software.ibm.com/webapp/iwm/web/preLogin.do?lang=en_US&source=swg-rszswg

- **IBM Redbooks**

  - **CICS Transaction Server from Start to Finish**, SG24-7952-00

  - **Smarter Banking with CICS Transaction Server**, SG24-7815-00

  - **IBM Problem Determination Tools for z/OS**, SG24-7918-00

  - **Leveraging CICS Events with an ESB**, SG24-7863-00

  - Coming soon …

    - CICS and SOA: Architecture and Integration, SG24-5466-06
    - Implementation of Popular Business Solutions with CICS Tools, REDP-4824-00

Raising new requirements with RFE

- **You can now raise and track requirements using the new IBM RFE system for**

  - CICS Transaction Server

  - CICS Explorer

  - TXSeries

  - WXTR

  - IBM CICS Tools

  - CICS Transaction Gateway

  - PD Tools - coming soon (target end Jan 2012)
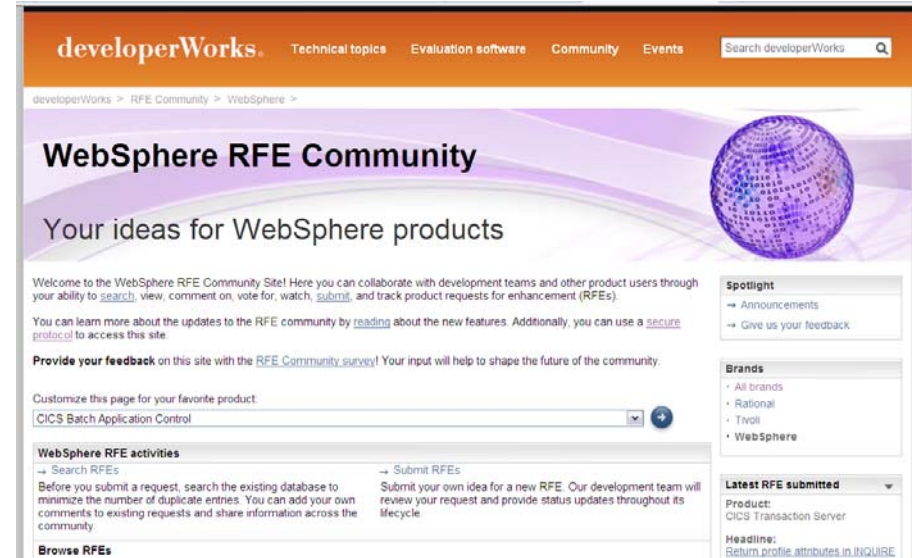
- **Existing FITS requirements are currently being processed, and will either be transferred to RFE or closed and returned.**

- **All brands https://www.ibm.com/developerworks/rfe/ - select Brand: WebSphere**

- **WebSphere only https://www.ibm.com/developerworks/rfe/?BRAND_ID=181**

- **Select Product Family: Transaction Processing - for CICS Transaction Server, TXSeries, and WXTR**

- **Select Product Family: Enterprise Tooling - for the CICS Tools, CICS Transaction Gateway, and PD Tools**

- **Raise CICS Explorer base requirements against the Explorer component of CICS TS.**

- **Raise plug-in requirements against the Explorer component of related product.**

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