IBM System z Technology Summit

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

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
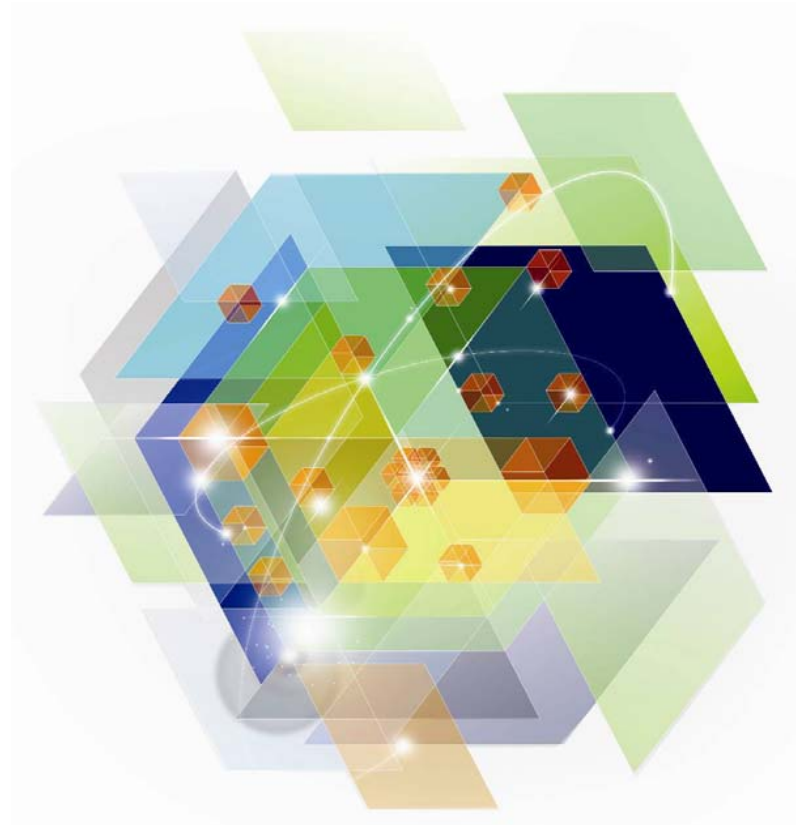
Understanding the application

- **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**

Create the new regions
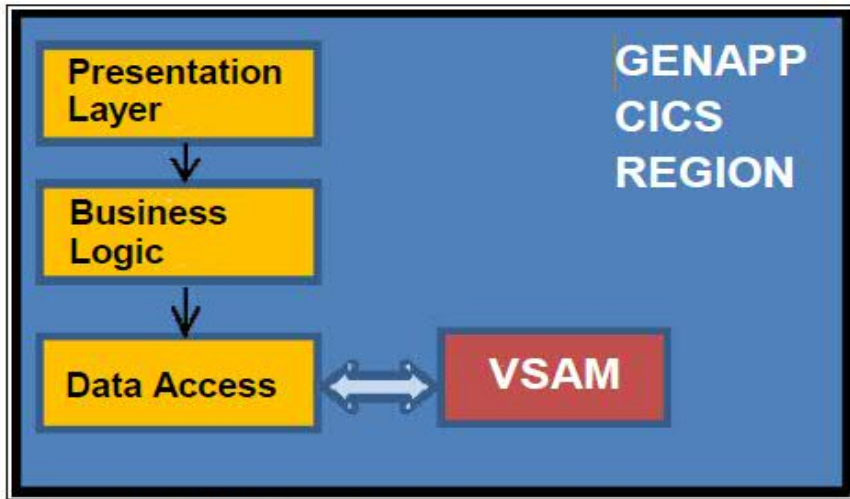
Single region structure
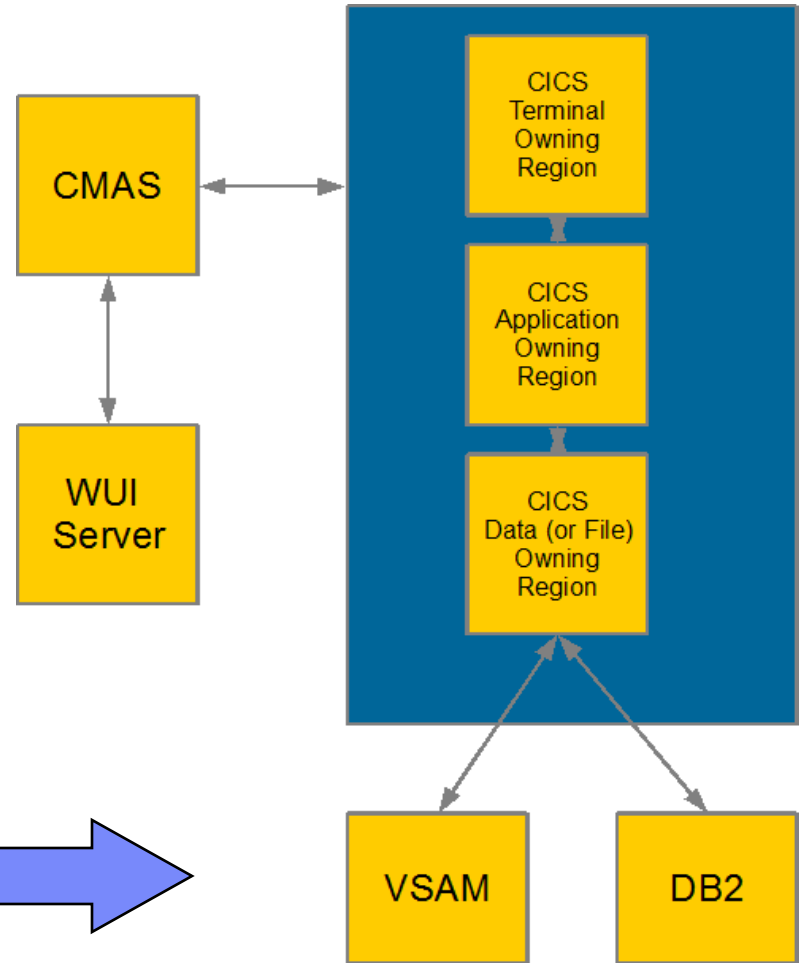
CICSplex structure

Building the CICSplex infrastructure

<u>Two approaches</u>

- CICSPlex SM commands

```
CONTEXT REDMAS42
  DEFINE CICSPLEX GNAPPLEX
  *
CONTEXT GNAPPLEX
  *
```

- CICS DA wizard
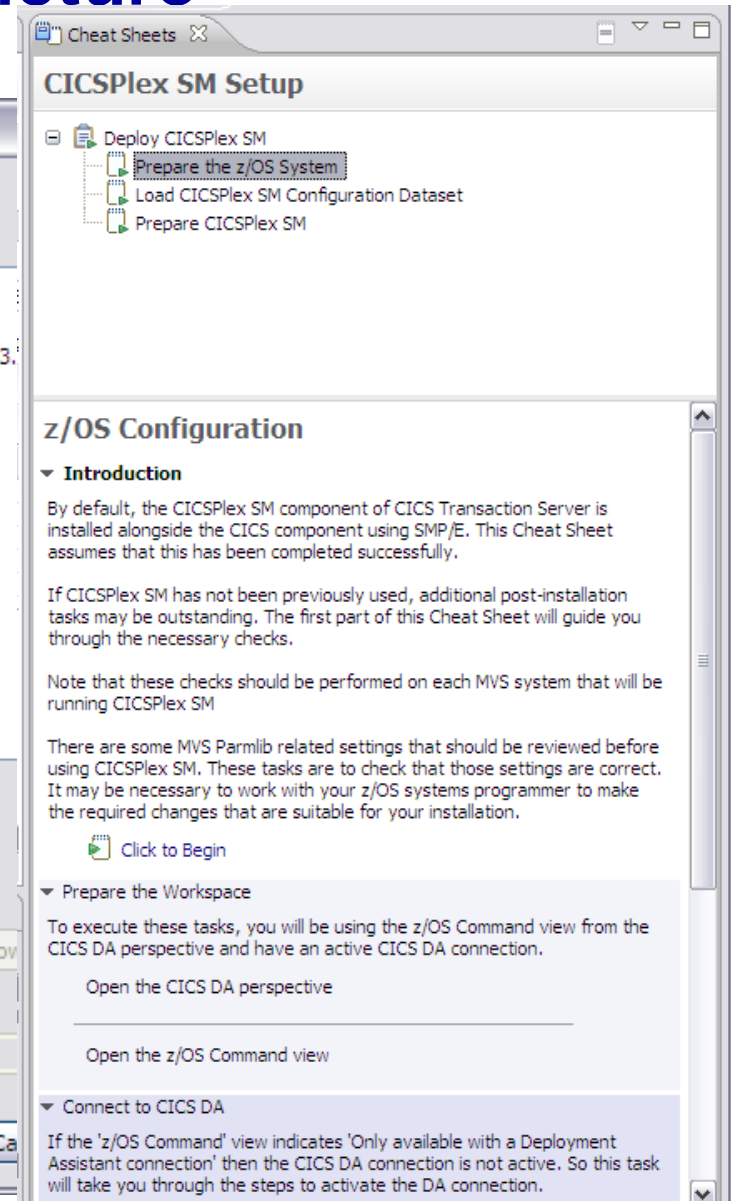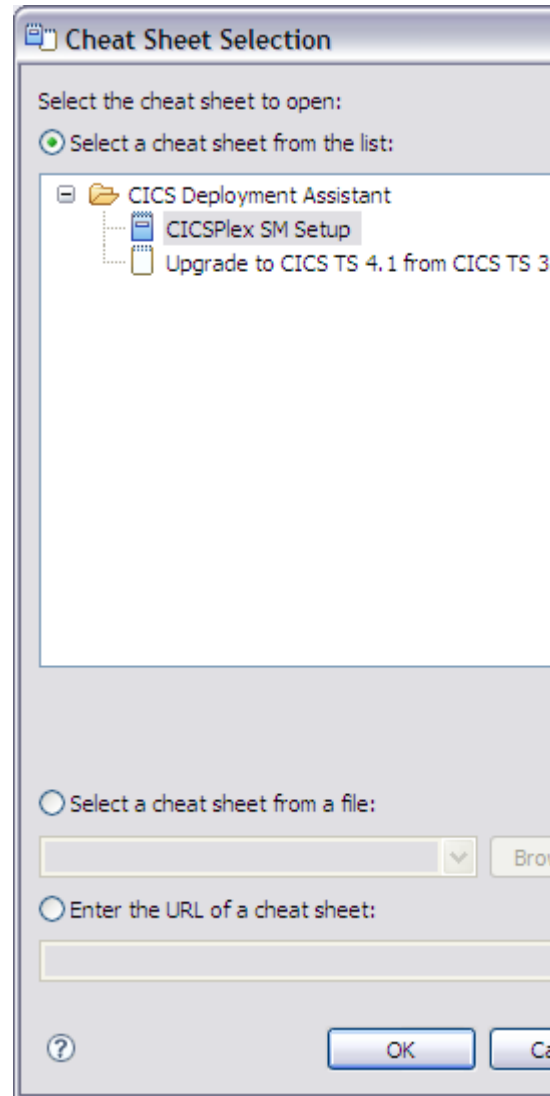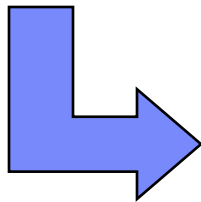
Discovering **CICS** and other sub-systems
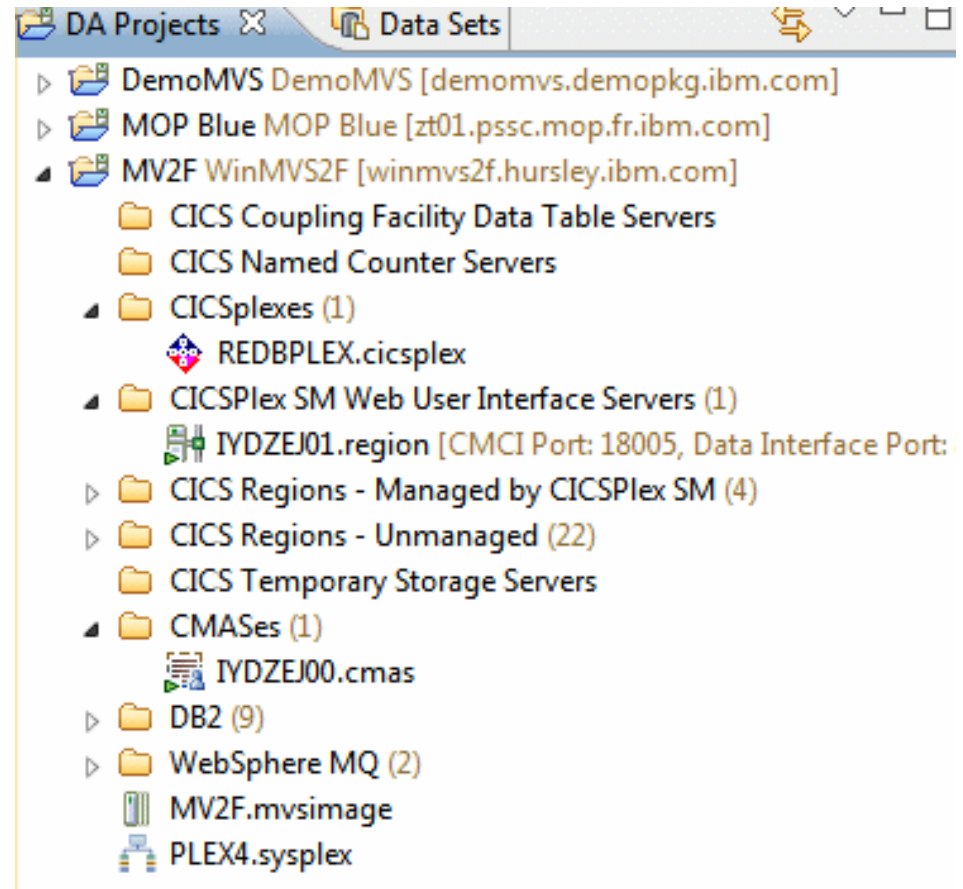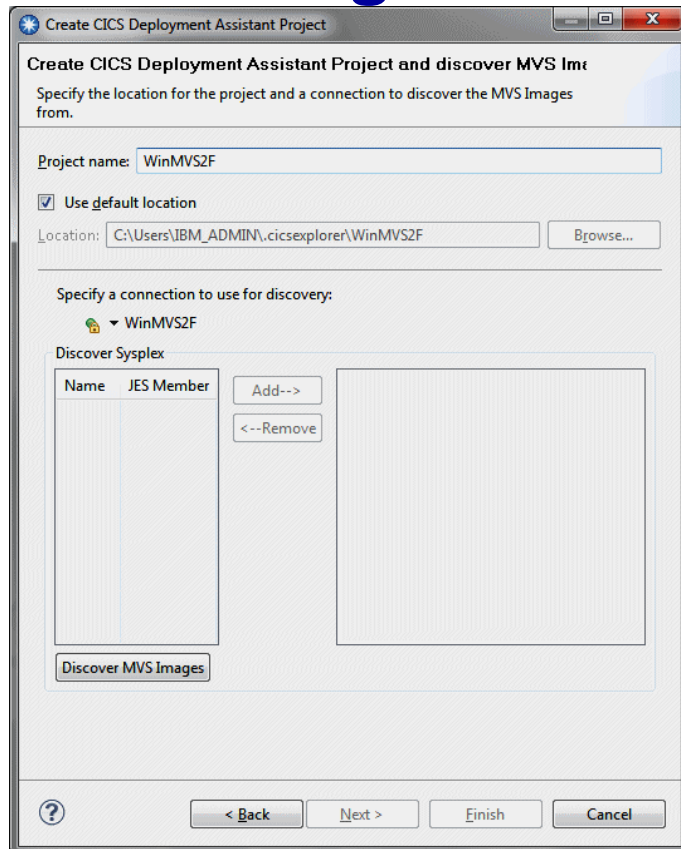
CICS Deployment Assistant
discovery wizard

Add CICS regions to the CICSplex

CICS Deployment Assistant

Clone an existing CICS region

CICS Deployment Assistant clone wizard
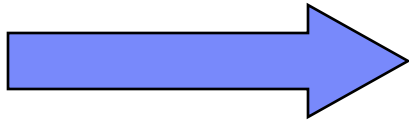
Accelerating return on your CICS investments

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

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 ***********************************
```

Migrating changes between environments

☑ **Group changes into a CICS CM** change package

☑ **Manage the package as a single unit**

☑ **Supports Ready, Approve and Backout processing**

☑ **APIs and exit-points for integration to change-control products**

☑ **Migration schemes and transformation rules allow for flexible deployment paths**

Development environment	CICS CM change package:	Test environment
CSD files	• Define	CSD files
CPSM	• Package	CPSM
	• Ready	
	• Approve	
	• Migrate	
	• Backout	
	• Install	
	• Newcopy	
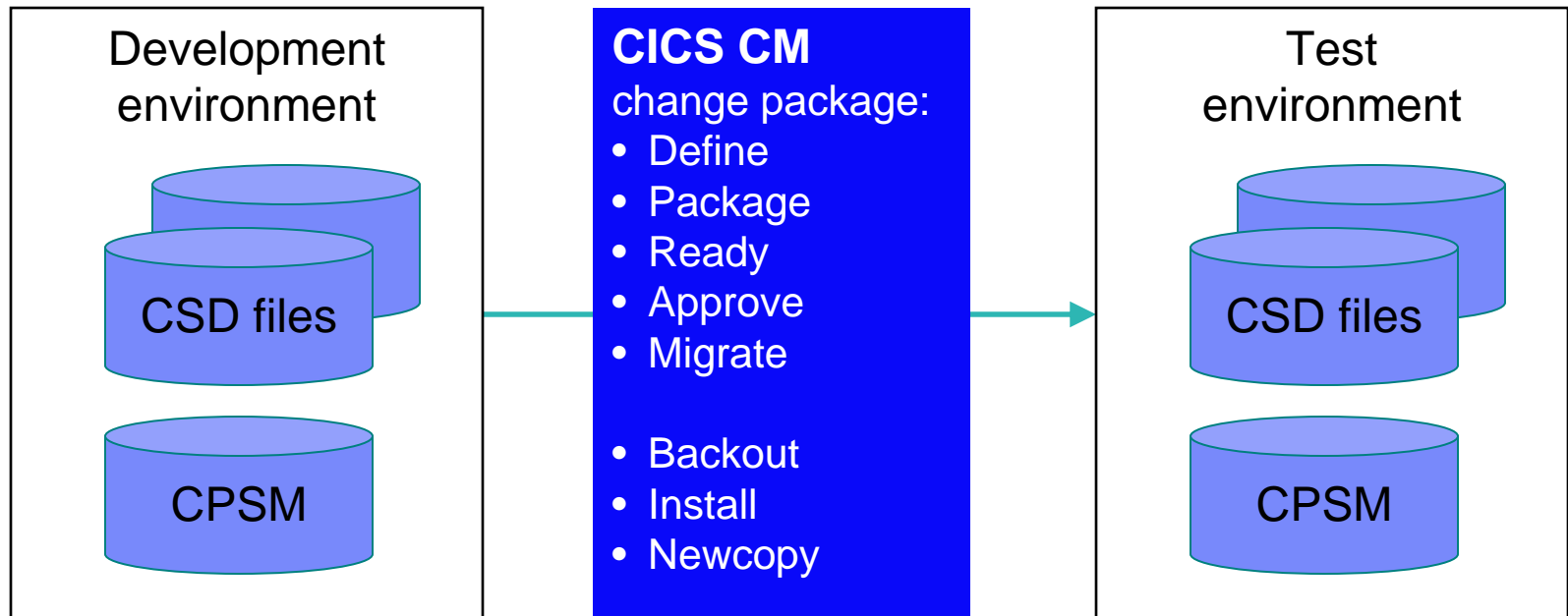
What will change at the next Cold Start?

Deployment Analysis

CICS Runtime Resources

Region

CSD

CPSM

CICS Resource Definitions

Collect ═ **Analyse**

Deployment Analysis Reports

✓ **Cold Start Analysis Report**

✓ **Runtime Resources Report**

✓ **Runtime Compare Report**

✓ **Candidates Report**

✓ **Candidates Compare Report**
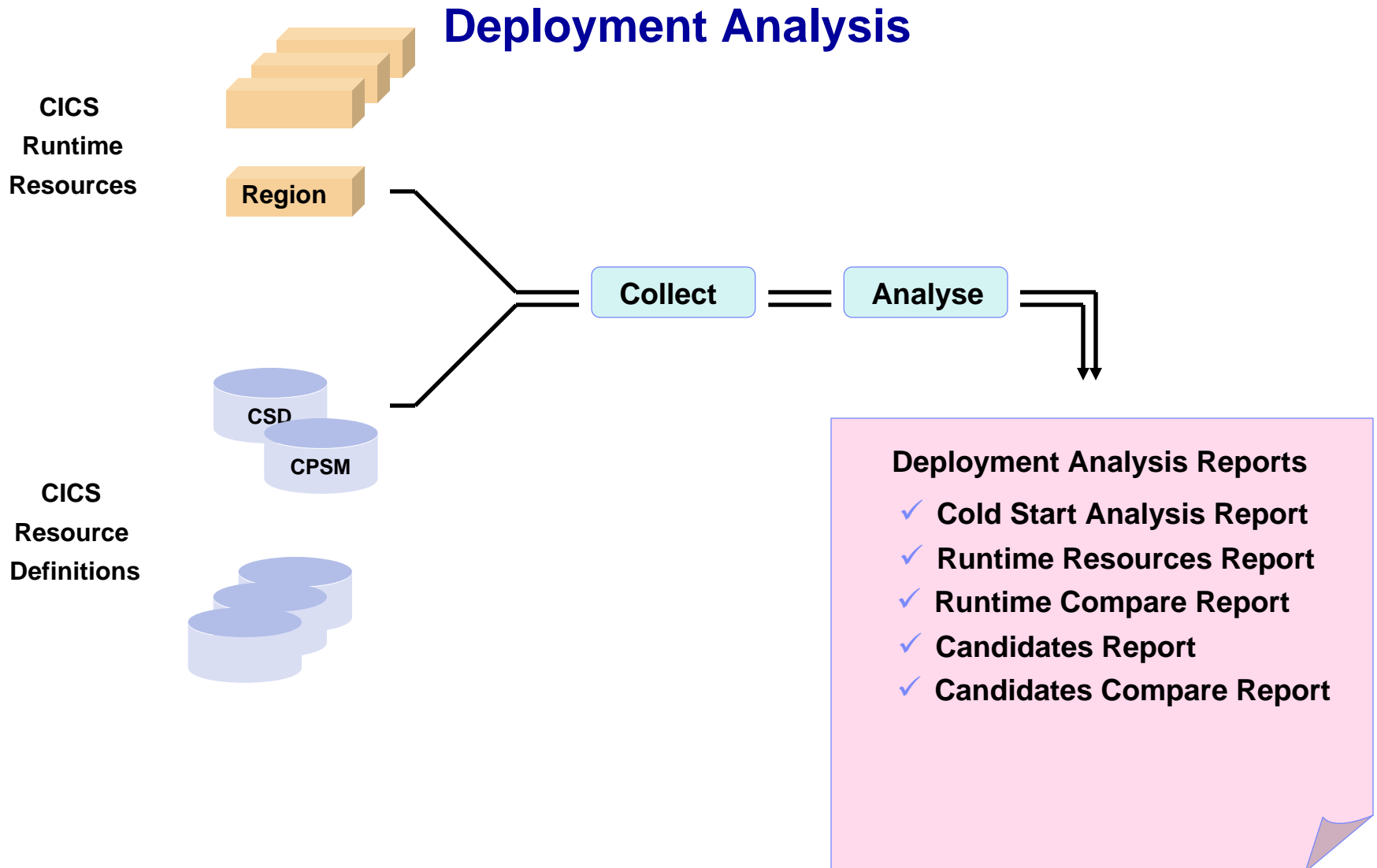
Solution

Cold start analysis

Missing

```
                    CICS Deployment Analysis Report
                     Region Startup Compare Report
                         Missing Definitions

                                     List or                    Loc Ena   Deploy   Collection
Count ID Name     Type       Group   RESDESC   Code Error       Rem Dis VV Checksum Type
----- -- -------- ---------- ------- -------- ---- ---------------- --- --- -- -------- ---------------
    1 01 CCVR0001 FILE                         0200 Missing        LOC DIS    8FE06597 REGION-CCM
    2 01 CCVR0002 FILE                         0200 Missing        LOC DIS    DB710EBA REGION-CCM
```

Different

```
                    CICS Deployment Analysis Report
                     Region Startup Compare Report
                        Mismatched Definitions

                                     List or                    Loc Ena   Deploy   Collection
Count ID Name     Type       Group   RESDESC   Code Error       Rem Dis VV Checksum Type
----- -- -------- ---------- ------- -------- ---- ---------------- --- --- -- -------- ---------------
   98 01 T31M     CONNECTION                   0300 Checksum Mismatch LOC ENA    A381AB42 REGION-CCM
         Attribute: ACCESSMETHOD     Value:  IRC
   99 02 T31M     CONNECTION CCVLINKS CCVT22M  0300 Checksum Mismatch LOC ENA    93C0BDE4 CANDIDATES-CSD
         Attribute: ACCESSMETHOD     Value:  XM
```

RI errors

```
                    CICS Deployment Analysis Report
                     Region Startup Compare Report
                    Referential Integrity Verification

                                     List or                    Loc Ena   Deploy   Collection
Count ID Name     Type       Group   RESDESC   Code Error       Rem Dis VV Checksum Type
----- -- -------- ---------- ------- -------- ---- ---------------- --- --- -- -------- ---------------
  142 02 CCVBACK  FILE       CCV210  CCM210   0951 CCV5451W       LOC ENA    D85D5400 CANDIDATES-CSD
         Attribute: LSRPOOLID       Value:  1
```

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**

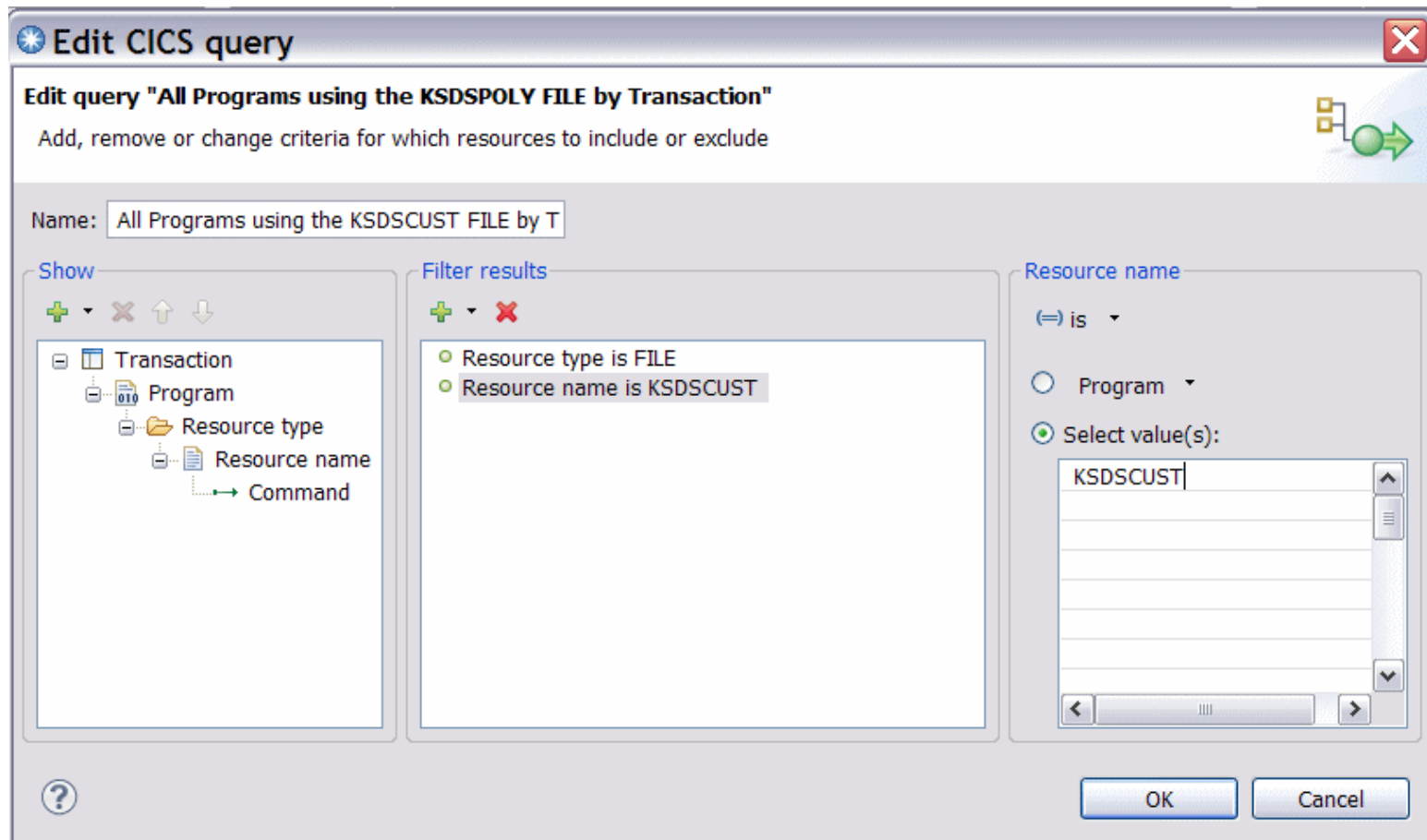- **Change Package 'Command Stack'**

- **Diagnostic Collection**

Migrating VSAM data to DB2

- Migrate files transparently - without application change
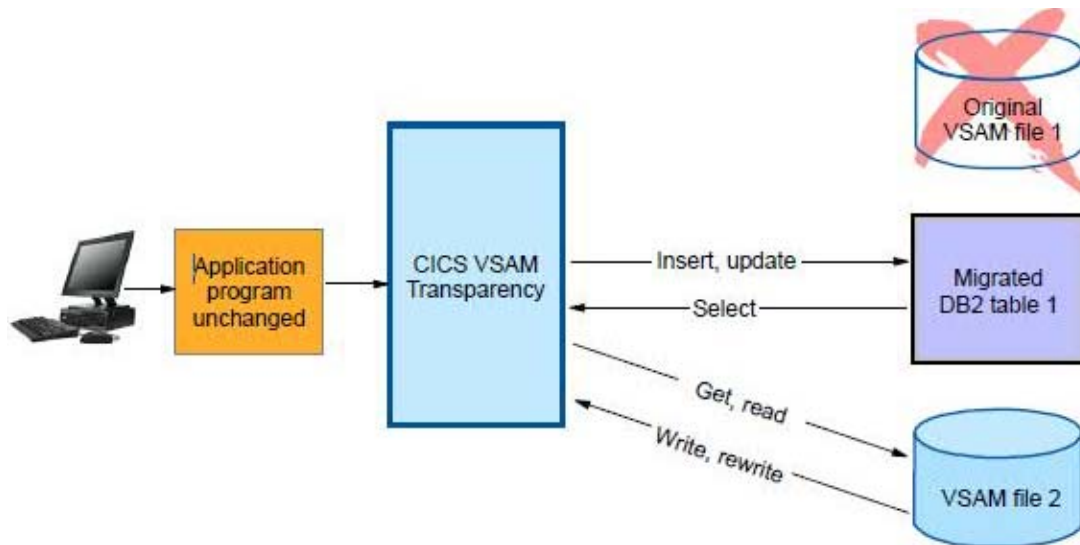
Migrating VSAM data to DB2

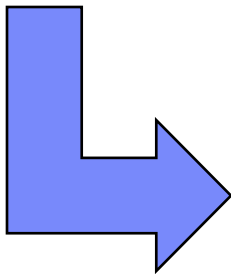■ Determine where the KSDSCUST file is used

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
      )
```

Data Migration – CICS VT vs. Conventional Method

Conventional migration effort from VSAM to DB2

(typically measured in months/years)

Analysis & Design	Data Migration	Data Testing	Reprogramming	Program Testing

VSAM to DB2 using CICS VT

(often measured in months or even weeks)

Analysis & Design	Data Migration	Data Testing

Increases with number of files / tables
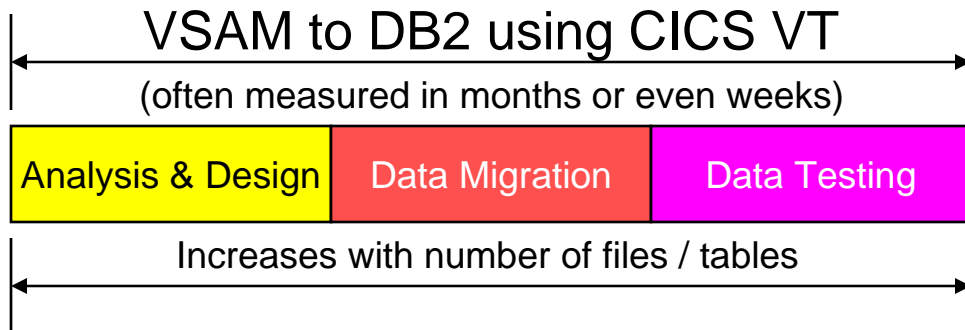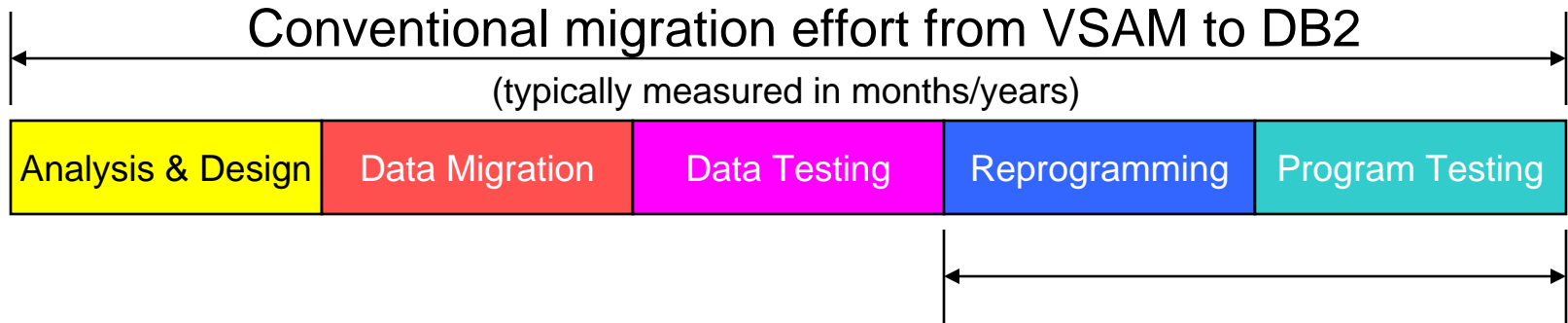
RUN TIME CALL INTERCEPTION - CICS

Application Program

Clear data

C I C S V T

Security & Privacy

**InfoSphere Guardium**

DB2

Encrypted data
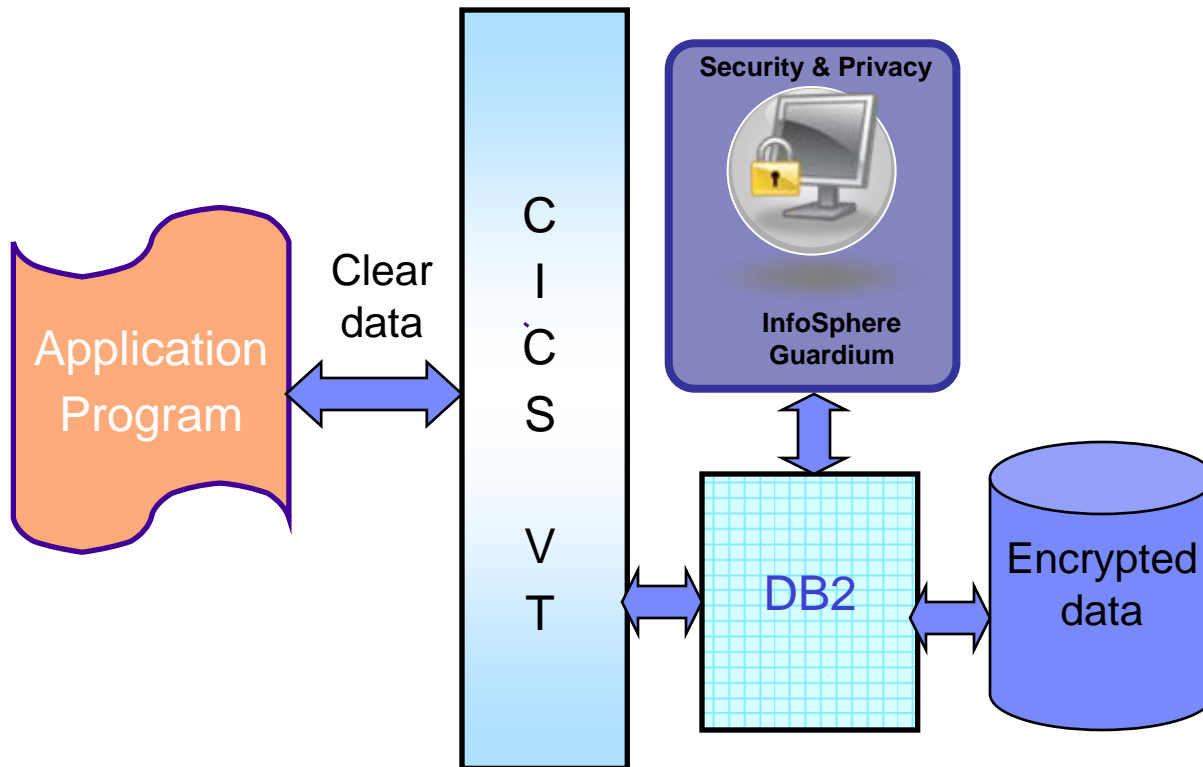
Encrypt credit card and key customer data

- **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
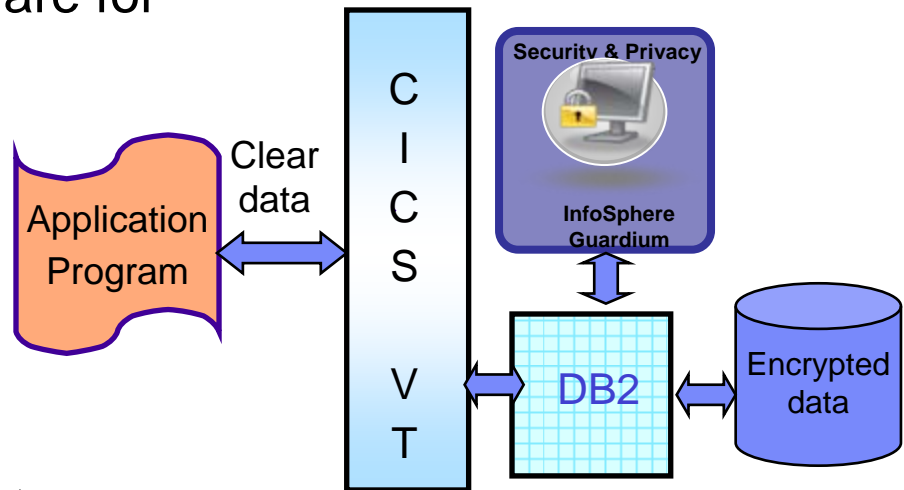
CICS VSAM Transparency for z/OS (CICS VT)

▪**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
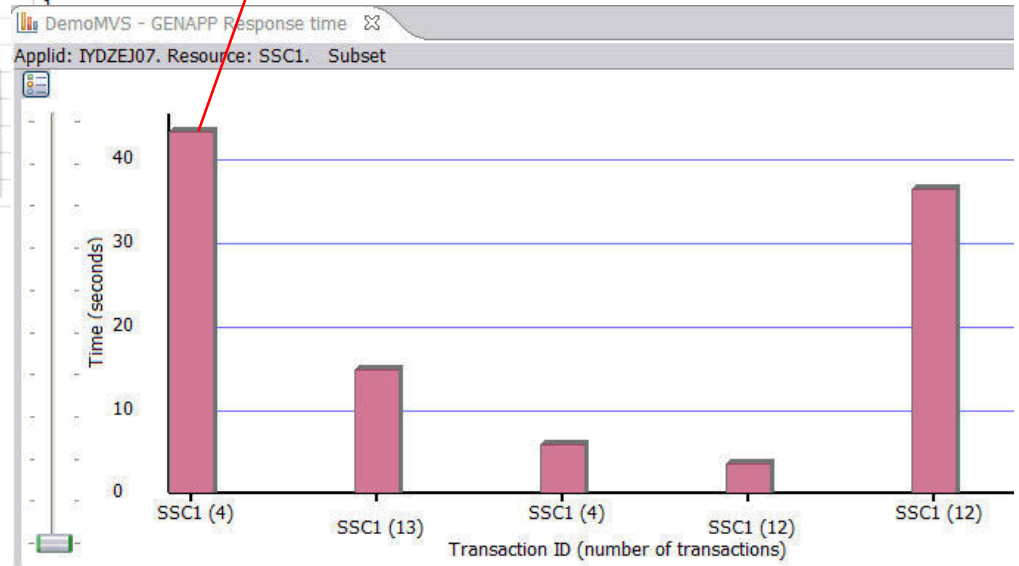
Performance analysis

- **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
```

Tran		#Tasks	Avg Response Time	Avg Dispatch Time	Avg User CPU Time	Avg Suspend Time	Avg DispWait Time	Avg FC Wait Time	Avg FCAMRq Count	Avg IR Wait Time	Avg SC24UHWM Count	Avg SC31UHWM 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

Develop Test Etc
RDz

Configuration Status Control, Test
MQ

Status Situations Topology
XE

New!

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

Deployment, Discovery, Visualization, Cloning, Automation & Control
DA

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

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

Execution Tree Dependencies Queries Command Flow
IA

CRUD/Install History, Audit Backout Search, Compare
CM

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

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

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

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

Enhanced!

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

CICS TS

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

Learn How to Perform Popular Business Solutions with the CICS

Chris Rayns
Peter Siddell
Eric Higgins

Redpaper

ibm.com/redbooks
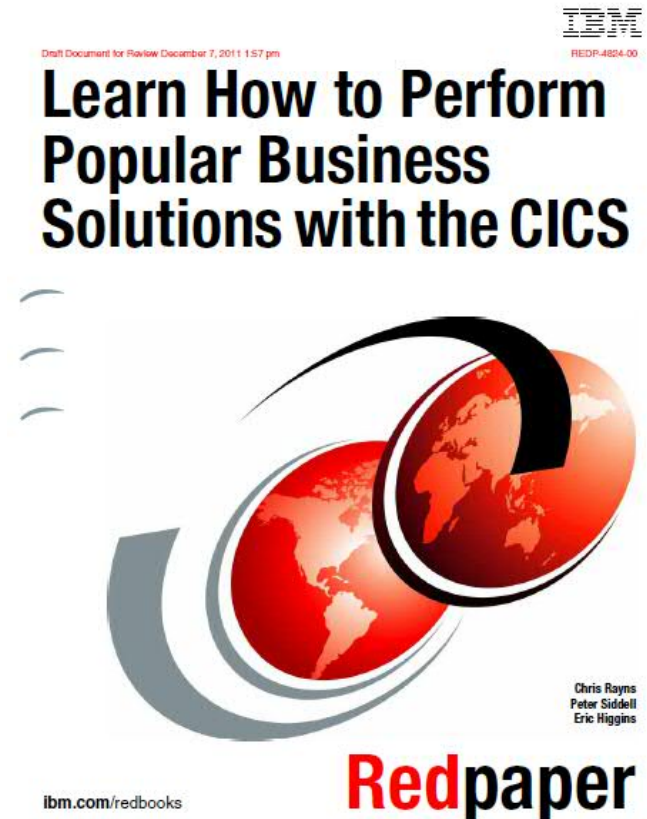
Summary

- **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)
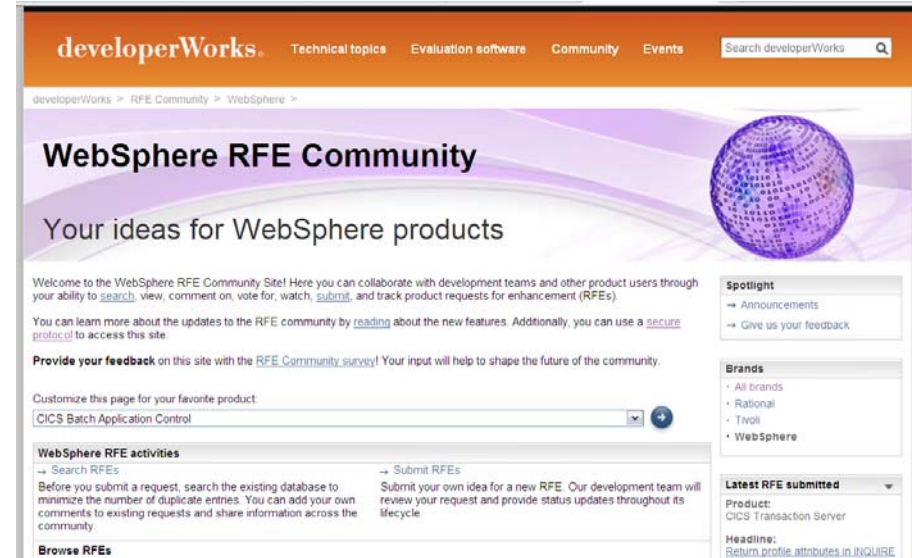
- **Existing FITS requirements are currently being processed, and will either be transferred to RFE or closed and returned.**

- **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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