Modern z/OS application development with RDz

GSE NL COBOL working group

Woerden - 14/05/2009

Gie Indesteege - ABIS Training & Consulting

Modern z/OS application development with RDz

Welcome

ABIS Training & Consulting

www.abis.be

abis

TRAINING & CONSULTING

Gie Indesteege

- **trainer and consultant**
- **president of BeNeLux GSE working group EGL/RDZ**

  Enterprise Generation Language/
  Rational Developer for System z

GSE
GUIDE SHARE EUROPE
1959-2009
50 YEARS
GSE NEDERLAND

Contents

Developing applications for the mainframe environment has been done for years, based on the **ISPF dialog manager** facilities and tools.

This well known **application development life cycle** is still used, but ... modern application development tools make it possible to optimise, enhance, facilitate all these aspects.

Moreover **integration** of these aspects will shorten the development process.

RDz (Rational Developer for System z), based on the Eclipse foundation, will help to make application development life easier and perhaps better.

This presentation will give you an overview of the architecture and possibilities of the development tool.

Agenda

- **Traditional application development**
- **Architecture of the Rational Developer for System z**
- **Project setup**
- **Developing COBOL applications with RDz (analysis, coding, validation, preparation, testing)**
- **Support of development process (synchronisation, remote debugging, build, change management)**
- **Integration aspects**
- **Q & A**

Traditional application development for z/OS

Application development life cycle

1. analysis and design

Repeat until OK

2. coding of COBOL sources -> ISPF/PDF editor

3. compilation/link-edit -> JCL procedures

4. check compile using SDSF

5. data preparation -> data manipulation tools

6. test/debug

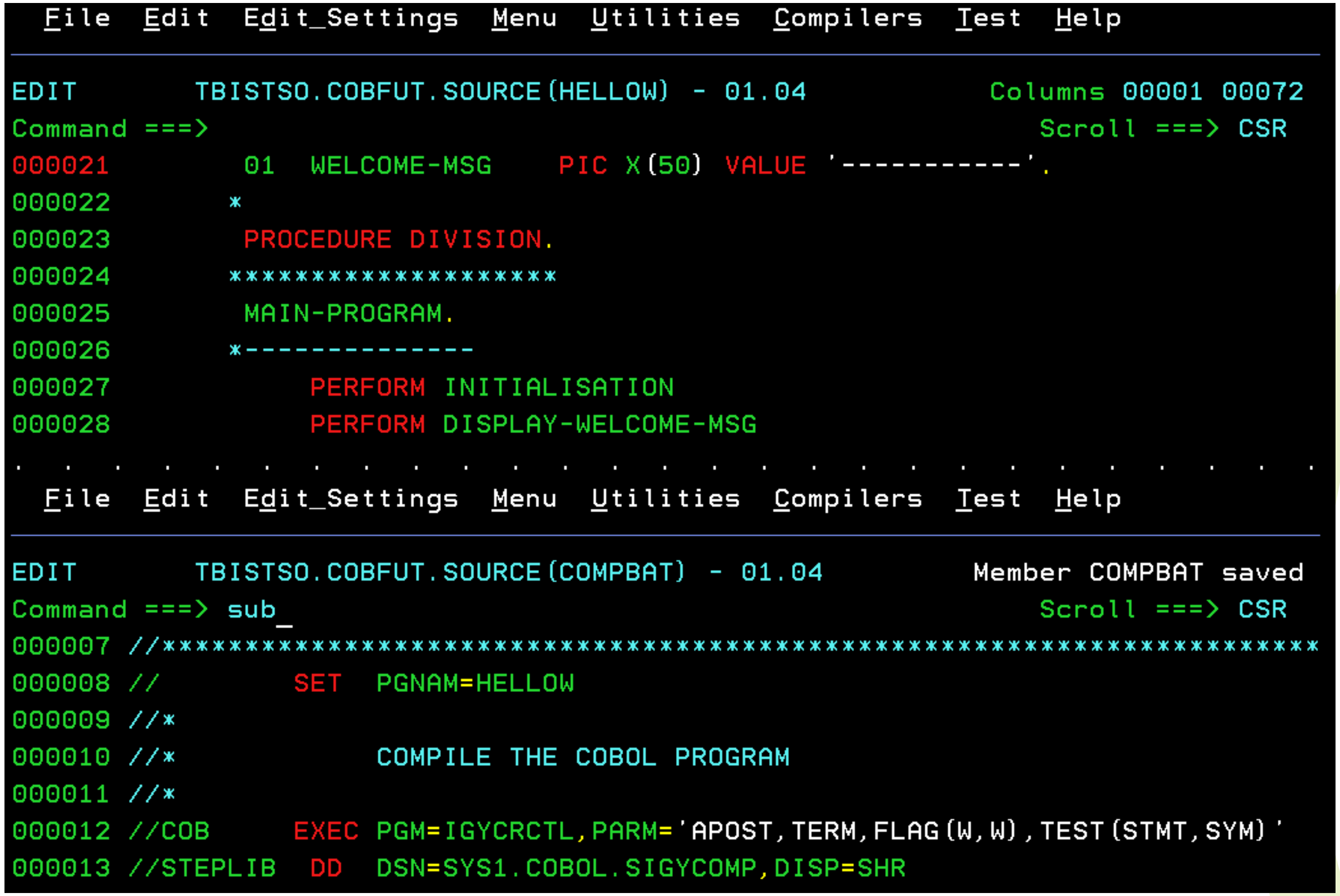
- **runtime** environments (batch, CICS, IMS)
- data stores (VSAM, DB2, DL1, ...)

Approval

7. stage into acceptation/production

Example

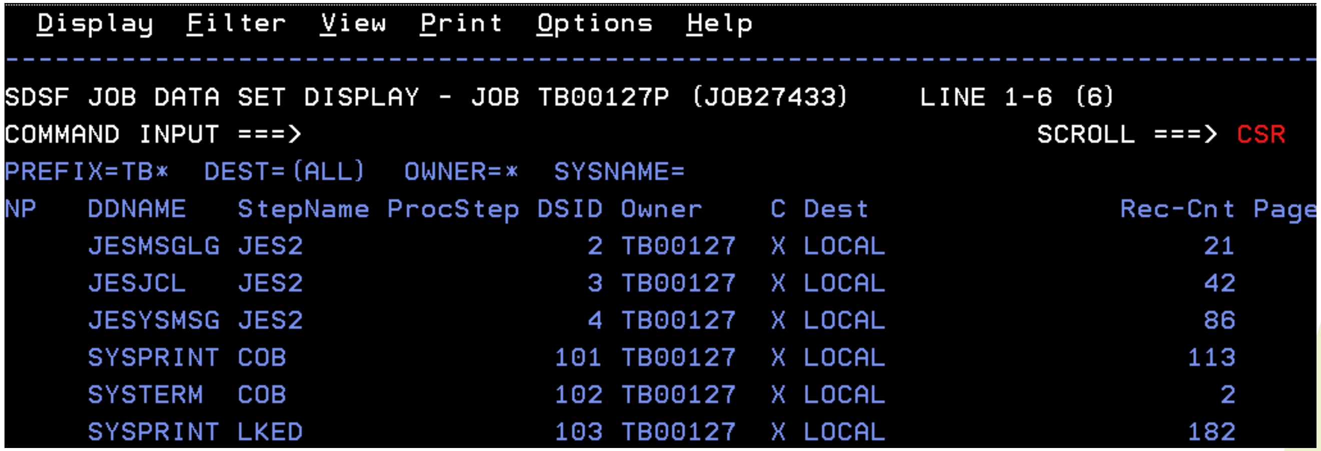
Edit COBOL source -> save -> Edit compile JCL -> submit



```
  File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
 ─────────────────────────────────────────────────────────────────────────────
EDIT       TBISTSO.COBFUT.SOURCE(HELLOW) - 01.04          Columns 00001 00072
Command ===>                                                 Scroll ===> CSR
000021        01  WELCOME-MSG    PIC X(50) VALUE '-----------'.
000022       *
000023        PROCEDURE DIVISION.
000024       ********************
000025        MAIN-PROGRAM.
000026       *--------------
000027            PERFORM INITIALISATION
000028            PERFORM DISPLAY-WELCOME-MSG
 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
 ─────────────────────────────────────────────────────────────────────────────
EDIT       TBISTSO.COBFUT.SOURCE(COMPBAT) - 01.04         Member COMPBAT saved
Command ===> sub_                                            Scroll ===> CSR
000007 //*********************************************************************
000008 //        SET  PGNAM=HELLOW
000009 //*
000010 //*           COMPILE THE COBOL PROGRAM
000011 //*
000012 //COB      EXEC PGM=IGYCRCTL,PARM='APOST,TERM,FLAG(W,W),TEST(STMT,SYM)'
000013 //STEPLIB  DD  DSN=SYS1.COBOL.SIGYCOMP,DISP=SHR
```

Example (cont.)

Swap -> Check SDSF - find Job



```
 Display  Filter  View  Print  Options  Help
-------------------------------------------------------------------------------
SDSF JOB DATA SET DISPLAY - JOB TB00127P (JOB27433)    LINE 1-6 (6)
COMMAND INPUT ===>                                           SCROLL ===> CSR
PREFIX=TB*  DEST=(ALL)  OWNER=*  SYSNAME=
NP   DDNAME   StepName ProcStep DSID Owner    C Dest               Rec-Cnt Page
     JESMSGLG JES2                 2 TB00127  X LOCAL                   21
     JESJCL   JES2                 3 TB00127  X LOCAL                   42
     JESYSMSG JES2                 4 TB00127  X LOCAL                   86
     SYSPRINT COB                101 TB00127  X LOCAL                  113
     SYSTERM  COB                102 TB00127  X LOCAL                    2
     SYSPRINT LKED               103 TB00127  X LOCAL                  182
```

find code line in error (remember) -> swap to source

...

repeat until OK -> prepare TEST

- data
- runtime environment

Modern z/OS application development with RDz

Traditional development

PRO

- well known development environment
- central management

  mainframe RAS - security, concurrency control, backup/recovery
- shareable (source, procedures, data, ...)

CON

- long cycle
- switching between environments
- rigid procedures, not flexible

Agenda

- Traditional application development
- **Architecture of the Rational Developer for System z**
- Project setup
- Developing COBOL applications with RDz (analysis, coding, validation, preparation, testing)
- Support of development process (synchronisation, remote debugging, build, change management)
- Integration aspects
- Q & A

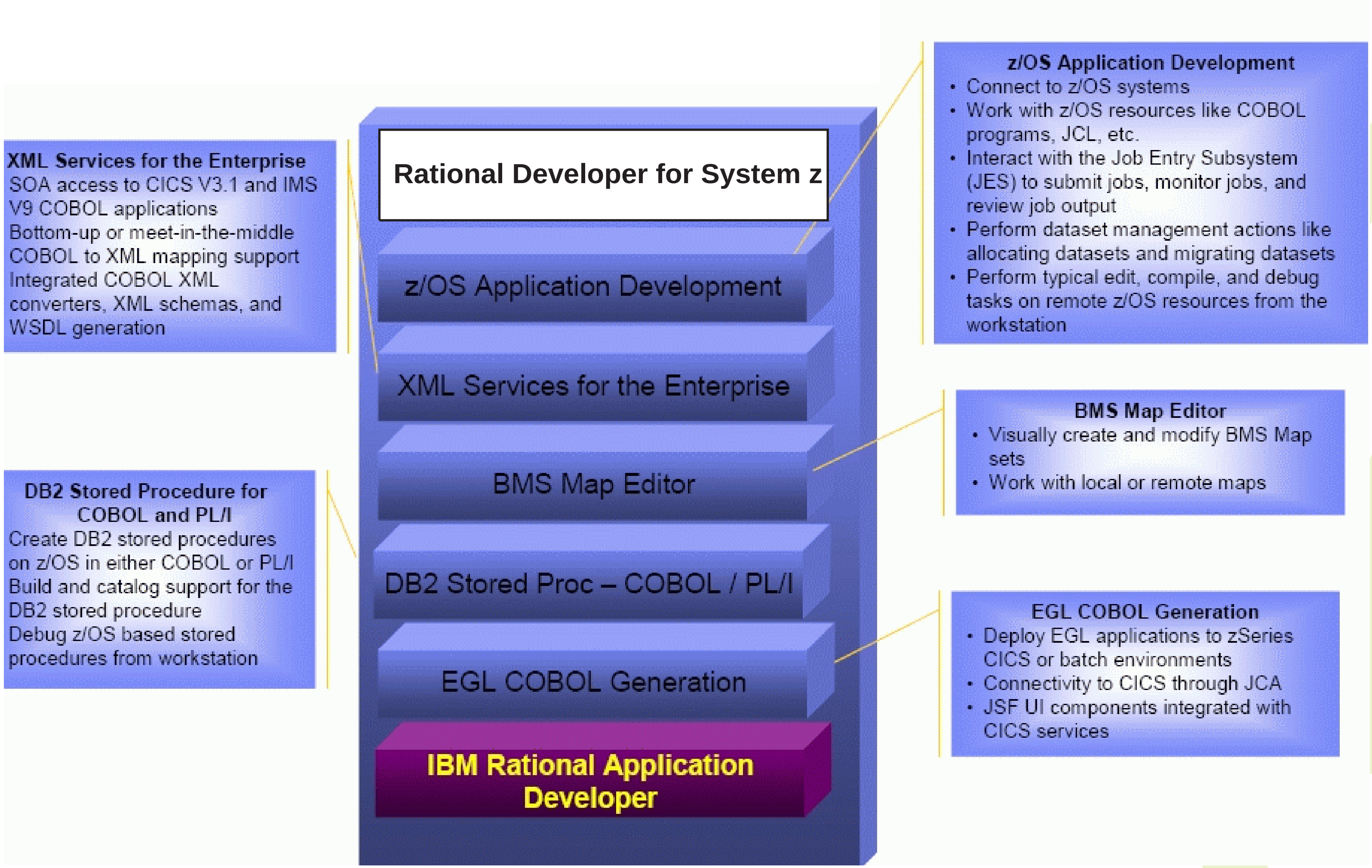
Architecture of Rational Developer for System z

Based on the Eclipse workbench (www.eclipse.org)

- **open, portable and universal tooling platform**
- **manage complexity of different**
  - **runtime environments**
  - **operating systems**
  - **workgroup servers**
- **provides frameworks and services and tools for building plug-in tools**
- **all functionality is provided by plug-ins**
- **role-based development (single repository)**

  web designer, COBOL programmer, administrator, architect
- **file-based IDE**
- **team development**

Architecture of RDz (cont.)



Rational Developer for System z
z/OS Application Development
XML Services for the Enterprise
BMS Map Editor
DB2 Stored Proc – COBOL / PL/I
EGL COBOL Generation
IBM Rational Application Developer

XML Services for the Enterprise
SOA access to CICS V3.1 and IMS V9 COBOL applications
Bottom-up or meet-in-the-middle COBOL to XML mapping support
Integrated COBOL XML converters, XML schemas, and WSDL generation

DB2 Stored Procedure for COBOL and PL/I
Create DB2 stored procedures on z/OS in either COBOL or PL/I
Build and catalog support for the DB2 stored procedure
Debug z/OS based stored procedures from workstation

z/OS Application Development

- Connect to z/OS systems
- Work with z/OS resources like COBOL programs, JCL, etc.
- Interact with the Job Entry Subsystem (JES) to submit jobs, monitor jobs, and review job output
- Perform dataset management actions like allocating datasets and migrating datasets
- Perform typical edit, compile, and debug tasks on remote z/OS resources from the workstation

BMS Map Editor

- Visually create and modify BMS Map sets
- Work with local or remote maps

EGL COBOL Generation

- Deploy EGL applications to zSeries CICS or batch environments
- Connectivity to CICS through JCA
- JSF UI components integrated with CICS services

Features of RDz

intended for (legacy) enterprise developers

- **development of large enterprise applications by connecting web applications to enterprise business logic**
- **supports multiple technologies:**
  - Java SE and Java EE (JSPs, servlets, Struts, JSF, EJBs)
  - web applications (HTML, CSS, JavaScript,AJAX)
  - XML and web services
  - COBOL, PL/I, Assembler
  - Enterprise Generation Language (EGL) for Java and COBOL
- **integration with z/OS and subsystems (JES, CICS, DB2, ...)**
  - BMS map editor
  - DB2 stored procedures
  - JES spool access ...

Agenda

- Traditional application development
- Architecture of the Rational Developer for System z
- Project setup
- Developing COBOL applications with RDz (analysis, coding, validation, preparation, testing)
- Support of development process (synchronisation, remote debugging, build, change management)
- Integration aspects
- Q & A

Project setup in RDz

- perspectives
  - Remote System Explorer -> connection to host
  - z/OS -> development of legacy applications
- views
  - z/OS (MVS) projects
  - source outline
  - z/OS file system mapping
  - remote system info (details, error list, shell)
  - Job monitor
  - TSO commands
- editors
  - LPEX (z/OS, basic or remote systems)

Workstation based development

Remote development

- working on local copy of host files (PDS, SDS)
- local syntax checking
- build implies remote compile and link on host

    generate and customise JCL
- remote debug (run on host)
- local error reporting

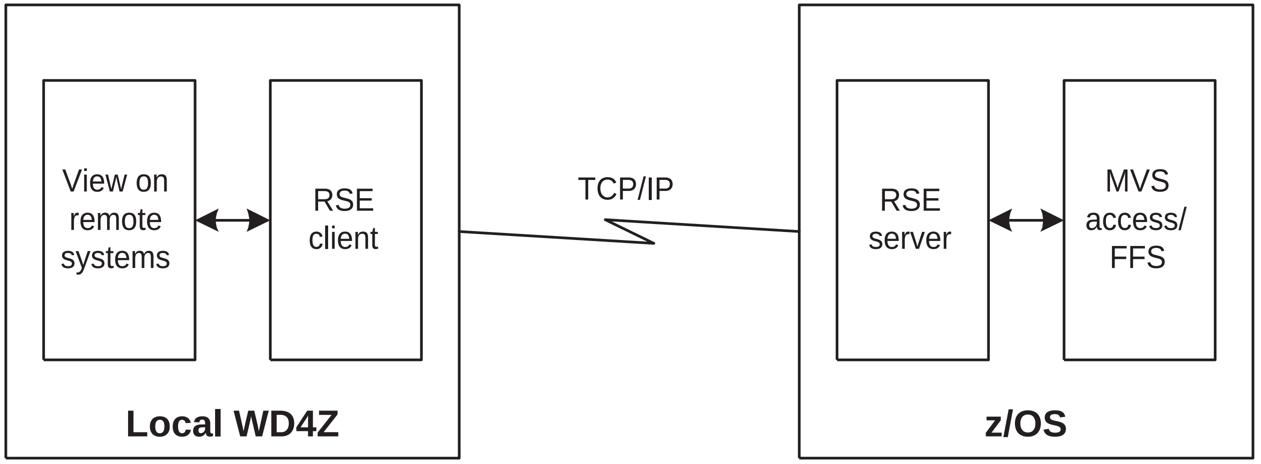
Local development

- working on local workstation files
- local syntax checking
- local compile and build
- local debug

Modern z/OS application development with RDz

Connection between RDz and host

Connection to z/OS host



offers local view on host files -> Remote System Explorer (**RSE**)

- z/OS file mapping for COBOL, JCL, PL1, ...
- code page customisation

access to JES spool -> Job monitor

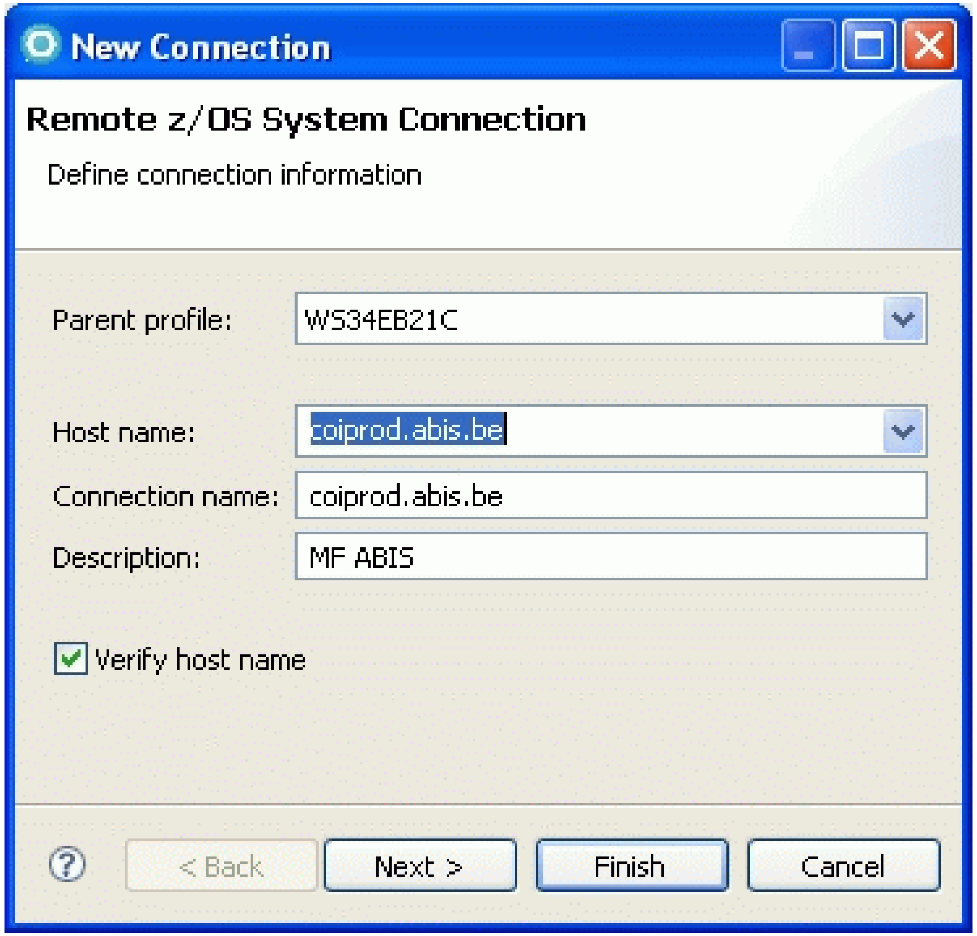
also used for remote debugging -> Debug tool

Agenda

- Traditional application development
- Architecture of the Rational Developer for System z
- Project setup
- Developing COBOL applications with RDz (analysis, coding, validation, preparation, testing)
- Support of development process (synchronisation, remote debugging, build, change management)
- Integration aspects
- Q & A

Developing COBOL applications with RDz

Set up connection to host



New Connection

Remote z/OS System Connection

Define connection information

Parent profile: WS34EB21C

Host name: coiprod.abis.be

Connection name: coiprod.abis.be

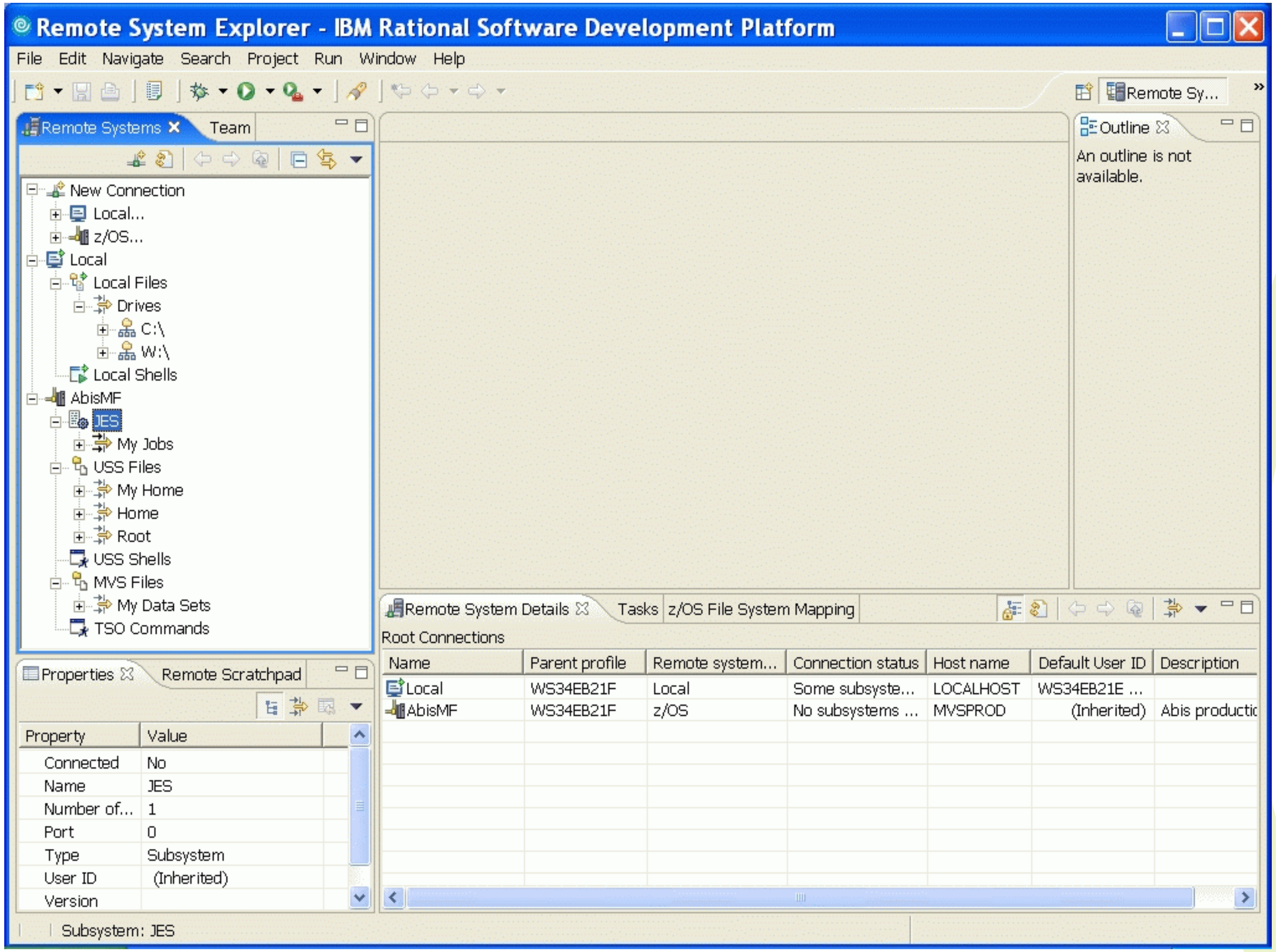
Description: MF ABIS

☑ Verify host name

Modern z/OS application development with RDz

Developing COBOL applications with RDz (cont.)

Look-up z/OS resources



An outline is not available.

Property	Value
Connected	No
Name	JES
Number of...	1
Port	0
Type	Subsystem
User ID	(Inherited)
Version	

Name	Parent profile	Remote system...	Connection status	Host name	Default User ID	Description
Local	WS34EB21F	Local	Some subsyste...	LOCALHOST	WS34EB21E ...	
AbisMF	WS34EB21F	z/OS	No subsystems ...	MVSPROD	(Inherited)	Abis productic

Subsystem: JES

Developing COBOL applications with RDz

Define assocations of remote files

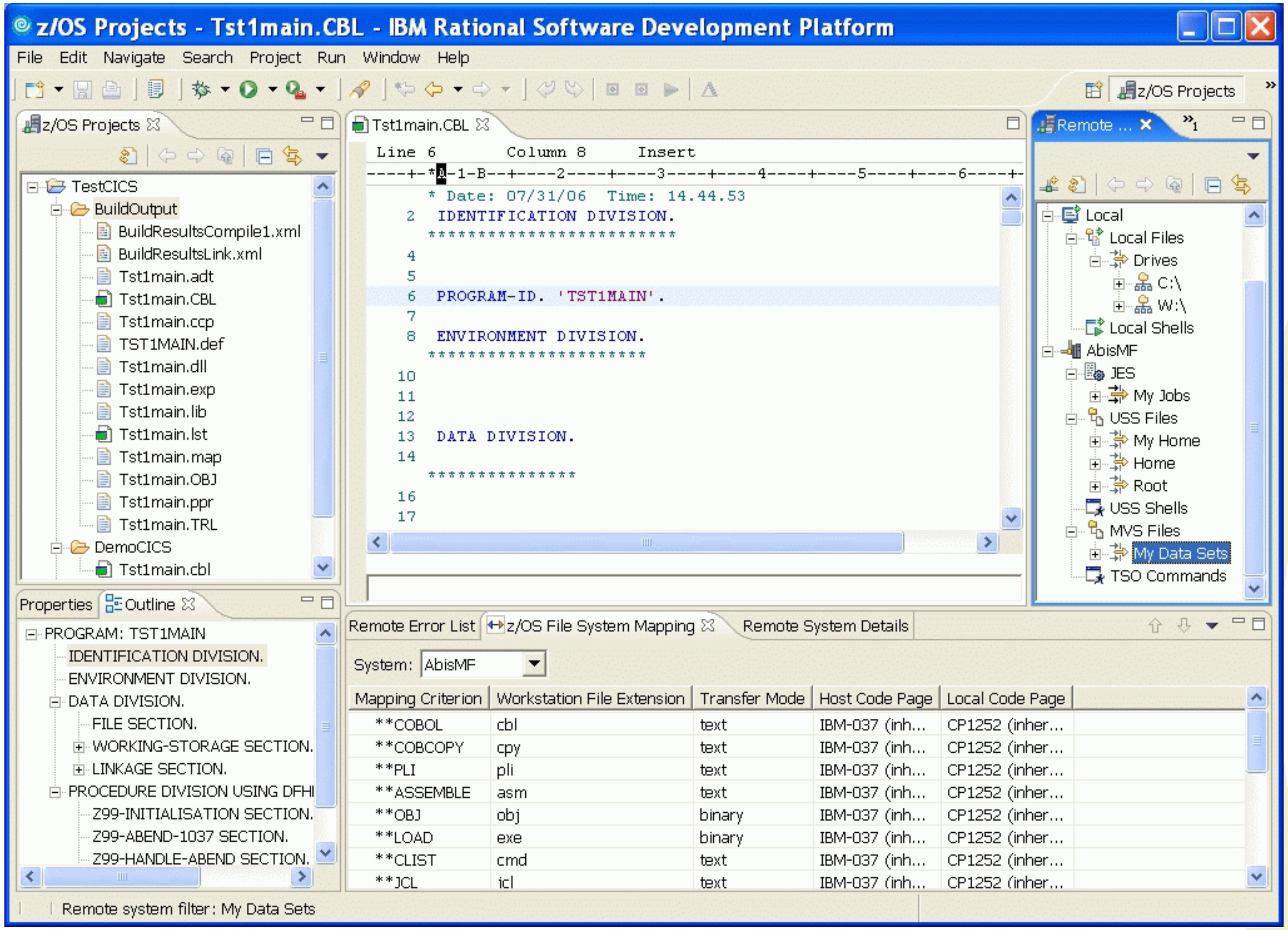
- JCL
- COBOL
- PL/1
- BMS
- REXX

Open file with LPEX editor

- ISPF like editor
- language sensitive highlighting
- syntax checking
- code assist
- outline view

z/OS project definitions

Combine z/OS resources into z/OS projects



```
----+-*A-1-B--+----2----+----3----+----4----+----5----+----6----+-
      * Date: 07/31/06  Time: 14.44.53
       IDENTIFICATION DIVISION.
      *************************


       PROGRAM-ID. 'TST1MAIN'.

       ENVIRONMENT DIVISION.
      **********************



       DATA DIVISION.

      ***************


```

Mapping Criterion	Workstation File Extension	Transfer Mode	Host Code Page	Local Code Page
**COBOL	cbl	text	IBM-037 (inh...	CP1252 (inher...
**COBCOPY	cpy	text	IBM-037 (inh...	CP1252 (inher...
**PLI	pli	text	IBM-037 (inh...	CP1252 (inher...
**ASSEMBLE	asm	text	IBM-037 (inh...	CP1252 (inher...
**OBJ	obj	binary	IBM-037 (inh...	CP1252 (inher...
**LOAD	exe	binary	IBM-037 (inh...	CP1252 (inher...
**CLIST	cmd	text	IBM-037 (inh...	CP1252 (inher...
**JCL	jcl	text	IBM-037 (inh...	CP1252 (inher...

z/OS project

Workstation based development of host resources (COBOL, JCL, ...)

1. create MVS project

via z/OS projects view

2. search PDS on z/OS host

-> MVS files -> My Data Sets

3. optional: allocate new PDS

based on High Level Qualifier and data set name

-> define data set characteristics

4. add PDS to MVS project

5. Edit COBOL source

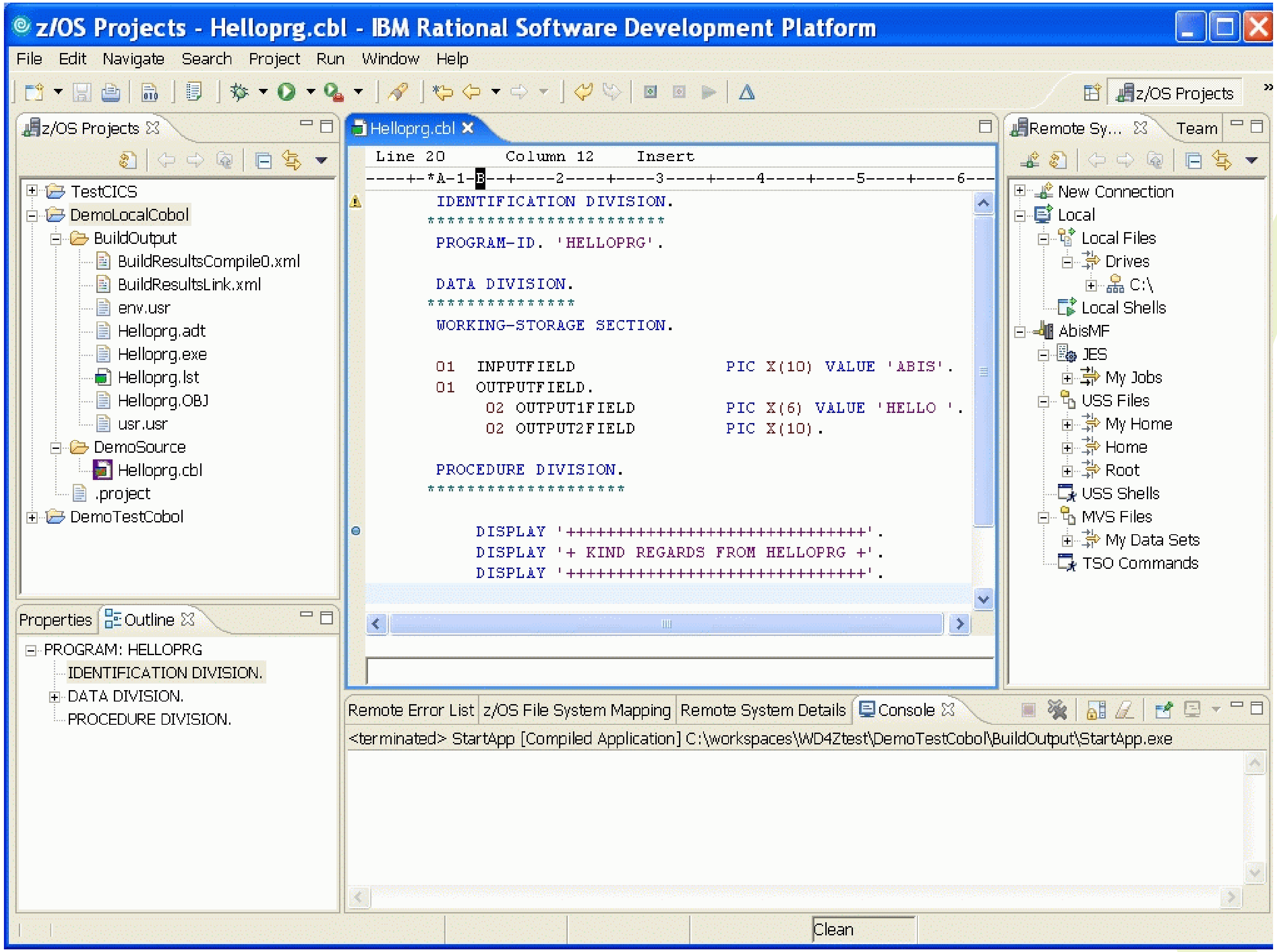
6. Build the project, based on (main) program entry point

7. Run (or debug) generated load module

Local project

1. Create local project (Workstation COBOL or PLI)
2. Edit COBOL source
3. Build the project, based on (main) program entry point
4. Run (or debug) generated load module (.exe)

Example of local project



```
 Line 20       Column 12      Insert
----+-*A-1-B--+----2----+----3----+----4----+----5----+----6---
       IDENTIFICATION DIVISION.
      ************************
       PROGRAM-ID. 'HELLOPRG'.

       DATA DIVISION.
      ***************
       WORKING-STORAGE SECTION.

       01   INPUTFIELD                  PIC X(10) VALUE 'ABIS'.
       01   OUTPUTFIELD.
             02  OUTPUT1FIELD           PIC X(6) VALUE 'HELLO '.
             02  OUTPUT2FIELD           PIC X(10).

       PROCEDURE DIVISION.
      ********************

           DISPLAY '++++++++++++++++++++++++++++++'.
           DISPLAY '+ KIND REGARDS FROM HELLOPRG +'.
           DISPLAY '++++++++++++++++++++++++++++++'.
```

```
<terminated> StartApp [Compiled Application] C:\workspaces\WD4Ztest\DemoTestCobol\BuildOutput\StartApp.exe
```

Modern z/OS application development with RDz

Customise build process

Modify properties of file

- use CICS

    invokes CICS translator

- user DB2

    invokes SQL pre-compiler

- COBOL compiler options
    - remote COBOL
    - local COBOL
- use IMS

    specify IMS libraries

Agenda

- Traditional application development
- Architecture of the Rational Developer for System z
- Project setup
- Developing COBOL applications with RDz
  (analysis, coding, validation, preparation, testing)
- **Support of development process**
  (synchronisation, remote debugging, build, change management)
- Integration aspects
- Q & A

Supporting the development process

- **CARMA - Common Access (Host) Repository Manager**

  access to Software Configuration Manager (SCM) - e.g. SCLM

  - CARMA repository view
  - check-in/check-out
  - project synchronisation
  - team working

- **Remote debugging**

  integration with IBM Debug tool

- **Build**

  Rational Team Concert for System z

Agenda

- Traditional application development
- Architecture of the Rational Developer for System z
- Project setup
- Developing COBOL applications with RDz
  (analysis, coding, validation, preparation, testing)
- Support of development process
  (synchronisation, remote debugging, build, change management)
- **Integration aspects**
- Q & A

Integration aspects

Development of CICS applications

- BMS map editor
- Service Flow Modeler (for CICS) - tech preview

Development of DB2 stored procedures

XML services - enable COBOL programs as web services

- WSDL generation
- type conversion
  - web service
  - CICS SOAP
  - IMS SOAP

Q & A

Q&A

Thank you

Gie Indesteege

Trainer and Consultant

gindesteege@abis.be

abis

TRAINING & CONSULTING

thanks you

Modern z/OS application development with RDz