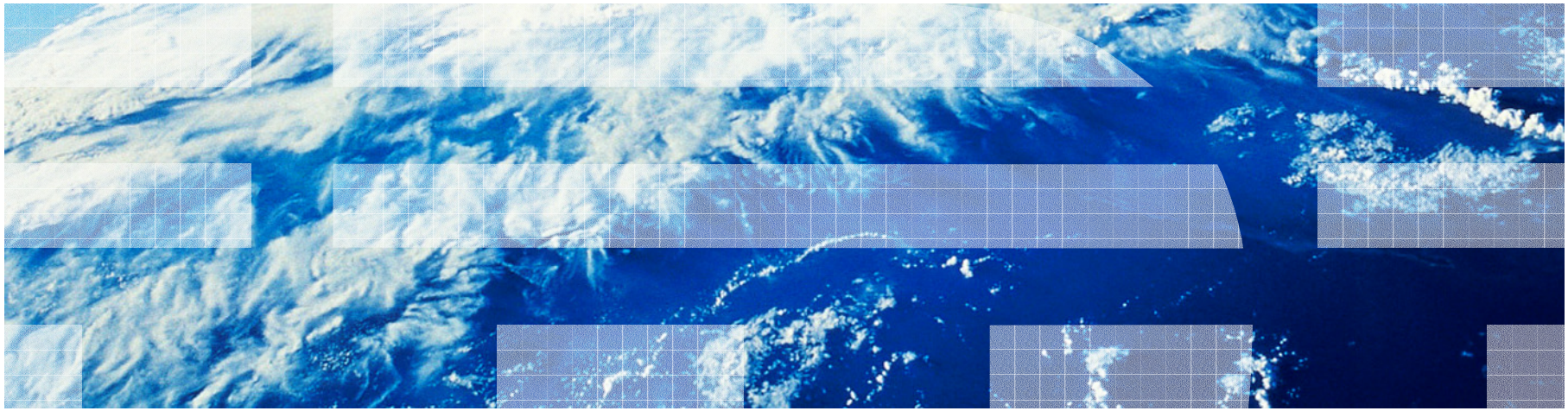
Wilhelm Mild – IT Architect

17 May 2010

Modern Eclipse based Development Environments for z/VSE



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Development objectives !!!

- Tools for managing existing z/VSE source code and changes
  - COBOL, ASM, PL/I, C, 4GL Languages
  - increased productivity for changes and new development
  - flexibility in versioning
  - effective group development control
- Develop for multiple platforms
  - common framework for the enterprise instead of multiple unique platform dependent tools
  - same basic tool set for open systems and mainframe
- Open source based technology
  - tools that students know from school and university communities
  - help new developers adapt to the mainframe

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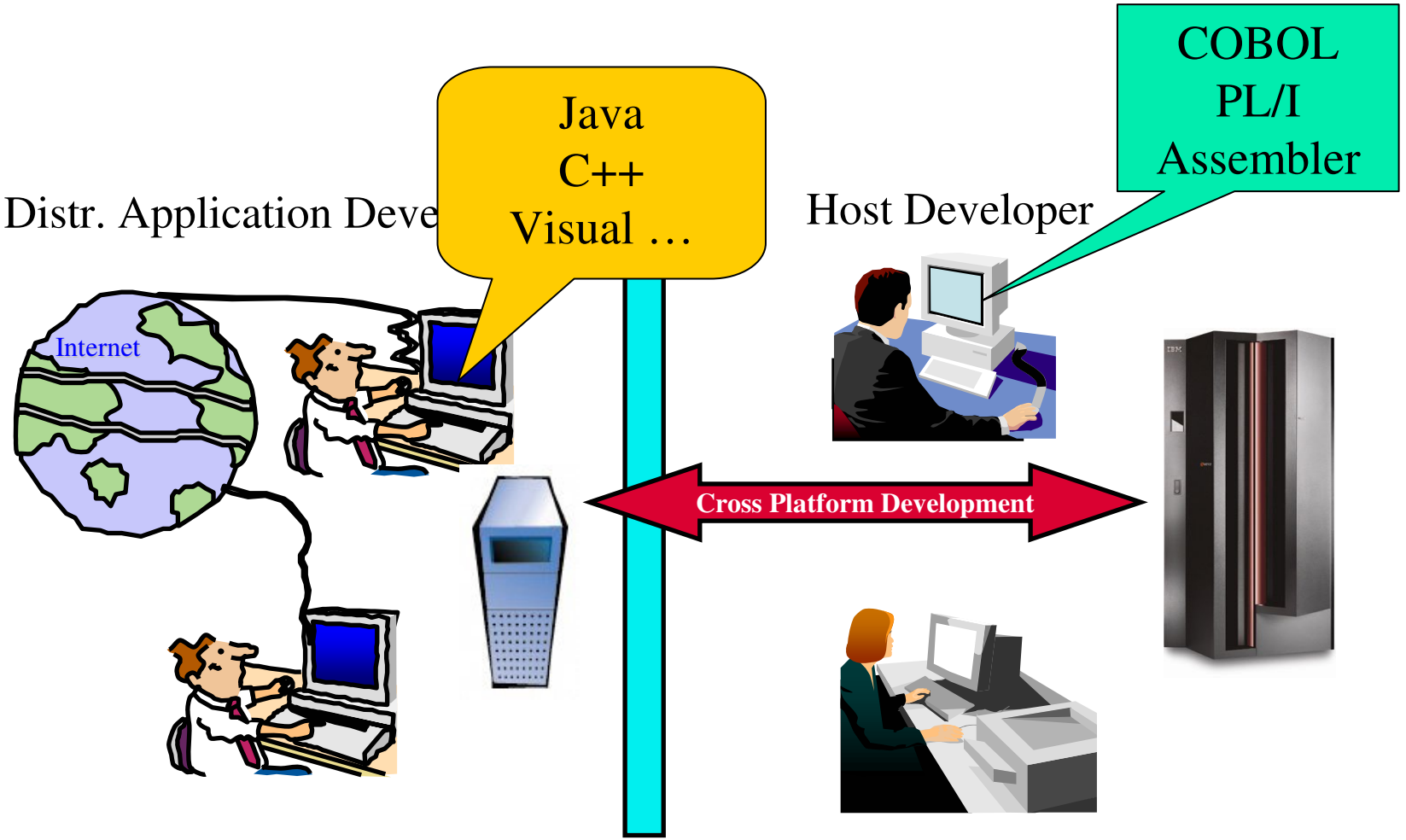
‘Distributed’ Development Landscape…



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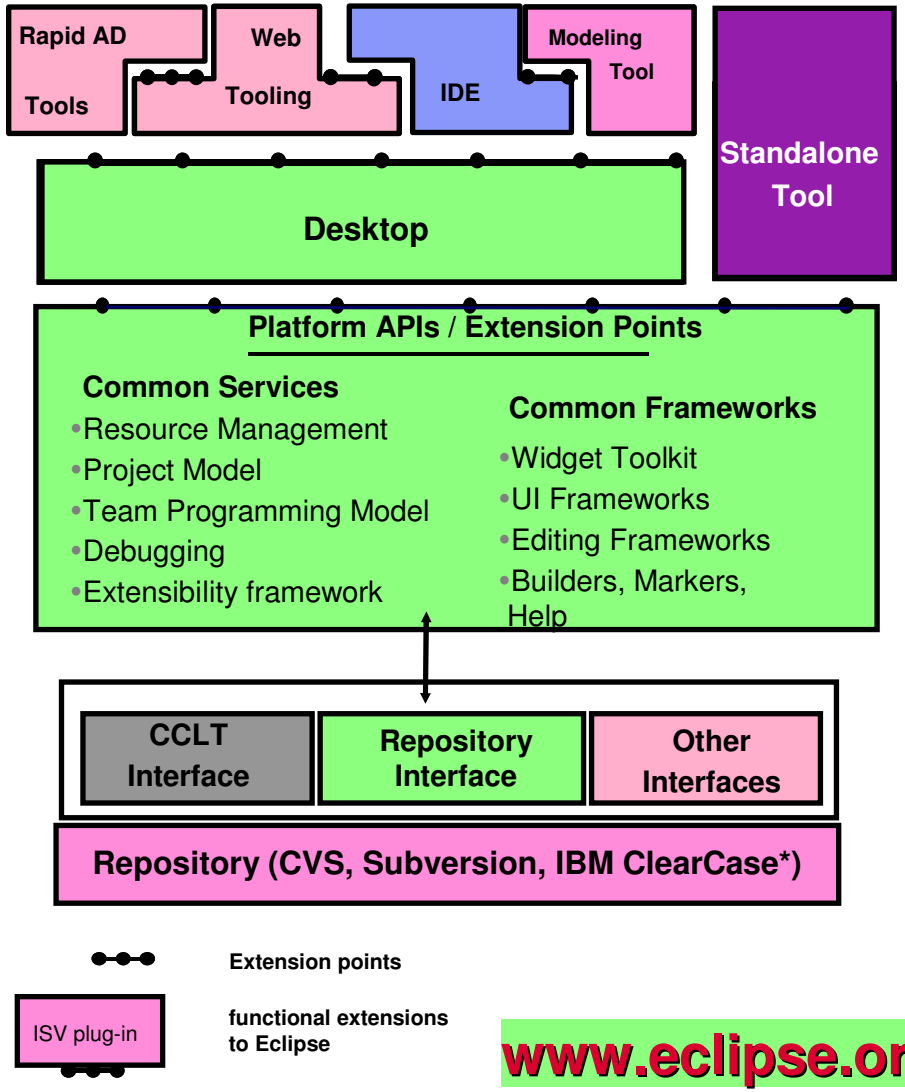
Eclipse – the open Standard for application development



What is Eclipse about:

- Open source development framework
  - with modern Editors
  - syntax help & check
  - semantic check
- Centralized source code maintenance
  - entire source code in central Repository
  - cross platform project administration
- Versioning software interface
  - CVS, Subversion, or IBM ClearCase
  - automatic Workgroup-control
    - i.e. development groups, system group
- Open for ISVs development Plug-Ins
  - **Integrated Development Environments (IDE)**
    - for System z (RDz)
    - for Java, COBOL, PL/I, ASM,C
  - Application analysis and optimization
    - Analyze the applications and workflows with graphical correlations
  - IBM HATS Development Plug-In
    - develop new front-ends to 3270 applications
  - IBM EGL development for z/VSE (RBD)
    - follow-on to Visual Age Generator

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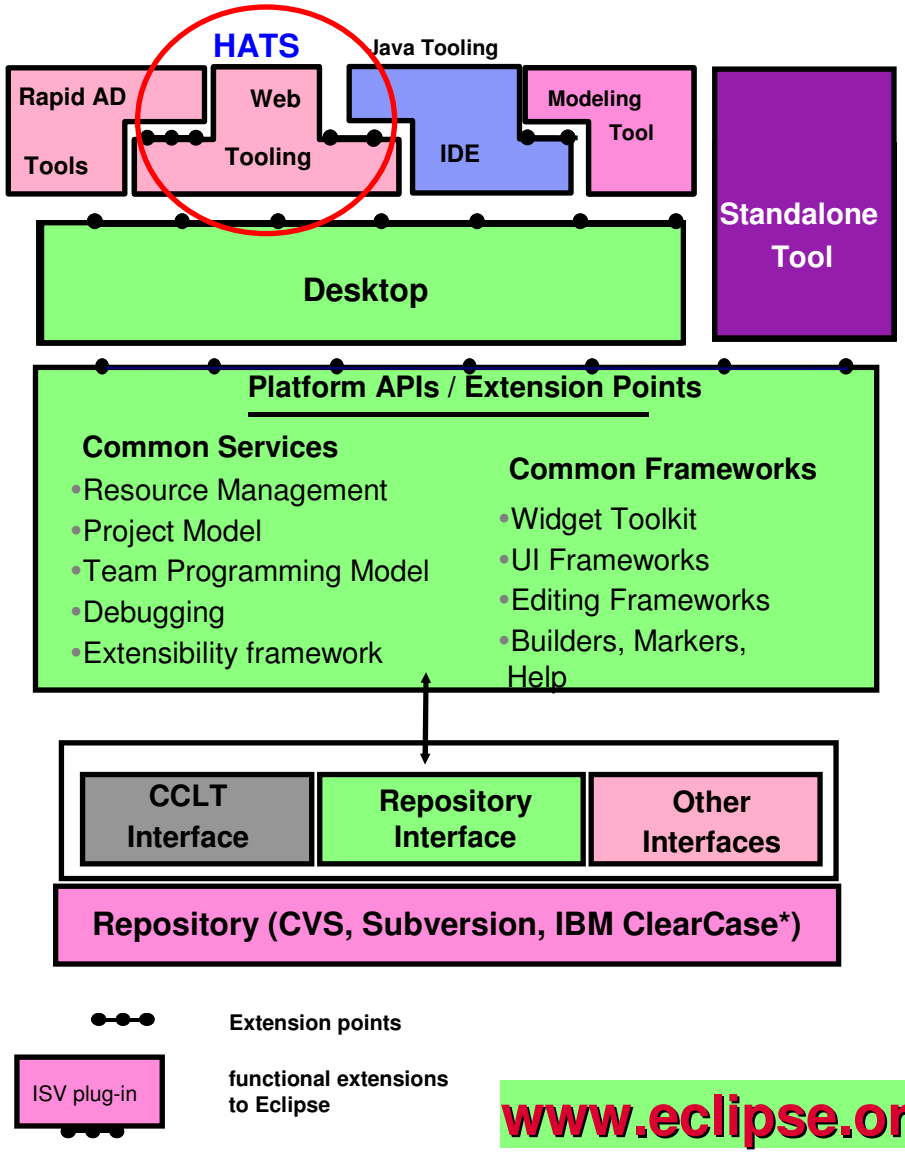

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    - Analyze the applications and workflows with graphical correlations
  - IBM HATS Development Plug-In
    - develop new front-ends and GUIs to existing 3270 applications
  - IBM EGL development for z/VSE (RBD)
    - follow-on to Visual Age Generator

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Host Access Transformation Server (HATS)

- A Web-to-host integrator, HTML emulator ...
- rules-based transformation engine, application integration ...
- converts green screens to graphical user interfaces in web applications
- improves ease-of-use of host applications.

Benefit: Easily extend existing applications to the web

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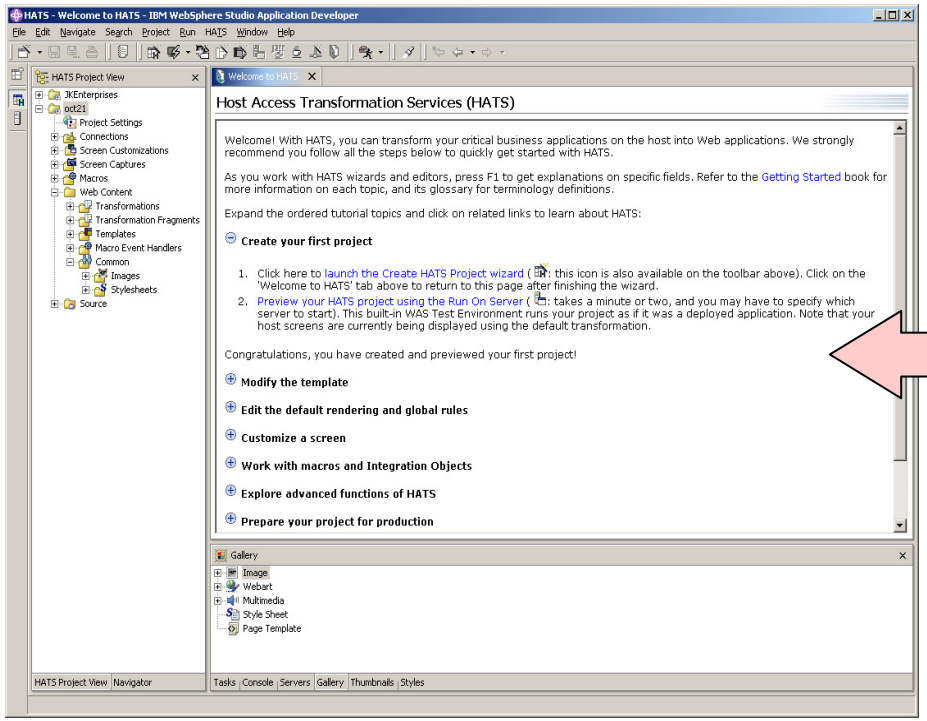
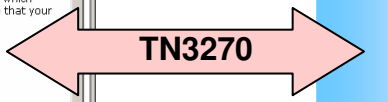
Modernize Existing Applications with HATS

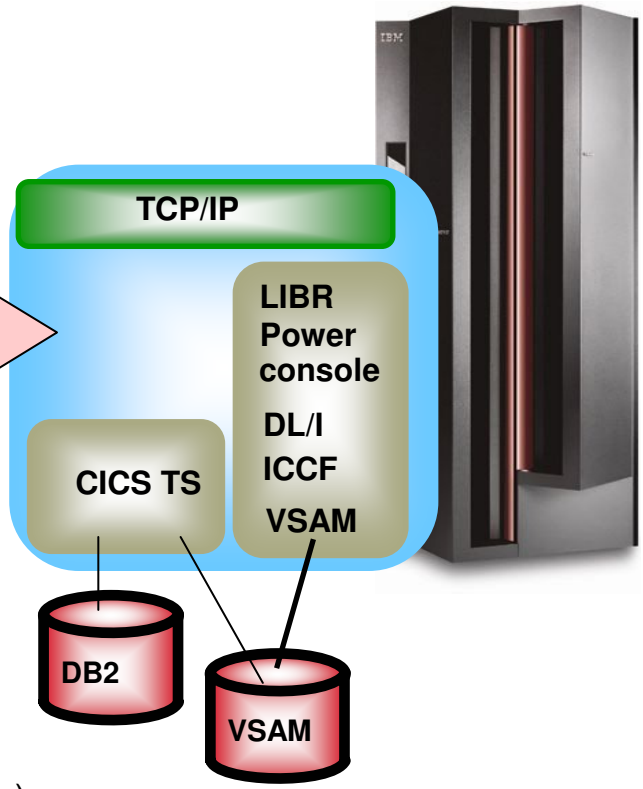
(2) Integrate existing applications in Web applications – in Java

Rational Application Development + HATS Plug-In





z/VSE Server



- **Application-Development – in Java** (i.e. HATS Studio or Eclipse)
- The new application accesses unchanged VSE application and data
- the new application is a web application using internet technologies

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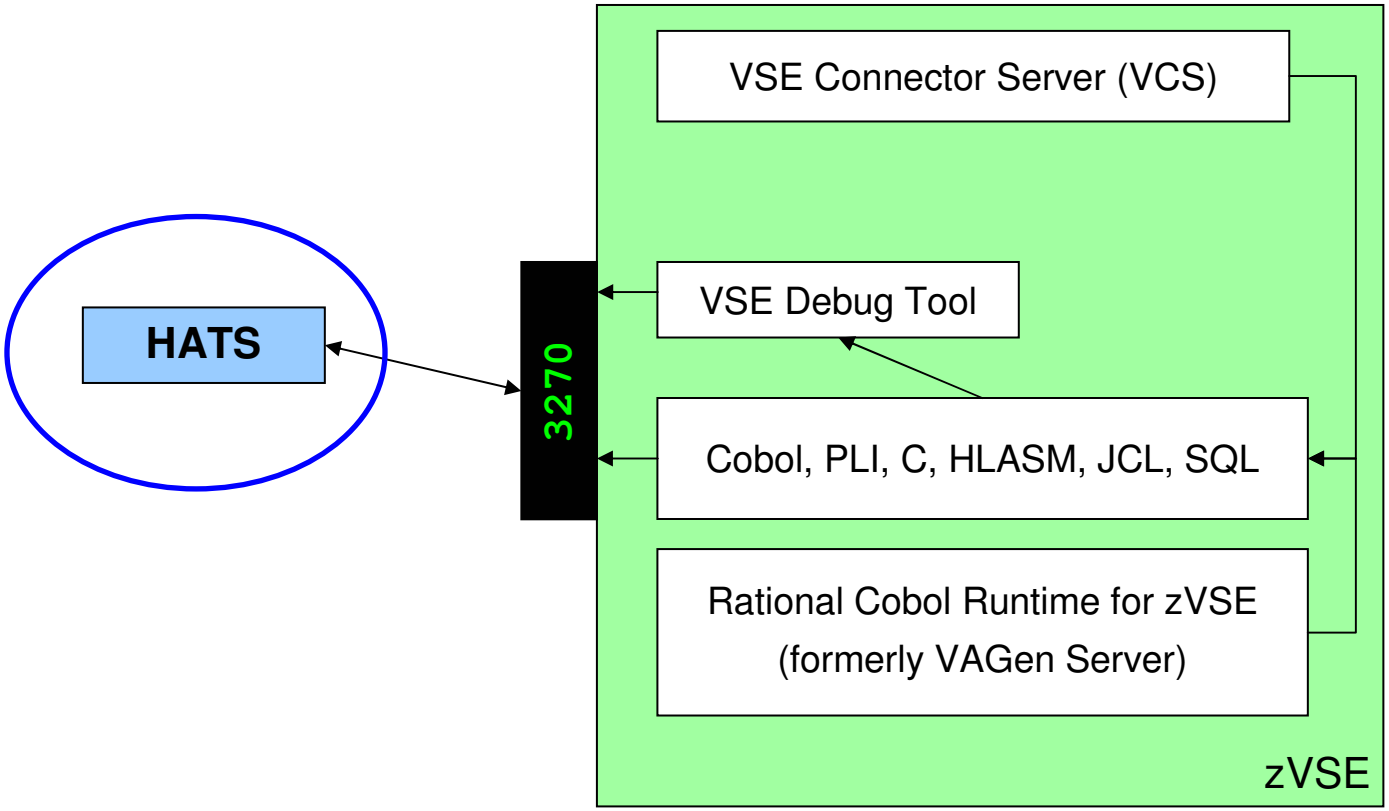

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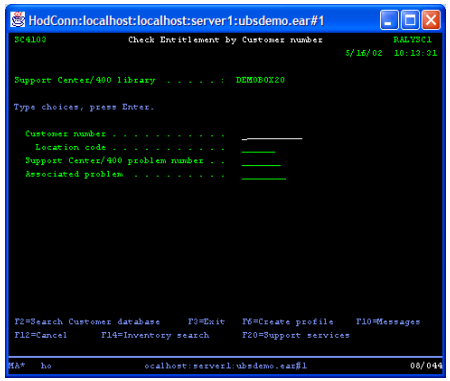
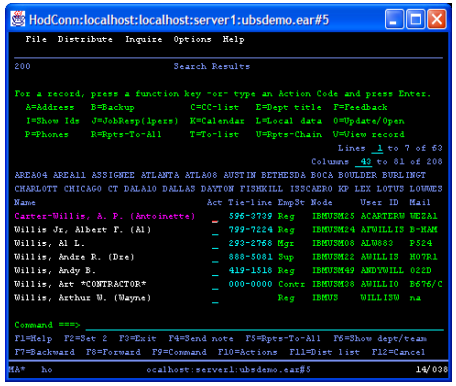
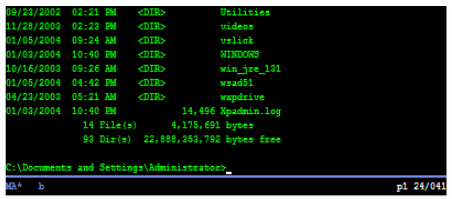
Web application for z/VSE applications with 3270 interface

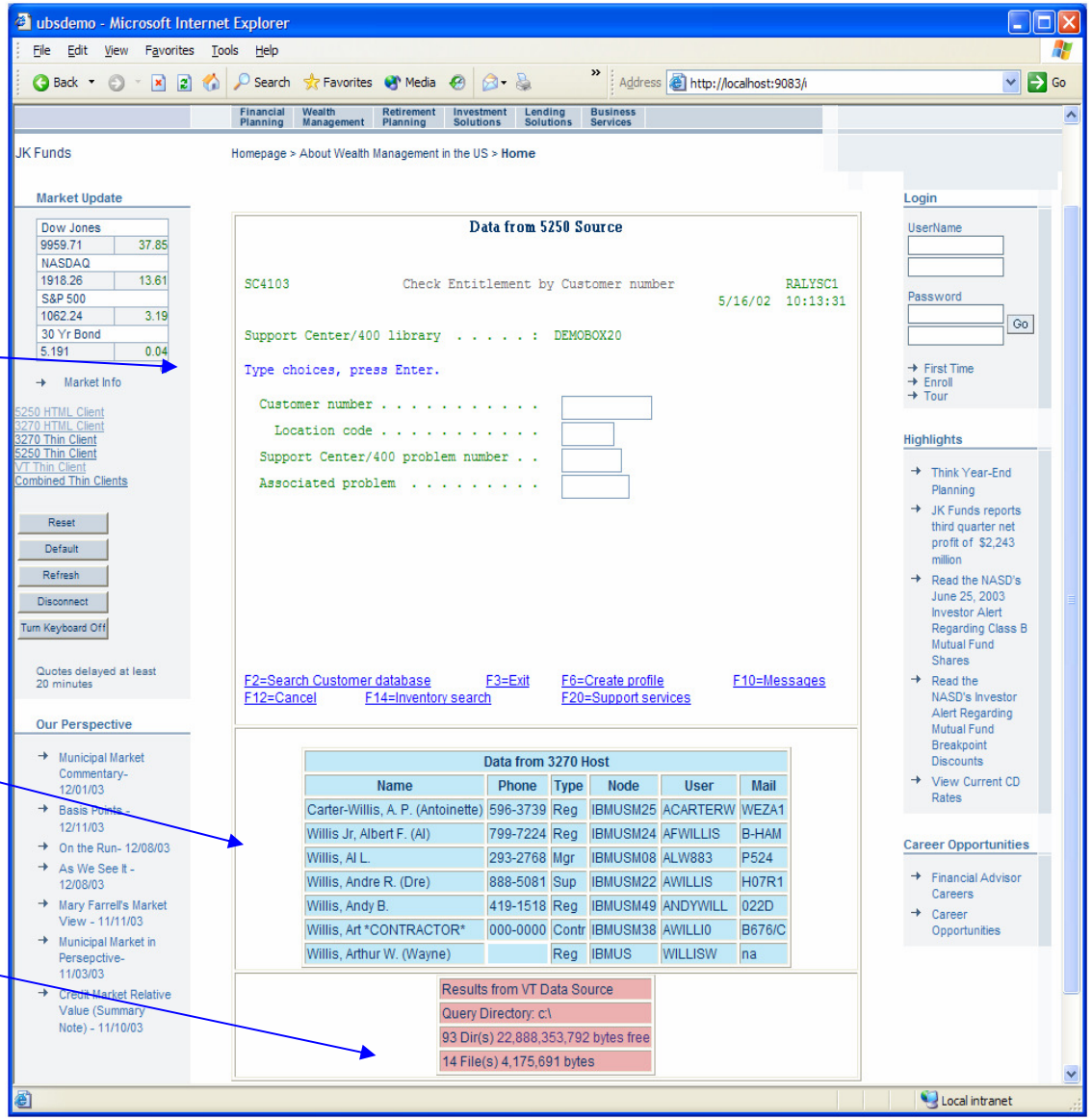
HATS Advantages:

- Combine / Integrate









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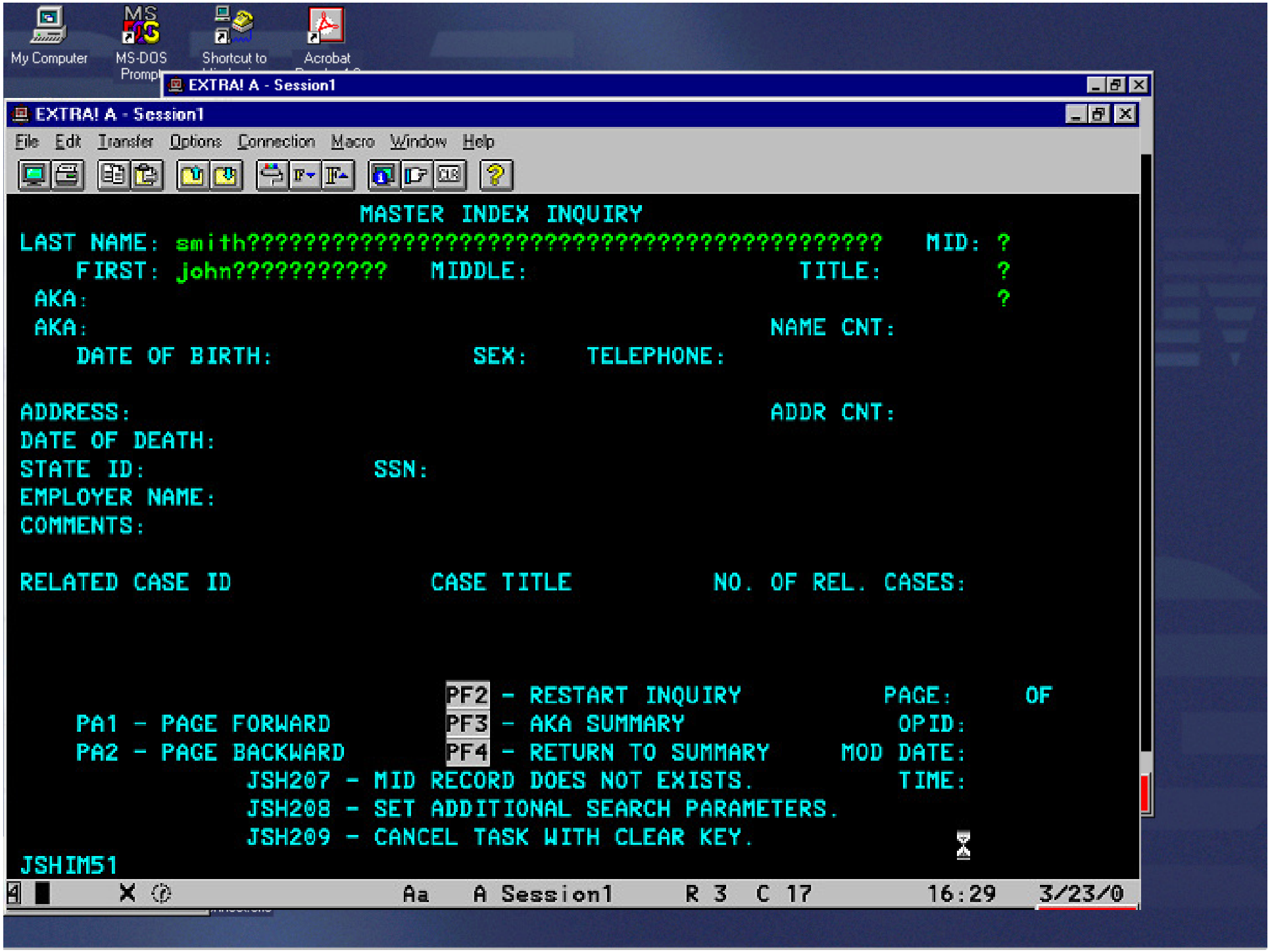
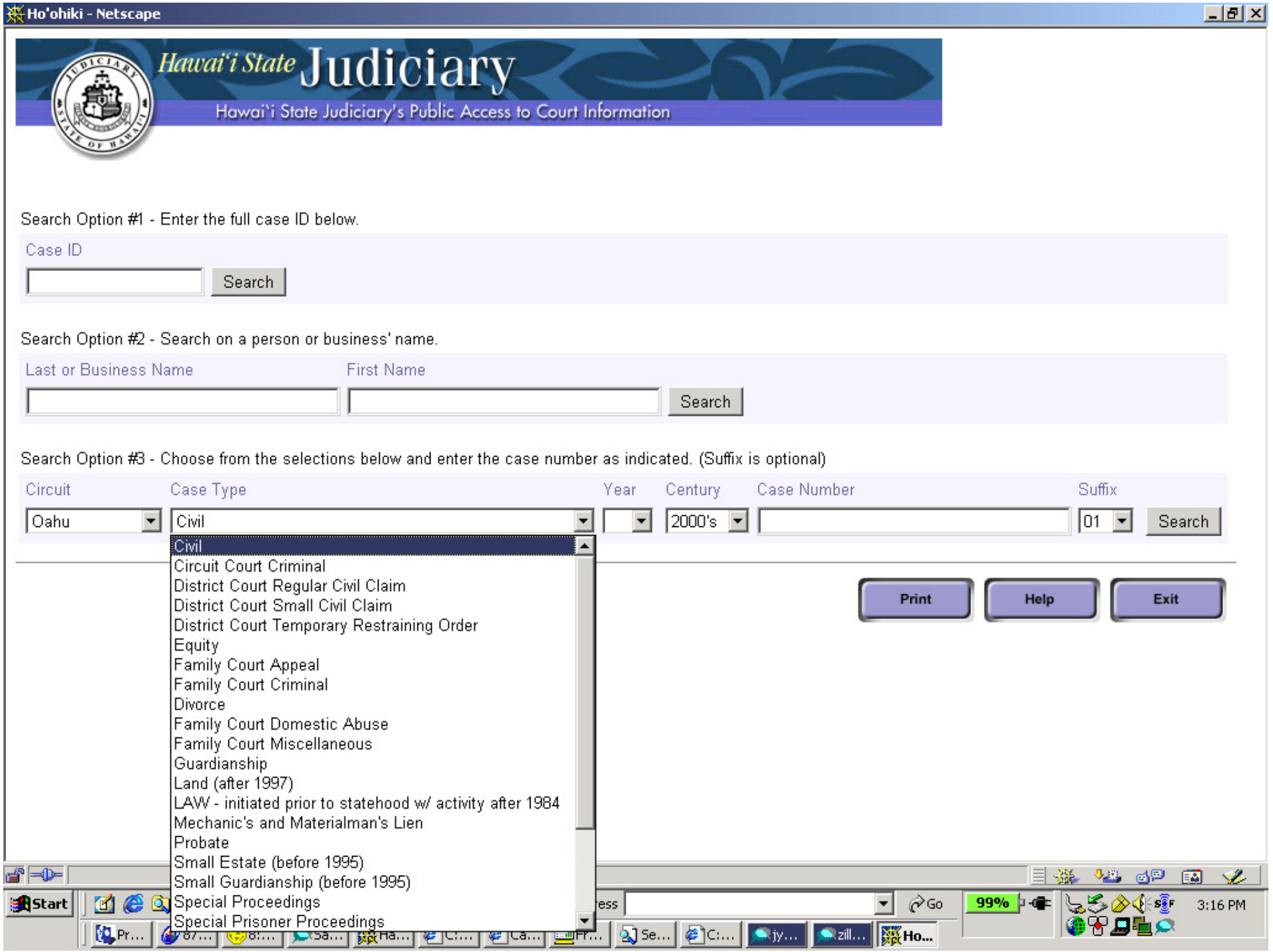

My Computer
MS-DOS
Shortcut to
Acrobat
EXTRA! A - Session1
EXTRA! A - Session1
File Edit Transfer Options Connection Macro Window Help
MASTER INDEX INQUIRY
LAST NAME: smith??? MID: ?
FIRST: john??????????? MIDDLE: TITLE: ?
AKA: ?
AKA: NAME CNT:
DATE OF BIRTH: SEX: TELEPHONE:
ADDRESS: ADDR CNT:
DATE OF DEATH:
STATE ID: SSN:
EMPLOYER NAME:
COMMENTS:
RELATED CASE ID CASE TITLE NO. OF REL. CASES:
PF2 - RESTART INQUIRY PAGE: OF
PA1 - PAGE FORWARD PF3 - AKA SUMMARY OPID:
PA2 - PAGE BACKWARD PF4 - RETURN TO SUMMARY MOD DATE:
JSH207 - MID RECORD DOES NOT EXISTS. TIME:
JSH208 - SET ADDITIONAL SEARCH PARAMETERS.
JSH209 - CANCEL TASK WITH CLEAR KEY.
JSHIM51
Aa A Session1 R 3 C 17 16:29 3/23/0


Ho'ohiki - Netscape
Hawai'i State Judiciary
Hawai'i State Judiciary's Public Access to Court Information
Search Option #1 - Enter the full case ID below.
Case ID
Search
Search Option #2 - Search on a person or business' name.
Last or Business Name
First Name
Search
Search Option #3 - Choose from the selections below and enter the case number as indicated. (Suffix is optional)
Circuit
Case Type
Year
Century
Case Number
Suffix
Oahu
Civil
2000's
01
Search
Civil
Circuit Court Criminal
District Court Regular Civil Claim
District Court Small Civil Claim
District Court Temporary Restraining Order
Equity
Family Court Appeal
Family Court Criminal
Divorce
Family Court Domestic Abuse
Family Court Miscellaneous
Guardianship
Land (after 1997)
LAW - initiated prior to statehood w/ activity after 1984
Mechanic's and Materialman's Lien
Probate
Small Estate (before 1995)
Small Guardianship (before 1995)
Special Proceedings
Special Prisoner Proceedings
Print
Help
Exit
Start
Go
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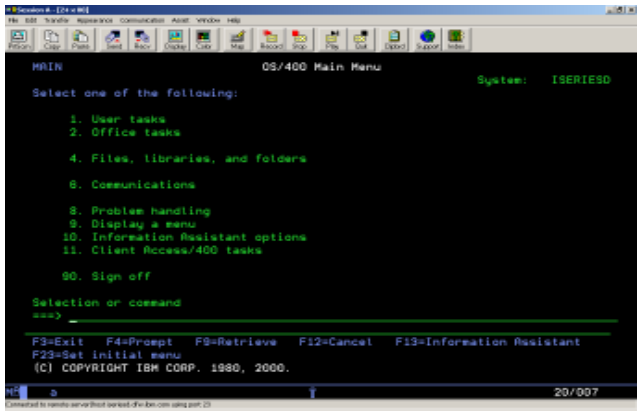
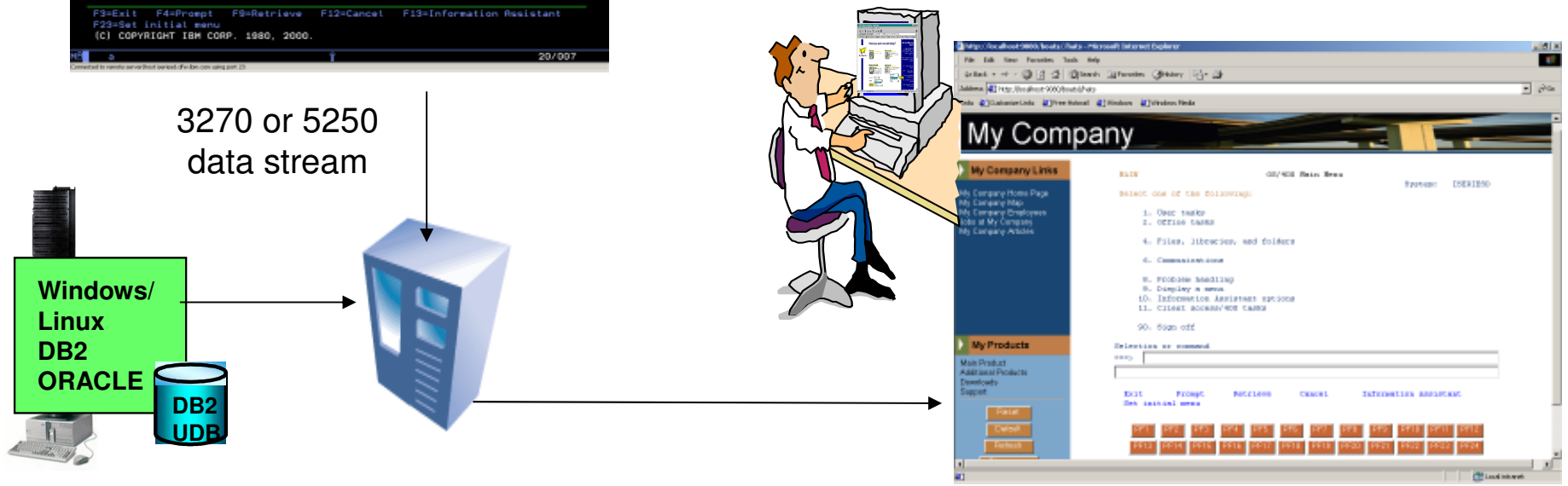
Application Integration with Host Access Transformation Services (HATS)



- Not invasive
- No software download to the client
- Web Services on the fly
- Integration with distributed applications



Screen transformation rules running on WebSphere Application Server

HTML in a Browser

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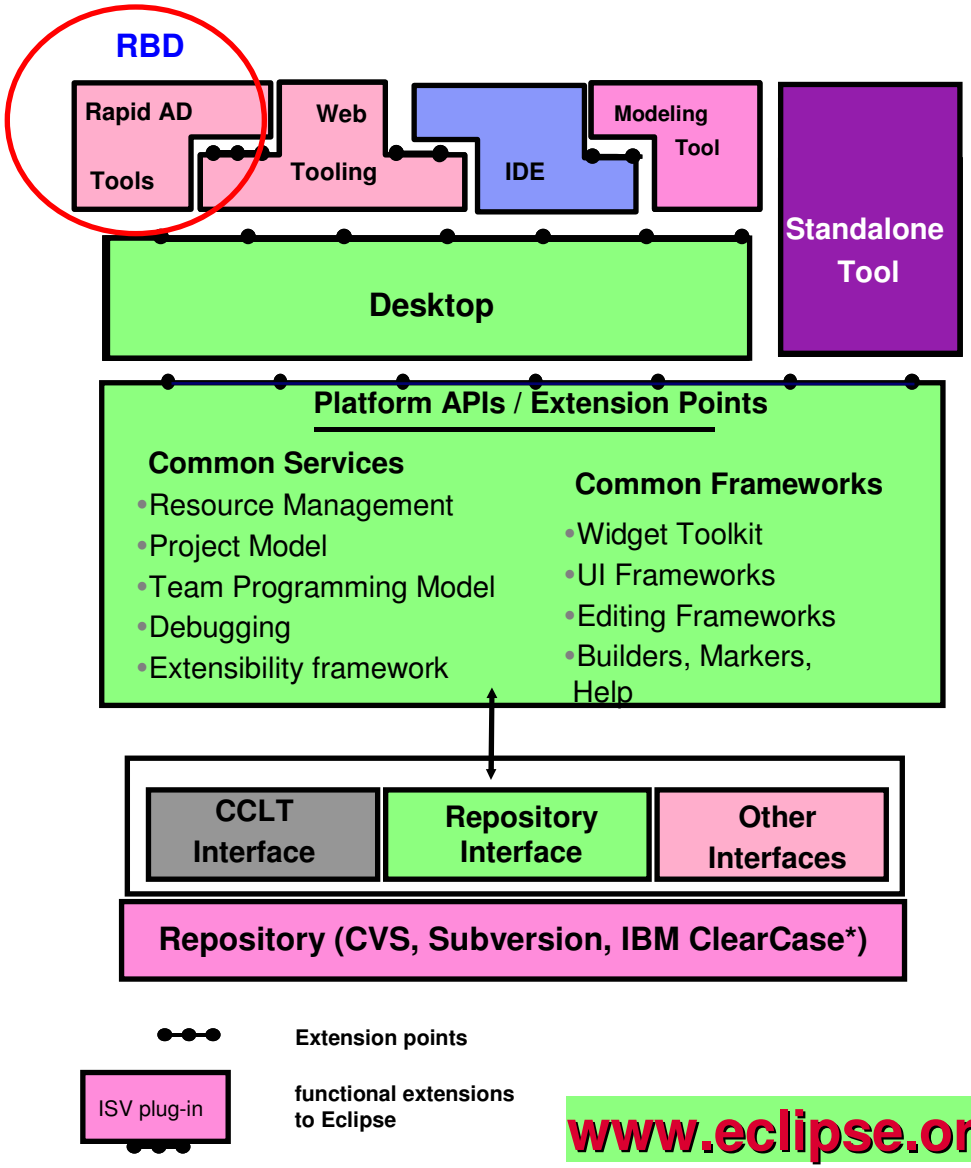
Eclipse – the open Standard for application development



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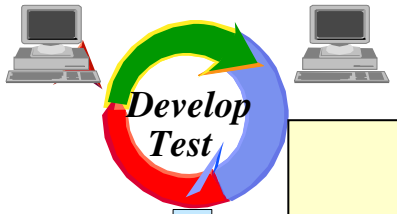
(2)Cross Platform Solution development
Approach with 4GL Language (EGL)

Rapid Development

Generation

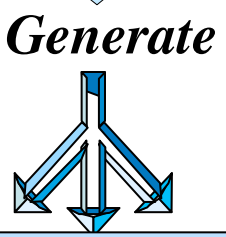
Execution

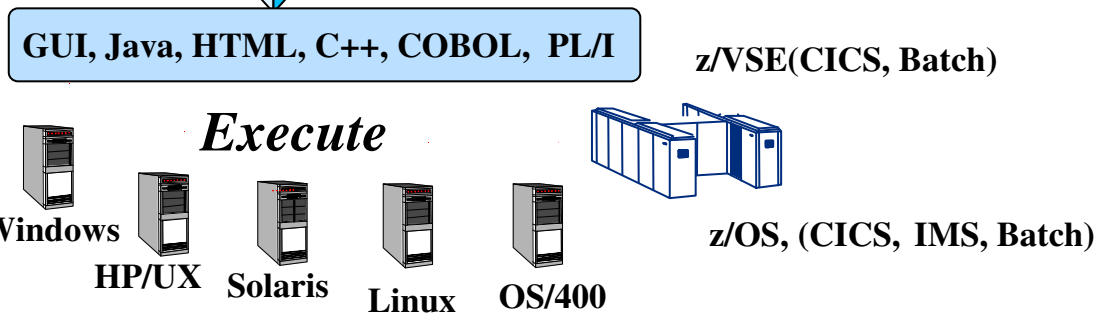


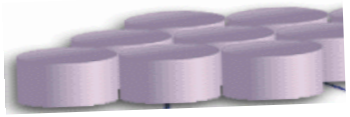
IBM 4GL history:

CSP (~1981) -> VAGen (~ 1994) -> EGL (~2003)

Migration-Options available ...







DB2 UDB VSAM ODBC
Oracle DLI, IMS/DB

- Multiple platforms
- Client /Server Applications
- Java applets/servlets or standalone
- Multiple database/file support apps

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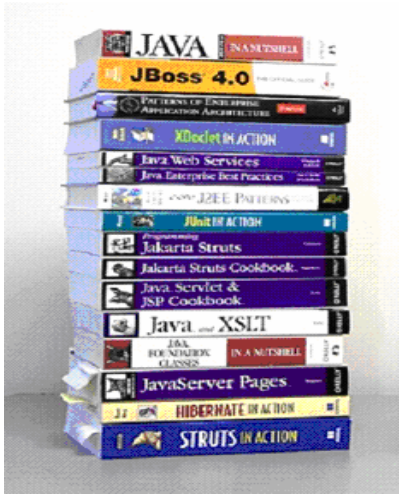
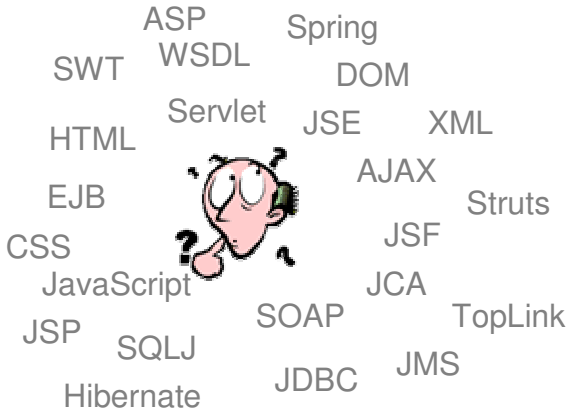
Why EGL?
Because building applications today is not easy





- Learn and master myriads of
  - programming languages and semantics
  - middleware interfaces
  - programming paradigms and styles
  - frameworks and libraries
- Constantly emerging new technologies

- Code at a more abstract and simpler level
- Easy to learn, modern and comprehensive language
- Keeps up with emerging technologies
- Inter-operates seamlessly with legacy

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The power of the Language

Simple and familiar…. yet robust and complete

- Rich data types
  - Primitive
    - Simple (int, string, boolean, etc.)
    - Complex (any, arrays, dynamic arrays, dictionaries, array dictionaries, etc.)
  - User defined Data Parts
- Keywords
  - Case, if-then-else, while, for loop, for loop cycling through a database result set, etc.
- High power language capabilities
  - Automated Casting (e.g. using AS operator)
  - Mixing data types in assignments and expressions
  - Exception handling
- Rich libraries of built-in functions
  - Math, string, date/time, system, i5/OS objects APIs
- Robust integration with existing investment or access to low level APIs
  - Call RPG, COBOL, C, etc.
  - Full Java interoperability
    - Invoke Java from EGL (map Java classes with EGL External Types)
    - Invoke EGL from Java

hello.egl

```
1  // Hello World basic program
2
3  program hello type BasicProgram
4
5      // Data Declarations
6      name string = "World";
7
8      function main()
9          writeStdOut("Hello " +name);
10     end
11
12 end
13
```


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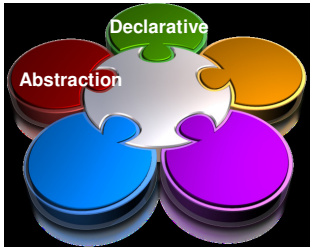
The power of Abstractions and Declarative



- Data access:
  - "Records" provide access to:
    - SQL, Indexed, Relative, Serial, DL/I, Service data, Message Queues
  - Common Verbs for data access (**Get, Add, Replace, Delete**).
  - Allows complete access to SQL statement if needed.
  - Common Error Handling.

*sampleProgram.egl

```
function allLoans()
    loans LoanRec[];
    get loans;
end
```

- Remote Invocation
  - Call COBOL, RPG, C, Java.
  - Linkage information separated from code.
  - Data mapping, protocol invocation all resolved at runtime, NO code necessary

*sampleProgram.egl

```
function callHelloWorldOniSeries()
    salutation char(30);
    call helloworld salutation;
end
```

- User Interface:
  - EGL "handlers" hide complexities of
    - Web (JSF) UI
    - Reports (BIRT)
    - Portlets
    - Rich Web (Ajax)

*sampleProgram.egl

```
DataItem SSN Password char(9) {
    validatorFunction = "ValidateSSN()",
    displayUse = secret,
    pattern = "XXX-XX-XXXX",
    displayName = "Social Security No",
    inputRequired = yes}
end
```

Validation/Editing Rules:

- Via properties in "Data Items.
- Define formatting & validation rules in a common place.
- Reuse data items for Records, screens, web pages, reports.

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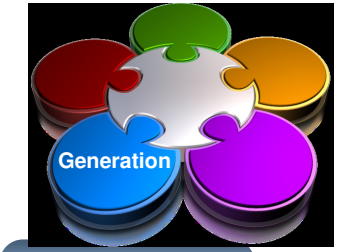
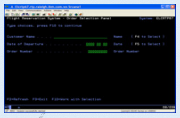
Respond to Broadest Application Needs



Batch Processes

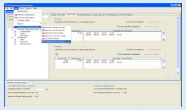
Text UI



Portals

Web

Rich UI



Reports

Services

Program

Control Logic

User Interface

Business Logic

Service/Interface

Enterprise Connection

Write application and control logic with EGL

Encapsulate existing or create new resources

- RPG
- COBOL
- C, C++
- Java

DB2 UDB
SQL Server
Oracle
Derby
Informix
DL/I
VSAM
other…

Browser

- IE
- Firefox
- Safari

LUW

- WebSphere
- Tomcat
- Native

System z

- WebSphere
- USS, Linux
- Batch, CICS (z/OS and zVSE)
- IMS

System i

- WebSphere
- Native i5OS
- Native i5OS

Java
COBOL
JavaScript

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Modern development environment for z/VSE with RBD - IBM Rational Business Developer

- Since December 2008, continued 4GL support for z/VSE is available:

1. z/VSE host component IBM Rational COBOL Runtime for z/VSE (V7.5) (replaces the Visual Age Generator Server for VSE)

2. PC tool for development: IBM Rational Business Developer (RBD V7.5.1) and the associated components
   - IBM Rational Business Developer Extension for VSE V7.5.1
     - COBOL Code generation for z/VSE
     - Generation for System z (z/OS)

- J2C-Tools (Java EE Connector)

- IBM CICS Transaction Gateway (optional – for CICS access only)

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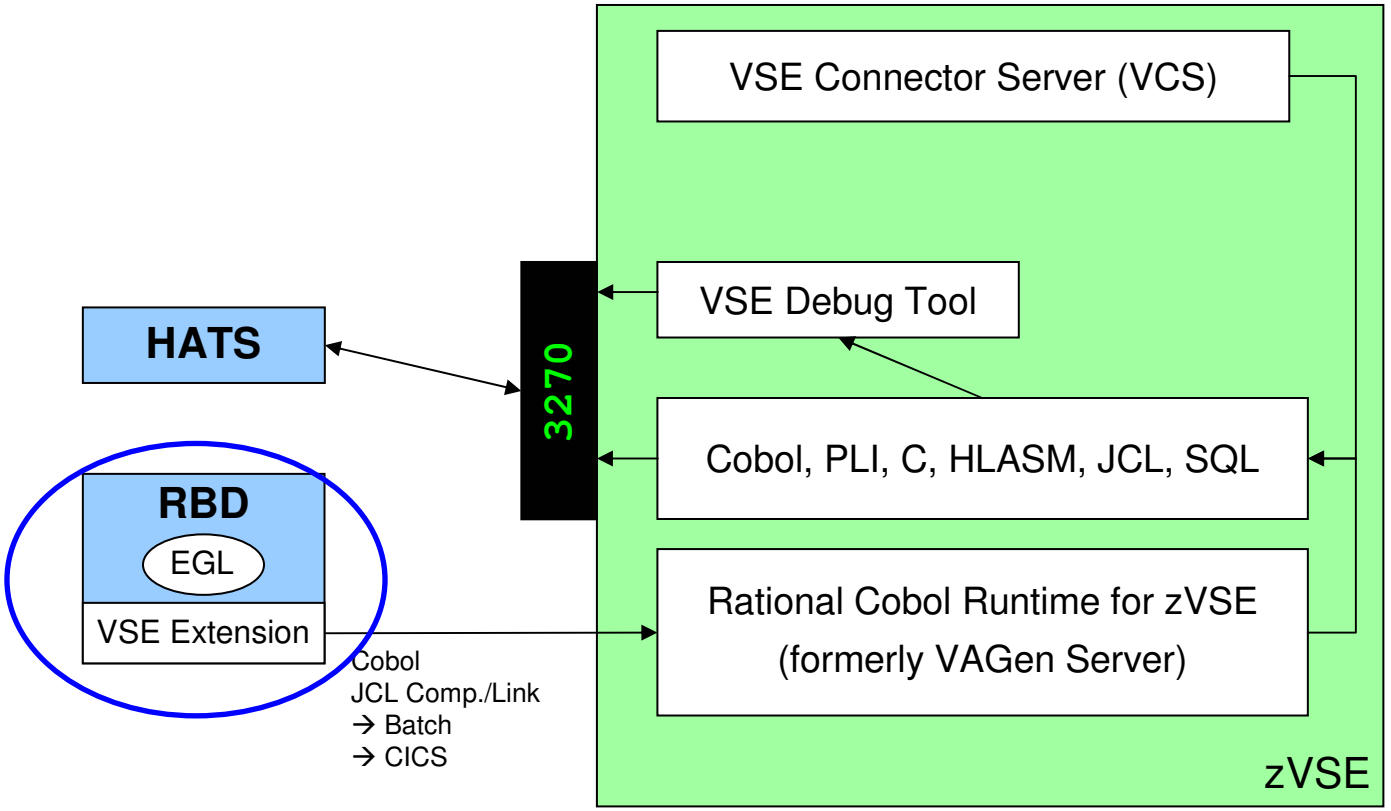

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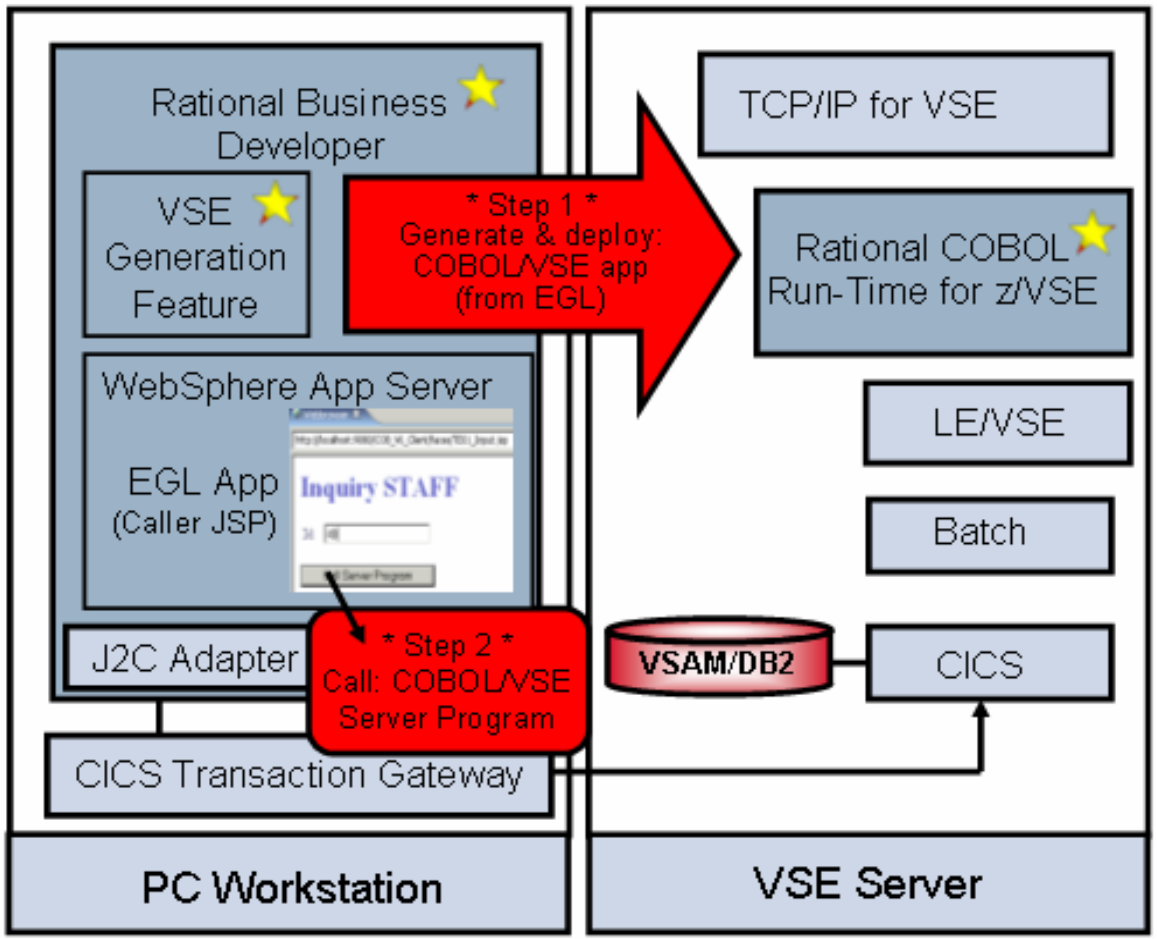
RBD – functional view
(Generate COBOL applications on z/VSE using EGL)



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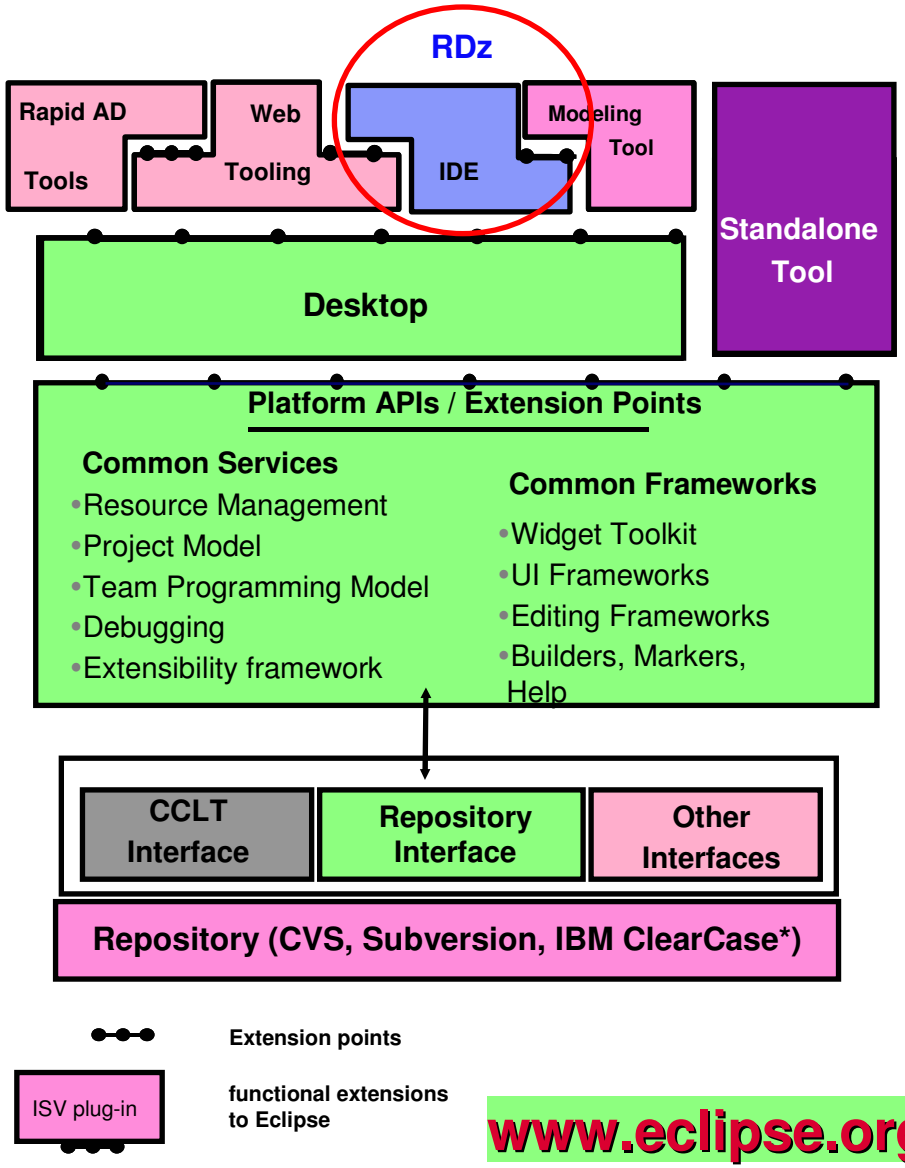
Eclipse – the open Standard for application development



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Analyze applications with graphical correlations

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- develop new front-ends to 3270 appls.

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- follow-on to Visual Age Generator

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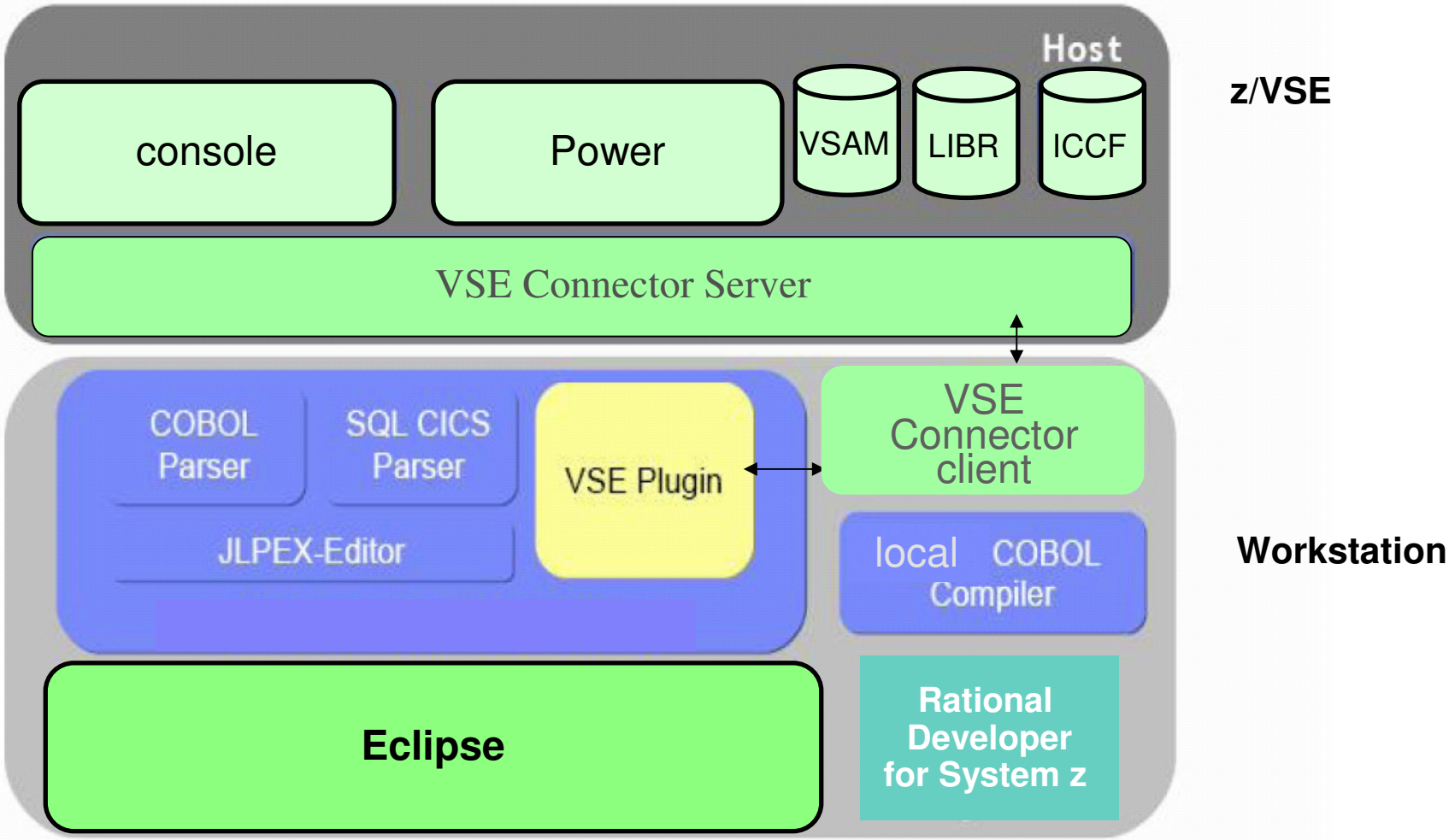
The IBM Development environment for the enterprise

Rational Developer for System z (RDz 7.5)
with z/VSE Development Plug-in for RDz 7.5



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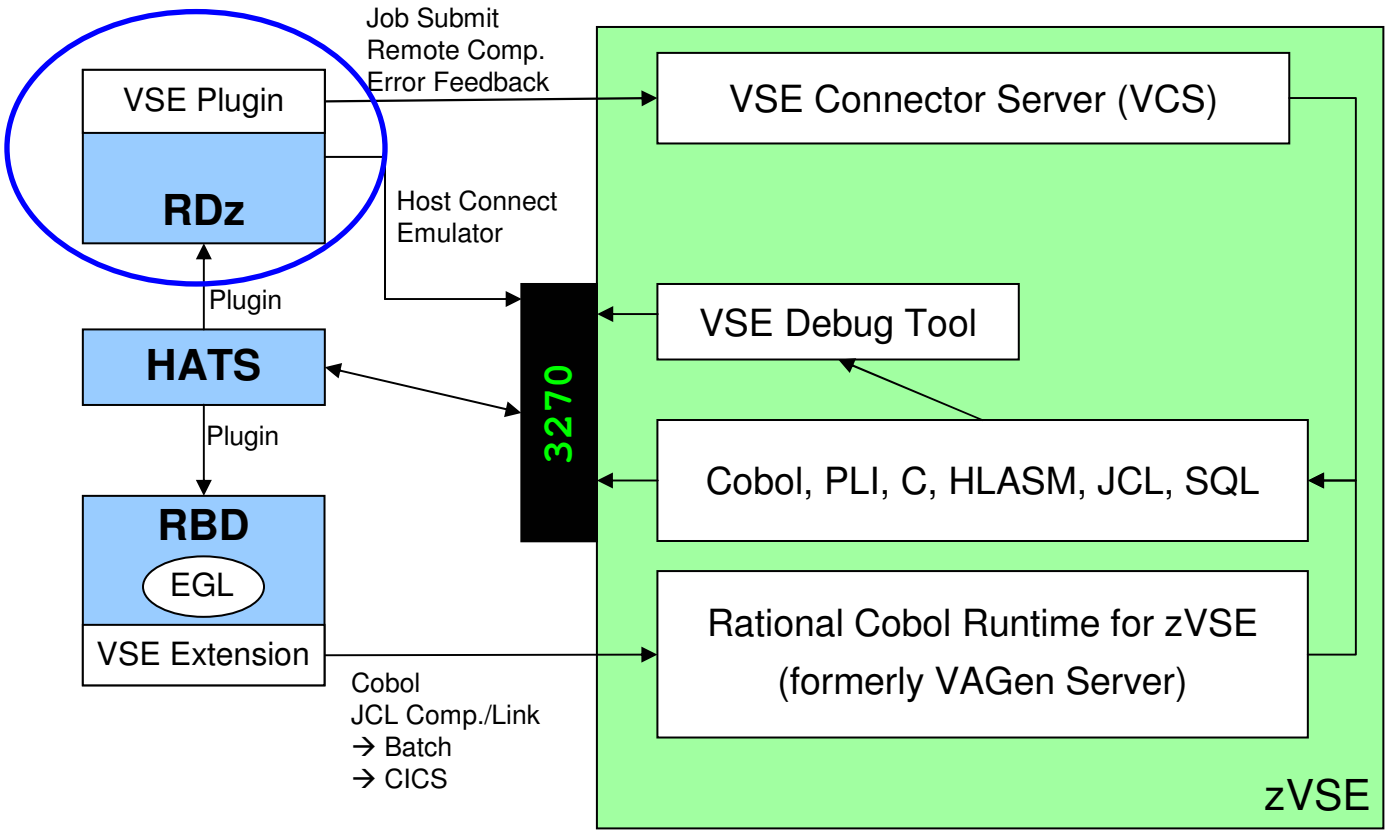

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RDz functions for z/VSE and z/OS development

- Enhanced Eclipse tools with mainframe development functions
  - special editor functions for mainframe languages
  - local COBOL compiler
  - support for COBOL, ASM, PL/I, C
  - editor for CICS BMS maps
  - support for SQL generation
  - functions for remote processing and mainframe deployment
- Integrated test environment
  - full functional test within the development environment
  - debug possibility via z/VSE emulation window

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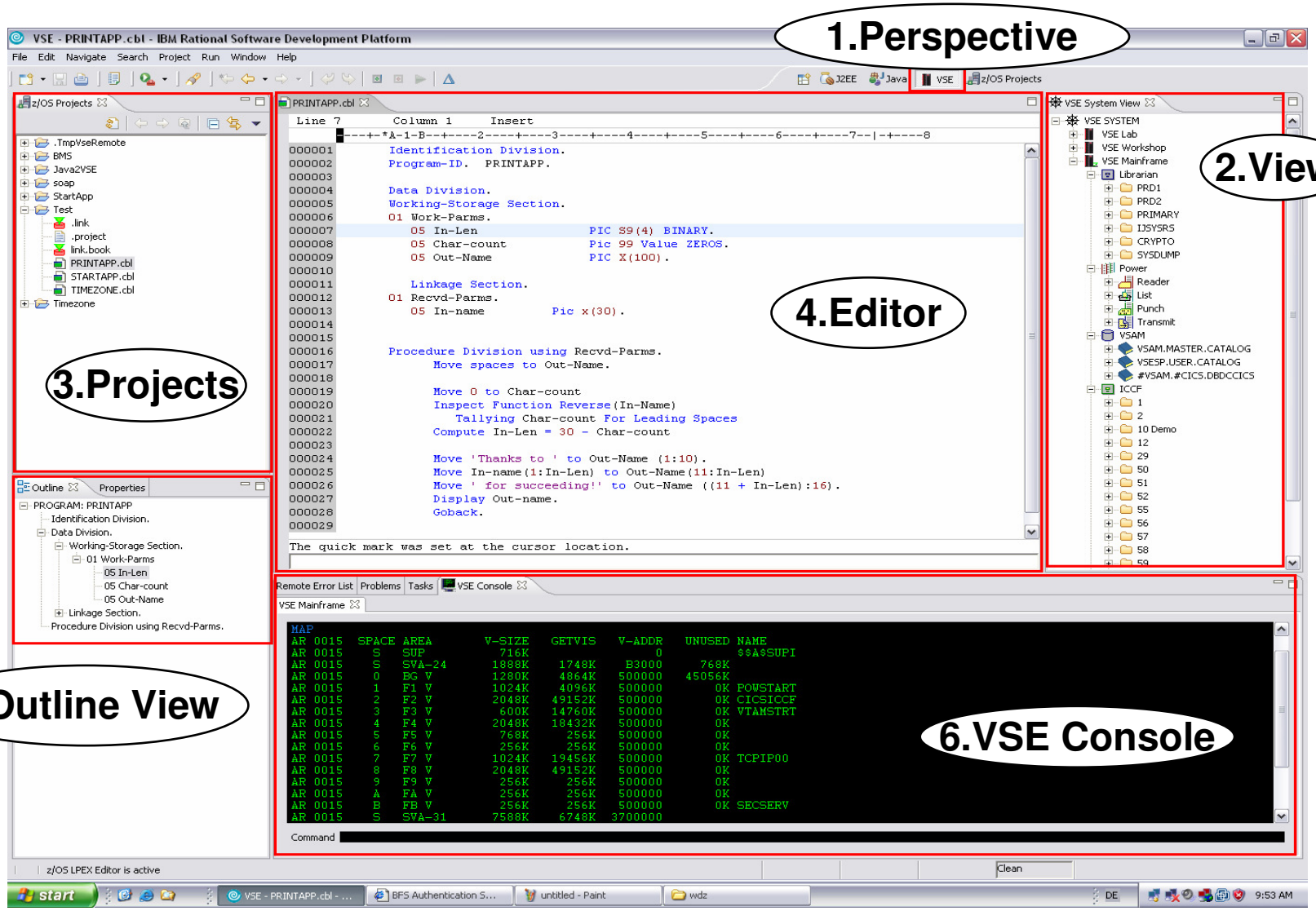
Rational Developer (RDz) in z/VSE perspective



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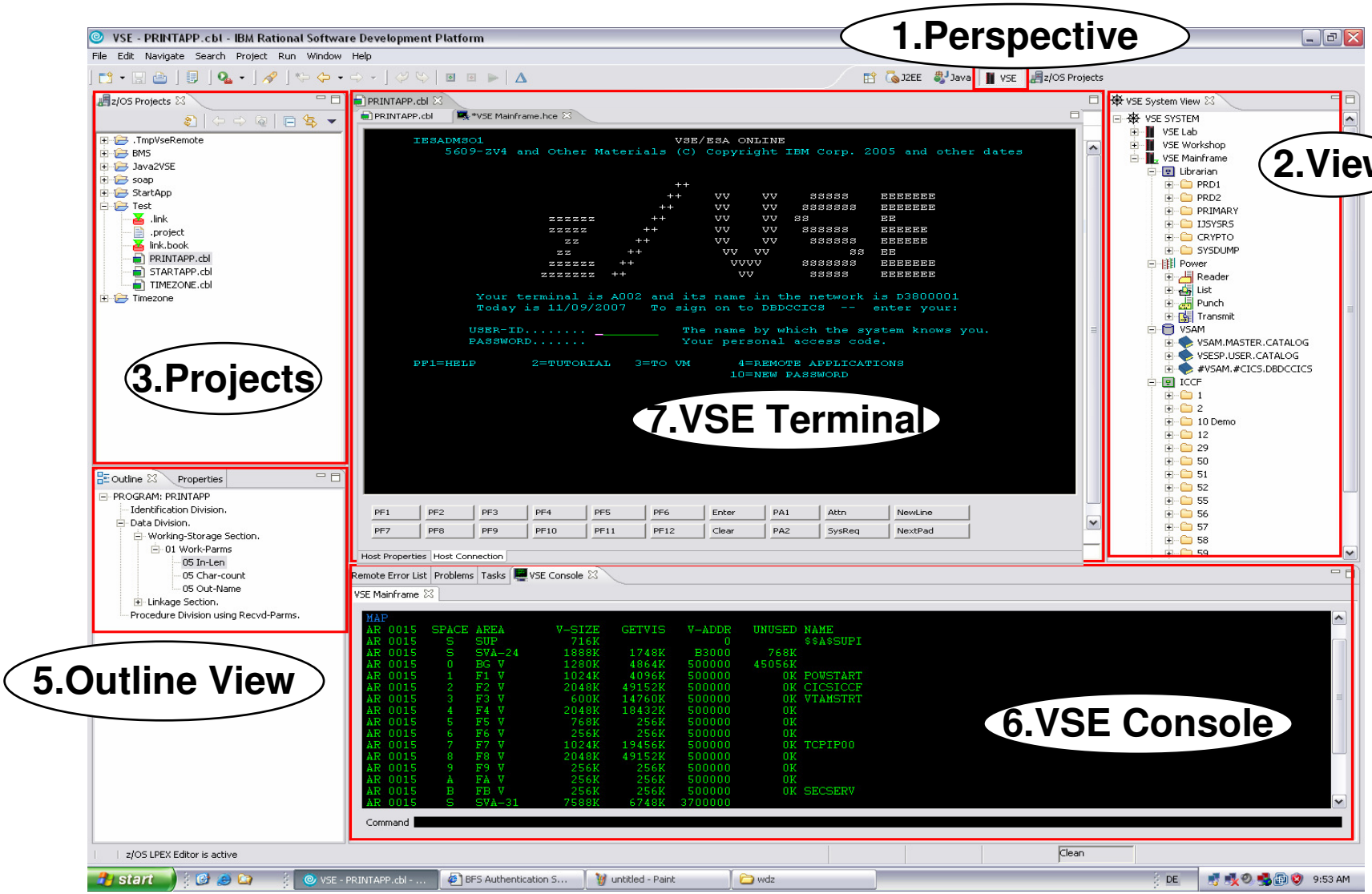
Rational Developer (RDz) in z/VSE perspective



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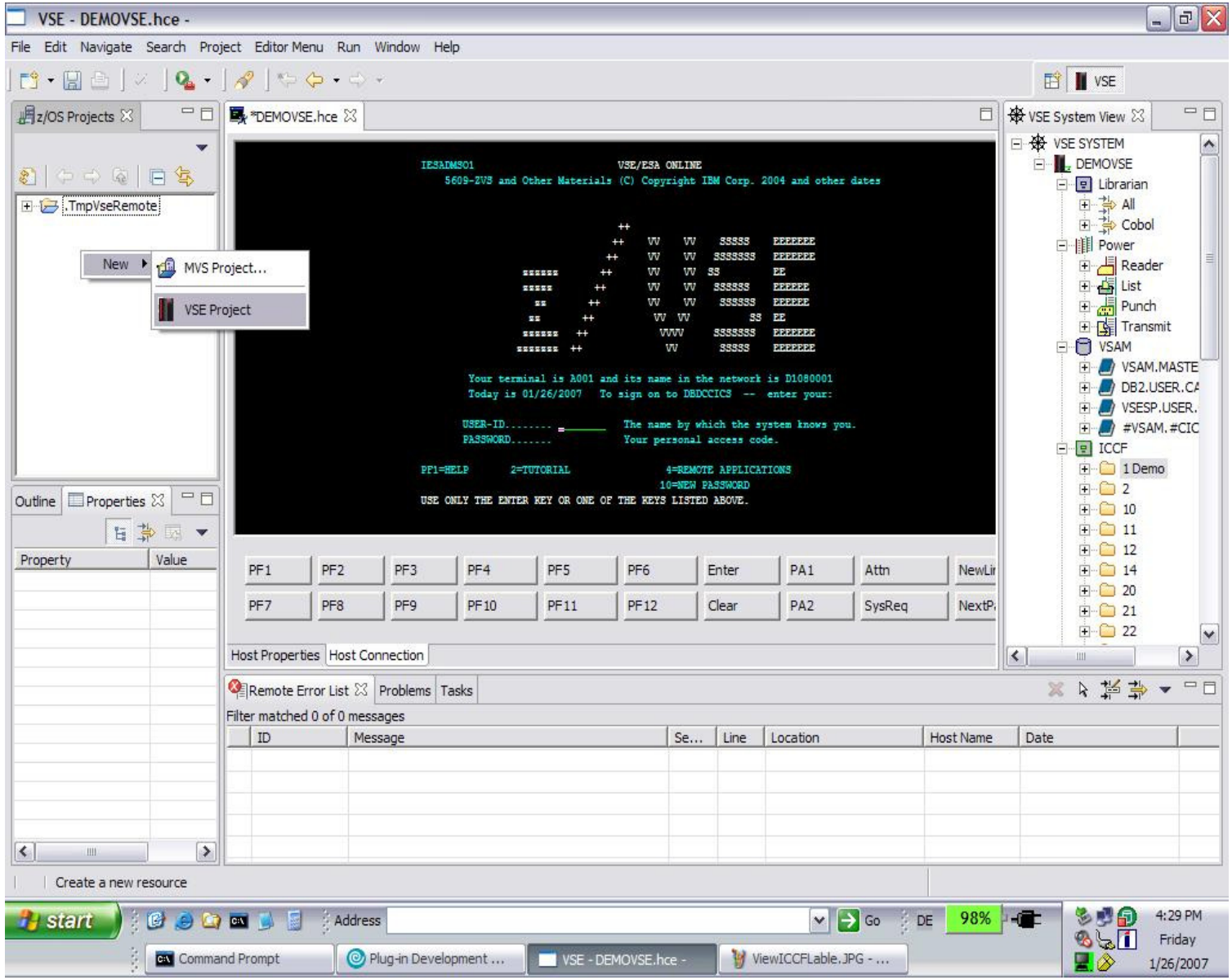
Develop a z/VSE project



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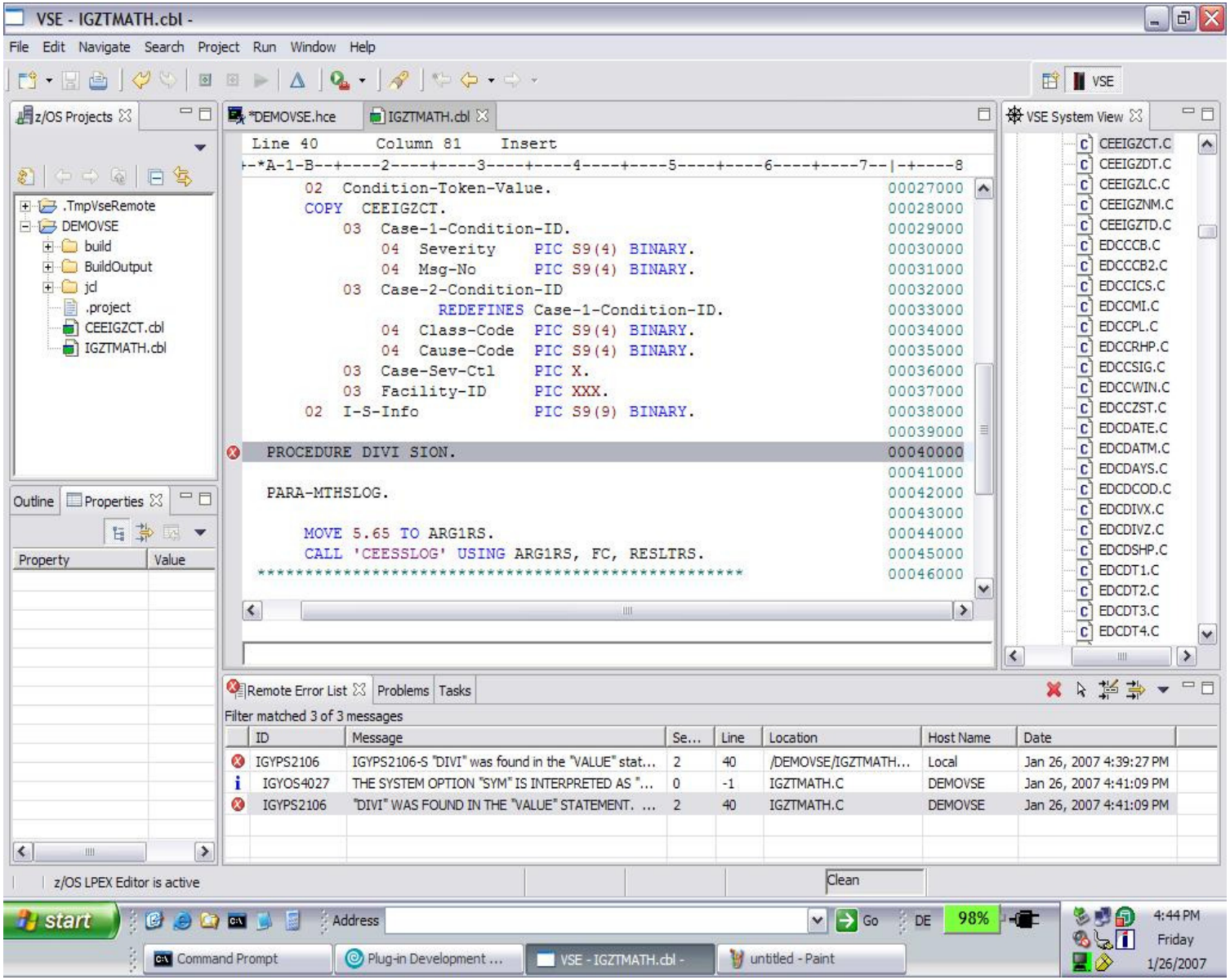
COBOL Syntax checking and highlighting



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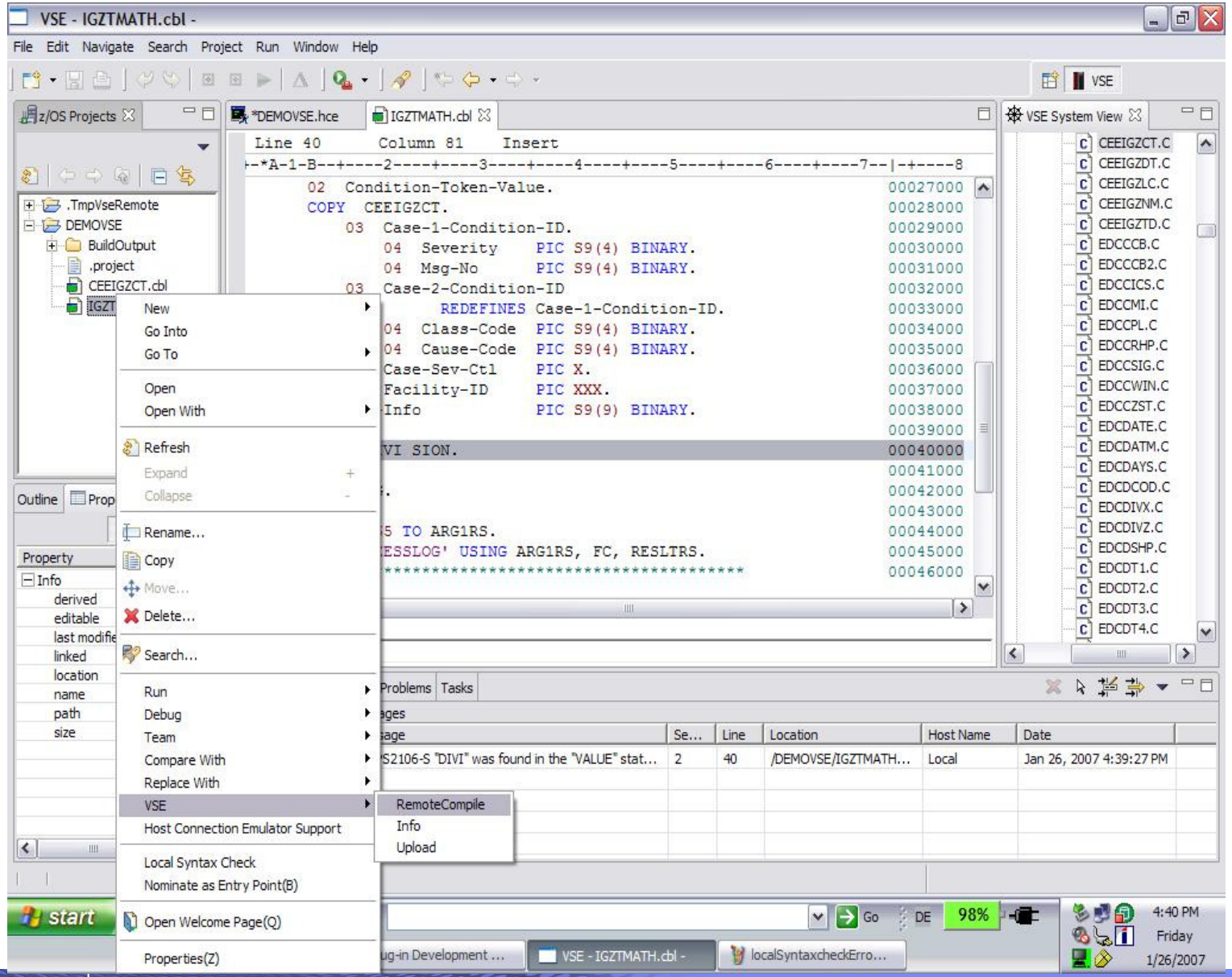
z/VSE local and remote Compile



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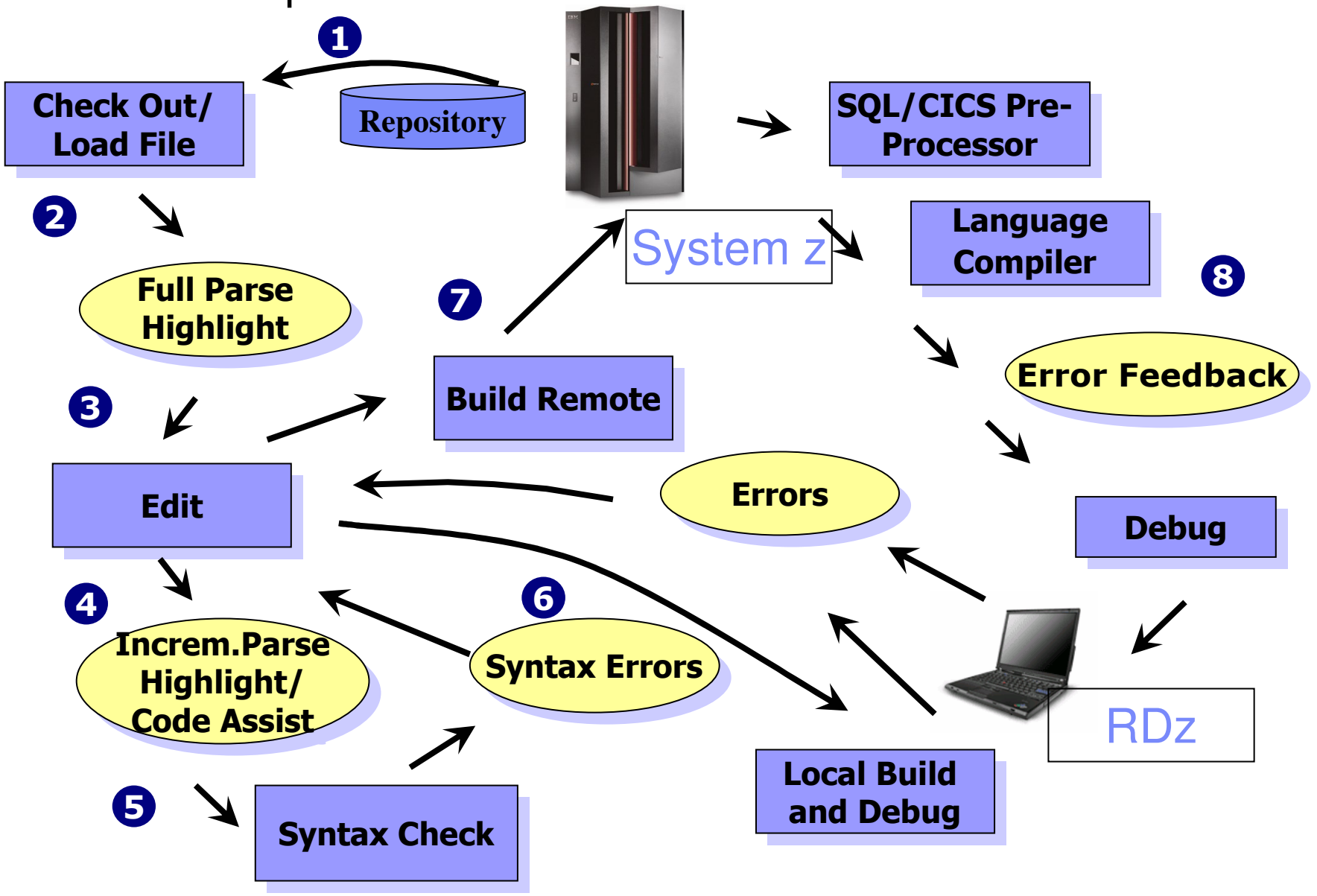
RDz Development Process



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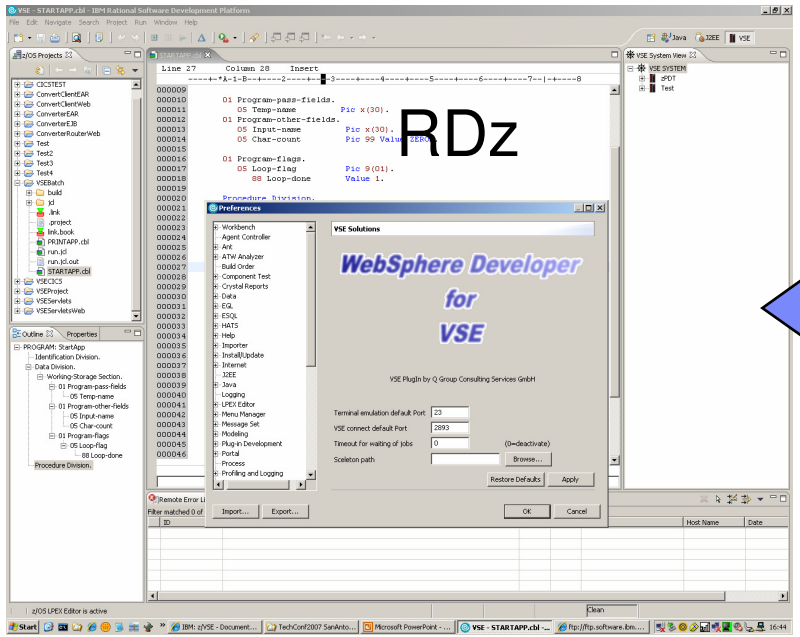
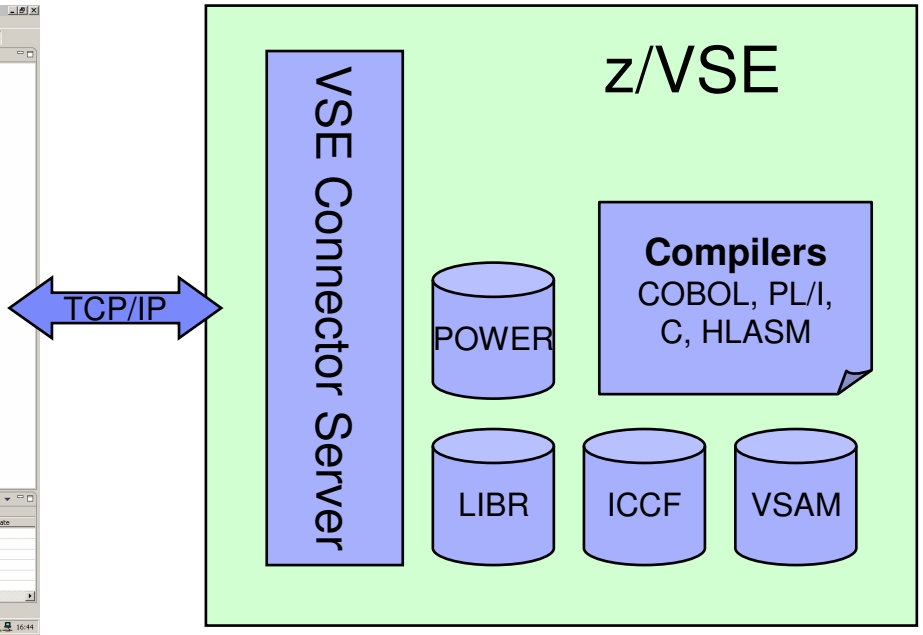
(1) Development of COBOL applications in RDz





- Development of COBOL
  - batch and CICS application
  - Source code editing/checking
  - Access to z/VSE within the tool (console and 3270 access)
  - Compile, Link and error feedback from z/VSE
- Additional supported languages: PL/I, ASM, C, BSM Maps

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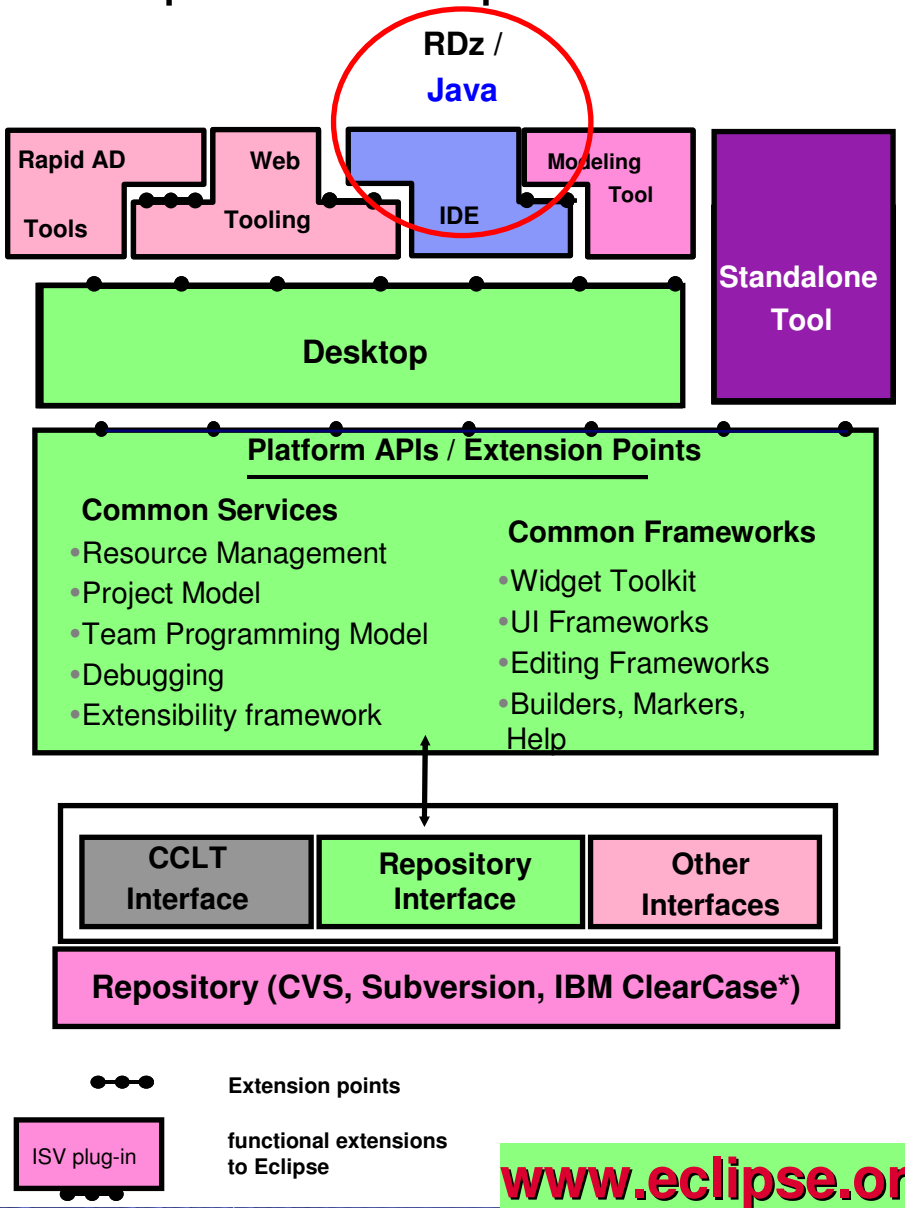
Eclipse – the open Standard for application development



www.eclipse.org

What is Eclipse about:

- Open source development framework
  - with modern Editors
  - syntax help & check
  - semantic check
- Centralized source code maintenance
  - entire source code in central Repository
  - cross platform project administration
- Versioning software interface
  - CVS, Subversion, or IBM ClearCase
  - automatic Workgroup-control
    - i.e. development groups, system group
- Open for ISVs development Plug-Ins

  - Integrated Development Environments (IDE)

    - for System z (WDz, RDz)
    - for Java, COBOL, PL/I, ASM,C

  - Application analysis and optimization

    - Analyze the applications and workflows with graphical correlations

  - IBM HATS Development Plug-In

    - develop new front-ends to 3270 appls.

  - IBM EGL development Plug-In for z/VSE

    - follow-on to Visual Age Generator

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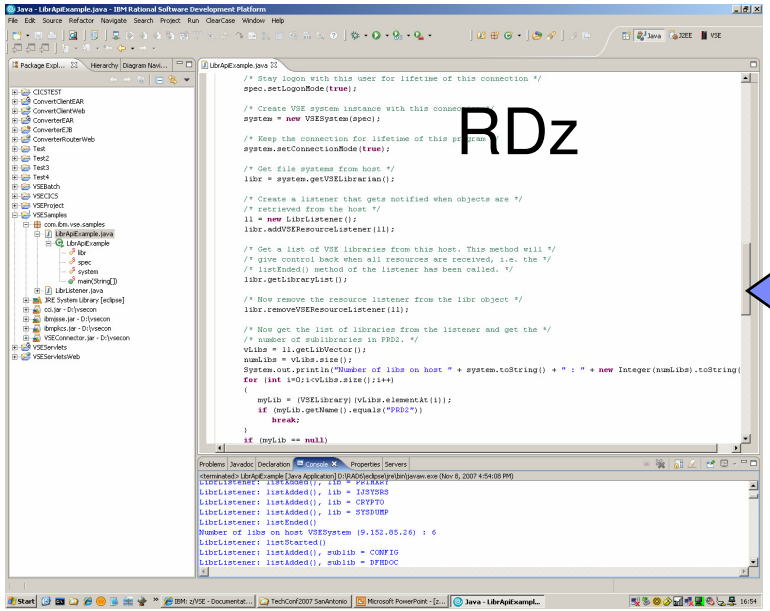
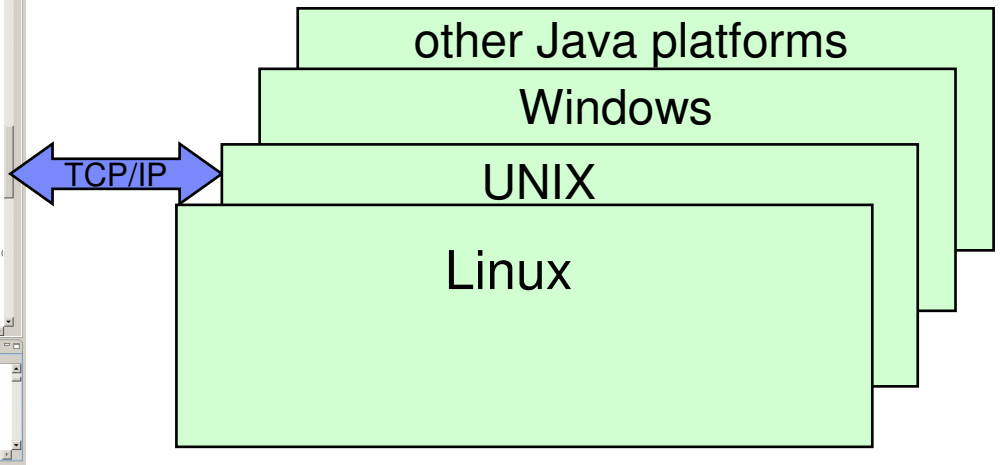
(3) Development of Java applications in RDz





- Development of native Java applications
  - for systems like UNIX, Linux, Windows or other Java platforms
  - Edit, compile and Build
  - Test the Java application in the integrated WebSphere test environment and access z/VSE resources
  - **additional supported languages are C, C++, REXX**
- Development of Java applications to access z/VSE resources
  - use of z/VSE Java-Based Connectors
  - develop SOA components to access z/VSE services

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Conclusion: Development for all platforms with one **tool set**

- A modern tool set to support z/VSE development and maintenance
  - modern editor for enhanced productivity
  - tools to analyse and optimize existent applications and workflow
- Common framework for enterprise development
  - standard for all developers
    - example: z/VSE with COBOL, Linux on System z with Java
  - easy skill transfer
- Open source framework
  - commonly thought in schools and universities
  - smooth introduction of new developers to the mainframe

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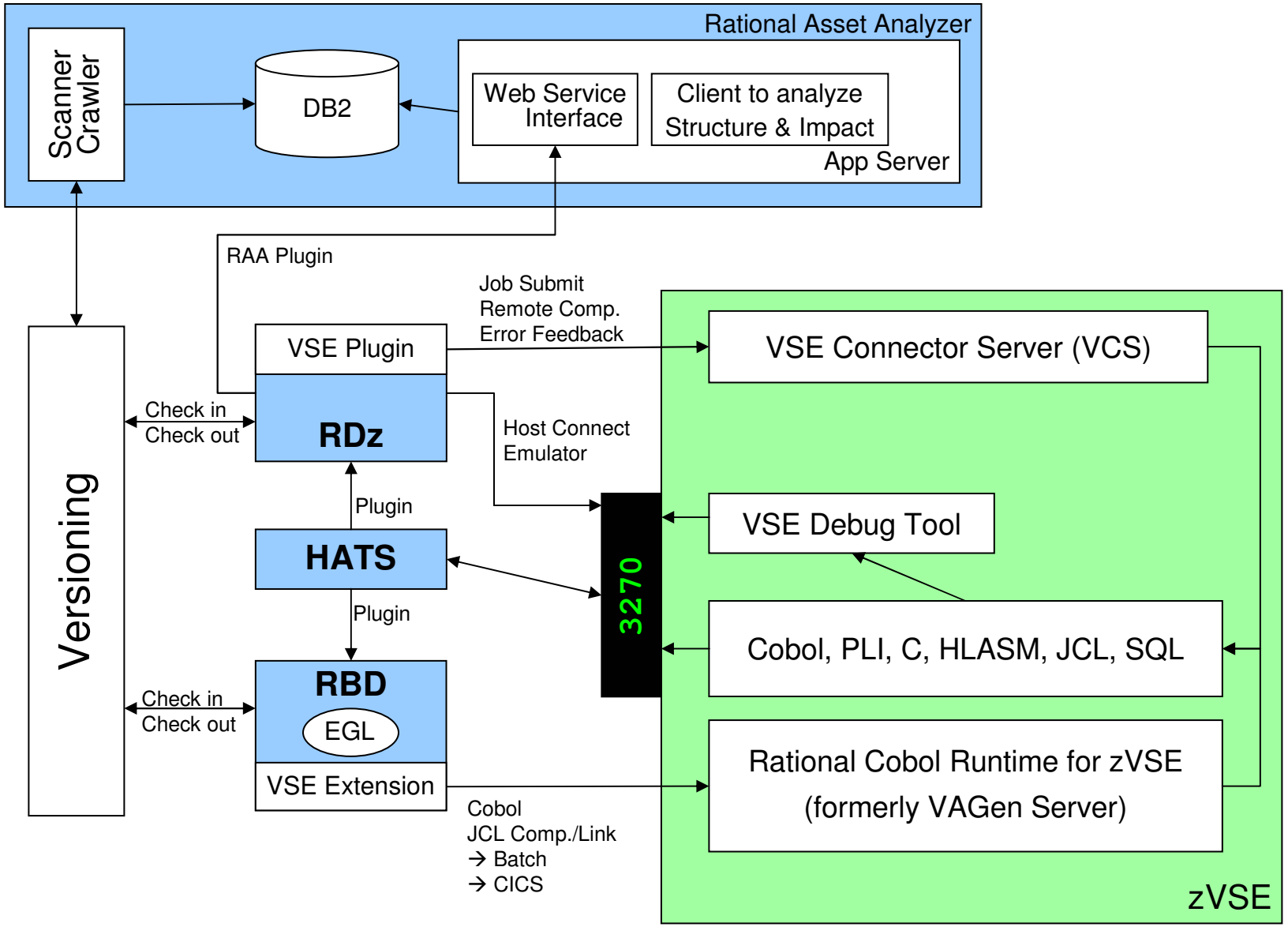

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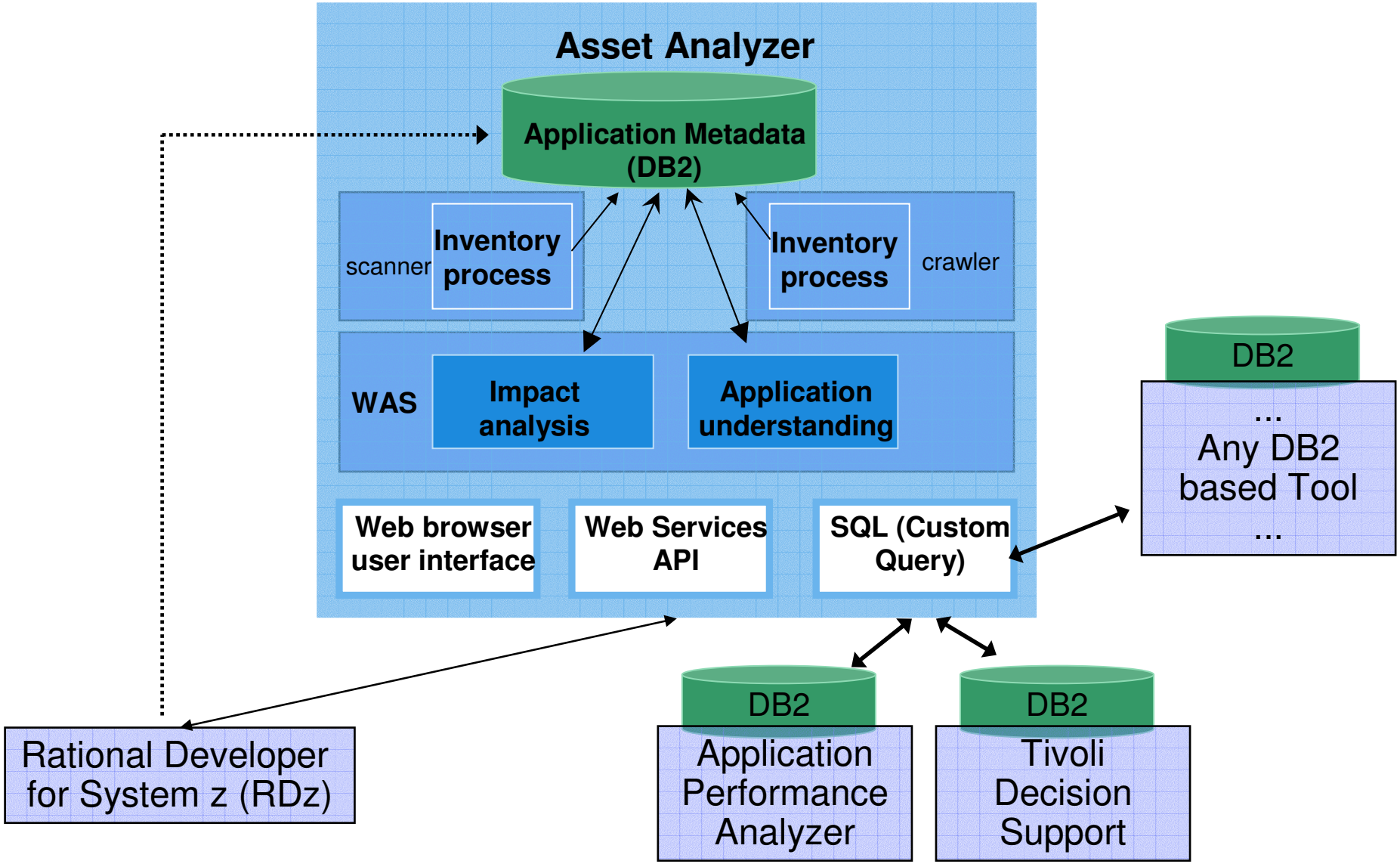
Asset Analyzer



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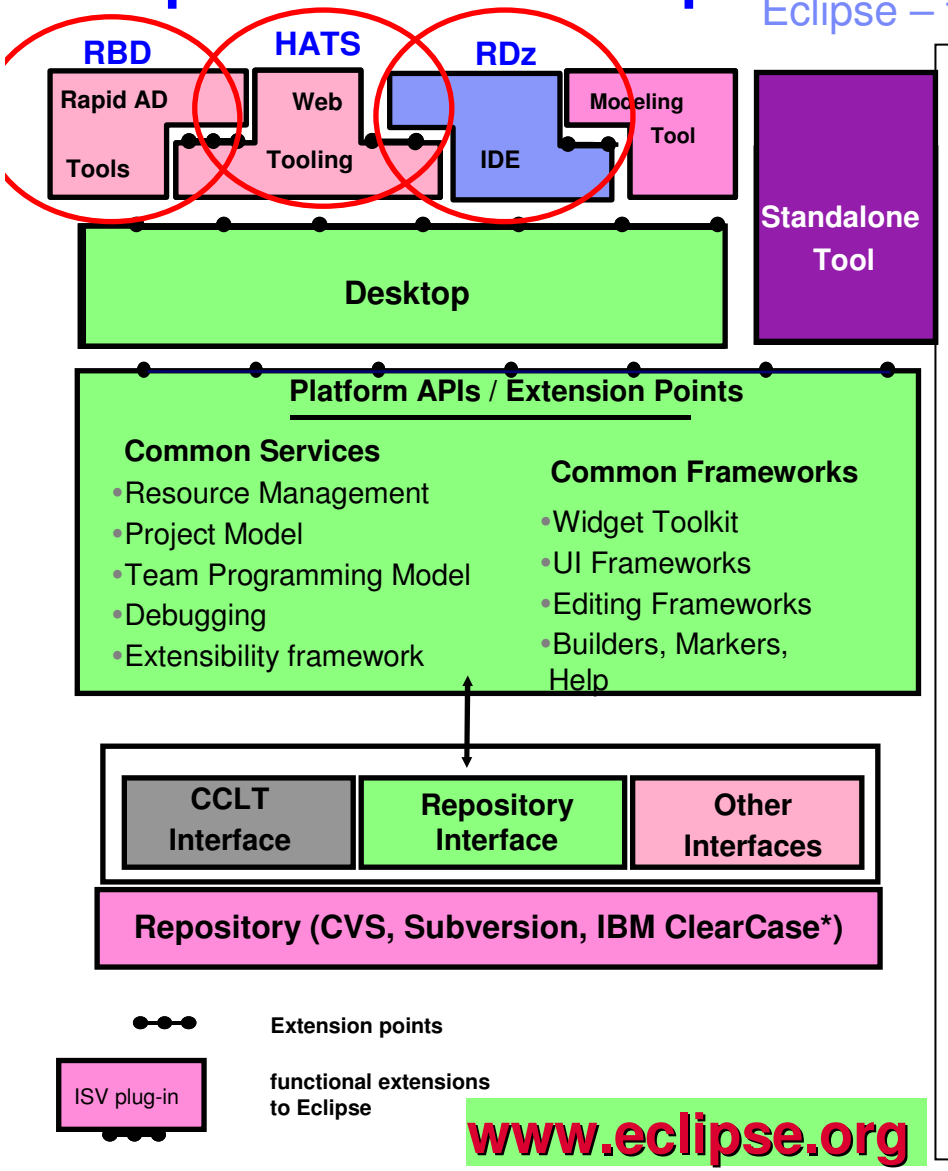
Eclipse based Development Environments for z/VSE

Eclipse – the open Standard for application development



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   - for Java, COBOL, PL/I, ASM,C

2) IBM HATS Development Plug-In
   - develop new front-ends to 3270 applications

3) IBM EGL development for z/VSE
   - Rational Business Developer (RBD)
   - EGL Plug-In for z/VSE
   - follow-on to Visual Age Generator

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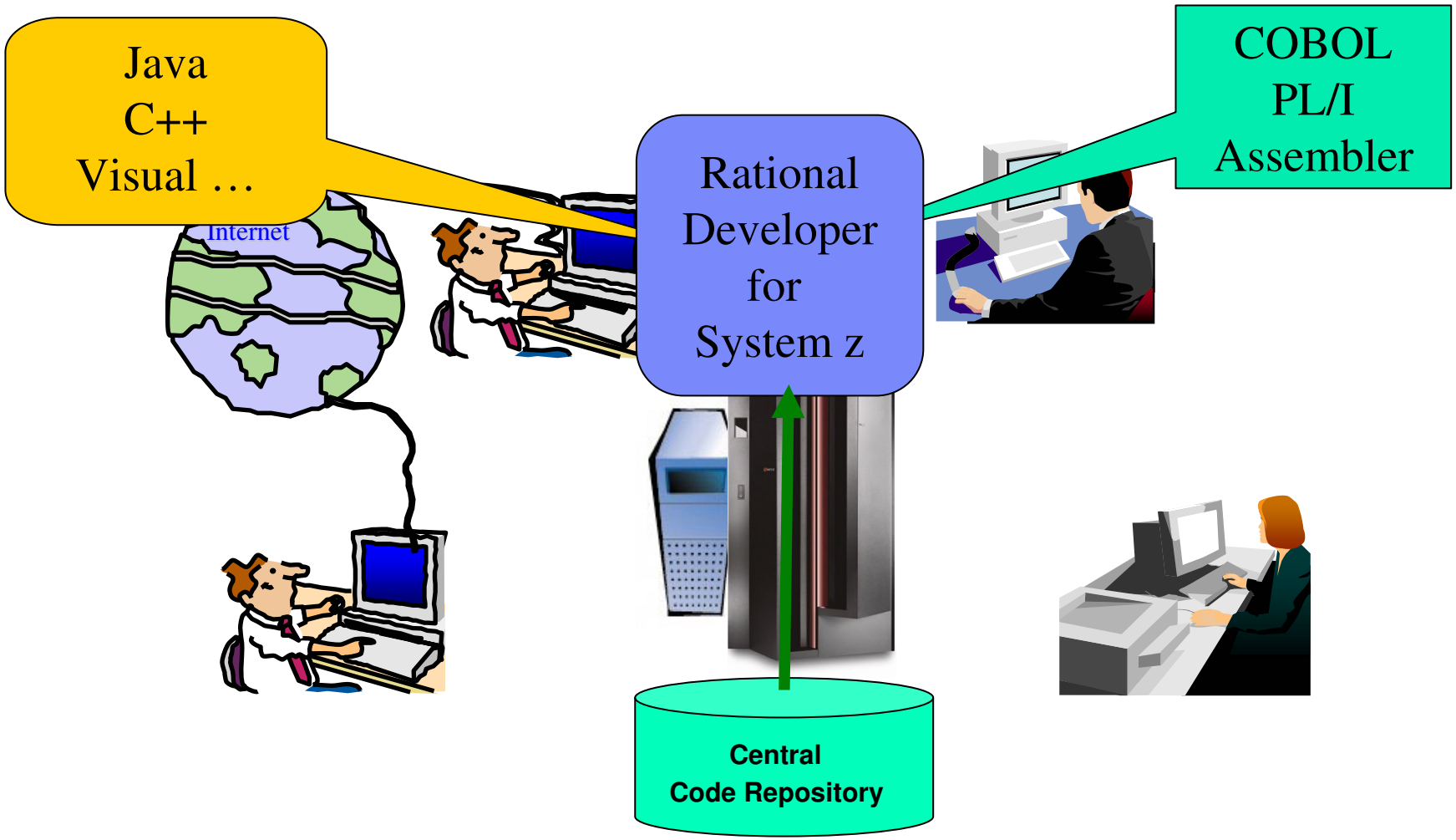
Summary

Eclipse – an open Integrated Development Environment for the enterprise



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z/VSE Additional Information

- z/VSE Home Page
  http://www.ibm.com/zvse/
- z/VSE Solutions and Utilities
  http://www-03.ibm.com/systems/z/os/zvse/solutions/
- RDz
  http://www-01.ibm.com/software/awdtools/rdz/
- RDz Plug-In for VSE
  http://www.qgrp.de/index.php?show=produkte&id=1&detail=wdz
- Live Virtual Classes for RDz for VSE
  http://www-03.ibm.com/systems/z/os/zvse/education/index.html#completed

e-business Solutions for VSE/ESA	SG24-5662
e-business Connectivity for VSE/ESA	SG24-5950
CICS Transaction Server for VSE/ESA CICS Web Support	SG24-5997
Handbook For WebSphere (Connectors to z/OS and VSE)	SG24-7042

We appreciate your comments on z/VSE: zvse@de.ibm.com

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