

CODE and jLPEX - The New SEU

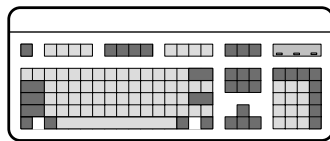
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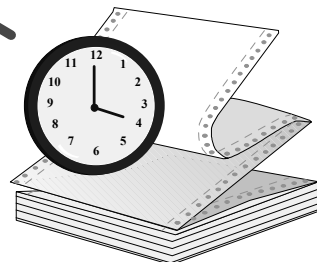
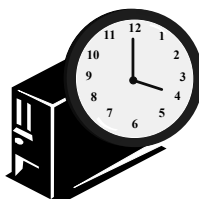
How we work with SEU



- 1- Open source
- 2- Make changes
- 3- Close and save source



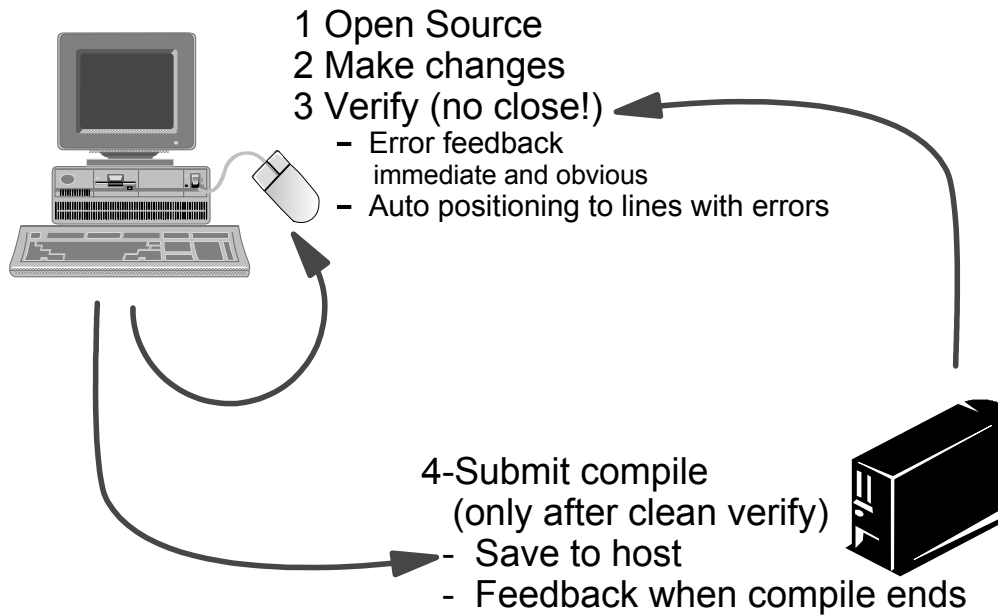
- 4- Submit compile
- 5- Batch job ends
- 6- Completion message



- 7- Look for spool file
- 8- Find errors
- 9- Locate errors in source

How we work with CODE and jLPEX

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Why Use WS-based Tools?

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Significant productivity gains

- Shorten edit/compile/debug cycle
- New edit-compile paradigm
 - Local syntax check & program verify
 - Invoke host compiler only AFTER clean verify
 - Caching: COPY members, Database references
 - From the editor window you can:
 - Search language reference manuals
 - Start debug session

Off-loads host cycles

- Use PC for editing, designing and verifying code
- Work in 'disconnected' mode - perfect for telecommuters

One tool, multiple environments

- Works equally well with leading edge and legacy language
- Working together with the other tools in WDS/400, create applications for host, client and web environments

What is CODE ?

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A part of Websphere Development Tools (WDT/400)

- And also shipped with the more recent WDS/400 and WDS*c*

A set of tools for developing OS/400 host applications

- Runs on your Windows PC

Formerly called "CODE/400"

- CoOperative Development Environment

Provides significant productivity enhancements for:

- The edit/compile cycle
- Designing DDS screens and reports
- Debugging OS/400 applications



And best of all it's "Free"

Where does jLPEX fit in?

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It is the built-in editor for the Eclipse-based WebSphere Development Studio Client (WDS*c*) workbench

It incorporates many of the features of the CODE editor

- But not all of them . . . Yet!

It also adds some powerful new features of its own

- For example:
 - Outline view
 - Auto code completion
 - Customizable tabs

Correlation with 5250 Tools

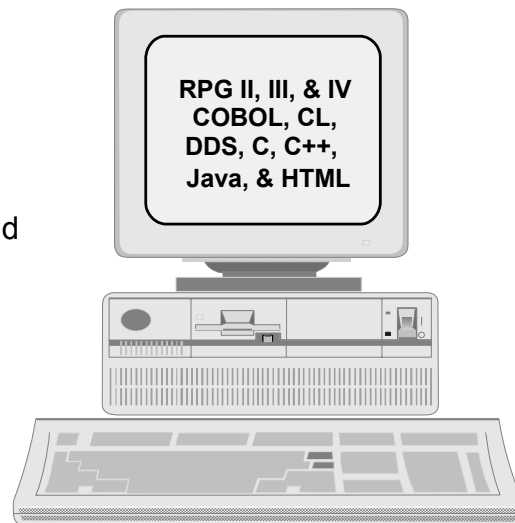
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Feature	CODE	Workbench
SEU	CODE Editor	Integrated jLPEX
STRDBG / ISDB	Stand alone	Integrated
SDA / RLU	CODE Designer	CODE Designer
PDM	CODE Project Organizer	Remote Systems Explorer (RSE) & iSeries Projects

Common Features of the Editors

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- Seamless access to local and host source
- Language-sensitive editing
- Token highlighting
- Built-in syntax checking
- Program verification
 - The compiler on your PC !!
- SEU-commands, format rulers and prompting
- Lots of on-line help
- Clipboard, unlimited undo
- Edit multiple files
- Command shell
- Programmable and customizable
- Plus lots more...



Host or local...
it's transparent!!

The CODE Editor

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The screenshot shows the CODE Editor window titled "CODE - F:\ADTSWIN\SAMPLE.DSP". The interface includes a menu bar (File, Edit, View, Actions, Options, Windows, Help), a toolbar, and a main text area. The text area displays code with columns for Row, Column, and Replace. A status bar at the bottom indicates "F:\ADTSWIN\SAMPLE.DSP saved".

Annotations with callout boxes identify the following features:

- Status area:** Points to the bottom status bar.
- Command line:** Points to the "Replace" column header.
- Format line:** Points to the header line: "...AAN01N02N03..Name+++++RLen++TdpBLinPosFunctions+++++*****".
- Sequence numbers:** Points to the row numbers (e.g., 00206, 00207).
- Syntax checking:** Points to a pink error message: "DDS7419S Data type not valid."
- Quick file access:** Points to the toolbar icons.

The jLPEX Editor

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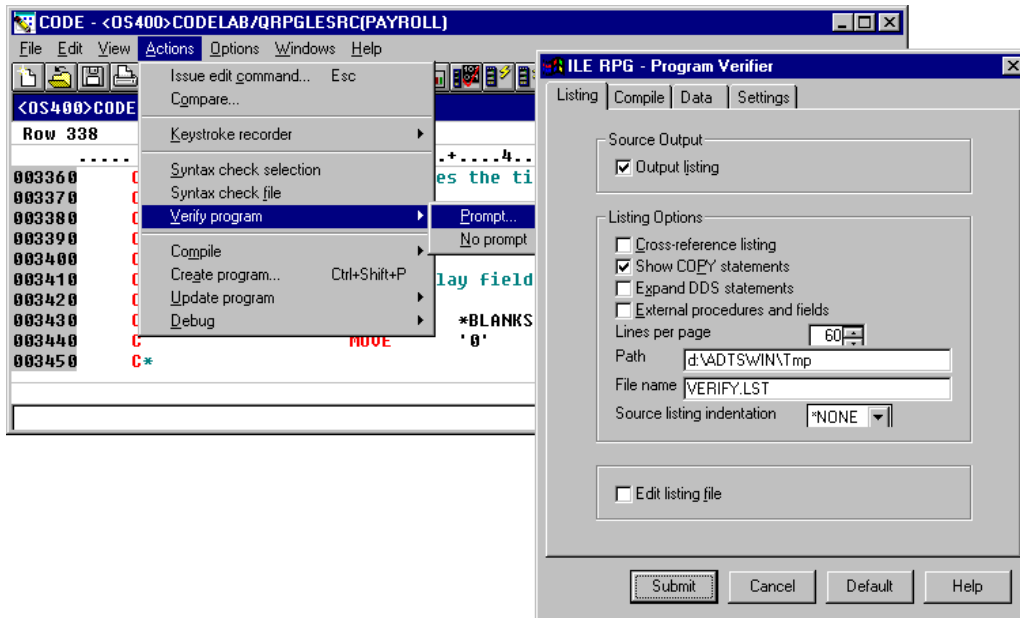
The screenshot shows the jLPEX Editor window titled "Remote System Explorer - WebSphere Development Studio Client for iSeries". The interface includes a menu bar (File, Edit, Source, Compile, Navigate, Search, Project, Run, Window, Help), a toolbar, and a main text area. The text area displays code with columns for Row, Column, and Replace. A status bar at the bottom indicates "PAYROLLG.RPGLE".

Annotations with callout boxes identify the following features:

- Status area:** Points to the bottom status bar.
- Command line:** Points to the "Replace" column header.
- Format line:** Points to the header line: "1+++++Opcode(E)+Factor2+++++Result+++++Len++D+HiLoEq... Comment".
- Sequence numbers:** Points to the row numbers (e.g., 026200, 026300).
- Syntax checking:** Points to a pink error message: "RNFS014E Operation code is not valid, specification is ignored."
- Quick file access:** Points to the toolbar icons.

The Program Verifier

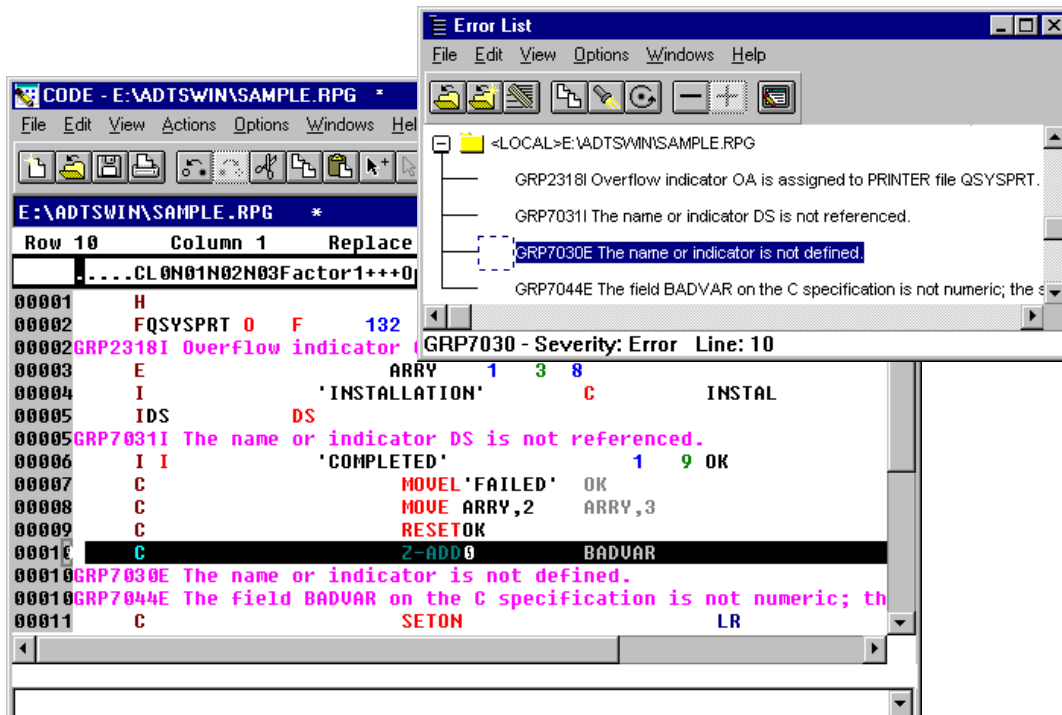
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Dialogs in both CODE & jLPEX are similar, not identical

The Error-List Window

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Help - at your fingertips



Context-sensitive

Message help

RPG, COBOL, DDS online references

- The manuals at your fingertips!

ILE RPG for AS/400^(R) Reference - CHAIN (Random R...

File Edit View Go Communicator Help

[CHAIN \(Random Retrieval from a File\)](#)

Code	Factor 1	Factor 2	Result Field	Indicators
CHAIN (E N)	Search argument	File name or Format name	Data structure	NR ER -

CODE - E:\ADTSWIN\LOCAL\samplv2.rpg *

File Edit View Actions Options Windows Help

E:\ADTSWIN\LOCAL\samplv2.rpg *

Row 74 Column 33 Replace 1 change.

```

.....CL0N01N02N03Factor1+++0pcdeFactor2+++ResultLenDEHiLoEq
000710 C          EXCPTADDNEW
000720 C* Re-access record to bring in defaults for all file
000730 C          ACCT          CHAINMLGMSTR          20
000740 C          20
000750 C          MOVE 'REACCESS'RTNCDE
    
```

from a full procedural file (F in tions), sets a record identifying fications), and places the data

in the key or relative record ess is by key, factor 1 can be a constant, or a literal. In addition,

SEU - Like Features



SEU Line Commands

Format line

CODE - <OS400>CODELAB/QRPGLESRC(PAYROLL)

File Edit View Actions Options Windows Help

<OS400>CODELAB/QRPGLESRC(PAYROLL)

Row 30 Column 10 Replace

```

.....FFilename++IPEASFRlen+LKlen+AIdevice+.Keywords+++++
000280 FEMPST UF A E          K DISK
000290 FPRJST UF A E          K DISK
000300 FRSMST UF A E          K DISK
000310 D*
    
```

RPG IV - F - File Description

File Name	File Type	File Designation	End of File	File Addition	Sequence	OK
FRSMST	U	F		A		Continue
File Format	Record Length	Limits Processing	Length of Key Field	Record Address Type	File Organization	Select...
E				K		Cancel
Device	Keywords	Comments				Help
DISK						

.....FFilename++IPEASFRlen+LKlen+AIdevice+.Keywords+++++Comments+++++

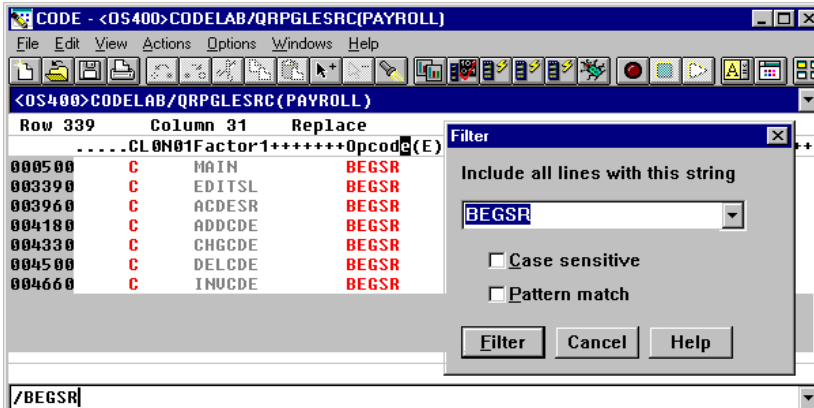
```

FRSMST UF A E          K DISK
    
```

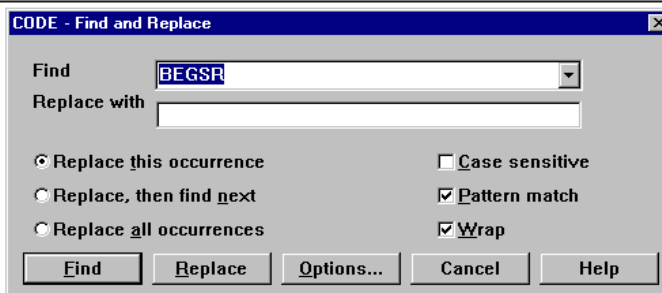
F4 Prompting

Finding Your Way

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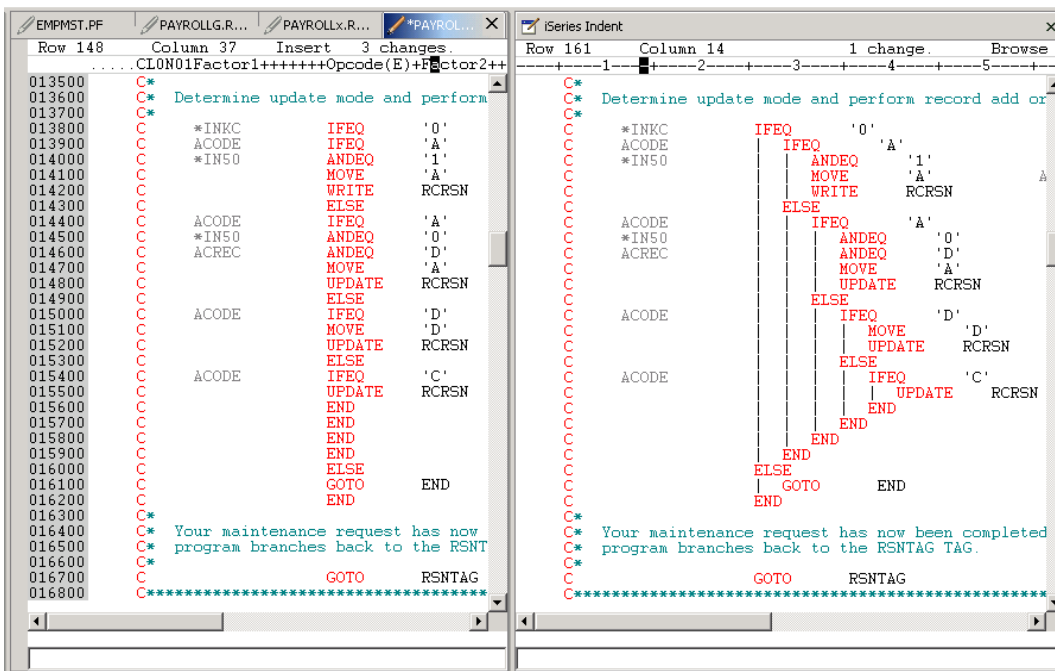
Filtering



Find and Replace

Indented View (jLPEX & CODE)

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The Navigator - CODE only



Called functions

- MAIN
 - SUBPGM
 - VALIDT
 - VALIDT
 - SUBPGM
- VALIDT
 - COD1SR
 - COD2SR
 - COD3SR
 - COD4SR
- COD1SR
- COD2SR
- RTVMSG
- DSPMSG

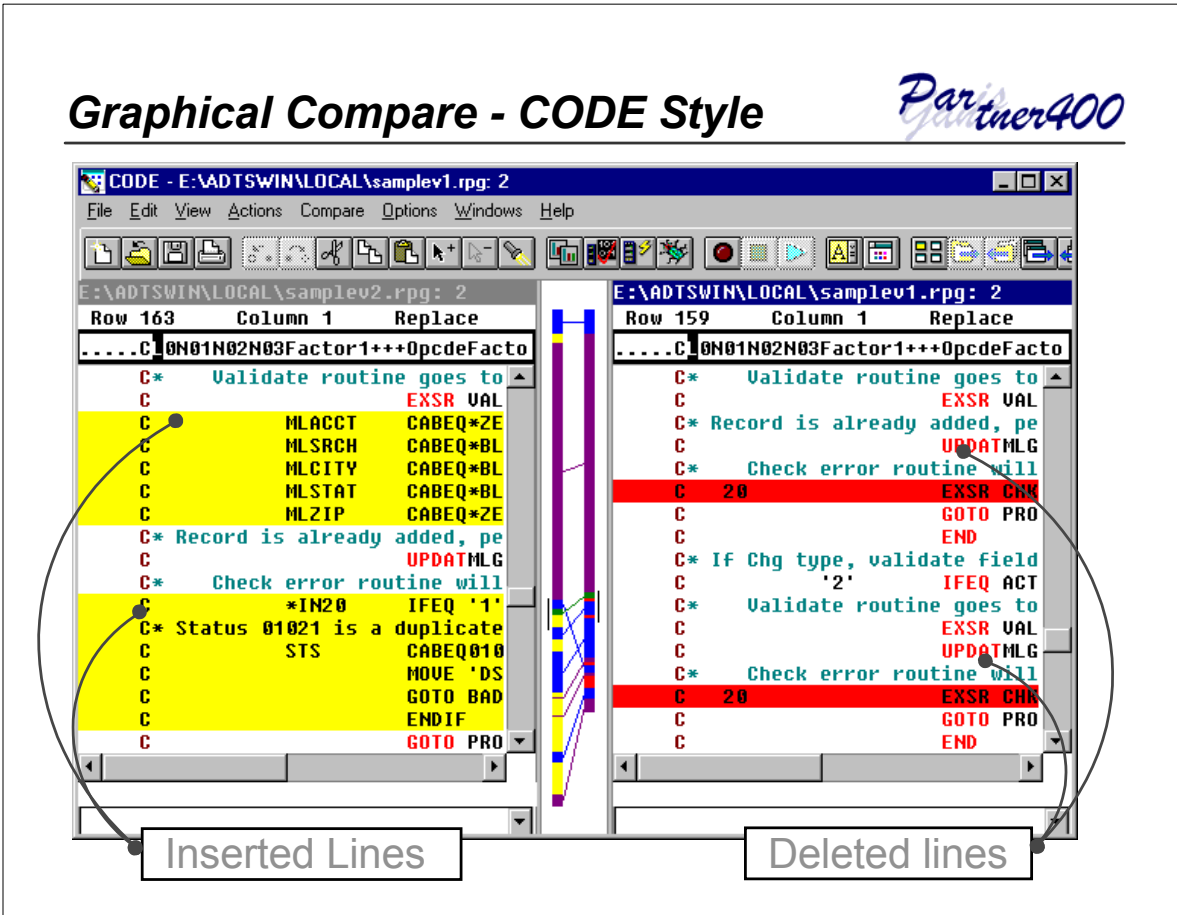
Outline View - Workbench Only



Row	Column	Replace
042000	C	ACREC ANDEQ 'A'
042100	C	MOVE '1' *IN60
042200	C	MOVE ERR(5) EMESS
042300	C	ELSE
042400	C	IFEQ '0'
042500	C	ACREC ANDEQ 'D'
042600	C	MOVE ERR(6) EMESS
042700	C	END
042800	C	ENDSR
042900	C	
043000	C*	
043100	C*	The following code verifies the change request.
043200	C*	
043300	C	CHGCDE BEGSR
043400	C	*IN50 IFEQ '1'
043500	C	MOVE '1' *IN60
043600	C	MOVE ERR(7) EMESS
043700	C	ELSE
043800	C	*IN50 IFEQ '0'
043900	C	ACREC ANDEQ 'D'
044000	C	MOVE '1' *IN60
044100	C	MOVE ERR(8) EMESS

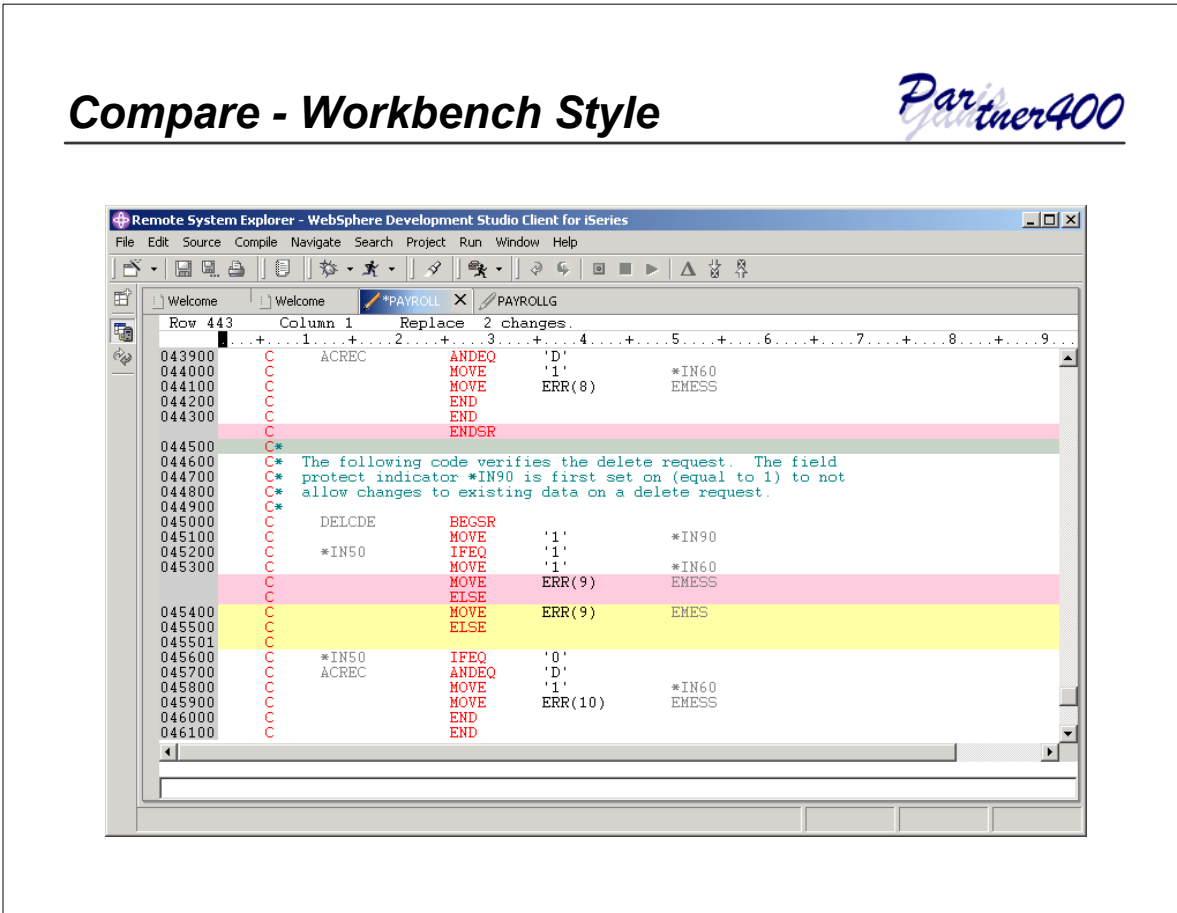
Graphical Compare - CODE Style

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Compare - Workbench Style

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Editor Programming

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What can you do?

- Add editor functions and your own extensions to the menus and toolbar
- Assign/re-assign keys and/or line commands to editor functions and your own macros

How do you do it?

- CODE: Write macros in REXX or Java + editor commands
 - IBM supply a number of samples - more in a moment
 - Use the 'profiles' to load in the macros
- WDS: Uses the Eclipse Java plug-ins model
 - More complex but far more powerful and all-embracing
 - See eServer Magazine, iSeries edition, June 2003 for a "simple" example!
 - IBM plans to add a simpler scripting language in the future
- CODE extensions do not port to workbench

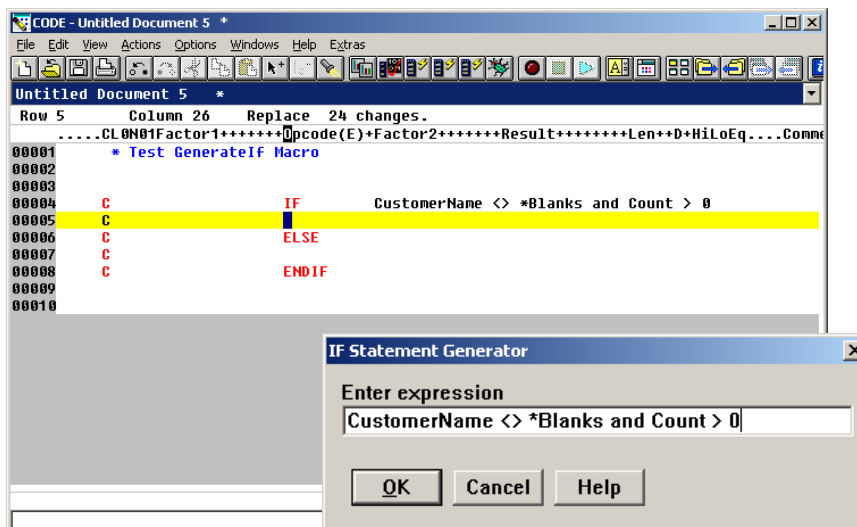
CODE: Using a simple editor macro

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The macro on the following chart "typed" this code

- The actual expression was prompted as shown

And then positioned the cursor ready for the first operation



The CODE macro itself - very simple

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```

CODE - C:\WDT400\MYMACROS\GenerateIF.1x *
File Edit View Actions Options Windows Help Extras
C:\WDT400\MYMACROS\GenerateIF.1x *
Row 26 Column 53 Insert 1 change.
-----1-----2-----3-----4-----5-----6-----7-----8-----
00001/* Sample RPG IU Macro */
00002/* Generates a simple IF/ELSE/ENDIF block and prompts user for expression */
00003
00004'Set lineread.title IF Statement Generator'
00005'Set lineread.prompt Enter expression'
00006'lineread 45'
00007'extract lastline'
00008'extract lastkey'
00009
00010if ((lastkey = esc) | (lastline = '')) then do
00011    'msg Function Cancelled'
00012    exit
00013end
00014
00015'insert      C          IF      'lastline
00016'insert      C'
00017'insert      C          ELSE'
00018'insert      C'
00019'insert      C          ENDIF'
00020
00021'extract cursorrow into rownumber'
00022'rownumber = rownumber + 2'
00023'set cursorrow 'rownumber'
00024'set cursorcol 26'
00025exit
00026
    
```

IBM CODE Smart Guide - RPG X-Ref

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CODE - d:\adtswin\sample.irp *

d:\adtswin\sample.irp *

Row 6 Column 1 Replace 17 changes.

....DName+++++++ETDsFrom+++To/L+++IDc.Keywords+++

00002	FQSYSPRT	O	F	132	PRINTER
00003					
00004	D ARRAY	S		8	DIM(3)
00005	D				CTDATA PERRC
00006	D INSTALL	C			CONST(' INST
00007	D DS	DS			
00008	D OK			1	8 INZ('VERIFI
00009					
00010	C		EVAL		OK = 'FAILED'
00011	C		MOVE		ARRAY(2) ARRAY
00012	C		RESET		OK
00013	C		SETON		
00014	OQSYSPRT	T	LR		1 1

RPG Cross Re... d:\adtswin\sample.irp

- Identifiers
 - ARRAY
 - ARRAY(2)
 - ARRAY(3)
 - DS
 - INSTALL
 - 6
 - 15
 - OK
 - QSYSPRT
- Indicators
 - LR

Refresh

Comparison of Features

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Feature	CODE	jLPEX
Ability to compile	X	X
Auto-uppercasing	X	X
Clear prefix area and show excluded lines	X	X
Code Assist		X
Column sensitive editing	X	X
Configure tabs		X
Configure token colors	X	
Convert to C Free-Form / CVTRPGSRC	X	
Cross reference	X	(Similar - via Outline view)
Delete errors	X	X
F1 context help	X	X
Filter / Filter by date	X	X (By Date in popup menu)
Format line selection	X	X
Highlight line x (in Extras)	Extras	X
Indent view	X	X

Comparison of Features

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Feature	CODE	jLPEX
Match (select/jump)	X	X
Modify enter key	X (Smart Enter)	X (via Preferences)
Navigator	X	(Similar - via Outline view)
Open or edit /COPY members	X	X
Outline view		X
Program verifier	X	X
Prompt	X	X
Resequence all lines & on save	X	X
Show	X	X (in popup menu)
Show Fields	X (Extras)	X
Signature	X	X
Smart Guides	X	
Syntax checker	X	X
Token highlighting	X	X (always on)

CODE Designer



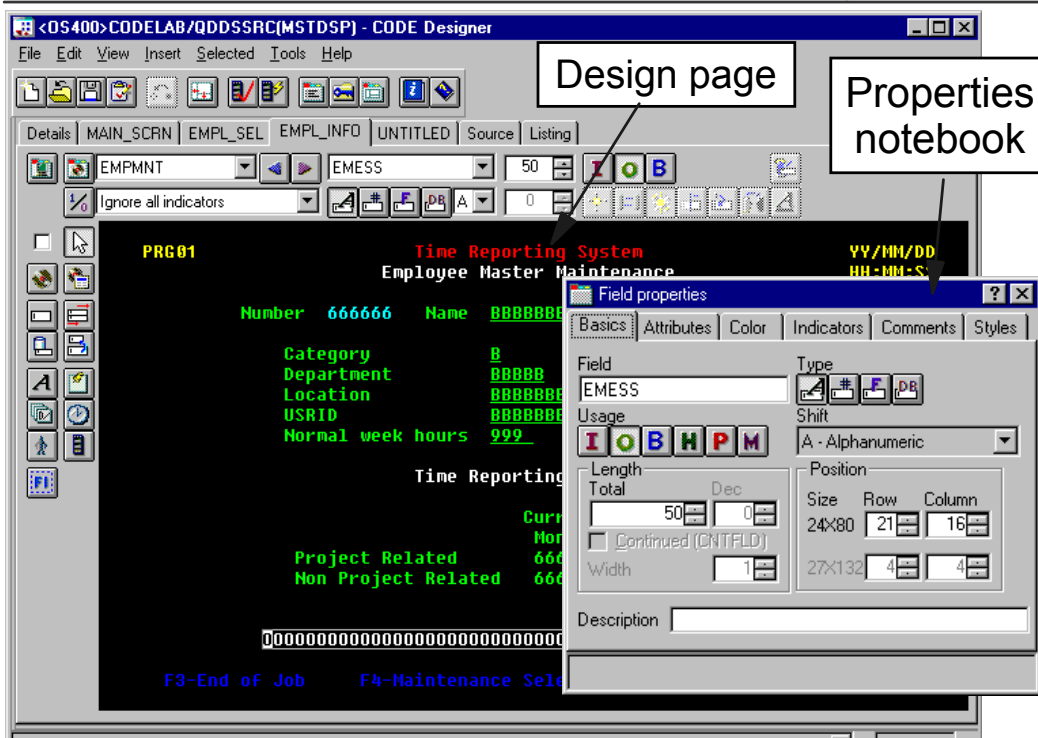
Graphical design tool only in CODE

- No equivalent in workbench
- Create and maintains DDS source for display, printer & database files
 - Provides additional features for WebFaced applications

Unique interface

- Lets novice create DDS quickly and easily while giving the expert access to all the features of DDS
- DDS Tree - Hierarchy of the DDS source
- Details Page - Details of the DDS Tree selection
- Design Page - Graphically design your DDS here
- Source - See the actual DDS source
- Listing - Output from the last verify.
- Selected DDS - See source for current selection
- Create keywords - Add file,record,field keywords
- Error List - Errors from the last verify

The Design Page - Display File



IBM Distributed Debugger

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RPG, COBOL, CL, C, C++, and Java

- Both OPM and ILE; step between them

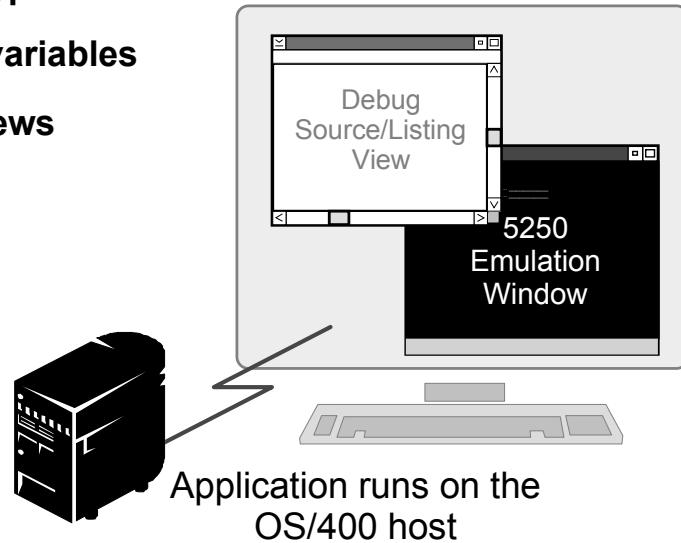
Multiple breakpoint types

Display and change variables

Source and listing views

Look at call stack

Batch and interactive



CODE Debugger Interface

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Programs and procedures

Source View

Active Breakpoint

Monitored Variables

This is the CODE version - WDS version looks very similar but individual windows appear in workbench

CODE Project Organizer



Like PDM - manages lists of local files, host objects and members

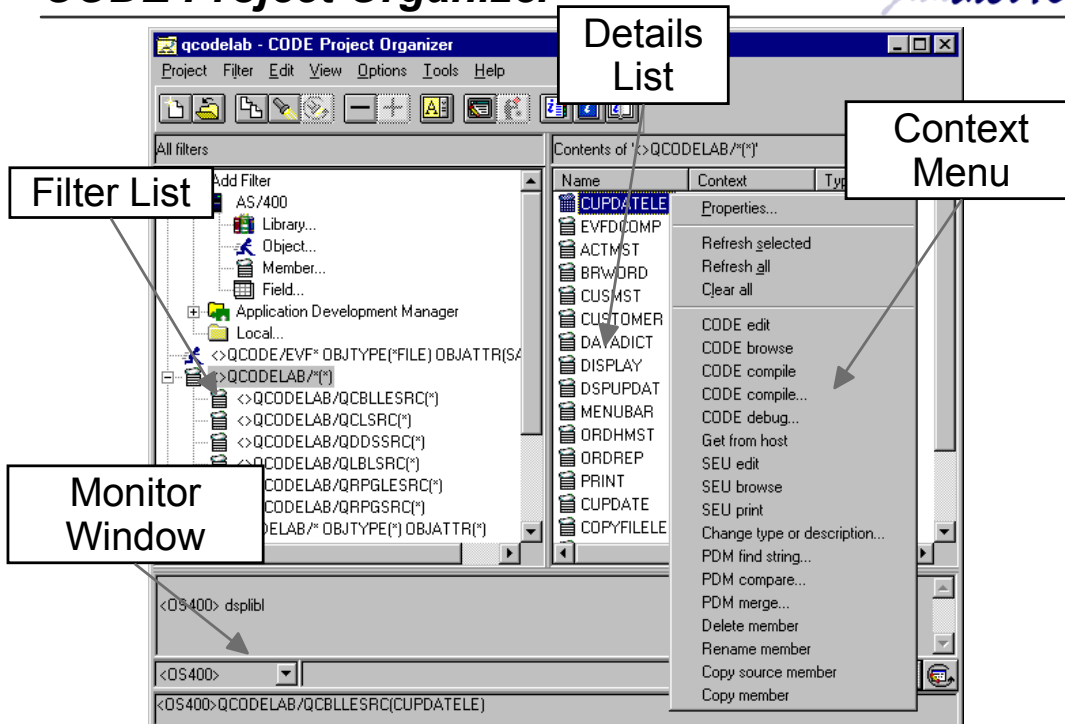
Pop-up menus allow easy access to local and AS/400 command actions

Easy to create user-defined actions

- Can use all PDM substitution variables
- Actions are importable and exportable

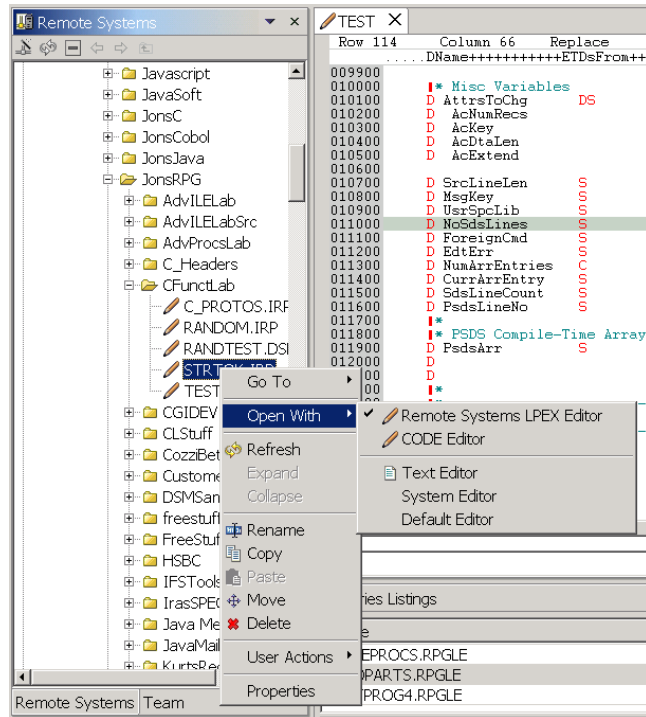
Replaced in new WDS*c* (Eclipse) product with Remote System Explorer

CODE Project Organizer



Remote Systems Explorer

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Packaging Details

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WebSphere Development Tools/400 (WDT/400)

- Shipped with V4R5 and early part of V5R1
- Includes CODE, VisualAge RPG, Webfacing, VisualAge for Java
- Allows customized install for CODE only
- Works with OS/400 V5R1 and earlier (not V5R2)

WebSphere Development Studio Client, Version 4 (WDS4 V4)

- Shipped with later V5R1 licenses and V5R2 until April 25, 2003
- Eclipse-based workbench tools + CODE, VARPG
 - Workbench editor has little support for RPG/COBOL/CLP/DDS
- Must install everything
 - Although you may use CODE and VARPG standalone
- Works with OS/400 V5R1, V5R2

WebSphere Development Studio Client, Version 5 (WDS5 V5)

- Shipped since April 25, 2003
- Eclipse-based workbench tools + CODE, VARPG
 - Workbench editor has significant support for RPG/COBOL/CLP/DDS
- Same installation issues as V4
- Works with OS/400 V5R1, V5R2

Summary

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All packages offer a complete development environment on your Workstation

- Huge productivity boost!
- Work disconnected from host - Great for telecommuters
- Offloads OS/400 workload
- Packaged with other great workstation-based programmer tools:
 - VisualAge RPG
 - Eclipse-based WDSc
 - Webfacing

Visit IBM's web site: www.software.ibm.com/ad/wds400

- User newsgroups
- Downloadable presentations and lab exercises
- Fix pack downloads
- News, FAQs, etc.