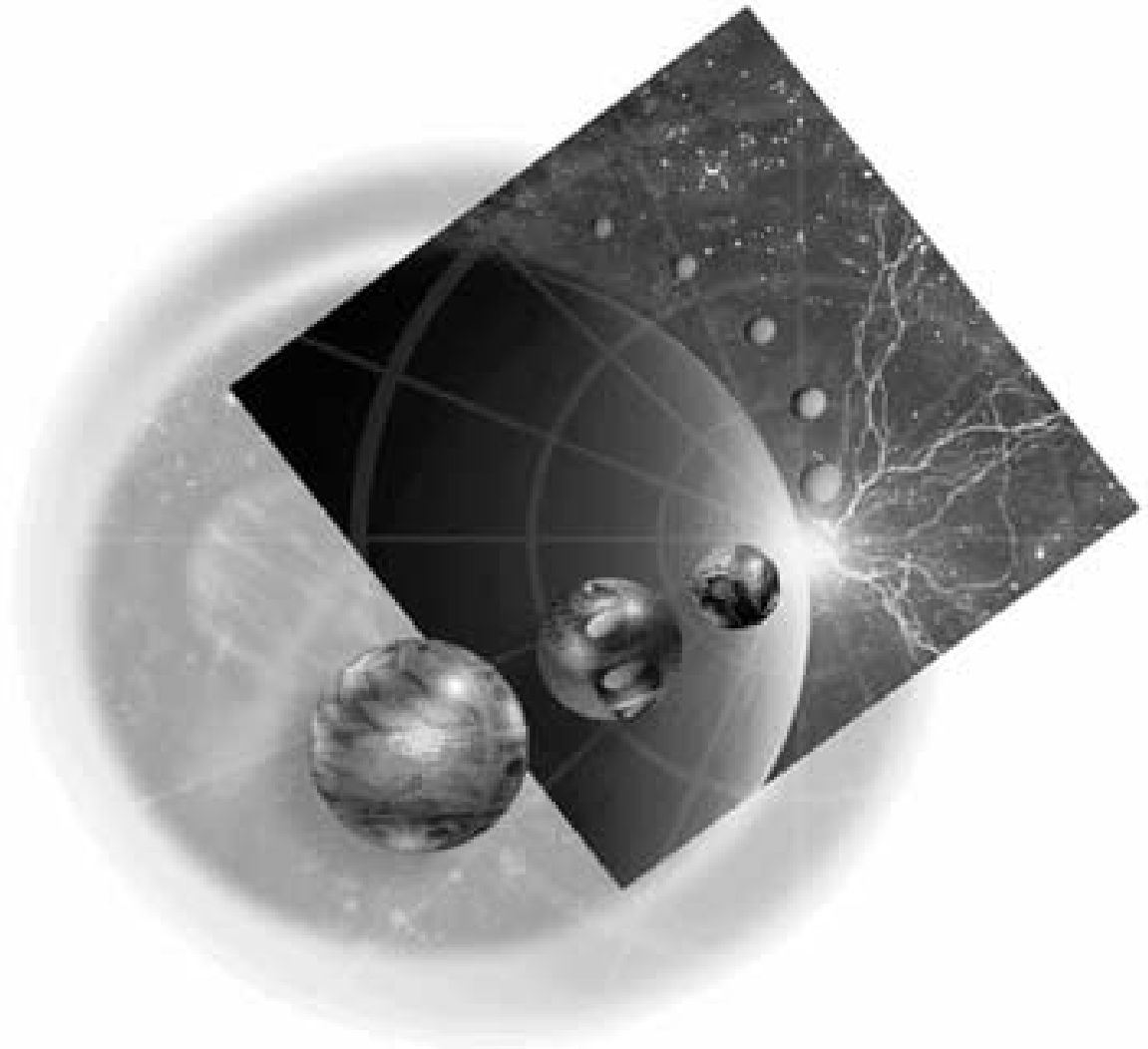


Introduction to CODE

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Fall COMMON 2002

Session ID: 404228
Agenda Key: 26TC, 56TB



Acknowledgement and Disclaimer

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CODE

Not your father's SEU!

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

```
.....CL 0N01N02N03Factor1+++0pcde fact
```

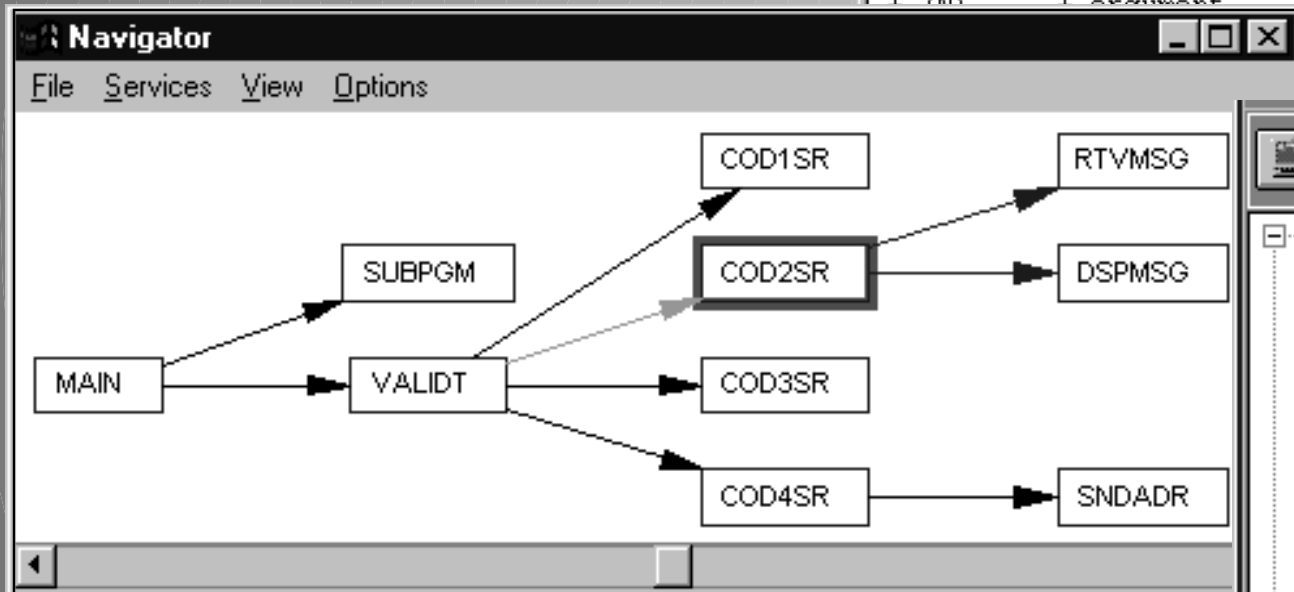
000710	C		EXCPTADDN
000720	C*	Re-access record to bring in	
000730	C	ACCT	CHAINMLGM
000740	C	20	DO
000750	C		MOVE 'REA

RPG/400 Help - CHAIN (Random Retrieval from a File) - Netscape

File Edit View Go Communicator Help

CHAIN (Random Retrieval from a File)

CODE	FACTOR 1	FACTOR 2	RESULT FIELD
CHAIN	Search	File name	Data structure



D:\ADTSW

- File Key
- MENU
- ENTRY
- INFO
- SF
- SFCTL
- SFBOT
- SCREEN1

Details SCREEN1 Source

MENU

Ignore all indicators

```
Select one of the following:
1. Work with cu
2. Work with in
3. Work with pa
4. Work with ad
5. Work with on
6. Work with pe
90. Sign off
```



The Agenda

iSeries AD, IBM Toronto

- What is CODE?
- The CODE Tools:
 - Editor
 - Designer
 - Distributed Debugger
- Remote Systems Explorer
- Summary
- CODE demo

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WebSphere Development Studio client

WebSphere Studio Site Developer Advanced

- ✓ Web tools
- ✓ Java tools
- ✓ XML tools
- ★ WebFacing
- ★ iSeries tools (Remote Systems Explorer)

Classic tools

- ✓ **CODE**

For RPG, COBOL, CL, C, C++, DDS

- ✓ VisualAge RPG

For RPG GUI

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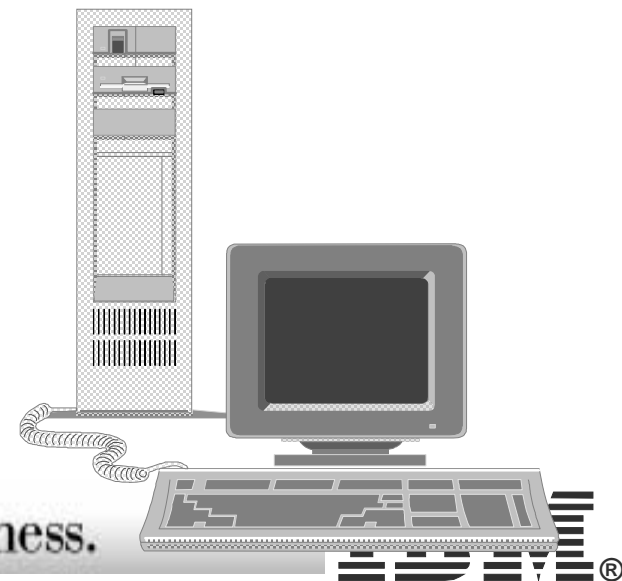


What is CODE ?

iSeries AD, IBM Toronto

- Application development environment for iSeries host applications
- Replacement for SEU and SDA
- Runs on Windows PC
- Significant productivity enhancements for:

- ▶ Edit / compile cycle
- ▶ DDS Designing
- ▶ Debugging
- ▶ Work at home scenario



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CODE Includes...

iSeries AD, IBM Toronto

- Editor

- A powerful PC editor for iSeries and PC source with integrated local and remote compilation.

- Designer

- A rich graphical interface for designing DDS display, printer and physical files.

- Debugger

- Debug host applications from your workstation.

 Integrated with Remote Systems

Explorer (RSE) --> PDM replacement

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CODE Value Proposition

iSeries AD, IBM Toronto

CODE delivers...

- ★ **Significant productivity gains**
 - New functions and GUI
 - Shortens edit/compile/debug cycle
- ★ **Off-loads host cycles**
 - Use PC for editing, designing and verifying
 - Work at home! In 'disconnected' mode
- ★ **Investment protection**
 - Makes use of existing developer skills
- ★ **Migration path**
 - From host applications today to Web applications tomorrow.
- ★ **Fun**

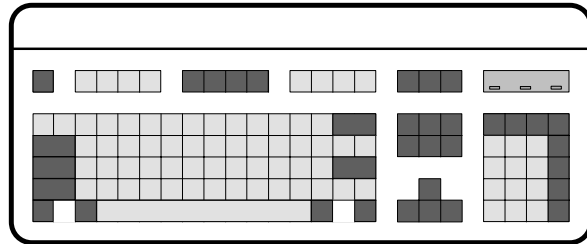
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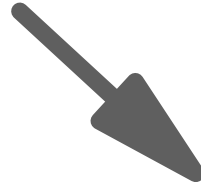


Working the legacy way

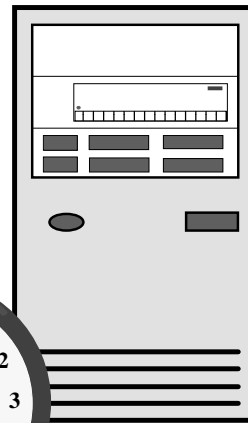
iSeries AD, IBM Toronto



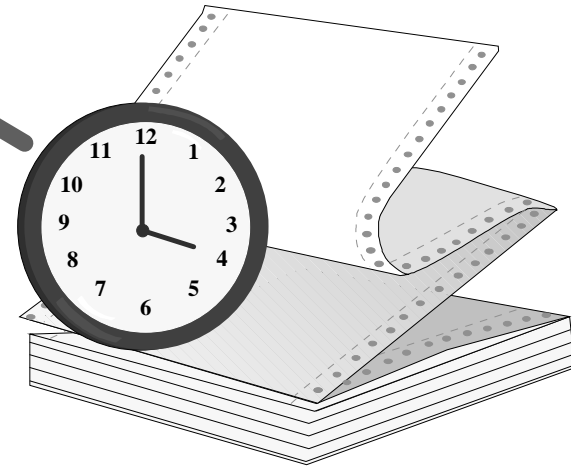
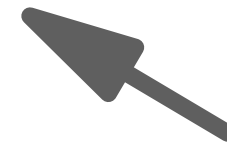
- 1- Open source
- 2- Make changes
- 3- Save source



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



- 7- Look for listing
- 8- Look for errors
- 9- Find fix in source



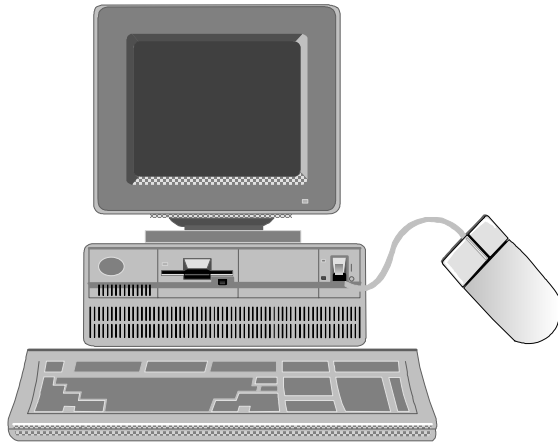
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Working With CODE

iSeries AD, IBM Toronto



- 1- Open Source
- 2- Make changes
- 3- Verify
- - Error feedback

● Event files

- 4- Submit compile
- - Auto save to host
- - Error feedback when compile ends



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CODE - integrated in WDS

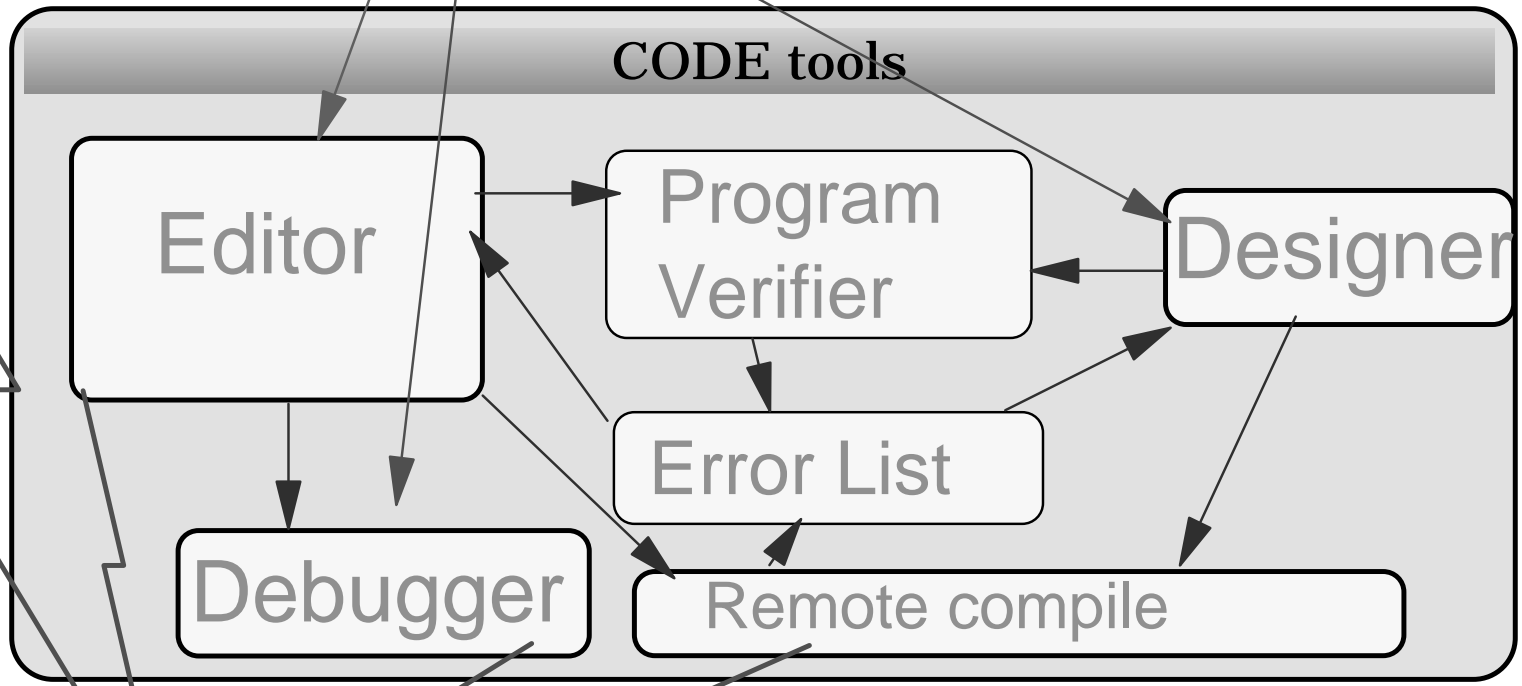
iSeries AD, IBM Toronto

WSSDA + iSeries tools

Remote Systems Explorer

Work with iSeries objects
Invoke any iSeries command
work with jobs and more

CODE tools



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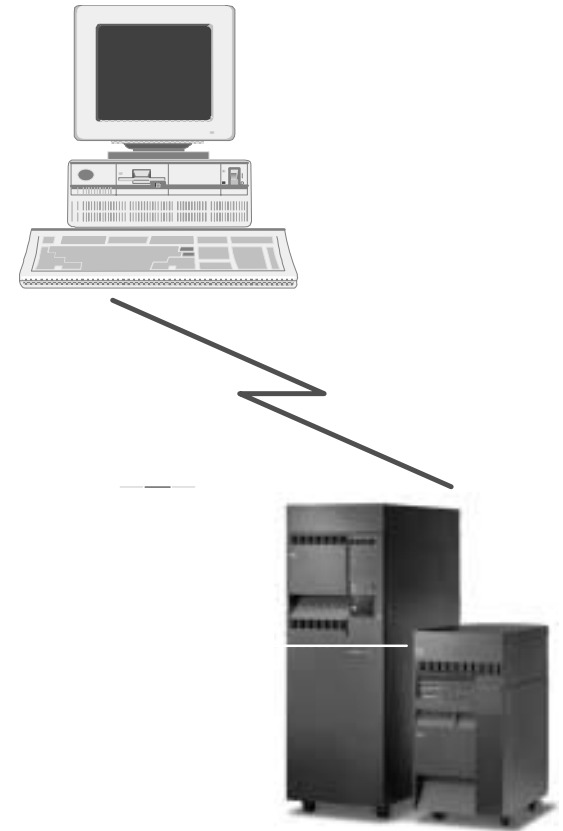




The CODE Editor

iSeries AD, IBM Toronto

- ▶ Seamless access to local and host source, ADM parts
- ▶ Language-sensitive editing
- ▶ Windows GUI , clipboard, unlimited undo, multiple files
- ▶ Command shell
- ▶ Programmable and customizable
- ▶ Plus lots more...



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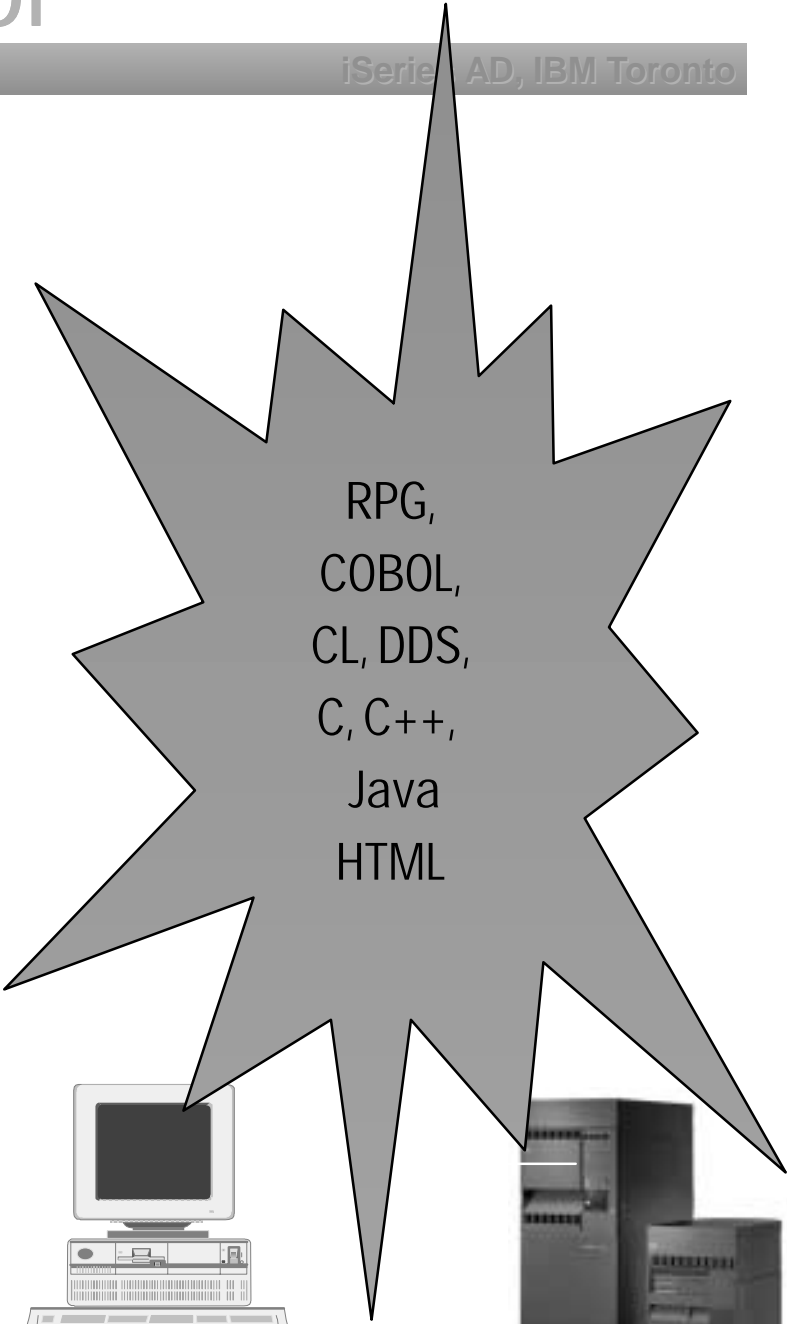


The CODE Editor

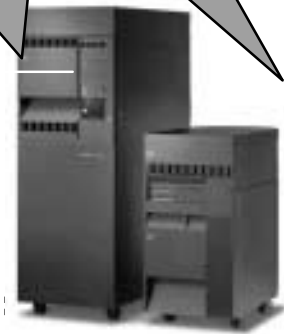
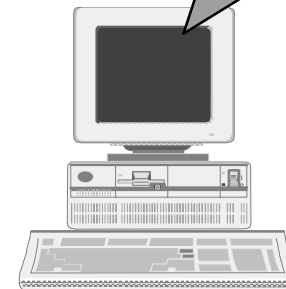
iSeries AD, IBM Toronto

► Language-support

- ★ **Token highlighting**
- ★ **Built-in syntax checking**
- ★ **Program verification**
- ★ **SEU-commands, format rulers and prompting**
- ★ **Lots of on-line help**



RPG,
COBOL,
CL, DDS,
C, C++,
Java
HTML

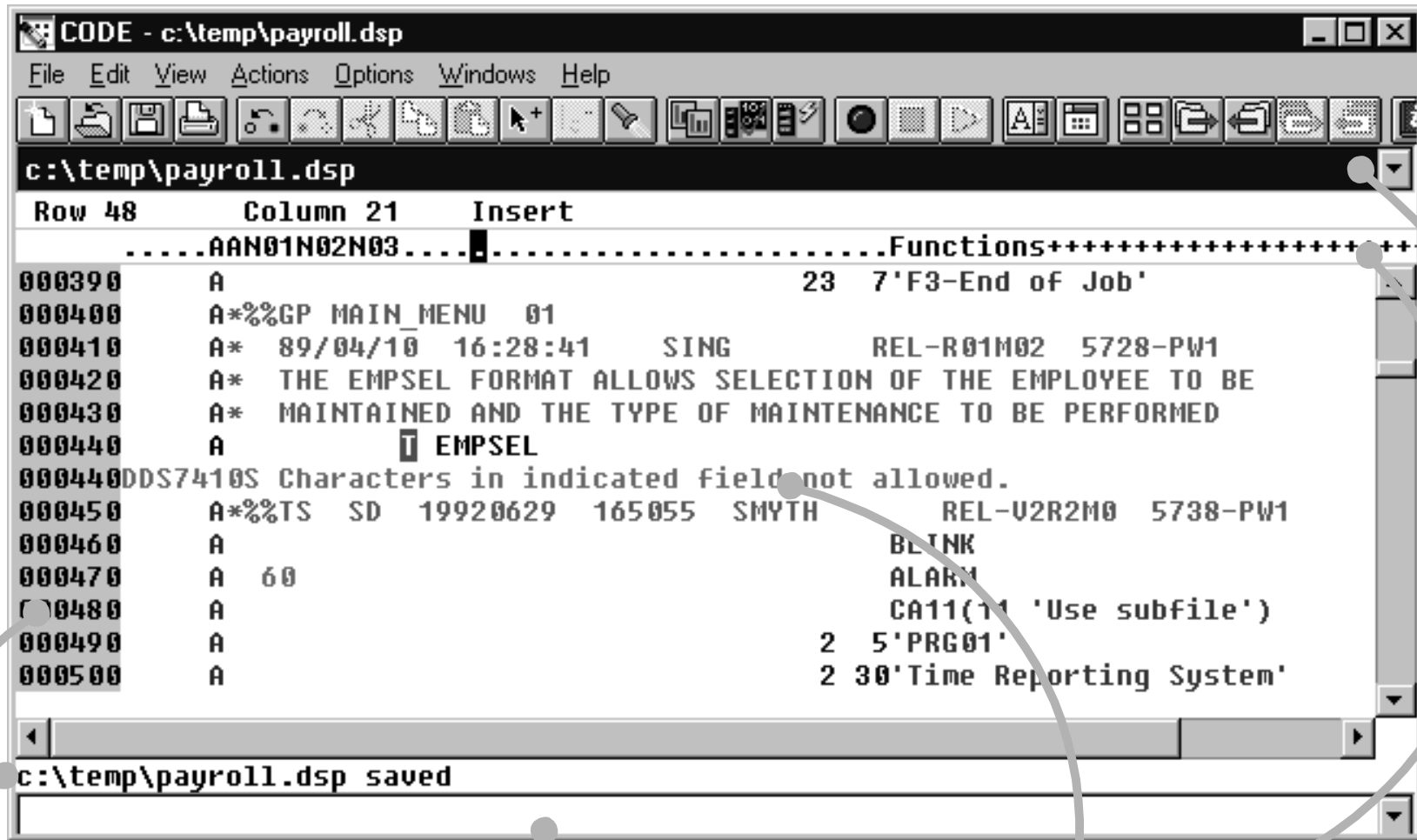


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The CODE Editor Window



Status area

Command line

Format line

Sequence numbers

Syntax checking

Quick file access



SEU - Like Features

iSeries AD, IBM Toronto

SEU
commands

Format
line

Row	Column	Replace
000280		FEMPMST UF A E K DISK
i5		FPRJMST UF A E K DISK
000300		FRSNMST UF A E K DISK
000310		D*

File Name: File Type: File Designation: End of File: File Addition: Sequence:

File Format: Record Length: Limits Processing: Length of Key Field: Record Address Type: File Organization:

Device: Keywords: Comments:

.....FFilename++IPEASFRlen+LKlen+AIDevice+.Keywords+++++Comments+++++

Finding Your Way

s AD, IBM Toronto

The screenshot shows a terminal window titled "CODE - <OS400>CODELAB/QRPGLESRC(PAYROLL)". The window contains a table of payroll codes. A "Filter" dialog box is open over the table, with the search string "BEGSR" entered. The dialog box has options for "Case sensitive" and "Pattern match", both of which are unchecked. The "Filter" button is highlighted.

Row	Column	Replace
000500	C	MAIN BEGSR
003390	C	EDITSL BEGSR
003960	C	ACDESR BEGSR
004180	C	ADDCDE BEGSR
004330	C	CHGCDE BEGSR
004500	C	DELCDE BEGSR
004660	C	INUCDE BEGSR

Filter dialog box content:

Include all lines with this string

BEGSR

Case sensitive

Pattern match

Filter Cancel Help

Filtering

The screenshot shows the "Find and Replace" dialog box. The "Find" field contains "BEGSR". The "Replace with" field is empty. The "Replace this occurrence" radio button is selected. The "Case sensitive" checkbox is unchecked, "Pattern match" is checked, and "Wrap" is checked. The "Find" button is highlighted.

Find and Replace dialog box content:

Find: BEGSR

Replace with: [Empty]

Replace this occurrence

Replace, then find next

Replace all occurrences

Case sensitive

Pattern match

Wrap

Find Replace Options... Cancel Help

Command line

Find and Replace



Integrated Error Feedback

iSeries AD, IBM Toronto



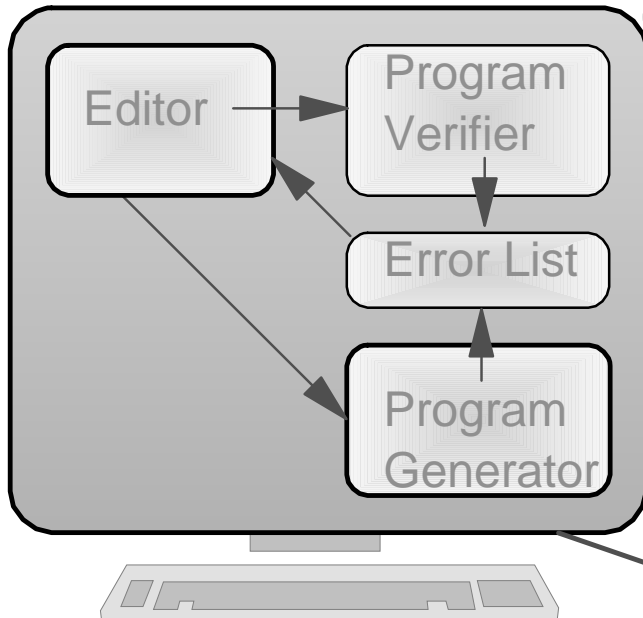
Local processing
saves cycles on your
iSeries

● New edit-compile paradigm

- Local syntax check
- Local program verify
- Caching: /COPY, DB refs
- Invoke host compiler

● From the edit window you can:

- Work with syntax checker, verifier, and compiler errors
- Search language reference manuals
- Start debug session



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The Program Verifier

iSeries AD, IBM Toronto

The screenshot shows a code editor window titled "CODE - <OS400>CODELAB/QRPGLESRC(PAYROLL)" with a menu bar (File, Edit, View, Actions, Options, Windows, Help) and a toolbar. The "Actions" menu is open, showing options like "Issue edit command...", "Compare...", "Keystroke recorder", "Syntax check selection", "Verify program", "Compile", "Create program...", "Update program", and "Debug". The "Verify program" option is selected, and a sub-menu is open with "Prompt..." and "No prompt" options. The code editor displays lines of code starting with "003360" and "003370".

The "ILE RPG - Program Verifier" dialog box is overlaid on the right side of the code editor. It has tabs for "Listing", "Compile", "Data", and "Settings". The "Listing" tab is active, showing the following options:

- Source Output:
 - Output listing
- Listing Options:
 - Cross-reference listing
 - Show COPY statements
 - Expand DDS statements
 - External procedures and fields
- Lines per page: 60
- Path: H:\Program Files\IBM\WDT400\Tmp
- File name: VERIFY.LST
- Source listing indentation: *NONE
- Edit listing file

Buttons at the bottom of the dialog box are "Submit", "Cancel", "Default", and "Help".

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The Error-List Window

iSeries AD, IBM Toronto

The screenshot displays two windows from an IBM AS/400 environment. The background window is a code editor titled "CODE - E:\ADTSWIN\SAMPLE.RPG". It shows a table with columns "Row 10", "Column 1", and "Replac". The code on the screen includes several lines, with error messages interspersed. The error messages are:

- GRP2318I Overflow indicator
- GRP7031I The name or indicator DS is not referenced.
- GRP7030E The name or indicator is not defined.
- GRP7044E The field BADVAR on the C specification is not numeric; th

The foreground window is titled "Error List". It shows a tree view of the file structure and a list of errors. The error "GRP7030E The name or indicator is not defined." is highlighted. Below the list, the error details are shown: "GRP7030 - Severity: Error Line: 10".

Row 10	Column 1	Replac
00001	H	
00002	FQSYSVRT 0 F 132	
00002	GRP2318I Overflow indicator	
00003	E	
00004	I 'INSTALLATION' C INSTAL	
00005	IDS DS	
00005	GRP7031I The name or indicator DS is not referenced.	
00006	I I 'COMPLETED' 1 9 OK	
00007	C MOVE 'FAILED' OK	
00008	C MOVE ARRY,2 ARRY,3	
00009	C RESETOK	
00010	C Z-ADD 0 BADVAR	
00010	GRP7030E The name or indicator is not defined.	
00010	GRP7044E The field BADVAR on the C specification is not numeric; th	
00011	C SETON LR	

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Help - at your fingertips

iSeries AD, IBM Toronto

- ★ Context-sensitive
- ★ Message help
- ★ RPG, COBOL, DDS online references
- ★ Lots of online documentation

RPG/400 Help - CHAIN (Random Retrieval from a File) - Netscape

File Edit View Go Communicator Help

Back Forward Reload Home Search Guide Print Security Stop

CHAIN (Random Retrieval from a File)

CODE	FACTOR 1	FACTOR 2	RESULT FIELD
CHAIN	Search	File name	Data
(N)	argument		structure

The CHAIN operation retrieves a record from a full procedural file (F in position 16 of the file description specifications), sets a record identifying indicator on (if specified on the input specifications), and places the data from the record into the input fields.

CODE - <OS400>CODELAB01/QRPGLESRC(PAYROLL)

File Edit View Actions Options Windows Help Extras

<OS400>CODELAB01/QRPGLESRC(PAYROLL)

Row	Column	Replace
000116	C*	
000117	C	*INKC IFEQ '0'
000118	C	RSCDE CHAIN RSNMST
000119	C	EXSR ACDESR
000120	C	ELSE

...CL0N01Factor1+++++Opcode(E)+Factor2+++++Result+++++Len++D+HiL

the key or relative record
s by key, factor 1 can be
instant, or a literal. In
name can be specified in
ess is by relative record
l or a numeric field with

me that is to be read. A

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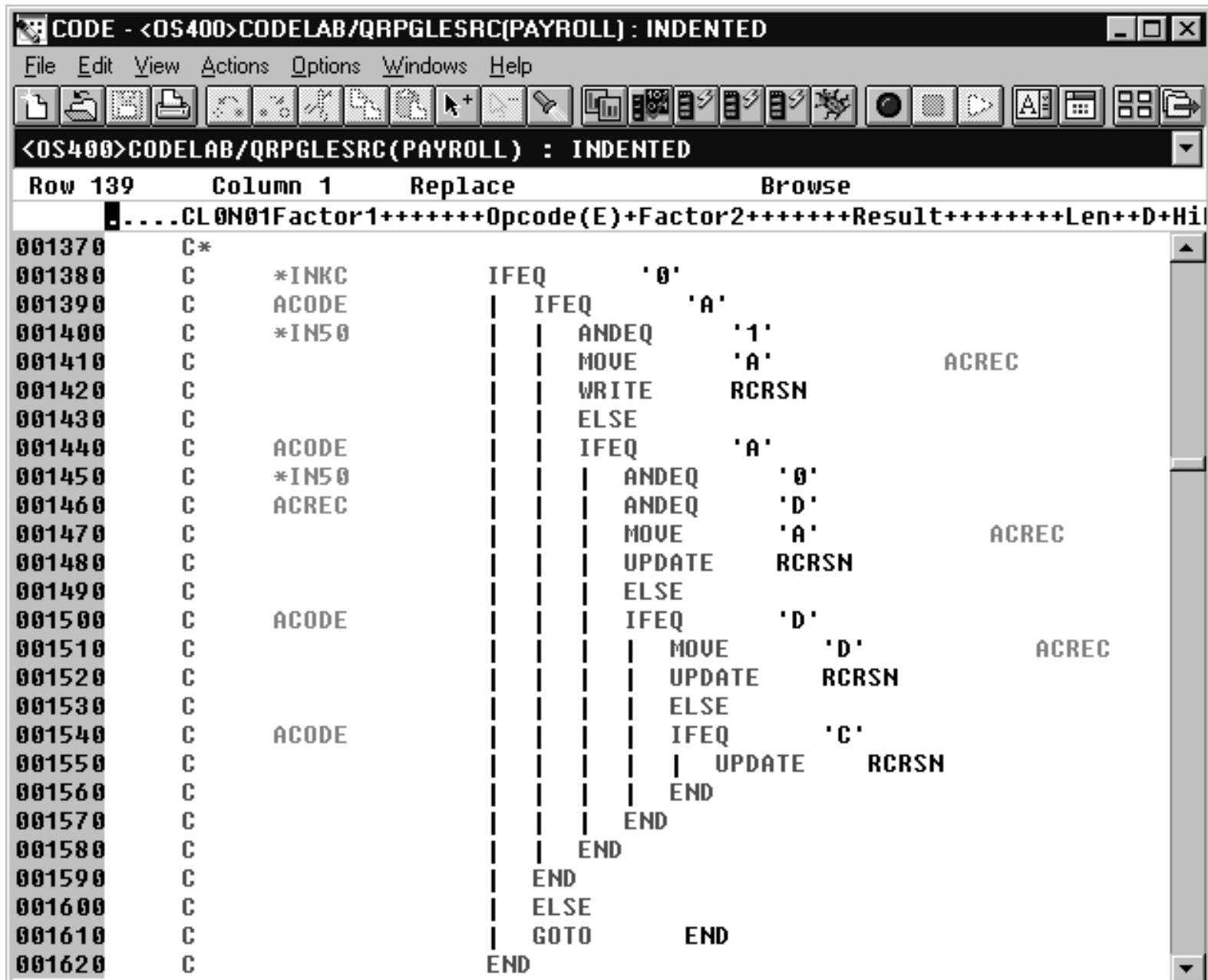
Multi-File Search

The screenshot shows the 'empapl - Multi-File Search' application interface. On the left, a search results tree lists files with columns for file type, name, and search criteria. The entry 'EMPAPL OREQ 'X'' is highlighted. Below the tree, a status bar reads 'Found 16 occurrences of 'empapl''. On the right, a preview window titled 'CODE - <OS400A>CODELAB/QRPGLESRC(PAYROLLG)' displays the contents of the selected file. The preview shows a list of rows with columns for row number, file name, and search criteria. Row 000352 is highlighted, showing 'EMPAPL OREQ 'X''. A grey arrow points from a text box 'Click to open file' to the highlighted row in the search results. Another grey box at the bottom right contains the text 'Search host libraries, directories, ADM parts'.



The Indent Function

iSeries AD, IBM Toronto



The screenshot shows a terminal window titled "CODE - <OS400>CODELAB/QRPGLESRC(PAYROLL) : INDENTED". The window contains a COBOL program with the following code:

```
....CL0N01Factor1+++++0pcode(E)+Factor2+++++Result+++++Len++D+Hi
001370 C*
001380 C *INKC IFEQ '0'
001390 C ACODE | IFEQ 'A'
001400 C *IN50 | ANDEQ '1'
001410 C | MOVE 'A' ACREC
001420 C | WRITE RCRSN
001430 C | ELSE
001440 C ACODE | IFEQ 'A'
001450 C *IN50 | ANDEQ '0'
001460 C ACREC | ANDEQ 'D'
001470 C | MOVE 'A' ACREC
001480 C | UPDATE RCRSN
001490 C | ELSE
001500 C ACODE | IFEQ 'D'
001510 C | MOVE 'D' ACREC
001520 C | UPDATE RCRSN
001530 C | ELSE
001540 C ACODE | IFEQ 'C'
001550 C | UPDATE RCRSN
001560 C | END
001570 C | END
001580 C | END
001590 C | END
001600 C | ELSE
001610 C | GOTO END
001620 C | END
```

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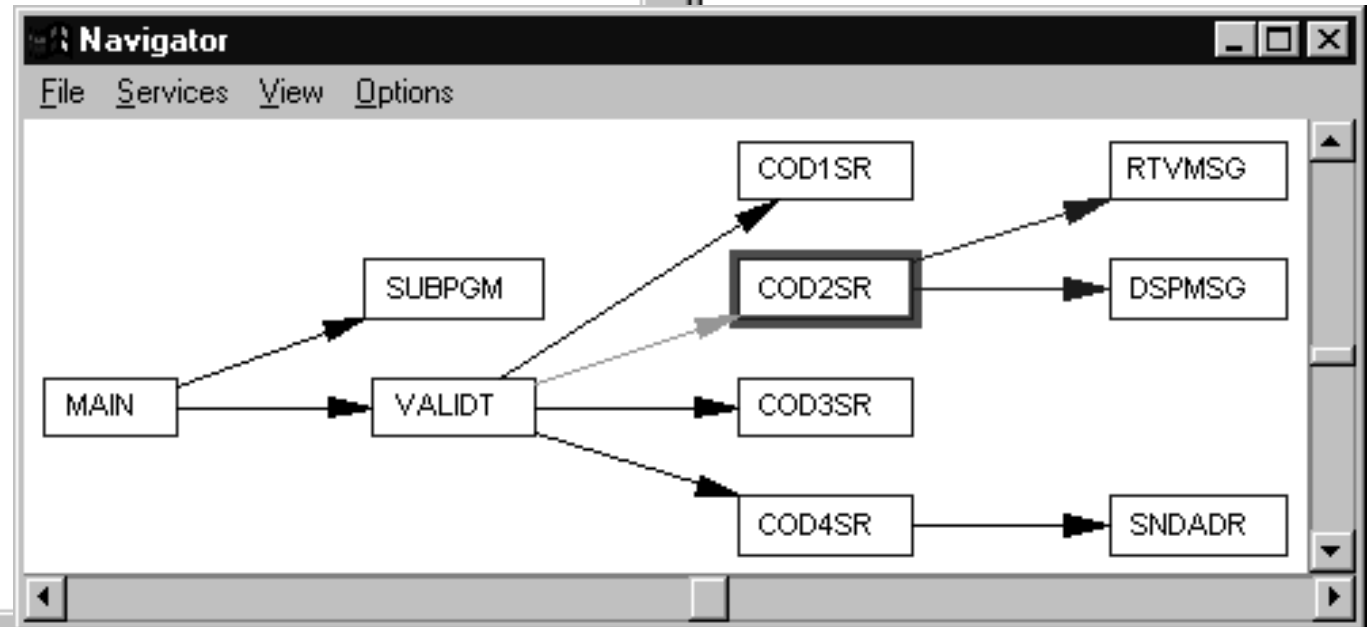


The Navigator

iSeries AD, IBM Toronto

Called functions

MAIN	SUBPGM
	VALIDT
	VALIDT
	SUBPGM
VALIDT	COD1SR
	COD2SR
	COD3SR
	COD4SR
COD1SR	
COD2SR	
	RTMSG
	DSPMSG



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Graphical Compare

iSeries AD, IBM Toronto

CODE - E:\ADTSWIN\LOCAL\samplev1.rpg: 2

File Edit View Actions Compare Options Windows Help

E:\ADTSWIN\LOCAL\samplev1.rpg: 2

Row	Column	Replace
163	1C 0N01N02N03Factor1+++0pcdeFacto
		C* Validate routine goes to
		C EXSR VAL
	MLACCT	CABEQ*ZE
	MLSRCH	CABEQ*BL
	MLCITY	CABEQ*BL
	MLSTAT	CABEQ*BL
	MLZIP	CABEQ*ZE
		C* Record is already added, pe
		C UPDATMLG
		C* Check error routine will
	*IN20	IFEQ '1'
	C* Status 01021 is a duplicate	
	STS	CABEQ010
		C MOVE 'DS
		C GOTO BAD
		C ENDF
		C GOTO PRO

E:\ADTSWIN\LOCAL\samplev1.rpg: 2

Row	Column	Replace
159	1C 0N01N02N03Factor1+++0pcdeFacto
		C* Validate routine goes to
		C EXSR VAL
		C* Record is already added, pe
		C UPDATMLG
		C* Check error routine will
	20	EXSR CHK
		C GOTO PRO
		C END
		C* If Chg type, validate field
	'2'	IFEQ ACT
		C* Validate routine goes to
		C EXSR VAL
		C UPDATMLG
		C* Check error routine will
	20	EXSR CHK
		C GOTO PRO
		C END

Inserted
lines

Deleted
lines

for the next generation of e-bu





★ Why program it?

- Need for a new editor function
- Repetitive task, fastpath key for heavily used function
- Tailor the editing environment for your shop

★ What can you do?

- Specify editor default settings
- Add editor functions and your own macros to the menus and toolbar
- Assign/re-assign keys and/or line commands to editor functions and your own macros
- Interact with the host via the CODESRV command

★ How do you do it?

- Write macros in REXX or Java + editor commands
- Use the 'profiles' to load in the macros.



Sample Editor Extensions

iSeries AD, IBM Toronto

- Many sample editor macros shipped with product
- Java examples
 - RPG IV Procedure SmartGuide
 - RPG IV D-Spec SmartGuide
 - RPG and Cobol Cross Reference Window
 - numerous more
- Source included too
 - ▶ See how its done, write your own!

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Procedure SmartGuide

iSeries AD, IBM Toronto

Actions **O**ptions **W**indows **H**elp

Issue edit command... Esc
Compare...

Keystroke recorder

SmartGuides Create procedure...
Create D-specification...

Syntax check c...

RPG Procedure SmartGuide

Start Parm1

Procedure name: GetCurrentDay

External name (EXTPROC):

Exportable for use by other code (EXPORT)

Purpose: Return current day as a string

Return a value

How many parameters? 1

<<Previous Next>> Final Cancel Help

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Procedure SmartGuide

iSeries AD, IBM Toronto

Procedure
prototype

Procedure
template

```
CODE - Untitled Document 6 *
File Edit View Actions Options Windows Help Extras
Untitled Document 6 *
Row 20 Column 60 Replace 1 change.
.....PName+++++.....B.....Keywords+++++.....Co
00001
00002 D*-----
00003 D* Prototype for procedure: GetCurrentDay
00004 D*-----
00005 D GETCURRENTDAY PR
00006 D DAY D DATFMT:(*YMD.)
00007
00008 P*-----
00009 P* Procedure name: GetCurrentDay
00010 P* Purpose: Return current day as a string
00011 P* Parameter: day =>
00012 P*-----
00013 P GETCURRENTDAY B
00014 D GETCURRENTDAY PI
00015 D DAY D DATFMT:(*YMD.)
00016
00017 C* Your calculation code goes here
00018
00019 C RETURN
00020 P GETCURRENTDAY E
```





D-Spec SmartGuide

iSeries AD, IBM Toronto

- A**ctions **O**ptions **W**indows **H**elp
- Issue edit command... Esc
- Compare...
- Keystroke recorder
- S**martGuides
 - Create procedure
 - Create D-specification
- Syntax check

1. Select options via GUI
2. D-Spec code generated in editor

RPG Definition Specification SmartGuide

Start Standalone

Attributes

Defined like another field (LIKE):

Type: **Packed Decimal**

Length: 7 (range 1 - 30)

Decimals: 2 (range 0 - 7)

Array? How many entries (DIM): 0

Array keywords

Keywords...

Other keywords

STATIC **INZ(*USER)** **INZ**

EXPORT **IMPORT**

ALTSEQ(*NONE) **NOOPT** **BASED**

No optimization alt+O

<<Previous Next>> Final Cancel Help

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CODE Program Generator

iSeries AD, IBM Toronto

CODE Program Generator

Options Tools Help

Server: OS400 Source: CODELAB/QRPGLESRC(PAYROLL) List...

Action

Label: CRTBNDRPG, CRTBNDRPG, CRTCBLMOD, CRTCBLPGM, CRTCLMOD, CRTCLPGM, CRTCMD, CRTCMOD, CRTDSPF, CRTICFF, CRTJVAPGM, CRTLF

Command: CRTBNDRPG

Associated profile: ILE RPG Compile/Bind

Add Change Remove Options...

Submit

Submit
compile to the
iSeries host

Change CRTxxx
command
options

Compile Option Notebooks

iSeries AD, IBM Toronto

ILE RPG - Create Bound RPG Program Options

Program | **Compile** | Data | Listing/Generation | Activation/Binding

Compiler Options

Debugging views	*ALL
Authority	*CMDDFT
User profile	*CMDDFT
Target release	*CMDDFT
Optimize	*CMDDFT
Enable performance collection	*FULL
<input checked="" type="checkbox"/> Profiling data	*CMDDFT
Define condition names	*CMDDFT

Add
Delete

CRTBNDRPG SRCFILE(&L/&F) SRCMBR(&M) PGM(&L/&M)
REPLACE(*YES) DBGVIEW(*ALL) ENBPFRCOL(*FULL)

OK Cancel Default Help

► Create your own command labels for different compile options

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CODE Designer

Not your father's SDA!

The screenshot displays the CODE Designer interface. At the top, there are menu items like 'EMPMNT' and 'EDEPT', and a toolbar with various icons. The main editor window shows a record for 'PRG01' with fields like 'Number', 'Name', 'Category', 'Department', 'Location', 'USRID', and 'Normal week hours'. A 'Record properties' dialog is open, showing options for 'Title' (checked) and 'Referenced field'. The dialog also has sections for 'Alignment', 'Position', 'Attributes', and 'Color'. A context menu is visible over the editor, listing actions like 'Copy', 'Paste', 'Find selection', 'Deselect all', 'Filter selection', and 'Show all'. The bottom of the screen shows an 'Error list' with the message: 'DDS7596S Constant field requires valid keywords.'

EMPMNT EDEPT 5 I O B

Inval Dept 0

1 PRG01 Time Reporting
2 Employee Master M
3
4
5 Number 666666 Name BBBBBBBB
6
7 Category B
8 Department BBBBBB
9 Location BBBBBBBB
10 USRID BBBBBBBB
11 Normal week hours 999
12 Time Reporting
13
14 Curr
15 Mas
16
17
18
19

Record properties

Ctrl Keywords CA/CF Window Title Border Style

Title

Defined as text Select Supplier

Referenced field

Alignment Position Attributes Color

WDWTITLE>(*TEXT 'Select Supplier') (*COLO

Copy Ctrl+C
Paste Ctrl+V
Find selection
Deselect all
Filter selection
Show all Ctrl+A

Error list
DDS7596S Constant field requires valid keywords.



● Graphical design tool for DDS

- display files - screens
- printer files - reports
- physical files - databases

● Powerful intuitive interface

- ▶ Lets novice create DDS quickly and easily
 - while giving expert access to all the features of DDS
- ▶ WYSIWYG graphical design
 - Drag/drop ease
- ▶ Properties notebook
 - full power of DDS exposed
- ▶ Integrated verifier
 - Catch all your errors locally
- ▶ Explorer-like browsing of DDS hierarchy

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Design Page - WYSIWYG layout

iSeries AD, IBM Toronto

Tab for each screen/report

Toolbar for visual display and modification of attributes

Drag/Drop from Palette

5>CODELAB/QDDSSRC(MSTDSP) - CODE Designer

File Edit View Insert Selected Tools Help

Details MAIN_MENU EMP_SELECT EMP_MAINT PRJ_SELECT PRJ_MAINT Source Listing

EMPMNT EMPMNT ENAME 30 I O B

Ignore all indicators

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

PRG01 Time Reporting System Employee Master Maintenance MM/DD/YY HH:MM:SS

Number 666666 Name

Category Department Location USRID

Normal week hours 999 g. 40.0 enter 400)

Time Reporting History

	Current Month	Year To Date	Prior Year
Project Related	66666	6666666	6666666
Non Project Related	66666	6666666	6666666

5,48

Properties Notebooks

iSeries AD, IBM Toronto

The screenshot displays the 'Record properties' dialog box for a field named 'Error Window'. The dialog is divided into several tabs: Basics, Window, Title, Border, CA/CF, and Styles. The 'Title' tab is active, showing options for 'Defined as text' (selected) and 'Referenced field'. The 'Title' field contains 'Error Window'. Below this, there are sections for 'Alignment', 'Position', 'Attributes', and 'Color'. A list of properties is shown, including 'WDWTITLE(*TEXT 'Error Window') (*DSPA 01 WDWTITLE(*COLOR RED))' and 'WDWTITLE(*COLOR YLW)'. Buttons for 'Add', 'Change', and 'Delete' are present. The 'Basic' tab shows a grid of fields (F1-F15) and a 'Condition' section. The 'Style' tab shows options for 'Key', 'Allow NULL values', and 'Type'. The 'Default value' is set to '345' and the 'Description' is 'DATE FIELD'. A status bar at the bottom indicates 'The CA/CF keyword is specified at another level.'

All of the power of DDS is abstracted in an intuitive highly visual user interface

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Windows Explorer for DDS

iSeries AD, IBM Toronto

The screenshot shows the CODE Designer application window titled '<TORAS06M>CODELAB/QDDSSRC(MSTDSP) - CODE Designer'. The interface includes a menu bar (File, Edit, View, Insert, Selected, Tools, Help) and a toolbar with various icons. On the left is the DDS Tree, which is expanded to show the 'EMPMNT' record. The main area is divided into two panes. The top pane, titled 'Details', shows a table of fields for the 'Record EMPMNT fields'. The bottom pane, titled 'Selected DDS', shows the source code for the selected DDS.

Field	Positi...	Len...	Type	Shift	Usa...	Reference
A 'PRG01'	2, 5	5	Text const...			
A 'Time R...System'	2, 30	21	Text const...			
*DATE	2, 70	6	Date const...			
*TIME	3, 70	6	Time const...			
A 'Employ...enance'	3, 27	27	Text const...			
A 'Number'	5, 14	6	Text const...			
EMPNO	5, 22	1	Alphanumeric	A - Alphanum		
A 'Name'	5, 31	4	Text const...			
ENAME	5, 37	1	Alphanumeric	A - Alphanum...	BOPT	RCEMP/ENAME EID

```
A          ENAME      R          B  5  37REFFLD(RCEMP/ENAME *
A  90                                     DSPATR(PR)
```

Details page

Settings for WebFacing

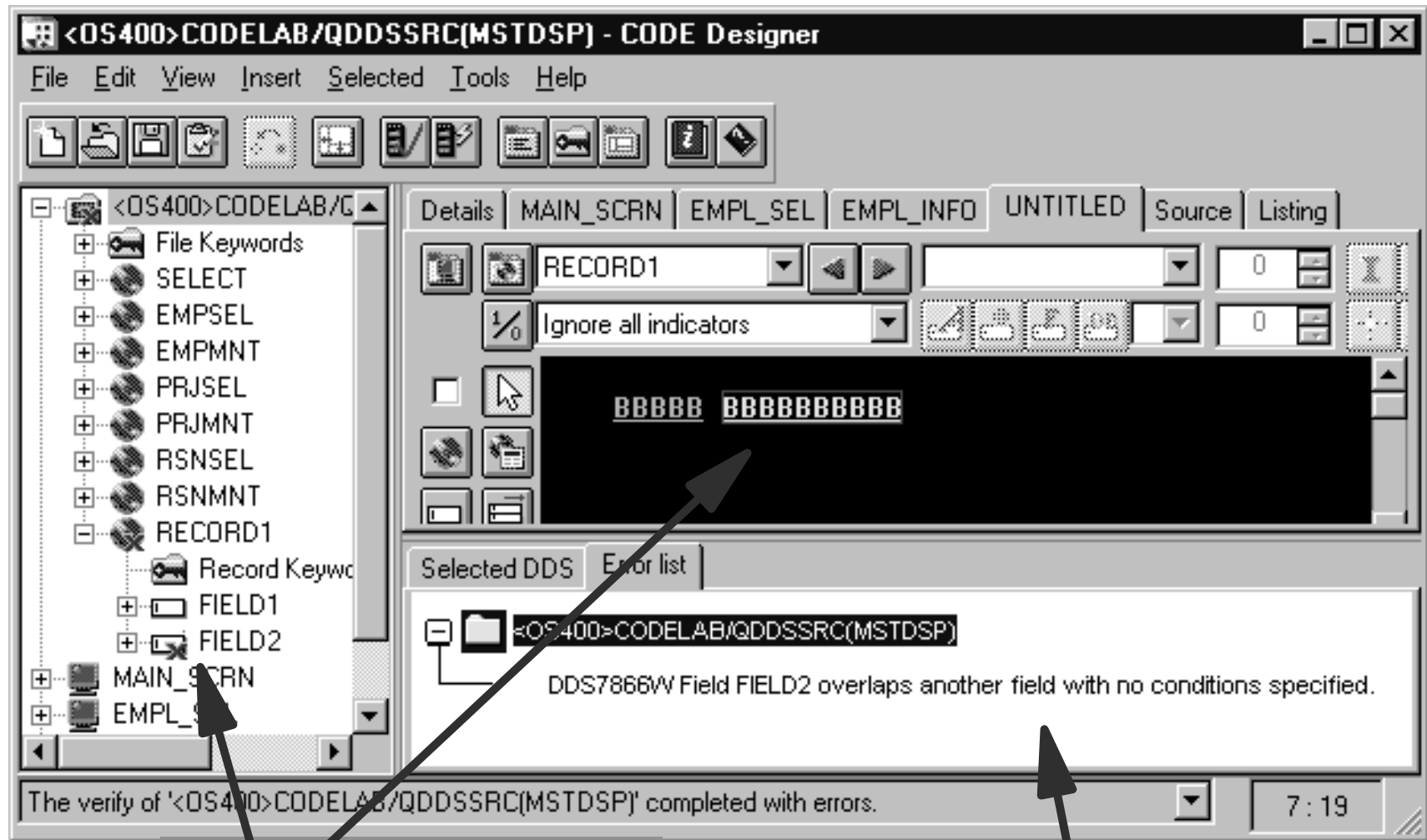
DDS Tree

Selected DDS source page



Designer - Program Verify

iSeries AD, IBM Toronto



Errors highlighted

Error list page

► Same DDS verifier as used by editor



Integrated DDS Editor

iSeries AD, IBM Toronto

Single click back to design mode

Single click verify

Full power of editor

Integrated error feedback

The screenshot displays the Integrated DDS Editor interface. At the top, the window title is '015>CODE LAB/QDDSSRC(REFMST) - CODE Design'. Below the title bar is a menu bar with 'Edit', 'View', 'Insert', 'Selected', 'Tools', and 'Help'. A toolbar contains various icons for file operations and editing. The main editor area shows a code listing with line numbers on the left. The current line is 13, column 52, with a message 'Replace 1 change.'. The code is as follows:

```
.....A.....Functions+++++++
00050 A* TIME REPORTING SYSTEM FILES. THESE DEFINITIONS WILL BE REFERE
00060 A* BY WHEN CREATING THE SPECIFIC PHYSICAL AND LOGICAL FILES AS WE
00070 A* BY SDA WHEN CREATING DISPLAY FORMATS.
00080 A*****
00090 A R RCREF TEXT('DATA BASE REFERENCE')
00100 A*%TS DD 19990204 231630 REINHARD REL-U3R2M2 5763-CL2
00110 A* COMMON FIELDS
00120 A ACREC 1 B TEXT('ACTIVE RECORD CODE')
00130 A COLHDG(ACREC )
00130DDS7508E Closing apostrophe missing for quoted string.
00140 A DATEFL 6 0B TEXT('DATE FIELD')
```

Below the editor is an error feedback window showing the following messages:

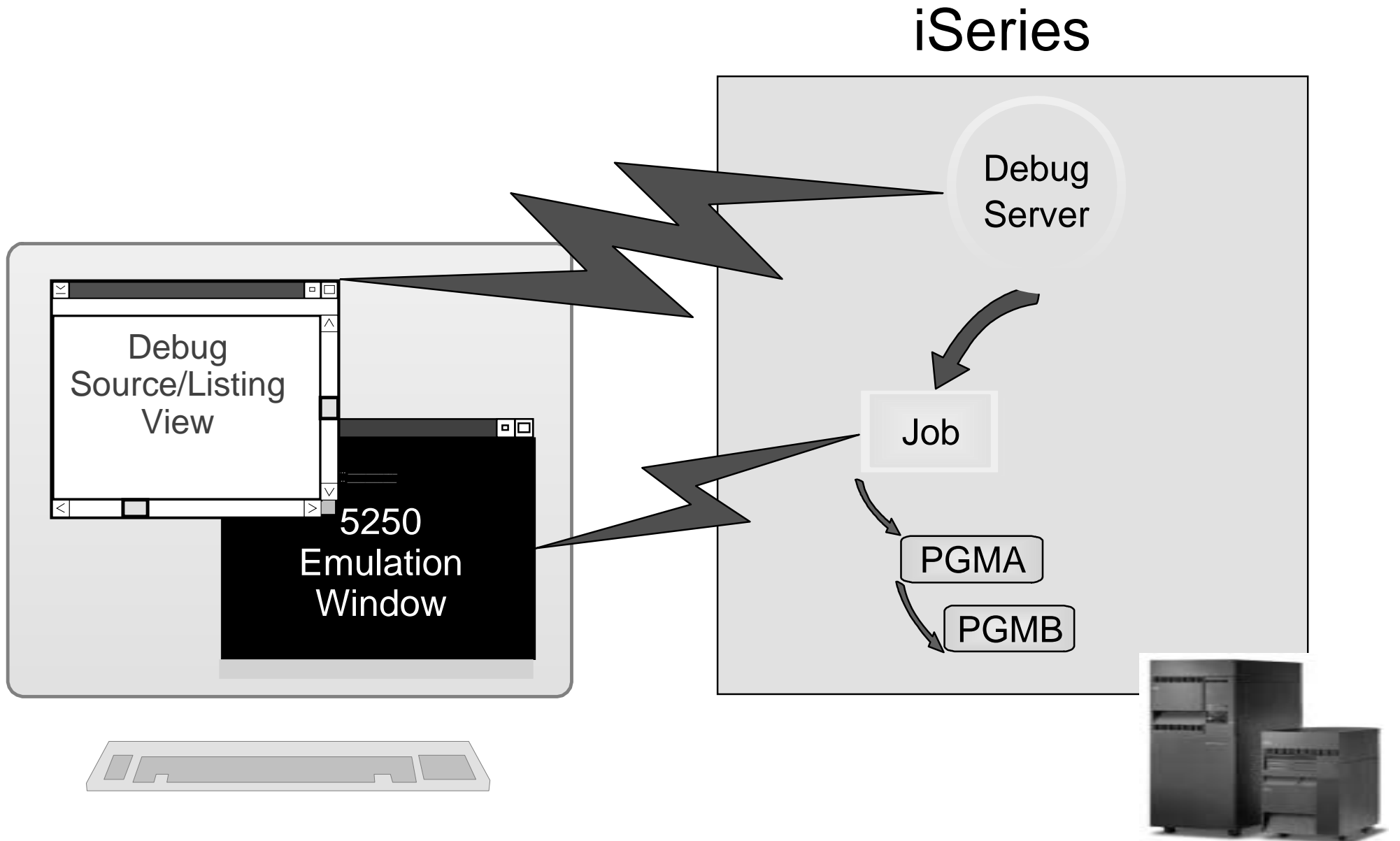
- DDS7520E Keyword COLHDG ignored because of error in list of values.
- DDS7508E Closing apostrophe missing for quoted string.

At the bottom of the window, a status bar indicates: 'The verify of '<T015>CODELAB/QDDSSRC(REFMST)'' completed with errors.'



Debugger Architecture

iSeries AD, IBM Toronto



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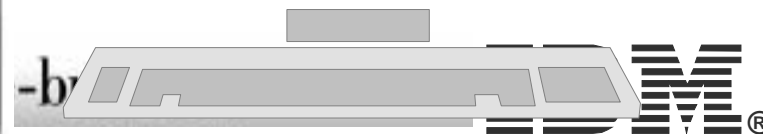
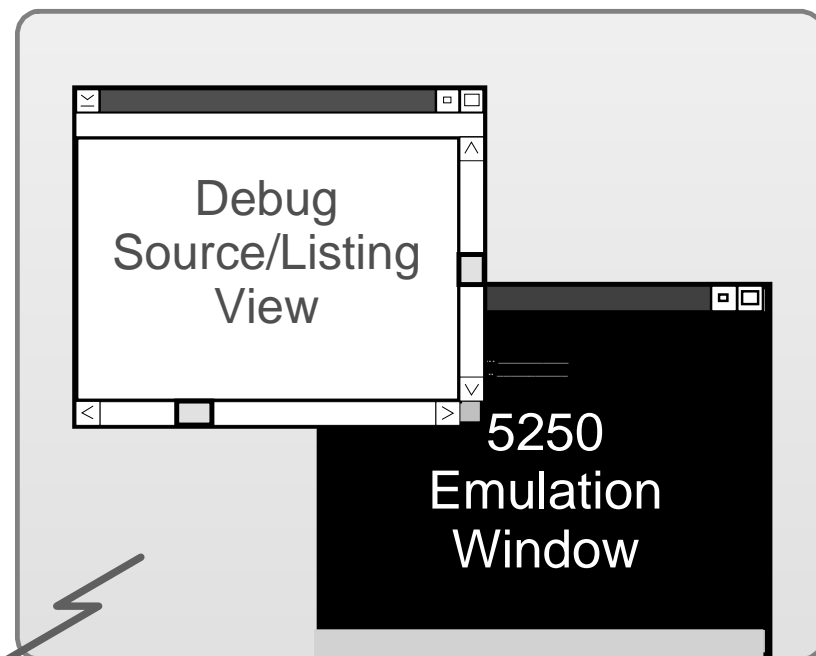


IBM Distributed Debugger

iSeries AD, IBM Toronto

- ▶ 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
- ▶ Attach to a running application
 - ▶ Application runs on the host

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Debugger Window

iSeries AD, IBM Toronto

The screenshot displays the IBM Distributed Debugger window for the program CODELAB01/PAYROLLG:0. The interface includes a menu bar (File, View, Selected, Debug, Source, Breakpoints, Monitors, Window, Help) and a toolbar with buttons for Step Over, Step Debug, Run, Halt, Terminate, and Restart. The main window is divided into several panes: Stacks, Breakpoints, Programs, Monitors, and Locals. The Breakpoints pane shows two line breakpoints for the source CODELAB01/PAYR. The Source pane displays the following code:

```
Thread 1: *PGM CODELAB01/PAYROLLG
47 C EXSR MAIN
48 C MOVE '1' *INLR
49 * MAIN SUBROUTINE
50 C MAIN BEGSR
51 C BEGIN TAG
52 C MOVE '0' *IN60
53 C MOVE *BLANKS EMESS
54 C MOVE *BLANKS EMPAPL
55 C MOVE *BLANKS PRJAPL
56 C MOVE *BLANKS RSNAPL
57
58 C* branch to END TAG; ELSE edit SELECT format.
59 C*
60 C SELTAG TAG
61 C EXFMT SELECT
62 C *INKC IFEQ '1'
63 C GOTO END
64 C ELSE
65 C
66 C EXSR EDTTST.
```

A context menu is open over line 57, showing options: Set Breakpoint F9 and Run to Location. Annotations include:

- An arrow pointing to the checked breakpoint at line 52, labeled "Active breakpoint".
- An arrow pointing to the unchecked breakpoint at line 61, labeled "Disabled breakpoint".
- An arrow pointing to the context menu, labeled "Breakpoint context menu".





Monitoring Variables

iSeries AD, IBM Toronto

The screenshot shows the IBM Distributed Debugger interface. The main window displays source code for Thread 1: *PGM EW37TEST/DBGDEMO. The code includes several Z-ADD, CALLP, and EXSR instructions. A context menu is open over line 35, with options: Add to Program Monitor, Add to Storage Monitor, Copy to Clipboard, Find, Find Next (F3), and Find Procedure. The Find Procedure option is highlighted with a red circle, and an arrow points from a label 'Variables context menu' to it. In the bottom-left pane, the 'Monitors' tab is active, showing two monitored variables: NUM = -234 and A = 0000. An arrow points from a label 'monitored variables' to this pane.

monitored variables

Variables context menu

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✓ Remote Systems Explorer Perspective

- Drill-down or filtered access to remote:
 - ▶ QSYS Libraries, Objects and Members
 - ▶ IFS Folders and Files
 - ▶ Linux, Unix, Windows and Local Folders and Files
- Remote command execution of
 - ▶ QSYS Commands and QSHELL Commands
 - ▶ Linux, Unix and Windows Commands
- Exploration of Jobs in QSYS

✓ iSeries Projects

- For structured, project-based development
- Local team-sharable project
- Holds source files, members and save files
- Each project associated with an iSeries and library
 - ▶ Push action to copy local files to associated library

- ✓ Remote Systems Explorer Perspective
 - Manages connections to remote systems
 - ▶ Where you create/manage connection information
 - ▶ Connections subsequently used in all iSeries tools
 - ▶ Start by using the 'New Connection' wizard
 - ✓ Connection appears in tree view
 - ✓ Expand it to see "subsystem" -> functional groupings

RSE Connections

iSeries AD, IBM Toronto

The screenshot displays the 'Remote Systems Explorer - Development Studio Client' interface. On the left, the 'New Connection Wizard' is open, showing the 'Remote System Connection' step. The wizard fields are filled with: Parent profile: coulthar, Connection name: My iSeries, System type: iSeries, Host name: toronto, Default User ID: coulthar, and Description: (empty). Below the wizard are buttons for '< Back', 'Next >', and 'Finish'. An arrow points from the 'Finish' button to the 'My iSeries' node in the 'Remote Systems' tree. The tree shows a hierarchy: Remote Systems > Local > My iSeries > iSeries Objects, iSeries Commands, iSeries Jobs, and IFS Files. Below the tree is a 'Properties' window with a table of connection details.

Property	Value
Connection status	No subsystems conn
Default User ID	COULTHAR (Inherite
Description	
Host name	TORONTO
Name	My iSeries
Number of children	4
Parent profile	coulthar
Remote system type	iSeries
Type	Connection

At the bottom right, there is a 'Commands' window with a list of commands and a dropdown menu showing 'My iSeries' and 'iSeries Comman'.

New Connection Wizard

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Remote Systems Perspective

iSeries AD IBM Toronto

The screenshot shows the 'Remote Systems Explorer - Development Studio Client' window. The main area displays a tree view of remote systems: QUSRSYS, WSSLABXX, and CODELABXX. Under CODELABXX, several files are listed, including CLR1.*pgm.clle, PAYROLLG.*pgm.rpgle, STRCODECPP.*pgm.c, EMPMST.*file.pf-dta, MSTDSP.*file.dspf, PRJMST.*file.pf-dta, QCLSRC.*file.pf-src, and QDDSSRC.*file.pf-src. A context menu is open over the 'EMPMST.pf' file, showing options like 'Open With' (with sub-options: LPEX Editor, CODE Editor, CODE Designer), 'Rename', 'Copy', 'Move', 'Delete', 'Compile', 'Compile (No Prompt)', and 'Properties'. A 'Properties' window is also visible at the bottom, showing the 'Name' property set to 'MSTDSP'. The bottom status bar includes 'Open new view' and a set of tabs: 'iSeries Job Log', 'Tasks', 'Commands', and 'Outline'. The 'Commands' tab is active, showing a dropdown menu with 'S400A' and 'iSeries Command'.

Expand filter to see objects resulting from resolution of filter

Actions available in the context menu depend on object type





RSE Customization

iSeries AD, IBM Toronto

✓ Library Filters

- To view groups of libraries.

✓ Object Filters

- To view one or more types of objects in one or more libraries.

✓ Member Filters

- To view one or more member types in one or more files in one or more libraries.

✓ User Actions

- Add an action to the popup menu for all objects or one specific object type.



CODE Summary

iSeries AD, IBM Toronto

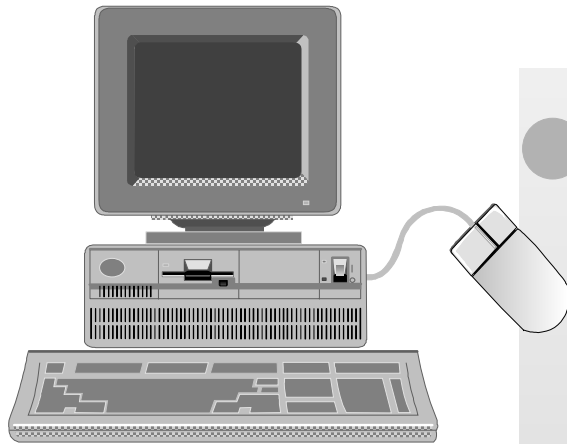
- **IBM's follow-on to SEU, RLU, SDA**
- **New world, new servers, new tools!**
 - ▶ Much higher productivity
 - ▶ Much more fun programming again
 - ▶ Much easier to attract/retain talent
 - ▶ Much more flexibility
 - **Work at home**
 - **Tailor extensively to suit your needs**
 - ▶ Much easier transition to future
 - **Today: Launch capability directly from RSE**
 - **Tomorrow: Full Integration into WDS*c* workbench**
 - RPG I V, CBL, I LE, GUI , Web, Java, XML, . .

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CODE - What you need

iSeries AD, IBM Toronto



● All you need is:

- ▶ Windows 98/NT/2000/XP
- ▶ Emulator of choice
- ▶ Web browser to view help
- ▶ Pentium II processor
- ▶ CODE 128MB, CODE with workbench 256MB
- ▶ 1.5 GB disk

● TCP/IP

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Additional Information

iSeries AD, IBM Toronto

- homepage

- ▶ www.ibm.com/software/ad/iseriess

- Education

- ▶ S6186 CODE/400 for iSeries -- Basic (2 days)

- ▶ S6205 CODE/400 for iSeries -- Advanced (1 day)

- ▶ S6286 iSeries Application Development using WDSsc for iSeries -- Basic (2 days)

- Newsgroup

- ▶ <news://news.software.ibm.com/ibm.software.code400>

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iSeries & WebSphere Resources & Deliverables

WebSphere Development Studio for iSeries
<http://www-3.ibm.com/software/ad/wds400/>

iSeries site
www.iseries.ibm.com/

iSeries WebSphere Application Server
<http://www-1.ibm.com/servers/eserver/series/software/websphere/wsappserver/>

PartnerWorld for Developers, iSeries & WebSphere
<http://www.iseries.ibm.com/developer/websphere/>

IBM eServer Solutions
<http://www-1.ibm.com/servers/eserver/series/solutions/>

iSeries e-business Solutions
<http://www-1.ibm.com/servers/eserver/series/ebusiness/>

iSeries B2B Solutions
<http://www-1.ibm.com/servers/eserver/series/btob/>

Connect for iSeries
<http://www-1.ibm.com/servers/eserver/series/btob/connect/v11high.html>

WebSphere Commerce Suite for iSeries
<http://www-1.ibm.com/servers/eserver/series/ebusiness/wcs51.html>

iSeries and e-commerce
<http://www-1.ibm.com/servers/eserver/series/ebusiness/ecommerce.htm>

iSeries HTTP Server
<http://www-1.ibm.com/servers/eserver/series/software/http/index.html>

iSeries and WebSphere References
<http://www.as400.ibm.com/developer/java/solutions/jjem.html>
<http://www2.software.ibm.com/casestudies/swcsweb.nsf/platform>

iSeries Solution Finder
<http://www.iseries.ibm.com/btobpartner/>

iSeries & Domino
<http://www-1.ibm.com/servers/eserver/series/domino/>

Dedicated Server for Domino
<http://www-1.ibm.com/servers/eserver/series/domino/dsd.htm>

Workload Estimator for iSeries, WAS, WCS & Domino, HTTP Server, Java, etc.
<http://as400service.ibm.com/estimator/>

iSeries Custom Technology Center
<http://www-1.ibm.com/servers/eserver/series/service/ctc/>

iSeries Technical Support
<http://as400service.ibm.com/>

iSeries Technical Studio
<http://www.as400.ibm.com/tstudio/>

1st Install for iSeries & WebSphere Application Server
<http://www.iseries.ibm.com/developer/websphere/assistance.html>

iSeries ToolsNet (Tools & Middleware)
<http://www.iseries.ibm.com/developer/tools/>

iSeries & Services Network
<http://as400service.ibm.com/supporthome.nsf/document/19251245>

iSeries e-business Handbook (SG24-5694-01)
<http://www.redbooks.ibm.com/abstracts/sg245694.html>

WebSphere Commerce Suite With Back-End Order Mgmt.
<http://ibm.com/redbooks>

iSeries Technology Center
<http://www.iseries.ibm.com/service/itc/ebiz.htm>

iSeries University
<http://www-3.ibm.com/services/learning/community/as400/>

iSeries & WebSphere Resources & Deliverables

WebSphere Application Server Overview

<http://www-4.ibm.com/software/webservers/appserv/>

WebSphere Commerce Suite

www-4.ibm.com/software/webservers/commerce/

WebSphere Payment Manager

www-4.ibm.com/software/webservers/paymgr/

MQSeries

www.ibm.com/software/ts/mqseries

iSeries & WebSphere Documentation

Redbooks & Red Pieces

Form Numbers/Web Sites

Building iSeries Applications for WebSphere Advanced Edition SG24-5691

Building Java Applications for the iSeries with VisualAge for Java SG24-6245

Integrating WCS with Domino Back-End Applications

<http://ibm.com/redbooks> (search for REDP0141)

Java & WebSphere Performance on iSeries

- <http://publib-b.boulder.ibm.com/Redbooks.nsf/RedpieceAbstracts/sg246256.html?Open>
- iSeries Application Development Directions white paper is now available
- <http://www.iseries.ibm.com/developer/tools/documents/addir/index.html>
- Connect for iSeries with WebSphere Commerce Suite Red Paper
- <http://www.redbooks.ibm.com/redpapers/pdfs/redp0127.pdf>

Tools for Application Reface and Redesign

- <http://www.as400.ibm.com/developer/comm/pidtechpapers.html?Tools>
- Introduction to Enterprise JavaBeans for AS/400 SG24-5192-00
- Web enabling AS/400 Applications with WebSphere Studio SG24-5634-00
- Building AS/400 Applications with WebSphere Standard Edition 2.0 SG24-5635-00
- Building AS/400 C/S Apps with Java SG24-2152-02
- Building AS/400 Internet-based applications with Java SG24-5337-00

IBM Redbooks

<http://www.redbooks.ibm.com/>

iSeries Nation

<http://www-1.ibm.com/servers/eserver/series/announce/form.html>