



THE NEW POWER EQUATION

Rational Developer for System i - RDi
Remote System Explorer

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Agenda

- Remote System Explorer (RSE)
 - Getting started
 - Accessing libraries, objects, and members
 - Remote Systems LPEX Editor
 - Other cool (and useful) features

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What is the RSE?

- **Application Development Tools** for RPG and COBOL developers
 - Tightly integrated set of tools
 - Modern, graphical, workstation based tools
 - PDM / SEU like features to make transition easier
- Remote access to i development resources
 - Libraries, objects and members
 - CL commands
 - Jobs
 - Integrated file system
- Replacement for SEU/PDM and CODE/400
 - But so much more than just a replacement
- A "perspective" inside of RDi or RDi SOA

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Why the RSE?

- Integrated set of tools for developing i applications
 - Tools based on Eclipse open source IDE
 - RPG, COBOL, DDS, CL
 - Integrated with change management systems
 - Open source tools
 - Vendor tools
- Improve productivity for native development
 - Closely integrated edit, compile, run / debug experience
 - Tools to help better understand large applications
 - Setup and customize development environment based on projects and individual preferences
- Skills transfer from RSE to other technologies
 - Learn the Workbench tools with RPG / COBOL development
 - Then branch into Web, XML and Web Services development using the same tools platform

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Remote Systems Explorer Perspective



Name	Type	Attribute	Text	Status
CLC1	*PGM	CLLE	debuggable, calls Payroll, parm workstation num	OK
CLR1	*PGM	CLLE	debuggable, calls Payroll, parm workstation num	OK
MYCOMPILE	*PGM	CLLE		OK
PAYROLLD	*PGM	CBLE	no errors	OK

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Agenda

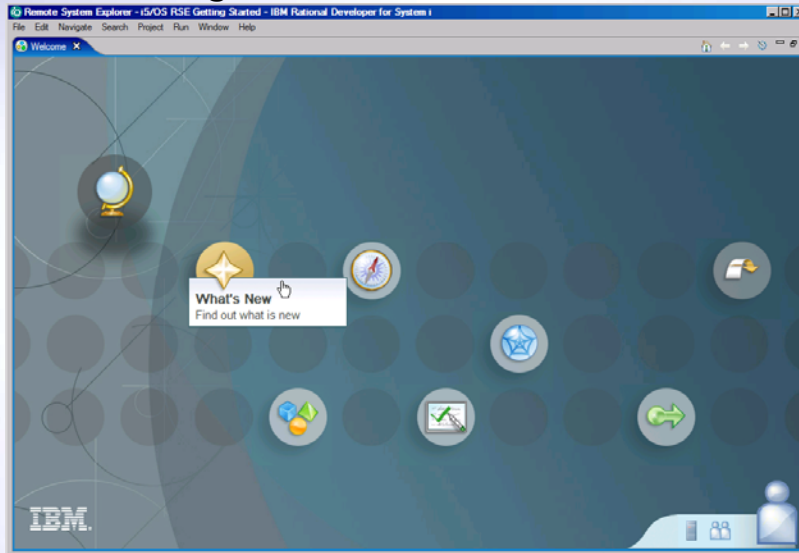
- Remote System Explorer (RSE)
- ★ Getting started
- Accessing libraries, objects, and members
- Remote Systems LPEX Editor
- Other cool (and useful) features

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Welcome Page



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Getting Started

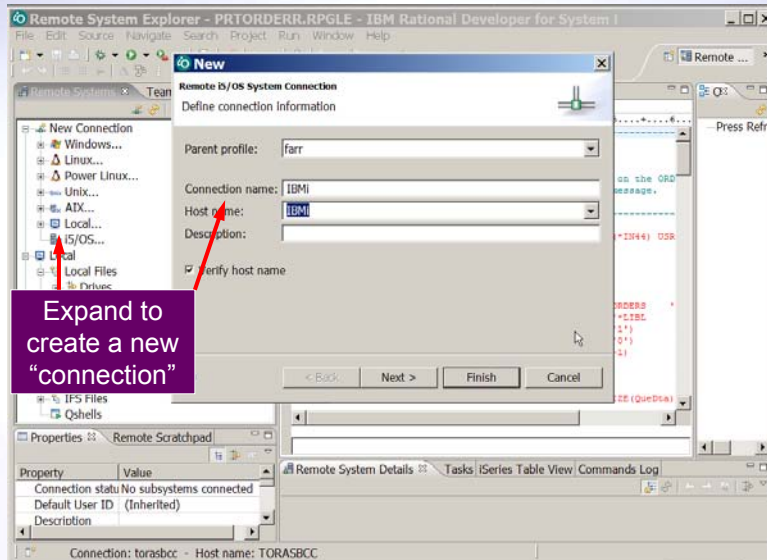
- Create a connection to your iSeries
- Setup library list (if necessary)
- Drill down to source member
- Edit source member using Remote Systems LPEX Editor
- Save changes and Compile

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Create a Connection to i



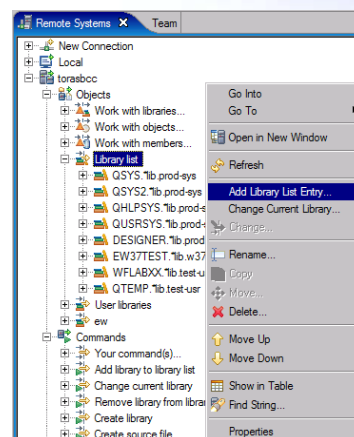
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Setup Library List (if necessary)

- Expand the new connection shows “subsystems”
 - Represent different resources you can access on the server
- Expanding a subsystem shows predefined filters
 - Subsets of resources
 - Create your own (more on this later)
- Objects > Library List
 - Shows library list for connection
 - Right click on Library List filter to add additional libraries
 - Right click on libraries in the list to:
 - Remove from LIBL
 - Move [up | down | within] LIBL



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Drill Down To Source Member

Objects

Members

Actions are "context sensitive" → different actions appear based on what is currently selected

Properties view shows details for selected object or member

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Editing Source Members

ALTSEQ(*NONE)

When the ALTSEQ(*NONE) keyword is specified, the alternate collating sequence will not be used for comparisons involving this field, even when the ALTSEQ keyword is specified on the control specification. ALTSEQ(*NONE) on Data Definition specifications will be meaningful only if one of ALTSEQ(*SRC) or ALTSEQ(*EXT) is coded in the control specifications. It is ignored if this is not true.

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Compiling (and Fixing Errors)

Launch compiles directly from editor or pop-up menu.

Compile errors automatically downloaded and shown in Error List

The screenshot shows the 'Remote Systems' tree on the left with a context menu open over a file. The menu includes options like 'Go To', 'Open With', 'Browse With', 'Rename...', 'Copy', 'Move', 'Verify (Prompt)...', 'Compile', 'Compile (Prompt)', 'User Actions', 'Add To iSeries Project...', 'Make Available Offline', 'Debug (Service Entry)', 'Compare With', and 'Properties (F4)'. The 'Compile (Prompt)' option is highlighted. Below the menu, a table of compilation errors is visible:

ID	Message	Se...	Line	Location	
RNS9308	Compilation stopped. Severity 30 errors found i...		50	0	WDSCDEMO\QRPGL...
RNF7030	The name or indicator DSPFN is not defined. ...		30	105	WDSCDEMO\QRPGL...
RNF7503	Expression contains an operand that is not defi...		30	105	WDSCDEMO\QRPGL...
RNF2013	The Device entry is not PRINTER, DISK, SEQ, ...		20	28	WDSCDEMO\QRPGL...
RNF7031	The name or indicator CUSTNAME is not refere...		00	71	WDSCDEMO\QRPGL...
	... is not referen...		00	72	WDSCDEMO\QRPGL...
	AME is not refere...		00	73	WDSCDEMO\QRPGL...
	s not referenced.		00	5	WDSCDEMO\QRPGL...

Double clicking on an error opens editor and positions to the line

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Debug

Debugging covered in another session

Select program to debug

Select method to launch program

Different ways to run and debug the program

The screenshot shows the 'Remote Systems' tree with a 'Library list' expanded. A context menu is open over a program, showing options like 'Go To', 'Show in Table', 'Refresh', 'Expand', 'Collapse', 'Rename...', 'Copy', 'Paste', 'Move...', 'Delete...', 'Update...', 'Change...', 'Save...', 'Restore...', 'User Actions', 'Run As', 'Run (Prompt)(B)', 'Debug (Service Entry)', 'Debug As (J)', 'Debug (Prompt)(L)', 'Batch', 'Interactive', and 'Multi-threaded'. The 'Batch' option is highlighted.

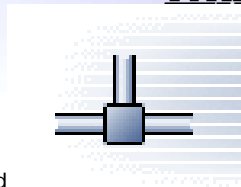
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Agenda

- **Remote System Explorer (RSE)**
 - Getting started
 - ★ • Accessing libraries, objects, and members
 - Remote Systems LPEX Editor
 - Other cool (and useful) features

What is an RSE "Connection"?

- Represents a remote system
 - Given a display name
 - Multiple connections to one system permitted
- Each connection can be customized with its own:
 - i user profile
 - Library list and environment variables
 - Command execution parameters
 - Object library for compiles
 - JOBDD for batch compiles / commands
 - Filters and filter pools
- Think of a connection as a development project instead of a remote system
 - Order Entry Application
 - Inventory Management Application

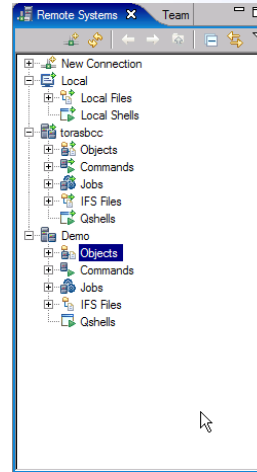


Accessing Libraries, Objects and Members

- Remote Systems View
 - Shows all connections
 - Allows drill down access to remote objects

- Expanding a connection shows “subsystems”
 - These are not i job subsystems
 - Just different parts of the i you can access
 - Drill down to access

- Subsystems
 - Objects
 - Commands
 - Jobs
 - IFS files
 - Qshell



Drilling Down

- Start using the RSE by just expanding:
 - Expand Library list to see libraries on library list
 - Expand a library to see all objects in it
 - Expand a source file to see members in it
 - Expand Home directory to see folders in \home in IFS
 - Expand a folder to see all folders and files in it
 - And so on

- Often this results in lists that are very large
 - Difficult to scroll through thousands of items in a list
 - Keep lists small, less than one hundred at most

Introducing Filters

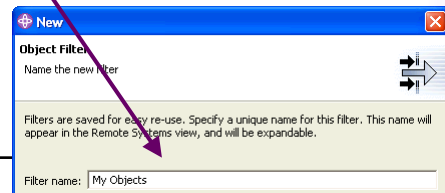
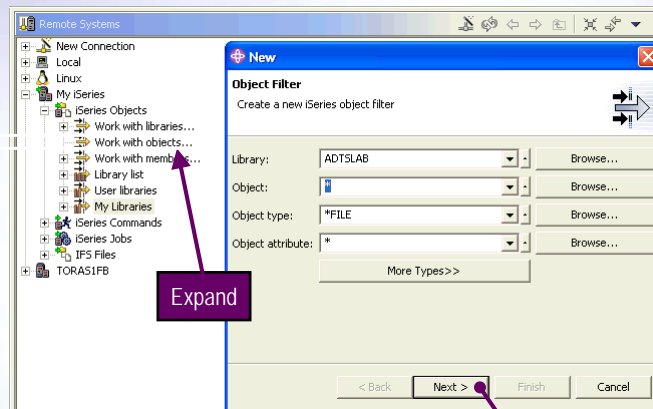
- To see a subsetted list
 - Use criteria like generic names, types and attributes
 - All subsystems (nodes under a connection) support **“filters”**
 - These allow fine-grained control over what is shown in the RSE.
- To create a filter, right click on any subsystem and select New -> xxx
 - Objects -> New -> Library Filter, Object Filter, Member Filter
 - Commands -> New -> Command Set
 - Jobs -> New -> Job Filter
 - IFS Files -> New -> Filter
- Or use the fastpath Work With XXX... prompts under Objects

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Object Filters



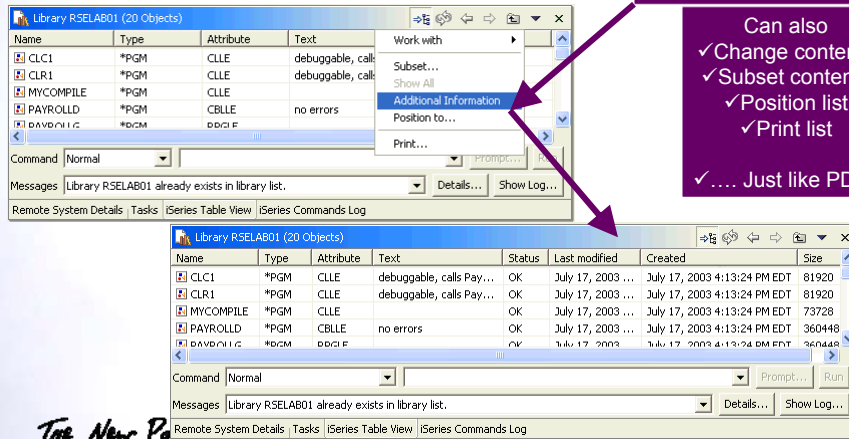
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Object Table View

- Table view of resources showing additional attributes
- Select "Show in Table" from the pop-up menu of any filter, library, or file in the Remote Systems View

✓ Use local pulldown to see additional columns

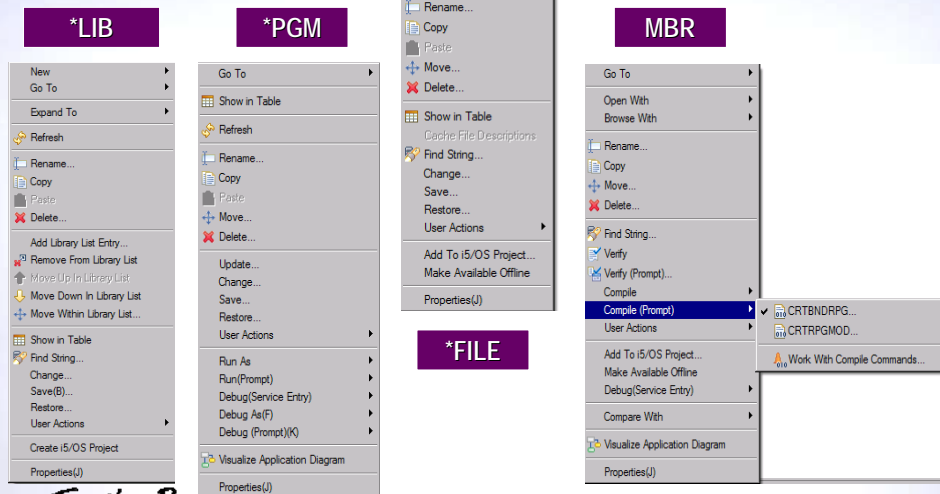
Can also
 ✓ Change contents
 ✓ Subset contents
 ✓ Position list
 ✓ Print list
 ✓ Just like PDM!



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Working With Things

- Right click actions



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Remote Systems LPEX Editor

- What happens during editing?
 - Double click on member or select Open With > Remote Systems LPEX Editor
 - RSE checks for required authority and member locks
 - Prompted if either check fails
 - Member is locked on i, downloaded and opened in editor
 - Changes written back to remote member on save
 - Locks released when editor is closed
 - Or the RSE connection is disconnected
- Editor and parsers
 - "LPEX Editor" provides basic editing capabilities
 - Copy, paste, undo, redo, find / replace, etc...
 - Not language specific
 - "Parsers" provide language specific features
 - Color tokenizing, prompting, syntax checking, content assist, etc...

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Remote Systems LPEX Editor

If necessary, SEU look and feel
-prefix commands
-format bar

Modern Editor
-Color tokenizing
-Undo / redo
-Highlight code with mouse and copy / paste

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Outline View

Ctrl+Shift+F5

Refresh: This populates Outline view

Click on entry to position to it

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Editing Tips

- In the RSE you can edit as many members as you like at once
 - Each editor opens up as a separate tab
- Double click on editor tab maximizes editor within workbench window
- Split screen editing of two or more members
 - Drag and drop editors to the left or right for *vertical* split screen editing of two (or more) members
 - Drag and drop editors to the bottom for *horizontal* split screen editing
- Split screen editing of the same member
 - Use the LPEX View > Open new view pop-up menu to open 2 views in the same source member
 - Each view is editable
 - Open more than 2 if you want
 - Ctrl+2 to open a new view, Ctrl+0 (zero) to close the view

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27

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Remote System Explorer - ORDENTR.RPGL - Eclipse Platform

File Edit Source Compile Navigate Search Project Run Window Help

ORDENTR.RPGL

WDSDEMO/QRPGLESRC(ORDENTR): 1 WDSDEMO/QRPGLESRC(ORDENTR): 2 WDSDEMO/QRPGLESRC(ORDENTR): 3

Line	Column	Replace	Line	Column	Replace	Line	Column	Replace
004000	D \$Warehouse	C	018600	CUSTOMER = %TRIM		061900	// Terminate the program	
004100	D \$District	C	018700	%TRIM(%FIRST		062000	//	
004200	D \$Panel1	C	018800	//		062100	//	
004300	D \$Panel2	C	018900	// Determine		062200	CSR EndPgmn	BEGSR
004400	D \$Change	C	019000	EXSR GetOrdNbr;		062300	//	
004500	//		019100	//		062301	/FREE	
004600	// Miscellaneous vari		019200	ENDIP;				
004700	D \$flRrn	S	019300	//				
004800	D CmtActive	S	019400	ENDIP;				
004900	D Error	S	019500	//				
005000	D Exit	S	019501	/END-FREE				
005100	D Exit2	S	019600	CSR				
005200	D DepPh1	S	019700	//				
005300	D \$flCnt	S	019800	// SUBROUTINE: C				
005400	D OrdCnt	S	019900	//				
005500	D OrdTot	S	020000	// To clear any erro		063200	//	
005600	//		020100	//		063300	// SUBROUTINE: *INZSR	
005700	// Data queue variabl		020200	//		063400	//	
005800	D DqName	S	020300	CSR ClrError	BI	063500	// Initialise the program	
005900	D DqLib	S	020400	//		063501	//	
006000	D QueDtaLen	S	020500	// Clear error indic		063502	//comment by don	
006100	D QueDta	DS	020600	C	HY	063503	//	

One member with three editable views

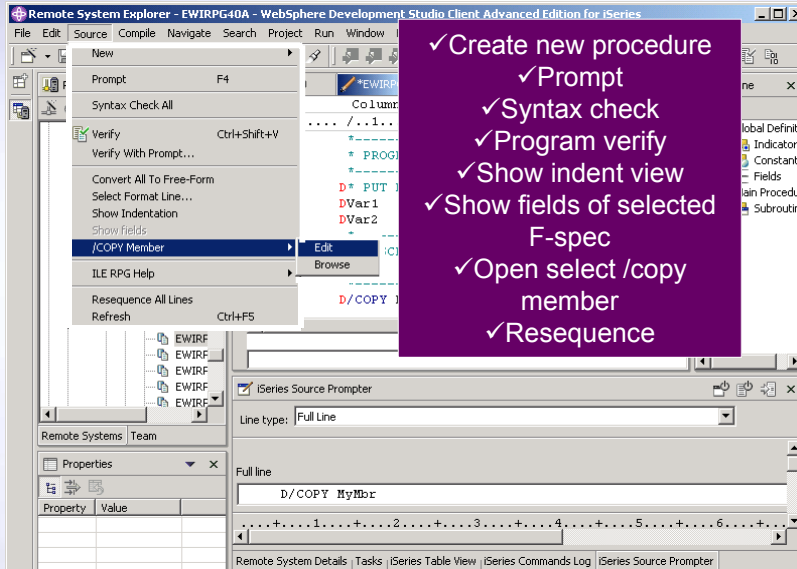
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28

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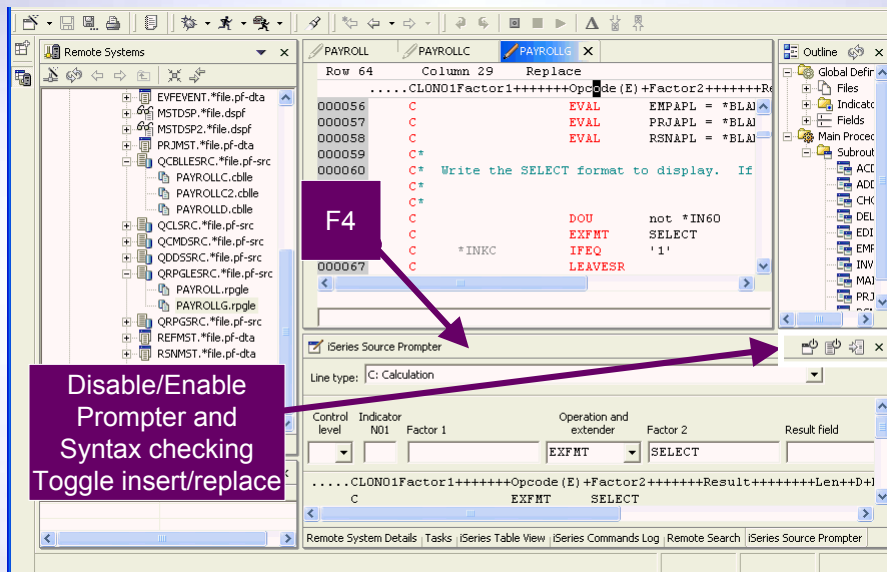
LPEX Editor Functions: Source Pull-Down Menu



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Prompting



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Editing Embedded SQL

Automatic formatting of SQL statements

Color tokenization (customizable)

Templates (predefined + add your own)

```

030000      EndS1;
030100
030200      // copy record
030300      /end-free
030400      /FREE
030500      exec Sql
030600      Insert Into Qtemp/AAAAA
030700      Select *
030800      From BBBB
030900      Where lilocn between 'PPA' and
031000      'PP999999';
031100
031200      select
031300      SELECT_group - The select group conditionally processes
031400      SELECT_OTHER_group - The select group conditionally pro
031500      SELECT_FROM_JOIN_WHERE - The SQL SELECT statement
031600      SELECT_FROM_WHERE - The SQL SELECT statement perf
031700      SELECT_INT0_FROM_WHERE - The SQL SELECT INTO sta
  
```

EXEC SQL
SELECT \$(CURSOR)col1, col2
INTO :var1 :var2
FROM table1
WHERE col2 = 99;

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Filtering Lines

Right click in editor to filter view

Only lines meeting filter criteria are shown

Use + / - to expand or collapse filtered sections

Row	Column	Insert
005900CLONO1Factor1+++++Opcode (E)+Factor2++++	
006000		
006100		
006200		
006300		
006400		
006500		
006600		
006700		
006800		
006900		
007000		
007100		
007200		
007300		
007400		
007500		
007600		
007700		
007800		
007900		
008000		

Filter view

- Show all
- By Date...
- Code
- Comments
- Control
- Procedures
- SQL Statements
- Subroutines
- Errors

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Indent View

The screenshot shows the 'Remote System Explorer - PAYROLL - WebSphere Development Studio Client Advanced Edition for iSeries'. The 'Show Indentation' menu item is selected. Below, the 'iSeries Indent' window displays the same code with vertical lines indicating the structure of the program, such as the 'DOU not *IN60' loop and the 'IF *IN60' conditional.

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Help – at your Fingertips

- RPG, Cobol, DDS online references
- Programming Guides including CL
- F1 Help
 - Sensitive to where cursor is in the editor
- Message Help
- and much more

The screenshot shows the 'Help - IBM Rational Developer for System i' window. The 'Contents' pane on the left is expanded to 'Language reference' > 'iSeries programming info' > 'Highlevel languages' > 'COBOL/400' > 'ILE COBOL' > 'ILE RPG'. The main window displays the 'ILE RPG Language Reference' page, which includes a section on 'Symbolic Names' and a list of name types: Arrays, Conditional compile names, Data structures, Exception output records, Fields, Key field lists, Labels, Named constants, Parameter lists, Prototype names, Record names, Subroutines, and Tables. It also lists rules for naming conventions, such as the first character being alphabetic and the remaining characters being alphanumeric.

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Verifying

Verify runs built-in copy of the compiler

The screenshot shows the 'Verify' menu option selected in the 'Remote System Explorer' interface. The 'Program Verification Options' dialog box is open, showing options for generating a listing and displaying cross references, COPY statements, DDS statements, and external procedures and fields. The 'Listing' section is checked, and the 'Lines per page' is set to 60. The 'Source listing indentation' is set to 'NONE'.

Automatically caches server info unless "Refresh" cache option selected.

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Verify – Error List

The screenshot shows the 'Error List' window in the IBM Rational Developer for System i. The list contains several errors related to the 'PAYROLL.RPGLE' file. The errors are:

ID	Message	Sev	Line	Location	Connection
RNF5178	ENDSR operation is missing for subroutine EDITSL E.	30	1	EWRSSELAB01.GRPGLE	torasboc
RNF7030	The name or indicator RSNTAX is not defined.	30	95	EWRSSELAB01.GRPGLE	torasboc
RNF7018	The operand RSNTAX of EXSR is not a subroutine n.	30	95	EWRSSELAB01.GRPGLE	torasboc
RNF5184	Factor 2 must be '1' when the Result is an indica...	30	264	EWRSSELAB01.GRPGLE	torasboc
RNF7029	RPG provides Separate-indicator area for file MSTDSP.	0	27	EWRSSELAB01.GRPGLE	torasboc
RNF7031	The name or indicator RSNTAG is not referenced.	0	110	EWRSSELAB01.GRPGLE	torasboc
RNF7031	The name or indicator 'INQ3 is not referenced.	0	1	EWRSSELAB01.GRPGLE	torasboc
RNF7031	The name or indicator 'INQ4 is not referenced.	0	1	EWRSSELAB01.GRPGLE	torasboc

Double clicking on error takes you to error in source

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37

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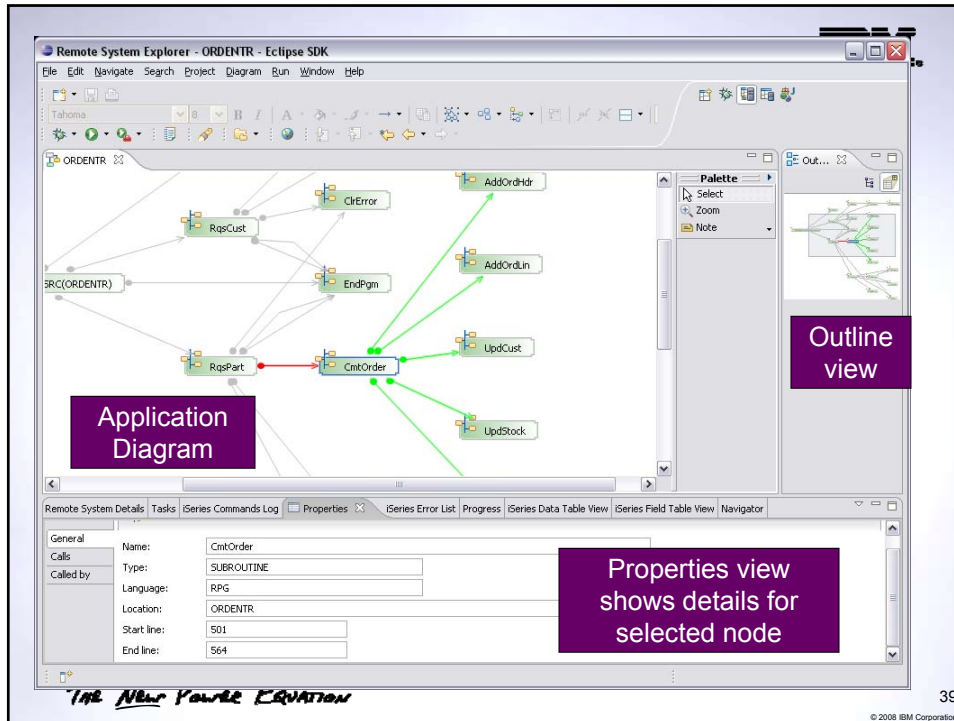
IBM Application Diagram Component

- Application Diagram
 - Graphical representation of the structure of an application
 - Call Graph Diagram shows
 - Source call graph showing RPG and COBOL subroutine and procedure calls
 - Program Structure Diagram shows
 - ILE binding relationships between programs and service programs
 - Modules bound into programs and service programs
- Features
 - Outline view shows high level overview and helps navigate diagram
 - Save, print, export to text or image file
 - Drag nodes to re-order diagram
 - Attach notes to document the diagram

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38

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DDS Screen Designer (Technical Preview)

- New editor for display file DDS source
 - Design and Source views
 - Changes made in one view automatically updated in the other
 - Outline view shows structure of source member
- Design View
 - Graphical editor for display file DDS source
 - Drag and drop parts from palette
 - Use mouse to move and resize fields
 - Use Properties view to graphically modify field name, data type, length, attributes, keywords, indicators, etc...
- Source View
 - Embedded copy of Remote Systems LPEX Editor
- A demonstration of Screen Designer can be found at:
 - http://rational.dfw.ibm.com/atdemo/rdi/screendesigner_vie_wlet_swf.html

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DDS Screen Designer (Technical Preview) Design page

The screenshot shows the DDS Screen Designer interface in Design view. A purple box at the top right says "Define 'screens' that affect visual display below", pointing to the Screens and Records/Display tabs. A purple box at the bottom left says "Switch between Design and Source views", pointing to the Design/Source/Preview tabs. A purple box at the bottom right says "Drag n' drop parts from the palette", pointing to the Palette on the right side of the screen. The main window displays a terminal-like screen with the text "Parts Order Entry" and "Customer number Order number".

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41

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Screen Designer (Technology Preview) Properties Pages

The screenshot shows the Properties Pages for a field in the DDS Screen Designer. Three overlapping windows are shown, each with a different tab selected: "Basics", "Attributes", and "Color".

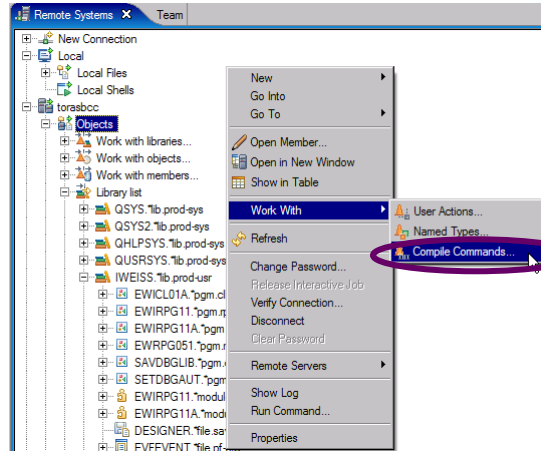
- Basics:** Shows field name (DATE), alias, usage (Output), format (JDD), position (24 x 80), and column (10).
- Attributes:** Shows various attributes like Blinking, Column separators, High intensity, Non display, Reverse image, Underline, and Position cursor.
- Color:** Shows a color palette with options for Green, White, Red, Turquoise, Yellow, Pink, and Blue.

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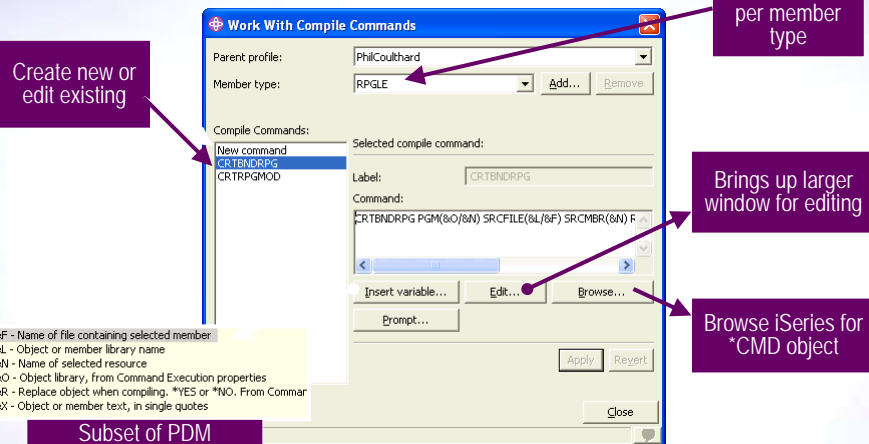
Work With Compile Commands

- Compile commands can be added, changed or created if necessary to ensure correct options are selected.



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Customizing and Create Compile Commands



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Running CL Commands

• Enter command, press Enter
• Use arrows to retrieve commands

Prompt

Run

Show Log

addlib rselab01

Library RSELAB01 added to library list.

addlib rselab01
Library RSELAB01 added to library list.
Cause : If the ADDLIB command was used, RSELAB01 was added to the user library list. If the CHGSYSLIBL command was used, RSELAB01 was added to the system portion of the library list.

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Summary

- Remote System Explorer (RSE)
 - Much more than just a replacement for SEU / PDM
 - Modern application development tools for i developers
 - First step in the roadmap
- Lots of resources available to get you started:
 - Webcasts and System i magazines
 - RDi website
 - www.ibm.com/software/awdtools/wdt400/
 - midrange.com mailing list
 - <http://lists.midrange.com/mailman/listinfo/wdsci-l>
 - COMMON and System i Technical Conferences
 - User group meetings
 - News Group
 - news://news.software.ibm.com/ibm.software.websphere.studio400
 - WDSC TEAM BLOG – including RDi
 - <http://wdsc.wordpress.com>

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Keyboard Shortcuts

- **RSE Specific**
 - Ctrl + Shift + a: open a member
 - In the Object Table view just start typing and a "Position To..." dialog will appear
- **General Workbench**
 - F1: context sensitive help
 - Ctrl + F6: Switch between open editors
 - Ctrl + F7: Switch between open views
 - Ctrl + F8: Switch between open perspectives
 - Ctrl + m: toggles a view or editor between normal and maximized
 - Ctrl + e: displays list of open editors
 - Ctrl + F4: close open editor
 - Ctrl + . And Ctrl + ,: position to next / previous message within an editor
- **Standard Windows shortcut keys:**
 - Use the arrow keys to navigate through tree and table views
 - In any list, just start typing and the an item that matches will be selected
 - Ctrl + S, Ctrl + Home, Ctrl + End, Tab
- **Tip: All of these can be customized using the Workbench > Keys preference page**
Window > Preferences > General > Keys

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47

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The New Power Equation

48

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