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Remote System Explorer (RSE) Overview

2007

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Acknowledgement:

- This presentation is a collaborative effort of the IBM Toronto iSeries Application Development presentation team, including work done by:

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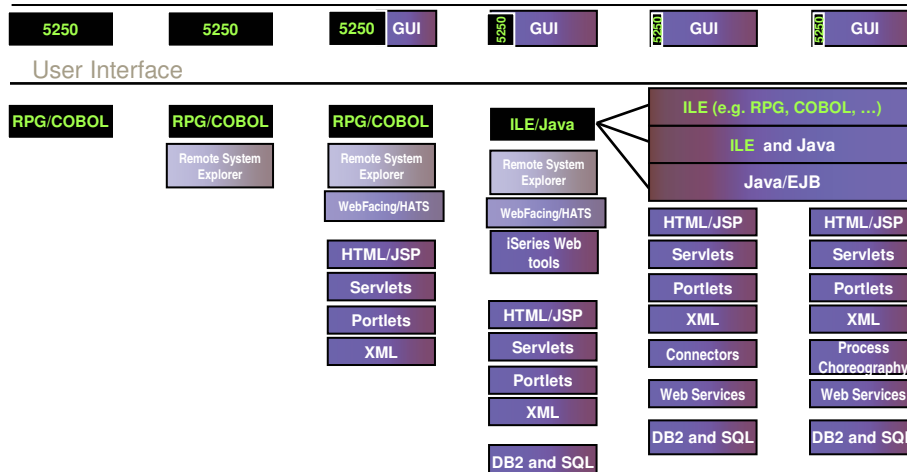
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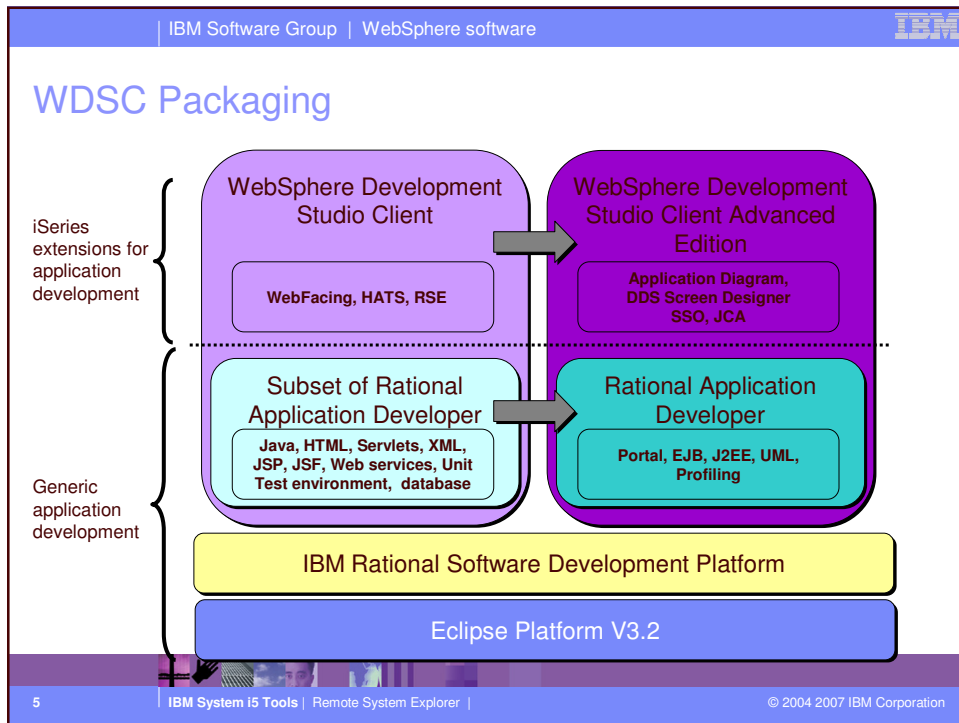
Agenda

- **IBM System i™ Developer Roadmap**
- Remote System Explorer (RSE)
 - Getting started
 - Accessing libraries, objects, and members
 - Remote Systems LPEX Editor
 - Other cool (and useful) features
- Integrated Debugger

IBM System i™ Developer Roadmap

Traditional

Improve
Your
ProductivityEnhance the
End User
ExperienceCreate a
Modular
ArchitectureIntegrate
ApplicationsIntegrate
Business
Processes



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Agenda

- IBM System iTM Developer Roadmap
- **Remote System Explorer (RSE)**
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- Integrated Debugger

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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 i5/OS 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 WDSC

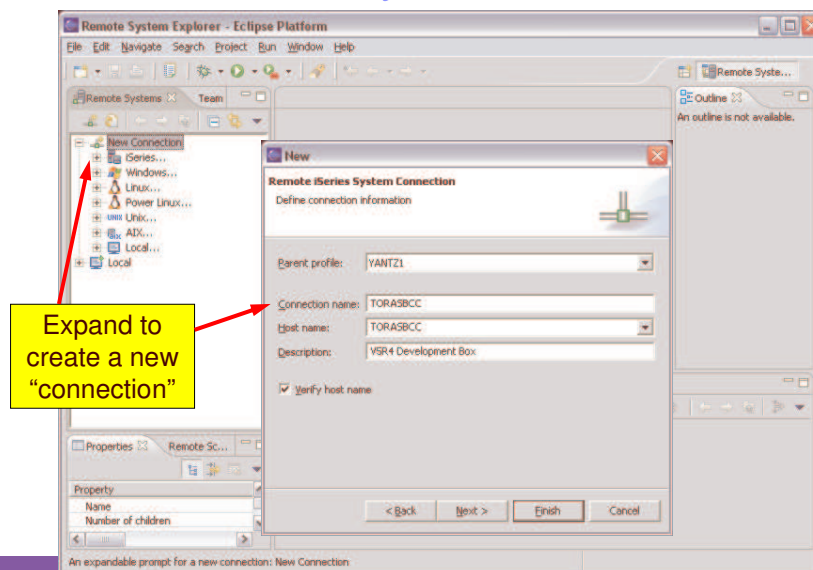
Why the RSE?

- Integrated set of tools for developing i5/OS 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
- Lower learning curve for other technologies
 - Learn the Workbench tools with RPG / COBOL development
 - Then branch into Web, XML and Web Services development using the same tools platform

Getting Started

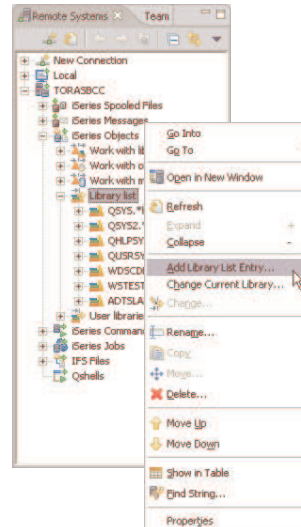
- Create a connection to your iSeries
- Setup library list
- Drill down to source member
- Edit source member using Remote Systems LPEX Editor
- Save changes and Compile
- Debug ☹

Create a Connection to your iSeries

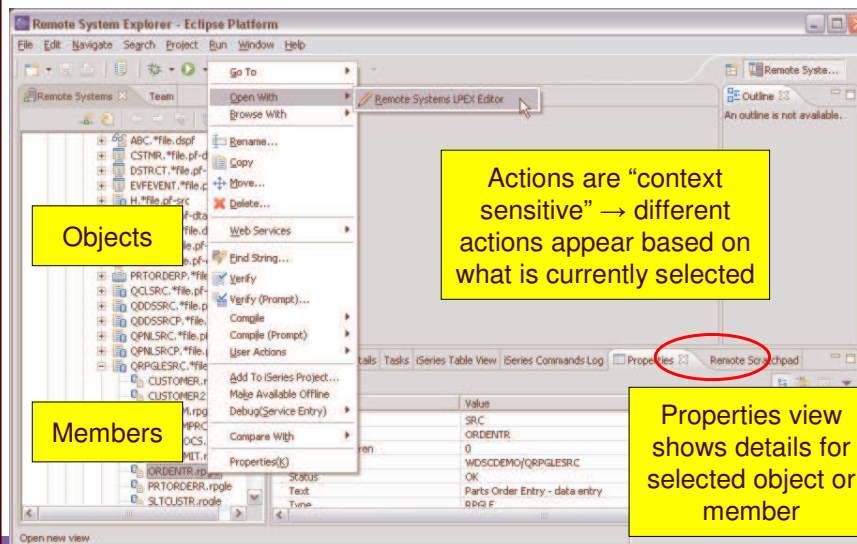


Setup Library List

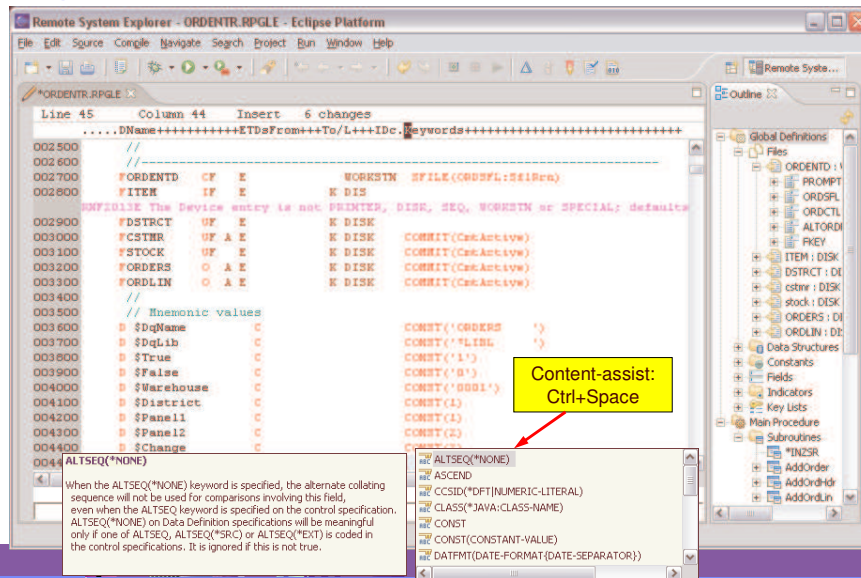
- Expand the new connection shows “subsystems”
 - Represent different resources you can access on the server
- Expanding a subsystem shows predefined filters
 - Subsets of resources
 - Create your own (more on this later)
- iSeries Objects > Library List
 - Shows library list for connection
 - Right 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



Drill Down To Source Member



Editing Source Members

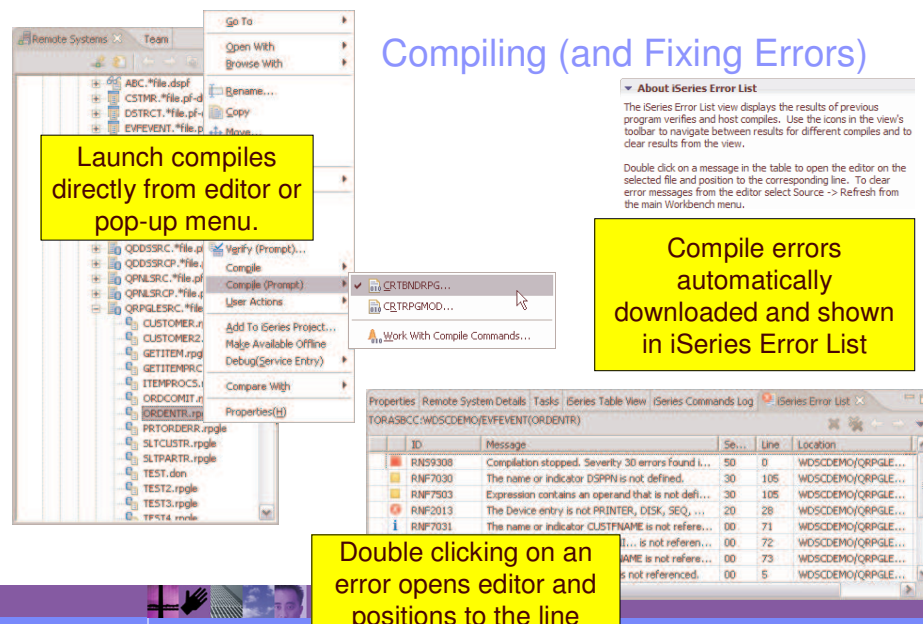


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Compiling (and Fixing Errors)



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Debug

More on debugging
in a minute...

Select program
to debug

Select method
to launch program

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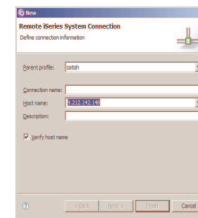
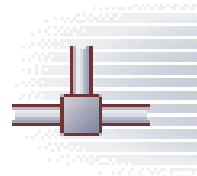
Agenda

- IBM System iTM Developer Roadmap
- Packaging and Install
- Remote System Explorer (RSE)
 - Getting started
 - **Accessing libraries, objects, and members**
 - Remote Systems LPEX Editor
 - Other cool (and useful) features
- Integrated Debugger

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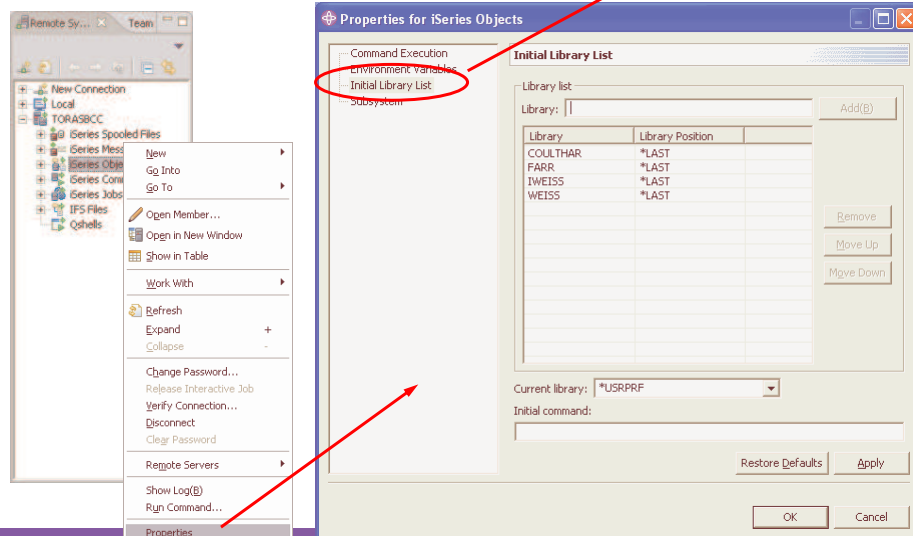
What is an RSE “Connection”?

- Represents a remote system
 - Given a connection name
 - Multiple connections to one system permitted
- Each connection can be customized with its own:
 - i5/OS user profile
 - Library list and environment variables
 - Command execution parameters
 - Object library for compiles
 - JOBD 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

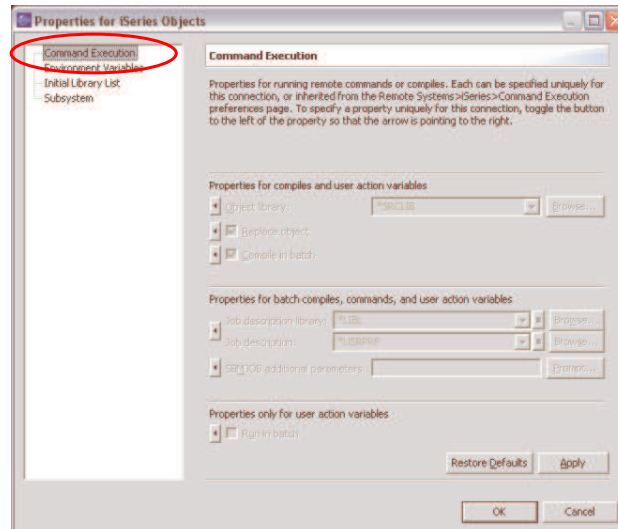


Customizing a Connection

The **Initial Library List** property page allows you to specify additional job setup information such as the library list, current library, and a sign on command.



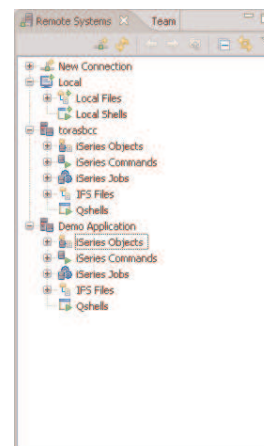
Customizing a Connection - 2



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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 i5/OS job subsystems
 - Just different parts of the i5/OS you can access
 - Drill down to access
- Subsystems
 - iSeries Objects
 - iSeries Commands
 - iSeries Jobs
 - IFS files
 - Qshells



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Drilling Down

- Typically we 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
- But this usually results in lists that are too large
 - Its unwieldy to scroll through thousands of items in a list
 - You really want to keep lists small, less than one hundred at most

Introducing Filters

- Eventually you will need to see a subsetting list
 - Using 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
 - iSeries Objects -> New -> Library Filter, Object Filter, Member Filter
 - iSeries Commands -> New -> Command Set
 - iSeries Jobs -> New -> Job Filter
 - IFS Files -> New -> Filter
- Or use the fastpath Work With XXX... prompts under iSeries Objects

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Object Filters

Specify simple, special, or generic library name

Specify simple or generic object name

Specify object type

Specify simple or generic object attribute

More types (next page)

Expand

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Filtering objects by type + attribute

When More Types>>> pressed

Prompt for object type

Prompt for object attribute

Specify multiple object type + attribute pairs

Will list all objects with any of the specified types+attributes

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Expanding Object Filters

Use Change to edit filter later

Filter is created, and expanded. It lists all objects matching the given criteria.

Filter exists until you delete it

Filter exists in all connections by default

Changing Filters

Filters are really made up of 1 or more filter strings. You can add additional filter strings in the change dialog.

This can allow you to create filters that capture exactly the objects or members you are interested in.

Show all *PGM and *FILE starting with A and B

- Remote Systems View

- Tree view of resources
- Great for seeing hierarchical structure
 - Library > Object > Member
- Not natural for people used to PDM

- 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

Remote System Explorer - Welcome - WebSphere Development Studio Client for iSeries

File Edit Navigate Search Project Run Window Help

Remote Systems

My Server

iSeries Objects

- Work with libraries...
- Work with objects...
- Work with members...
- Library list
- User libraries
- My Library
- RSELAB01.*lib.test

New

Go To

Expand To

Refresh

Expand

Collapse

Add to Library List...

Rename

Copy

Paste

Delete

Show in Table

Change...

Save...

Restore...

User Actions

Create iSeries Project

Properties(B)

Welcome

Development Studio Client for iSeries...

This page tells you what you should know before you start developing applications with WebSphere Development Studio Client for iSeries. To get started, read the sections below

Outline

An outline is not available.

✓ Same popup actions in table, and tree

✓ Sort by clicking on column heading

Library RSELAB01 (20 Objects)

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	CBLL	no errors	OK
PAYROLLG	*PGM	RPGL		OK
COMPARE	*FILE	PF-SRC		OK
EMPMST	*FILE	PF-DTA		OK

Command Normal

Messages

Remote System Details Tasks iSeries Table View iSeries Commands Log

Show children of selected object in a table view

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iSeries Table View

✓ Use local pulldown to see additional columns

Can also

- ✓ Change contents
- ✓ Subset contents
- ✓ Position list
- ✓ Print list
- ✓ Just like PDM!

The screenshot shows the 'Library RSELAB01 (20 Objects)' window. The table lists objects with columns: Name, Type, Attribute, Text, Status, Last modified, Created, and Size. A context menu is open over the table, showing options like 'Work with', 'Subset...', 'Show All', 'Additional Information', 'Position to...', and 'Print...'. A yellow box highlights the 'Additional Information' option, with an arrow pointing to the 'Additional Information' option in the menu.

Name	Type	Attribute	Text	Status	Last modified	Created	Size
CLC1	*PGM	CLLE	debuggable, call	OK	July 17, 2003 ...	July 17, 2003 4:13:24 PM EDT	81920
CLR1	*PGM	CLLE	debuggable, call	OK	July 17, 2003 ...	July 17, 2003 4:13:24 PM EDT	81920
MYCOMPILE	*PGM	CLLE		OK	July 17, 2003 ...	July 17, 2003 4:13:24 PM EDT	73728
PAYROLLD	*PGM	CBLL	no errors	OK	July 17, 2003 ...	July 17, 2003 4:13:24 PM EDT	360448
DAVDCLLG	*PGM	DBCL		OK	July 17, 2003 ...	July 17, 2003 4:13:24 PM EDT	360448

Command: Normal

Messages: Library RSELAB01 already exists in library list.

Remote System Details | Tasks | iSeries Table View | iSeries Commands Log

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Working with different objects types

■ Use right click actions

***LIB**

***PGM**

***FILE**

MBR

The screenshot shows the 'Library RSELAB01 (20 Objects)' window. Four context menus are shown for different object types: *LIB, *PGM, *FILE, and MBR. Each menu lists actions like 'New', 'Go To', 'Refresh', 'Expand', 'Collapse', 'Rename', 'Copy', 'Paste', 'Move', 'Delete', 'Add Library Entry...', 'Remove From Library List', 'Move Up In Library List', 'Move Down In Library List', 'Move Within Library List...', 'Show in Table', 'Find String...', 'Change(B)...', 'Save...', 'Restore...', 'User Actions', 'Add To iSeries Project...', 'Make Available Offline', 'Properties(K)', 'Service Entry Point', 'Run As(B)', 'Run(Prompt)(F)', 'Debug As(J)', 'Debug (Prompt)(K)', 'Compile', 'Compile (Prompt)', 'User Actions', 'Add To iSeries Project...', 'Make Available Offline', 'Compare With', and 'Properties(K)'. A yellow box highlights the 'Compile' option in the MBR menu, with an arrow pointing to the 'Compile' option in the menu.

Command: Normal

Messages: Library RSELAB01 already exists in library list.

Remote System Details | Tasks | iSeries Table View | iSeries Commands Log

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 - **Remote Systems LPEX Editor**
 - Other cool (and useful) features
- Integrated Debugger

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 i5/OS, 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

Best of Both Worlds

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

Click on entry to position to it

Refresh:
 This populates Outline view

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Content Assist

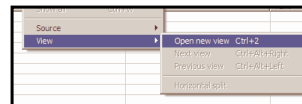
Use Ctrl+Space for context-sensitive selection

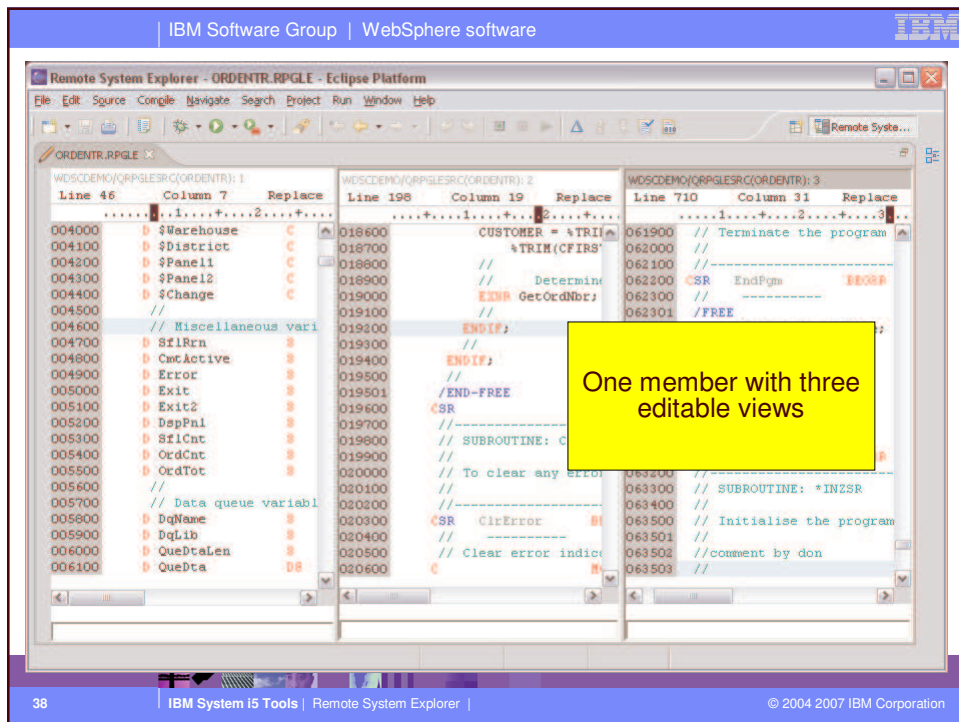
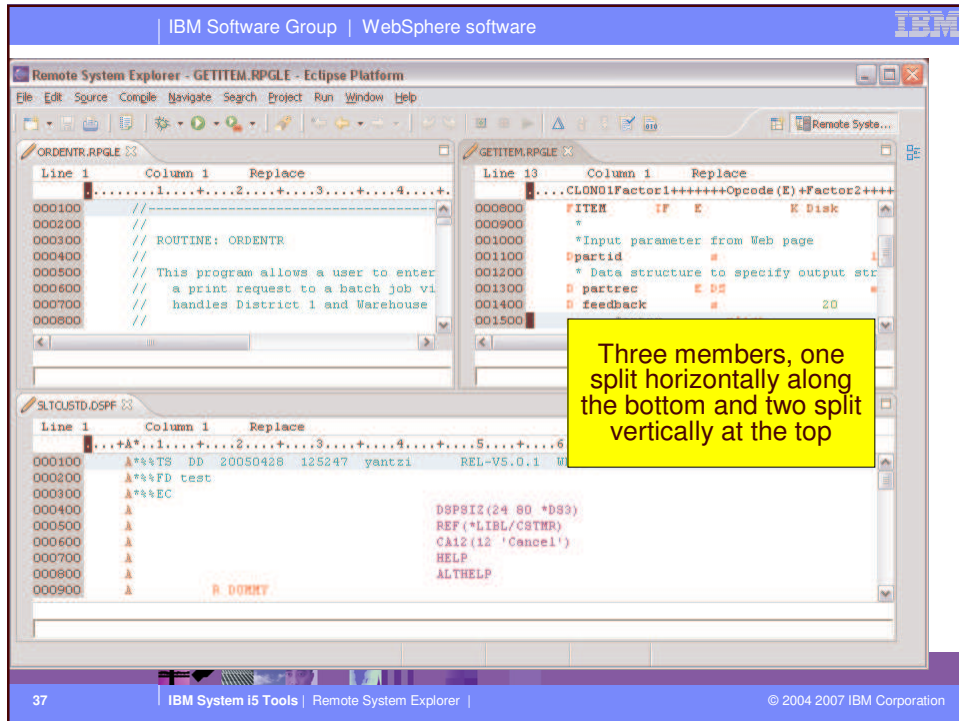
Vastly improved for RPG in 5.1 !

Available for COBOL in 5.1 and later

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 for 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





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LPEX Editor Functions: Source Pull-Down Menu

The screenshot shows the 'Source' pull-down menu in the LPEX Editor. The menu options are: New, Prompt (F4), Syntax Check All, Verify (Ctrl+Shift+V), Verify With Prompt..., Convert All To Free-Form, Select Format Line..., Show Indentation, Show Fields, /COPY Member (with sub-menu Edit and Browse), ILE RPG Help, Resequence All Lines, and Refresh (Ctrl+F5). A yellow box on the right lists the following functions:

- ✓ Create new procedure
- ✓ Prompt
- ✓ Syntax check
- ✓ Program verify
- ✓ Show indent view
- ✓ Show fields of selected F-spec
- ✓ Open select /copy member
- ✓ Resequence

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Prompting

The screenshot shows the 'Prompting' window in the LPEX Editor. A yellow box labeled 'F4' points to the 'Prompt' button in the toolbar. Another yellow box labeled 'Disable/Enable Prompter and Syntax checking Toggle insert/replace' points to the 'Toggle insert/replace' button in the 'iSeries Source Prompter' window. The 'iSeries Source Prompter' window shows the 'Line type' set to 'C: Calculation' and the 'Control level' set to 'N01'. The 'Operation and extender' is set to 'EXFMT' and the 'Factor 2' is set to 'SELECT'. The 'Result field' is set to '.....CLON01Factor1+++++Opcode (E) +Factor2+++++Result+++++Len+D+). C EXFMT SELECT'.

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Editing Embedded SQL

Automatic formatting of SQL statements

Color tokenization (customizable)

New in 7.0!

Templates (predefined + add your own)

```

003359
003369 /free
003370
003371 exec sql
003372 DECLARE listCursor CURSOR
003373 FOR
003374 SELECT * FROM WBSDEMO/ITEM
003375 WHERE IPRICE >= :minprice and IPRICE <= :maxprice;
003376
003377 exec sql
003378 OPEN listCursor;
003379
003384 exec sql
003385 FETCH NEXT FROM listCursor INTO :ipartrecs;
003386
003387 select
003388 @select
003389 SELECT_group - The select group conditionally processes
003390 SELECT_OTHER_group - The select group conditionally pr
003391 SELECT_FROM_JOIN_WHERE - The SQL SELECT statement
003392 SELECT_FROM_WHERE - The SQL SELECT statement part
003393 SELECT_INTRO_FROM_WHERE - The SQL SELECT INTO #
  
```

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Filtering

Right click in editor to filter view

Only lines meeting filter criteria are shown

Use + / - to expand or collapse filtered sections

Syntax Check Selection
Convert Selection To Free-Form
Cut
Copy
Paste
Select line
Select character
Select rectangle
Selected
Deselect
Filter view
Show all
Save
Add breakpoint
By Date...
Code
Comments
Control
Procedures
SQL Statements
Subroutines
Errors

Row	Column	Insert
Row 446	Column	Insert
005200	C	MAIN BEGSR
010200	C	endrs
011000	C	RSNTAG BEGSR
017600	C	ENDSR
018300	C	EMPTAG BEGSR
025700	C	ENDSR
026400	C	PRJTAG begsr
033500	C	endrs
034700	C	EDITSL BEGSR
040000	C	ACDESR BEGSR
040700	C	ENDSR
043100	C	ADDCDE BEGSR
044000	C	ENDSR
044400	C	CHGCDE BEGSR
044500	C	IF *IN50
044600	C	EVAL *IN60 = *C

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Indent View

Remote System Explorer - PAYROLL - WebSphere Development Studio Client Advanced Edition for iSeries

File Edit Source Compile Navigate Search Project Run Window Help

Row 72 Column 12 Replace 1 change.

```

006000 C* .....1.....2.....3.....4.....5.....6.....7.....
006100 C* Write the SELECT format to display. If end of job requested,
006200 C*
006300 C
006400 C
006500 C *INRC DOU not *IN60
006600 C EXFMT SELECT
006700 C IFEQ '1'
006800 C LEAVESR
006900 C ELSE
007000 C EXSR EDITSL
007100 C END
007200 C* IF the general error indicator *IN60 is on (equal to 1), the

```

Series Indent

Row 69 Column 12 Browse

```

C* Write the SELECT format to display. If end of job requested,
C*
C*
C *INRC | | DOU not *IN60
C | | EXFMT SELECT
C | | IFEQ '1'
C | | LEAVESR
C | | ELSE
C | | EXSR EDITSL
C | | END
C* IF the general error indicator *IN60 is on (equal to 1), the

```

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Language 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

Help - WebSphere Development Studio Client Advanced Edition for iSeries

Search: GO Search scope: iSeries

Contents

- iSeries application development
- iSeries programming information
 - High-level languages
 - PDF versions of the books
 - C/C++
 - COBOL/400
 - ILE COBOL
 - Language Reference
 - Programming Guide
 - Java
 - RPG/400
 - ILE RPG
 - Language Reference
 - Contents
 - RPG IV Concepts
 - Definitions
 - Specifications
 - About Specifications
 - Control Specifications
 - File Description
 - File Description

iSeries programming information

WebSphere(R) Development Reference

File Description Specifications

File description specifications identify each file must have a corresponding file description specifications.

A file can be either [program-described](#) or [externally described](#) (externally described files have externally using DDS, DSU, IDDU, or SQL control product.)

The following limitations apply per program:

- Only one primary file can be specified. The required.
- Only one record-address file.
- A maximum of eight PRINTER files.
- There is no limit for the maximum number of files.

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Verifying

Verify runs built-in copy of the compiler

Remote System Explorer - PAYROLL - WebSphere Development Studio Client for iSeries

File Edit Source Compile Navigate Search Project Run Window Help

New Context Prompt Syntax Check All Verify Verify With Prompt... Select Format Line... Show Indentation Show Fields /COPY Member Resequence All Lines Refresh

Row 56 Column 4 Insert

```

...CLON01Factor1+++++Opcode(E)+Extended-factor2+
* MAIN SUBROUTINE
005100 C MAIN BEGSR
005200 C MAIN
005300 C EVAL *inkc = *OFF
005400 C EVAL EMES = *BLANK
005500 C EVAL EMPAPL = *BLANK
005600 C EVAL PRJAPL = *BLANK
005700 C EVAL RSNAPL = *BLANK
005800 C
005900 C*

```

Program Verification Options

Listing Data Defines PCML Cache

Listing

☒ Generate listing

☐ Show cross references

☐ Show COPY statements

☐ Show DDS statements

☐ Show external procedures and fields

Lines per page: 60

Source listing indentation: *NONE

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

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Verify – Error List

Remote System Explorer - PAYROLL - WebSphere Development Studio Client for iSeries

File Edit Source Compile Navigate Search Project Run Window Help

Remote Systems

User Libraries My Library

RSELAB01.*lib.test

COMPARE.*file.pf-src

QCBLESRC.*file.pf-src

QCLSRC.*file.pf-src

QCMSDRC.*file.pf-src

QDQDRC.*file.pf-src

QRPGLSRC.*file.pf-s

PAYROLL.rpgle

PAYROLLG.rpgle

QRPGLSRC.*file.pf-src

Column 50 Insert

```

Factor1+++++Opcode(E)+Factor2+++++Result++++
036500 MOVE ERR(2) EMES
Factor 2 must be '0' or '1' when the Result is an i...
036600 ELSE
036700 MOVE '0' *IN60
036800 END
Following IF AND combination ensures that at
037000 IF AND combination has been selected.
037200 IF EQ
037300 MPAPL IFEQ
Verify program action completed with errors.

```

Double clicking on error takes you to error in source

iSeries Error List - <TORAS07M>RSELAB01/QRPGLSRC(PAYROLL)

MsgID	Message	Se...	Line	Location	Cor
RNF7004	Factor 2 must be '0' or '1' when the Result is an i...	30	364	RSELAB01/QRPGLSRC...	My
RNF7515	Move operands ERR and EMES have types that are not...	30	365	RSELAB01/QRPGLSRC...	My
RNF7089	RPG provides Separate-Indicator area for file M...	0	27	RSELAB01/QRPGLSRC...	My
RNF7031	The name or indicator RSNAPL is not referenced.	0	110	RSELAB01/QRPGLSRC...	My

Remote System Details | Tasks | iSeries Table View | iSeries Commands Log | iSeries Source Prompter | iSeries Error List

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LPEX Preferences

Two sets of "LPEX" preferences:

1. LPEX Editor (generic editor preferences)
2. Remote Systems > iSeries > LPEX Editor Parsers (language specific preferences)

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LPEX Editor Functions: Preferences

Language-specific editor preferences

Enable auto syntax checking

Enable auto uppercasing

Enter key behaviour

Tab key behaviour

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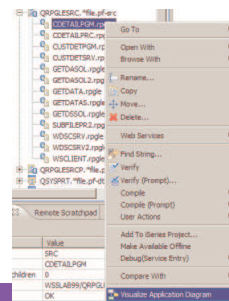
Agenda

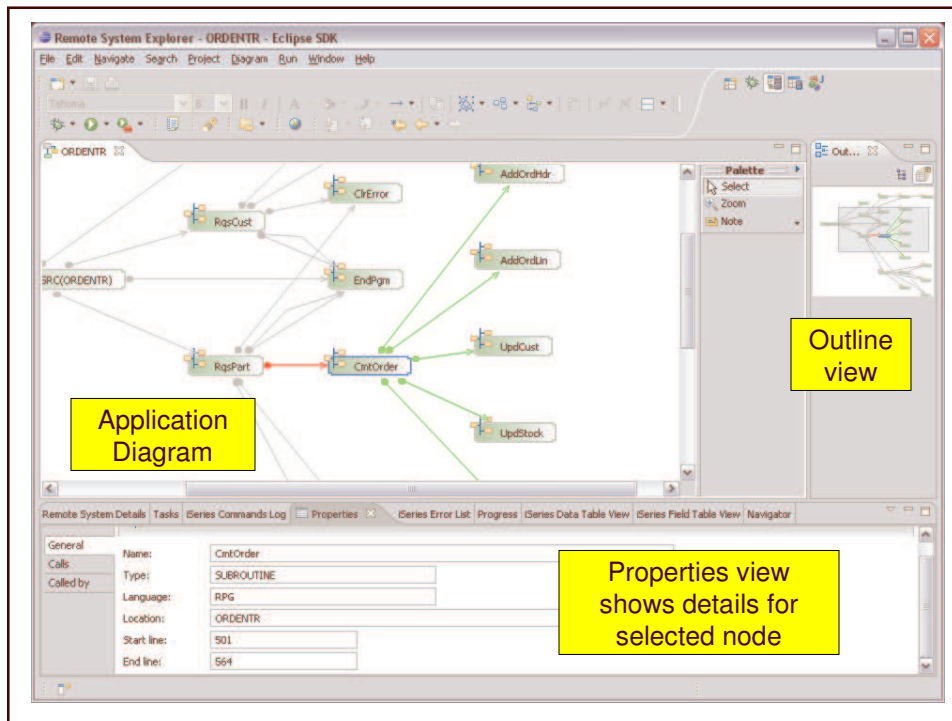
- IBM System i™ Developer Roadmap
- Packaging and Install
- Remote System Explorer (RSE)
 - Getting started
 - Accessing libraries, objects, and members
 - Remote Systems LPEX Editor
 - **Other cool (and useful) features**
- Integrated Debugger

IBM Application Diagram Component
[WDSC Advanced Edition Only]

New in 7.0!

- **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
 - Double click on nodes to launch Remote Systems LPEX editor
 - Properties view shows additional details for selected node in diagram
 - Exported procedures for module or service program
 - Starting and ending line numbers for subroutines and procedures
 - Save, print, export to text or image file
 - Attached notes to document the diagram





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DDS Screen Designer Technical Preview [WDSC Advanced Edition Only]

New in 7.0!

- **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

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DDS Screen Designer Technical Preview [WDSC Advanced Edition Only]

New in
7.0!

Define "screens" that affect visual display below

Drag n' drop parts from the palette

Switch between Design and Source views

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User Defined Actions

- User-Defined Actions ... like PDM!
 - Right-click on iSeries Objects -> Work With
 - User-defined Actions
 - Create, delete or change user-defined actions
 - Scope them so you only see them when appropriate
 - Named Types
 - Create named types to scope actions against
 - EG. "RPG" might be RPG + RPGLE + SQLRPGLE
- ... and even beyond PDM!
 - Create user actions for libs/objects, members ... and even jobs and IFS folders and files!
- Same Substitution variables as PDM
 - Plus a few extras!

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User Defined Actions

Define your own actions for object and member popup menus

Work With User Actions

Parent profile: PhilCoulthard

Action name: Add to Library List
Comment: Add selected library to lib list
Command: Normal command
ADDLIB 8N

PDM-like subst'n vars

Lots of options

Fine-grained scoping

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Running User Actions

Add Library List Entry (ADDLIB)

Library: CODELAB Name
Library list position: *FIRST
List position: *FIRST
Reference library: Name

Advanced All Parameters Keywords

ADDLIB LIB(CODELAB)

OK Restore defaults Cancel

My iSeries

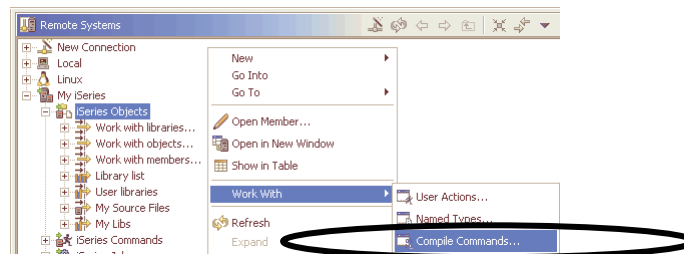
ADDLIB LIB(CODELAB)
Library CODELAB added to library list.
Cause If the ADDLIB command was used, CODELAB was added to the user library list. If the CHGVSYSLIBL command was used, CODELAB was added to the system portion of the library list.

Command Normal Prompt... Run

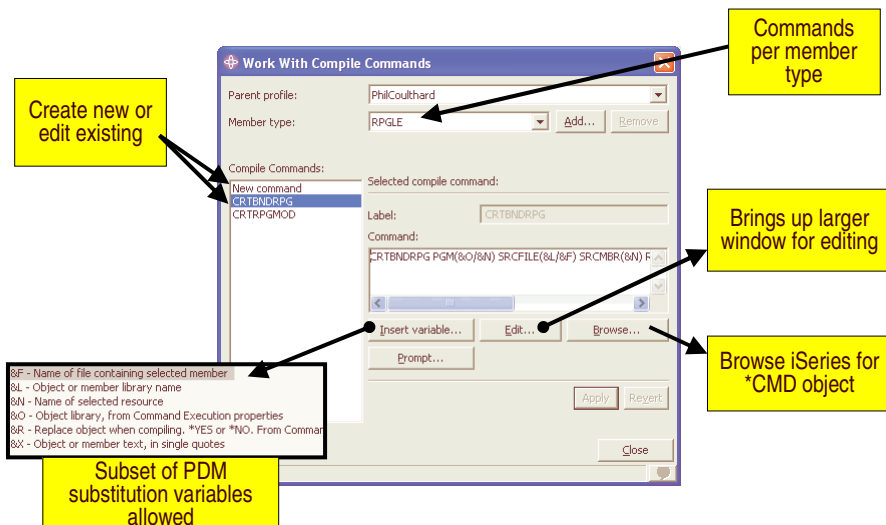
56 IBM System i5 Tools | Remote System Details | Tasks | iSeries Table View | iSeries Commands Log | iSeries Error List

Work With Compile Commands

- You can change IBM or vendor supplied compile commands, and add your own



Customizing and Creating Compile Commands



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Running New Compile Command

The screenshot shows the 'Library list' on the left with a context menu open for 'PAYROLL.rpgle'. The menu options include 'Go To', 'Open With', 'Browse With', 'Rename', 'Copy', 'Move', 'Delete', 'Verify', 'Verify (Prompt)', 'Compile', 'Compile (Prompt)', 'User Actions', 'Add To iSeries Project...', and 'Make Available Offline'. The 'Compile' option is selected, and a sub-menu is shown with 'CRTBNDRPG', 'CRTTRPGMOD', 'My RPG Compile Command' (highlighted), and 'Work With Compile Commands...'. A yellow callout box points to the 'My RPG Compile Command' option with the text: 'You will see the Error List view if the command generates an event file'.

The 'iSeries Error List - CODELAB/EVFEVENT(PAYROLLG)' window is displayed below, showing a table of errors:

ID	Message	Severity	Line	Location	Connection
RNS9308	Compilation stopped. Severity 40 errors found in program.	50	0	CODELAB/QRPGLESRC(PAYROLLG)	My iSeries
RNF2120	External descriptions for file MSTDSP not found; file is ignored.	40	27	CODELAB/QRPGLESRC(PAYROLLG)	My iSeries
RNF2120	External descriptions for file PRJMST not found; file is ignored.	40	29	CODELAB/QRPGLESRC(PAYROLLG)	My iSeries
RNF2120	External descriptions for file RSNMST not found; file is ignored.	40	30	CODELAB/QRPGLESRC(PAYROLLG)	My iSeries
RNF7030	The name or indicator ACDCE is not defined.	30	103	CODELAB/QRPGLESRC(PAYROLLG)	My iSeries
RNF7030	The name or indicator EMPAPL is not defined.	30	54	CODELAB/QRPGLESRC(PAYROLLG)	My iSeries
RNF7030	The name or indicator PRDCE is not defined.	30	257	CODELAB/QRPGLESRC(PAYROLLG)	My iSeries
RNF7030	The name or indicator PRCMP is not defined.	30	264	CODELAB/QRPGLESRC(PAYROLLG)	My iSeries

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Running CL Commands

The screenshot shows the 'Library R5ELAB01 (22 Objects)' window with a table of objects:

Name	Type	Attribute	Text	Status
CLC1	*PGM		adddble test	OK
CLR1	*PGM		adddble test	OK
MYCOMPILE	*PGM			OK
PAYROLL	*PGM			OK
PAYROLLD	*PGM			OK
PAYROLLG	*PGM	RPGLE		OK
COMPADE	*FILE	DE SRC		OK

A yellow callout box points to the 'adddble test' command with the text: 'Enter command, press Enter' and 'Use arrows to retrieve commands'. The 'Command' window shows 'Normal' as the command type and 'adddble test' as the command. The 'Prompt...' button is highlighted with a yellow callout box. The 'Run' button is also highlighted with a yellow callout box. The 'Show Log...' button is highlighted with a yellow callout box. The 'iSeries Commands Log' window is displayed below, showing the command history and the output of the 'adddble test' command.

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Multi-file Search

Select Search → iSeries from pull-down menu

GUI interface to FNDSTRPDM

Supports multi-generic names

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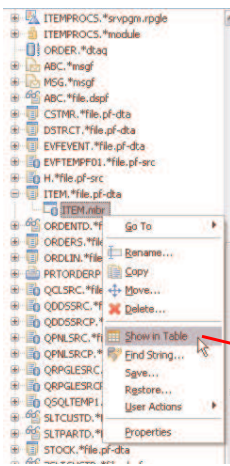
Search Result

Double click on match entry to open + position in editor

Use as a "task list", select line and click X button to remove from view.

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New in
7.0!

iSeries Data Table View

- Shows records from data physical file in the iSeries Data Table View
 - Retrieves and displays first few records for performance
 - Additional records retrieved as you scroll through table
- Read-only access
- Position to record by key
 - Start typing in table and dialog box appears where you enter search values for key fields



ID	NAME	PRICE	IDATA
000009	Cross_Country_Ski_Set	93.00	ENTRY LEVEL
000009	Rubber_Baby_Buggy_Wheel	98.71	4 INCH SIZE
000010	ITSO REDBOOK 5624-2152	50.00	ACCESSING THE AS/400 WITH JAVA
000011	ITSO REDBOOK 5624-2163	20.87	BUILDING AS/400 APPLICATIONS WITH JAVA
000012	Plastic_Garbage_Pail	22.40	36 GALLON CAPACITY
000013	Doll_House_Furniture	24.22	KITCHEN ONLY
000014	Plain_Podcasts_Pants	10.28	SEVERAL COLORS AVAILABLE
000015	25_Inch_Color_TV's	63.75	BUILT-IN VCR
000016	Multi-System_Paper	71.57	STANDARD US SIZE
000017	Magical_Mystery_Maze	39.83	FOR BEGINNERS
000018	Radio_Controlled_Plane	12.41	CHEAP MODEL
000019	Radio_Controlled_Plane	50.44	BETTER MODEL
000020	Square_Plastic_Calendar	49.04	FIVE YEAR CALENDAR

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Agenda

- IBM System i™ Developer Roadmap
- Packaging and Install
- Remote System Explorer (RSE)
 - Getting started
 - Accessing libraries, objects, and members
 - Remote Systems LPEX Editor
 - Other cool (and useful) features
- Integrated Debugger

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Integrated iSeries Debugger

- RPG, Cobol, CL, C, and C++
- ILE and non ILE, incl. free-form RPG
- DB2 and SQL stored procedures
- Source and Listing view
- Batch, interactive, and Multi-Threaded Applications
- Client/Server Applications
- Distributed Applications

Debugger Invocation

Debug As

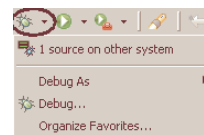
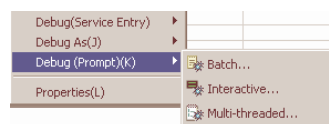
Program
iSeries job

Debug (Prompt)

Program
Service program

Debug (Service Entry)

ILE Program
Service program
Module
Procedure



To start debug session, select entry in Remote Systems view and use popup-menu, workbench Run menu, debug tool button, or debug pull-down menu.

Service Entry Points view

- Break is triggered when the first line of a specified procedure is executed in a job that is not under debug.
- Service Entry Points view is automatically displayed when Service Entry Point set.
- List of all Service Entry Points set from the RSE
- Pop-up menu to work with Service Entry Points
 - Set, Modify, Remove, Enable/Disable
- Pull down menu to Clear all or selected Service Entry Points

Library	Program	Program Type	Module	Procedure	User ID	Connection	Enabled
RSELAB10	PAYROLLG	*PDM	*ALL	*ALL	IWEISS	torasbcc	Yes
RSELAB10	CLR1	*PDM	*ALL	*ALL	IWEISS	torasbcc	Yes

Debug Perspective

Resume, Suspend, Terminate, Step Into, Step Over, Step Return

Call Stack

Break Point

Variables
Breakpoints
Monitored variables
Programs under debug

Current Line

Program Execution

- **Step Into**
 - Debug the next call level
- **Step Over**
 - Run the next call level and stop at the next statement
- **Step Return** (for ILE on V5R3 or higher)
 - Run until you are back in the previous call level and stop at the next statement
- **Resume**
 - Run until an event is encountered
- **Run To Location**
 - Run and stop at the current cursor position or until an event is encountered
- **Suspend**
 - Halt program at point of execution
- **Terminate**
 - End the debug session (but not the job being debugged)

Setting Breakpoints

Ways to set a Line Breakpoint:

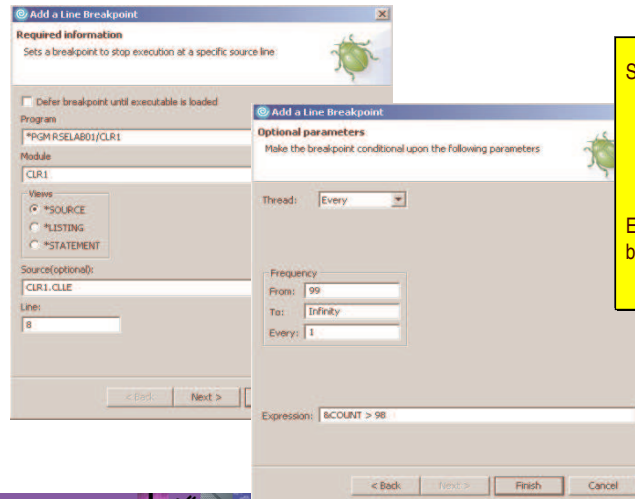
- Double click in prefix area
- In Editor prefix area, select **Add Breakpoint** from pop-up menu
- In Editor, select **Add Breakpoint** from pop-up menu
- In Breakpoints view, select **Add Breakpoint >Line** from pop-up menu.

Ways to set a Watch Breakpoint:

Double click variable and

- In Editor, select **Add Watch Breakpoint** from pop-up menu
- In Breakpoints view, select **Add Breakpoint > Watch** from pop-up menu.

Conditional Line Breakpoint

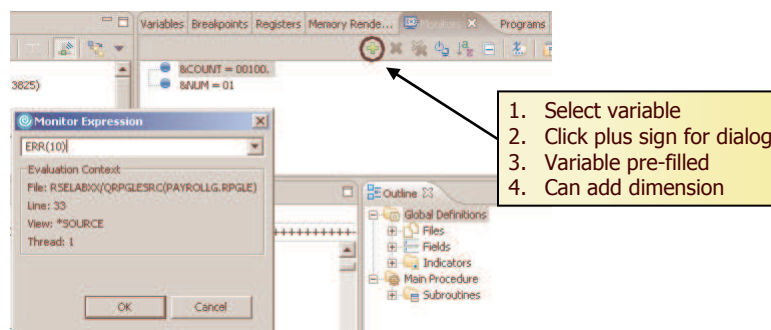


Set:

- Frequency
- Value to start
- Value to stop
- Breaks to skip

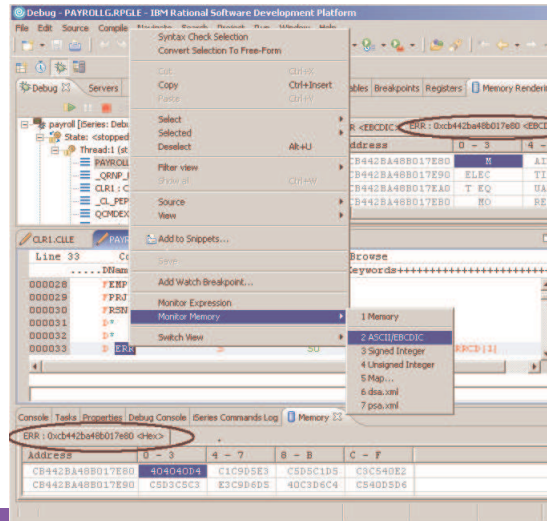
Expression: Condition must be true for break to happen

Viewing (and Changing) Fields



- Data in Monitor view updated at each stop
- Changed data marked in red with triangle icon
- Double click on entry to open for edit, modify value and press Enter

Display Memory Content



1. Select variable to display in a Memory view
2. Select Monitor Memory > Memory
3. Displays hex content
4. Select Monitor Memory > ASCII/EBCDIC to display text

- Each variable gets a new tab
- Memory displayed starting with address of selected variable
- Editable for teraspace enabled programs

Summary

- IBM System iTM Developer Roadmap
 - A starting place for i5/OS application modernization
- Remote System Explorer (RSE)
 - Much more than just a replacement for SEU / PDM
 - Modern application development tools for i5/OS developers
 - First step in the roadmap
- Lots of resources available to get you started:
 - Webcasts and System i magazines
 - WDSC website
 - www.ibm.com/software/awdtools/wdt400/
 - midrange.com mailing list
 - <http://lists.midrange.com/mailman/listinfo/wdsci-l>
 - IBM Learning Services
 - COMMON and System i Technical Conferences
 - User group meetings

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