



IBM Software Group

PDM and SEU to RSE and LPEX Transition

Violaine Batthish

WebSphere software



@business on demand software

Agenda

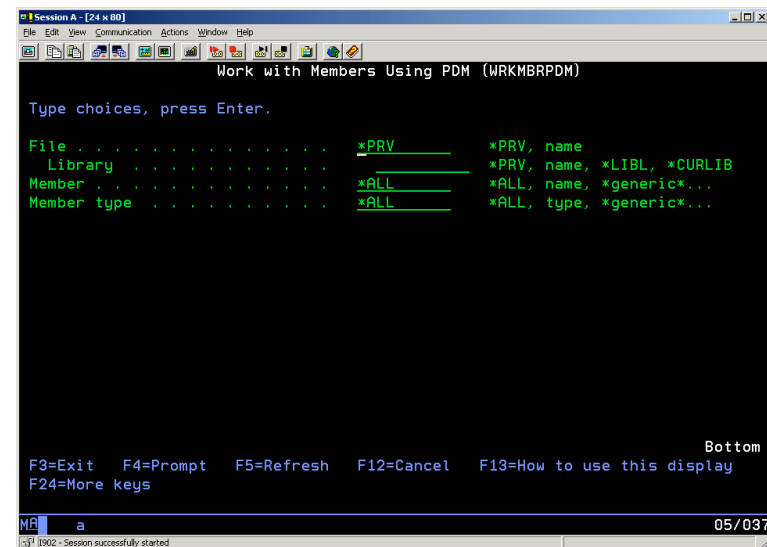
- ♣ PDM Beginnings & How to start in RSE
- ♣ Table View
- ♣ Running commands
- ♣ Compiling
- ♣ Searching iSeries files
- ♣ Basic editing with SEU & LPEX
- ♣ LPEX Syntax checkers, verifiers and outline views
- ♣ Other LPEX tricks & features
- ♣ Comparing source

- ♣ Questions



Starting with PDM

- ♣ There are two ways to start PDM:
 - ▶ STRPDM, or
 - ▶ WRKxxxPDM commands
- ♣ Only the last entries are remembered
- ♣ Work with multiple programs, libraries etc, you might have more than one emulator running so you can work with all your items at the same time



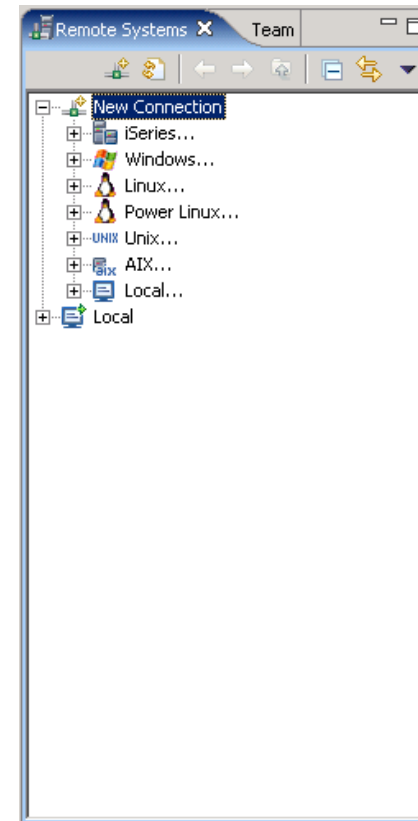
```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
Work with Members Using PDM (WRKMBRPDM)
Type choices, press Enter.
File . . . . . *PRV _____ *PRV, name
Library . . . . . *PRV _____ *PRV, name, *LIBL, *CURLIB
Member . . . . . *ALL _____ *ALL, name, *generic*...
Member type . . . . . *ALL _____ *ALL, type, *generic*...

Bottom
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys
MR a 05/037
0902 - Session successfully started
```



How to begin in RSE

- ♣ When you first start WDSC workbench, you will be prompted for a workspace. This is where all the definitions of your RSE preferences and workbench configuration information and files will reside.
- ♣ Once the workbench is started, ensure that you are in the Remote System Explorer Perspective
 - ▶ Window->Open Perspective->Remote System Explorer
- ♣ Next you will need a connection...



Creating a connection

- ♣ Expand the iSeries icon in the New Connection Filter
- ♣ Leave the default profile name
- ♣ Specify host name and connection name
- ♣ Ensure Verify connection is selected
- ♣ Push Finish

New

Name personal profile
Uniquely name user profile

Welcome to Remote Systems. Connections can be sharable by the team or private to you. Enter a profile name to uniquely identify you from your team members. You will decide for each new connection whether it is owned by the team profile or your profile.

Profile: violaine

< Back Next > Finish Cancel

New

Remote iSeries System Connection
Define connection information

Parent profile: violaine

Connection name: TORAS3PM

Host name: TORAS3PM

Description:

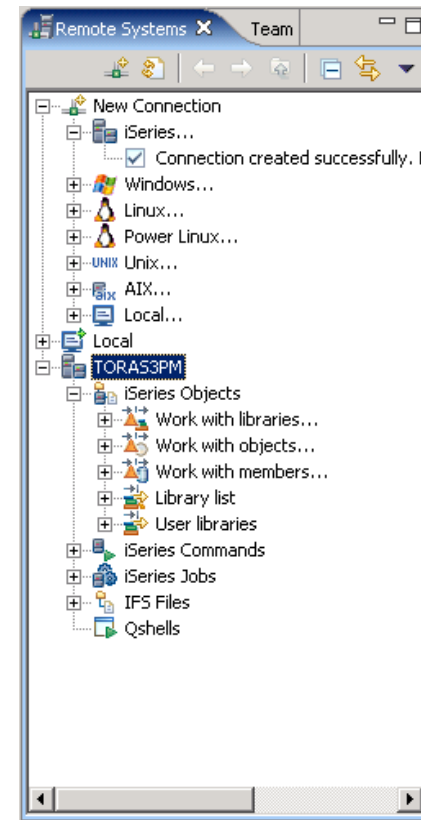
Verify host name

< Back Next > Finish Cancel



Subsystems

- ♣ Expanding a connection lists the subsystems within that connection:
 - ▶ Objects: used to access libraries, objects and members
 - ▶ Commands: predefined commands you can use to run against remote objects. You can also define command sets. Results are logged in the Commands log view
 - ▶ Jobs: display various jobs, subset by job attributes, and perform job operations
 - ▶ IFS Files: explore IFS file an folder structure and perform actions on them.
 - ▶ Qshells: lists the active running qshells for the connection



Filters

- ❖ Filters are named lists of items that you can specify, reuse and share.
- ❖ Expanding the Work with... items opens the appropriate filter creation dialog
- ❖ Specify the list of libraries, objects, or members you want RSE to retrieve.
- ❖ Give the filter a name
- ❖ Choose whether or not you want the filter to be only for the specified connection
- ❖ Choose whether or not you would like to share the filter with others

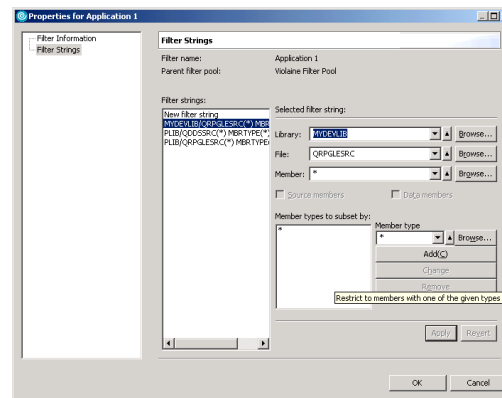
The screenshot shows the 'New Object Filter' dialog box with the title 'Object Filter' and subtitle 'Create a new iSeries object filter'. It contains four dropdown menus: 'Library' (set to 'MYLIB'), 'Object' (set to 'MY*'), 'Object type' (set to '*'), and 'Object attributes' (set to '*'). Each dropdown has a 'Browse...' button to its right. Below these is a 'More Types >>' button. At the bottom are '< Back', 'Next >', 'Finish', and 'Cancel' buttons.

The screenshot shows the 'New Object Filter' dialog box with the title 'Object Filter' and subtitle 'Name the new filter'. It contains a text field for 'Filter name' with the value 'MY objects in MYLIB'. Below it is a checkbox labeled 'Only create filter in this connection' which is unchecked. A note states: 'Filters are saved for easy re-use. Specify a unique name for this filter. This name will appear in the Remote Systems view, and will be expandable.' Below the note is a dropdown for 'Owner profile' set to 'violaine'. At the bottom are '< Back', 'Next >', 'Finish', and 'Cancel' buttons.



Filter Strings

- ♣ When first created, a filter is created with only one filter string
- ♣ By modifying the properties of a filter, you can add additional filter strings
 - ▶ In PDM you could only list the members in one source physical file in one library.
 - ▶ In RSE you can use filters and filter strings to list members in different files and even in different libraries.
- ♣ In PDM only the last WRKxxxPDM setting is remembered. In RSE all filters are persisted between sessions.



RSE Tree View

- ♣ Filters appear in the tree view
- ♣ Drill down like File Explorer in Windows
- ♣ Drag & drop, copy, paste, delete rename actions
- ♣ Actions appear in popup (right-click)

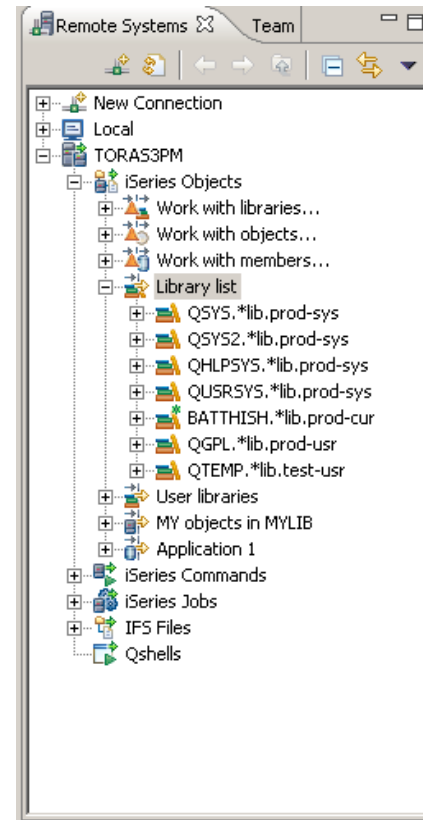


Table View

- ♣ More comfortable interface for PDM users
- ♣ Launch table view from RSE Tree view by using the **Show in Table View** action
- ♣ Use the Work with menu option to access list same way as you would using the WRKxxxPDM commands
- ♣ Work with menu keeps a small list of previously displayed lists specifications

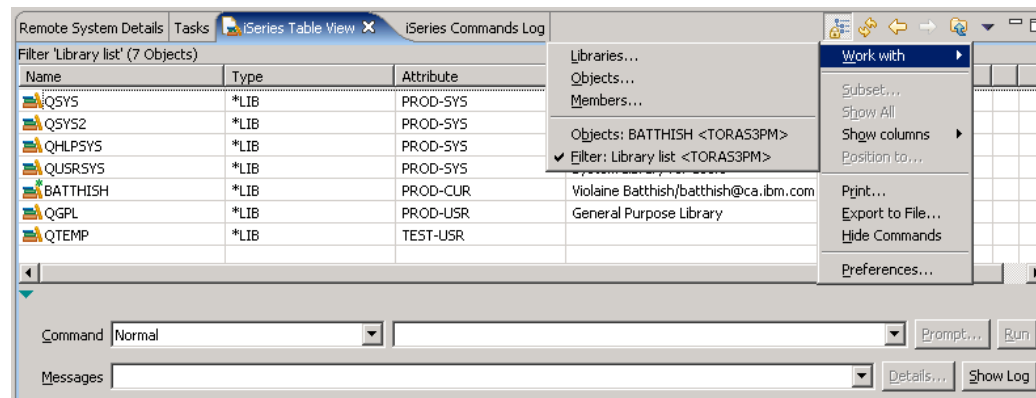
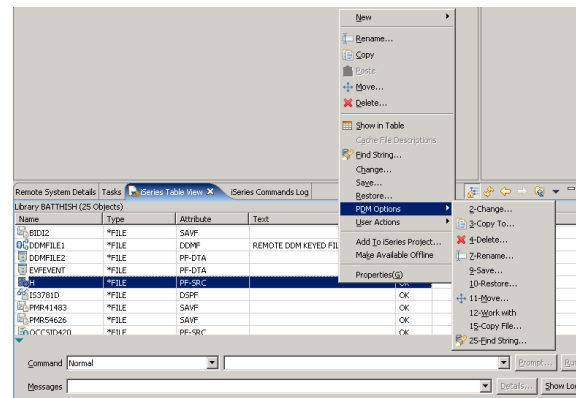


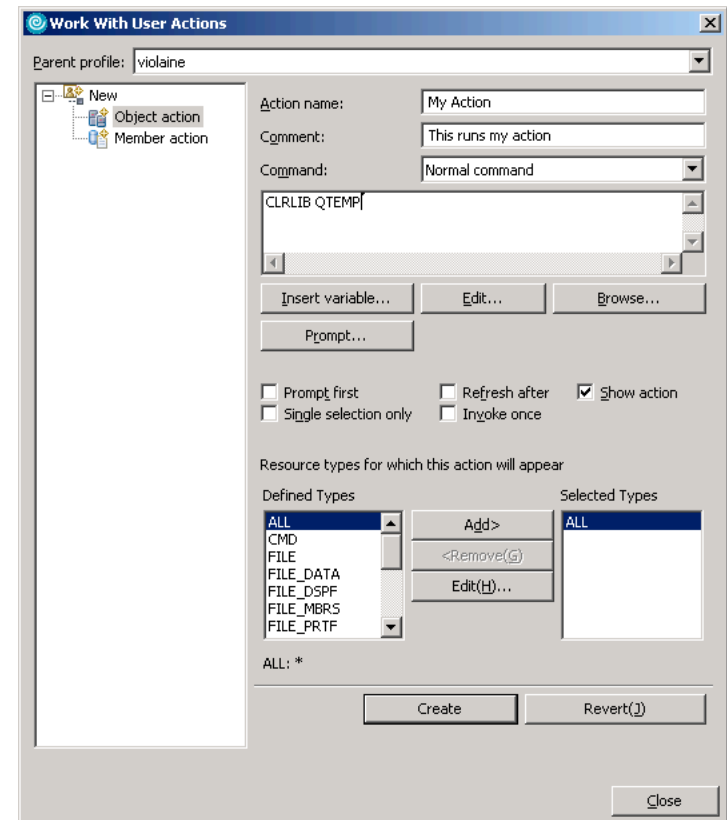
Table View Actions

- ♣ Use the Show in Table action from inside Table View to go from a list of libraries to a list of objects etc.
- ♣ A list of familiar PDM Options
- ♣ Use the User actions menu to create and add your own actions
- ♣ Double click on member to edit it

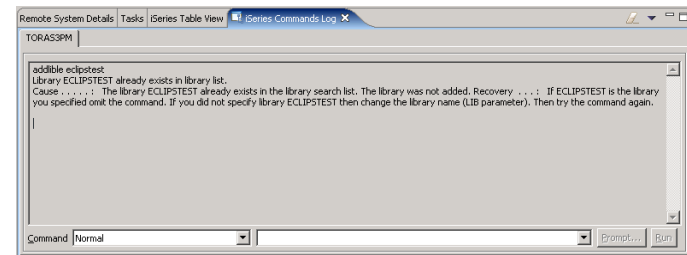
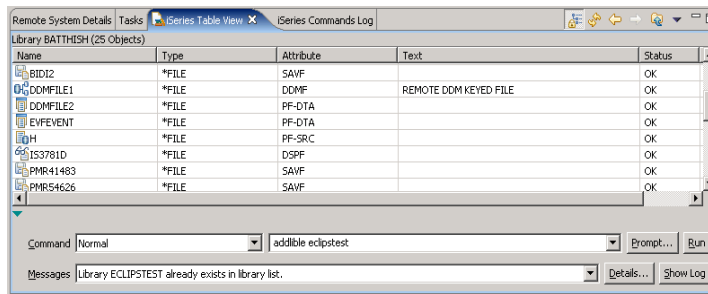


User Actions (F16)

- Define your own action
- Prompt the command to define and also optionally when executing
- Use the same substitution variables as PDM and several more
- Specify if the action should refresh the views
- Specify when action applies when a single object is selected
- Specify Invoke once to group the items into one command execution
- Refine them to apply to the appropriate types (add your own)



Command Line

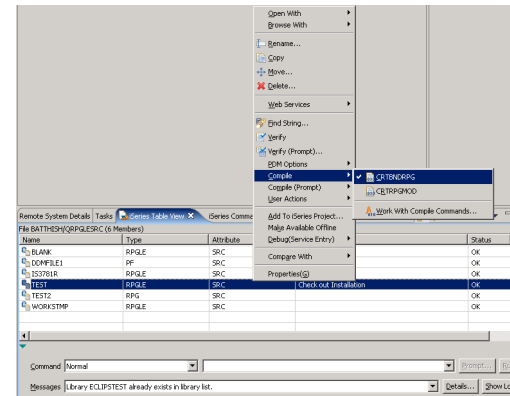


- ♣ Use the command line to run any command
- ♣ Specify additional parameters for PDM Options
- ♣ Results displayed in the messages field
- ♣ Use familiar keys:
 - ▶ F9: repeat last command
 - ▶ F4: prompt command
- ♣ Use the Show Log button to view iSeries commands Log view.
- ♣ Use the STRRSESVR command to handle interactive commands
- ♣ Batch option uses the SBMJOB command



Compiling (option 14,15)

- ♣ Compile actions are grouped in two menus (with and without prompting)
- ♣ Users can add their own commands to the compile commands
- ♣ Compile actions are different from other actions:
 - ▶ Results of the command itself appear in the Command Log
 - ▶ Errors appear in the Error List view
- ♣ Additional command execution preferences can be found in the Window->Preferences->Remote Systems->iSeries->Command Execution preference page (F18)

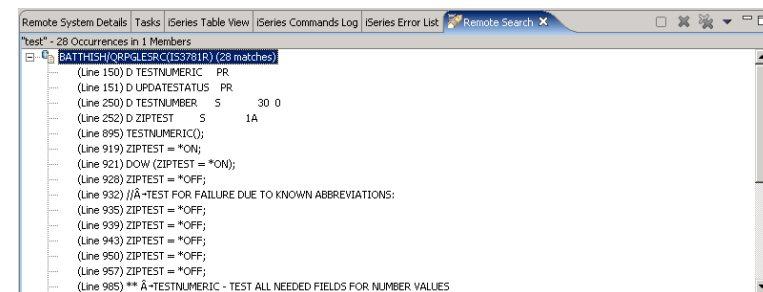
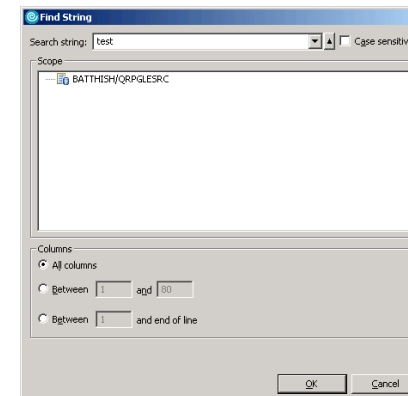


ID	Message	Sev...	Line	Location	Connection
RNF9308	Compilation stopped. Severity 30 errors found in program.	50	0	BATTHISH\QRPGLSRC\TE...	TORAS3PM
RNF9257	Form-Type entry for main procedure not valid or out of seq...	30	11	BATTHISH\QRPGLSRC\TE...	TORAS3PM
RNF2316	Overflow indicator *INCA is assigned to PRINTER file QSYS...	00	2	BATTHISH\QRPGLSRC\TE...	TORAS3PM
RNF7031	The name or indicator ARRAY is not referenced.	00	4	BATTHISH\QRPGLSRC\TE...	TORAS3PM
RNF7031	The name or indicator DS is not referenced.	00	7	BATTHISH\QRPGLSRC\TE...	TORAS3PM



Searching (Option 25)

- ♣ Two ways to search:
 - ▶ Search->iSeries menu
 - ▶ Find String... action
- ♣ Search filters, not just libraries, files, members. This means that you can create very flexible search patterns.
- ♣ Results appear in the Remote Search view.
- ♣ Double click on a result to open the member in Remote Systems LPEX Editor and position to the match
- ♣ The popup menu for the members in the list has similar actions to the table view (rename, move, etc)
- ♣ View has a history of searches



Launching Remote Systems LPEX Editor

- ♣ From RSE, or Table view:
 - ▶ Double-click
 - ▶ Open (option 2), or
 - ▶ Browse (option 5) using menus
- ♣ Tokenization: the colouring of language tokens
- ♣ Prefix area: can use all the SEU commands
- ♣ Show date: use the context menu
- ♣ Outline view: shows the outline of your program. Used to navigate within your program

Line	Column 1	Replace	2 changes
000001	H DFTNAME (PROOF)		
000002	FQSYSPRT	O F 132	PRINTER
000003			
000004	D ARRAY	S	DIM(3)
000005	D		CTDATA PERRCD(1)
000006	D INSTALL	C	CONST('INSTALLATION')
000007	D DS	DS	
000008	D OK		INZ('VERIFIED')
000009			
000010	C	EVAL	OK = 'FAILED'
----- 5 lines excluded. -----			
000016	O		24 'OF'
000017	O		28 'THE'
000018	O		36 'ILE RPG'
000019	O		45 'COMPILER'
000020	O		+ 1 'IS'
000021	O	OK	+ 1
000022	**		
000023	COMPILE		
000024	TIME		
000025	ARRAY		

Line	Column 1	Replace	2 changes
0000.01	H DFTNAME (PROOF)		
0000.02	FQSYSPRT	O F 132	PRINTER
0000.03			
0000.04	D ARRAY	S	DIM(3)
0000.05	D		CTDATA PERRCD(1)
0000.06	D INSTALL	C	CONST('INSTALLATION')
0000.07	D DS	DS	
0000.08	D OK		INZ('VERIFIED')
0000.09			
0000.10	C	EVAL	OK = 'FAILED'
0000.11	d f a f d	MOVE	ARRAY(2) ARRAY(3)
0000.12	C	RESET	OK
0000.13	C	SETON	
0000.14	QSYSPRT	T LR	1 1
0000.15	O	INSTALL	21
0000.16	O		24 'OF'

Remote Systems LPEX Editor vs SEU Basics

♣ SEU

- ▶ Full screen mode when browsing (F13)
- ▶ Split screen and browse

- ▶ Date area: at the right

- ▶ Print: STRSEU and Option 6

♣ Remote Systems LPEX Editor

- ▶ Full screen mode for both edit and browse: double click on editor tab
- ▶ Split screen for edit and browse: there are two options
 - Drag and drop the editor tab to view two different members
 - Use editor popup or Ctrl+2 to split the current LPEX view to work with different parts of the same member (up to 5 splits)
- ▶ Date appears next to sequence numbers. Can be enabled by a preference or by popup
- ▶ Print: from File Menu or Ctrl+P



Split Screens And Date Area

The screenshot displays the IBM Rational Developer for System z interface with three main windows:

- TEST.RPGLE**: A split-screen view of two panels.
 - Panel 1 (Left):** BATTHISH/QRPGLESRC(TEST): 1. Shows code for lines 3-7. Line 3 has a date area: `.....1.....+.2.....+...3`. Lines 4-7 contain declarations: `H DFTNAME (PROOF)`, `FQSYSPRT O F 132`, `D ARRAY S`, `D INSTALL C`, and `D DS DS`.
 - Panel 2 (Right):** BATTHISH/QRPGLESRC(TEST): 2. Shows code for lines 19-24. Line 19 has a date area: `.....O.....NO1NO2NO3F`. Lines 20-24 contain: `O`, `O`, `O`, `O`, `**`, `COMPILE`, and `TIME`.
- DDMFILE1.PF**: A window showing a table with a date area.

Line	Date	Action	Name	Length	TDpB	Functions
000100	05/12/20	R	FMT1			
000101	05/12/20		FIELD1	10		
000102	05/12/20		FIELD2	10		
000103	05/12/20		FIELD3	10		
000104	05/12/20		FIELD4	10		
000105	05/12/20	K	FIELD			
- Outline**: A tree view on the right showing the project structure. The **FIELD4 10** node is selected.



Syntax Checking, Help & Prompting

- ♣ RSE, like SEU has auto-syntax checking
 - ▶ See all the errors, not just the first one
- ♣ Help (F1) is available for the errors, but also for the source!
 - ▶ Context sensitive help directly linked to the reference manuals
 - ▶ Manuals quickly accessible from the Source menu
- ♣ Prompting (F4) appears either in the iSeries Source Prompter view or (for CL) in a dialog. F1 context sensitive help available from the prompt view or the CL prompter.

```

000004 D ARRAY S 8 DIM(3)
000005 D CTDATA PERCRD(1)
000006 D INSTALL C CONST('INSTALLATION')
000007 D DS DS
000008 D OK 1 A INZ('VERIFIED')
RNF3712E To-Field-Location entry is not valid; defaults to From-F:
RNF3431E Length of initial value exceeds size of field.
000009
000010 C EVAL OK = 'FAILED'
000011 asdfafd MOVE ARRAY(2) ARRAY(3)
RNF3702E Entry is not blank for a subfield definition; defaults to
RNF3302E The Data-Type entry is not valid; defaults to blank.
RNF3708E From-Field-Location entry is not valid; defaults to 1.
RNF3712E To-Field-Location entry is not valid; defaults to From-F:
RNF3414E The Decimal-Positions entry is not valid; defaults to Bl:
RNF3308E Keyword name is not valid; the keyword is ignored.
    
```

Name	Externally described	Data structure type	Definition type	From	To/length	Internal data type	Decimal positions	Keywords	Comment
INSTALL								CONST('INSTALLATION')	

.....DRIbase*****XTDofFzcos+++To/L++++IDo:Ryrcods*****Comments*****
 > INSTALL C CONST('INSTALLATION')



Verifiers & Error List

- ♣ COBOL, RPG & DDS have a program verifier (Ctrl+Shift+V)
- ♣ Syntax & semantic checking (no code generation)
- ♣ Verifiers generate the same error messages as the compiler
- ♣ Use Source->Verify (Prompt) to specify additional options or modify default verify preferences.
- ♣ Errors appear in the Error List View as for compile.
 - ▶ Insert errors into source
 - ▶ F1 help for errors
 - ▶ Filter errors
 - ▶ Use as a TODO list
 - ▶ In editor,
 - use Ctrl+F5 to Refresh (removes all errors, clears any excluded lines), or
 - Source->Remove messages to remove errors

The screenshot shows a COBOL program editor window titled '*TEST.RPGLE' with several error messages. Below the editor is the 'Series Error List' window, which displays a table of errors.

ID	Message	Sev...	Line	Location
RN59308	Compilation stopped. Severity 30 errors found in program.	50	0	BATTHISH/QRPGLESRC(TE..
RNF0257	Form-Type entry for main procedure not valid or out of seq...	30	11	BATTHISH/QRPGLESRC(TE..
RNF2318	Overflow indicator *INOA is assigned to PRINTER file QSYS...	00	2	BATTHISH/QRPGLESRC(TE..
RNF7031	The name or indicator ARRAY is not referenced.	00	4	BATTHISH/QRPGLESRC(TE..
RNF7031	The name or indicator DS is not referenced.	00	7	BATTHISH/QRPGLESRC(TE..

Content assist and Templates

The screenshot shows an RPGLE editor window with a list of code lines. At line 10, column 36, the word 'ARRAY' is typed, and a dropdown menu of suggestions is displayed. The suggestions include 'ARRAY', 'INSTALL', 'OK', 'INLR', and 'INCA'. The 'ARRAY' suggestion is highlighted, and a preview of the code completion is shown to the right, displaying 'ARRAY char(8) DPM(3)'. The code in the background includes various RPG operations like 'H DFYNAME(PROOF)', 'FQSYSPRT', 'D ARRAY', 'D INSTALL', 'D OK', 'EVAL', 'RES', and 'SET'.

The screenshot shows the 'Preferences' dialog box with the 'Templates' tab selected. The dialog contains a table of templates with columns for 'Name', 'Content', and 'Description'. Below the table, there is a preview area showing a sample template for a FOR loop.

Name	Content	Description
FOR_ALL_keys	FOR ALL keys	The FOR operator begins a group of operations and controls the number of iterations.
FOR_DOWNTO_keys	FOR DOWNTO keys	The FOR operator begins a group of operations and controls the number of iterations.
FOR_UP_keys	FOR UP keys	The FOR operator begins a group of operations and controls the number of iterations.
FOR_UPDOWNTO_keys	FOR UPDOWNTO keys	The FOR operator begins a group of operations and controls the number of iterations.
FOR_keys	FOR keys	The FOR operator begins a group of operations and controls the number of iterations.
IF_statement	IF statement	The IF operator code precedes a group of operations which you want to be processed only if the condition is true.
IF_NOT_statement	IF NOT statement	The IF NOT operator code precedes a group of operations which you want to be processed only if the condition is false.
SELECT_group	SELECT group	The SELECT operator code allows a series of alternative operations to be processed.
SELECT_NOT_group	SELECT NOT group	The SELECT NOT operator code allows a series of alternative operations to be processed.
MONITOR_group	MONITOR group	The MONITOR operator code allows a series of alternative operations to be processed.
MONITOR_NOT_group	MONITOR NOT group	The MONITOR NOT operator code allows a series of alternative operations to be processed.
SET_statement	SET statement	The SET statement can be used to move data to make conditional work.
IF_THEN_statement	IF THEN statement	The IF THEN statement evaluates a condition and provides for alternative actions.
IF_THEN_ELSE_statement	IF THEN ELSE statement	The IF THEN ELSE statement evaluates a condition and provides for alternative actions.
PERFORM_statement	PERFORM statement	The PERFORM statement transfers control explicitly to one or more programs.

FOR ((CDSDB)) index = :const_value TO :last_value;
// Loop body goes here.
DO3PDB;

- ♣ Content assist (Ctrl+Space): propose, display and insert code completions at the cursor position
 - ▶ Can be used to provide context information
 - ▶ RPG: Refresh the outline view
- ♣ Templates: type the name of the template and press Ctrl+Space
 - ▶ Add your own templates



RPG Wizards

- ♣ Three RPG wizards available to facilitate programming:
 - ▶ D Specification Wizard
 - ▶ Procedure Wizard
 - ▶ Java Method Call Wizard
- ♣ Accessed via Source menu or by popup in source and selecting appropriate option in the New submenu
- ♣ Specify all needed information using a graphical interface and source is then generated

RPG Procedure Wizard
Create RPG procedure

Procedure type: Subprocedure
 Procedure name: MYSUBPROC
 External name (EXTPROC): BOJ
 Purpose: my purpose

Exportable for use with other code (EXPORT)
 Generate free-form calculation

Name	Type	Length	Decimal	Keywords	Comments
PARM1	A-Character	10	3	DIR(1)	first parameter
PARM2	P-Packed Decimal	4			second parameter

Buttons: Add, Delete, Create, Refresh, Previous, Next, Help, Cancel

Page the operational descriptors with the parameters
 Return a value
 Refresh Outline view upon completion

```

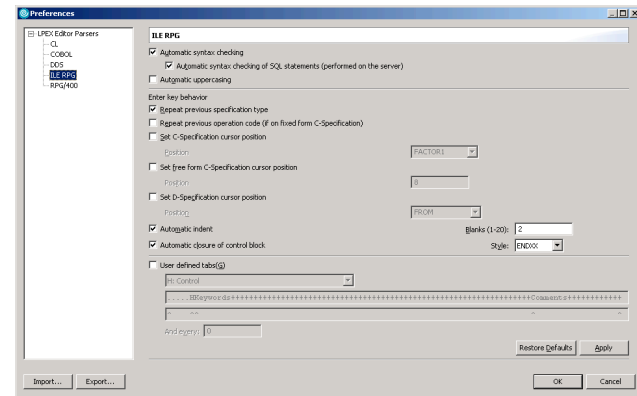
Line 31 Column 35 Replace 3 changes
-----
000001
000002
000003
000004  D*-----
000005  D* Procedure name: MYSUBPROC
000006  D* Purpose: my purpose
000007  D* Returns:
000008  D* Parameter: PARM1 => first parameter
000009  D* Parameter: PARM2 => second parameter
000010  D*-----
000011  D MYSUBPROC PR EXTPROC(BOJ)
000012  D PARM1 10A
000013  D PARM2 4P 3 D1X(12)
000014
000015
000016  D*-----
000017  D* Procedure name: MYSUBPROC
000018  D* Purpose: my purpose
000019  D* Returns:
000020  D* Parameter: PARM1 => first parameter
000021  D* Parameter: PARM2 => second parameter
000022  D*-----
000023  D MYSUBPROC B
000024  D MYSUBPROC PI 10A
000025  D PARM1
000026  D PARM2 4P 3 D1X(12)
000027
000028
000029 /FREE
000030 // Your calculation code goes here
000031
000032
000033 /END-FREE
000034 D MYSUBPROC E
000035
    
```



Additional LPEX parser options and features

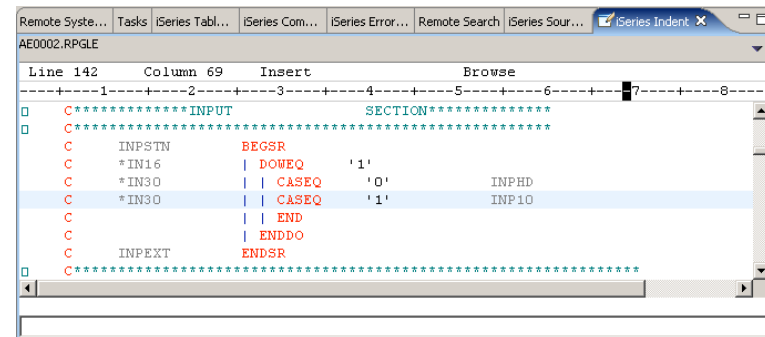
♣ Preferences

- ▶ Column sensitive editing
- ▶ Signatures
- ▶ Auto-uppercasing
- ▶ Auto-indent
- ▶ Auto-formatting
- ▶ Enter Key behaviour



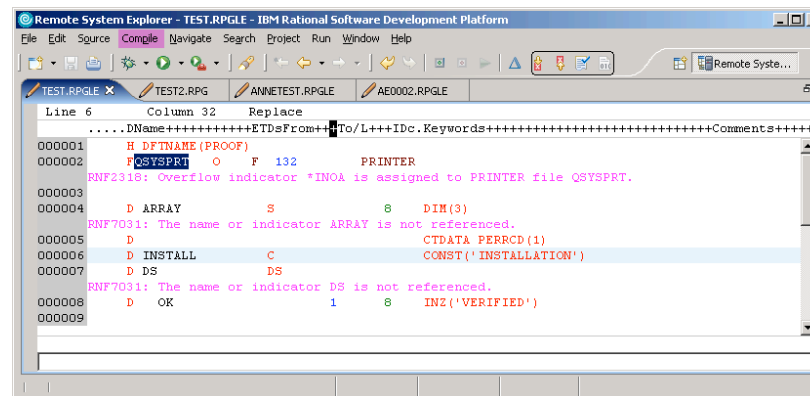
♣ Parser specific functions:

- ▶ Open copy member/book
- ▶ Convert to free form (RPG)
- ▶ Convert to ILE (RPG)
- ▶ Show indentation (RPG)



Compiling from Remote Systems LPEX

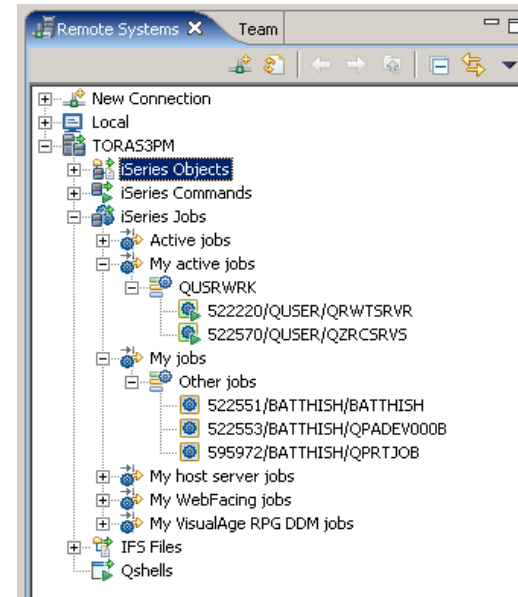
- ♣ Ctrl+Shift+C runs the default compile command
- ♣ Toolbar button for compiling
- ♣ Toolbar buttons for next (Ctrl+Shift+H) and previous error (Ctrl+Shift+Y)
- ♣ Compile menu is available to select
- ♣ Must be connected to compile



```
Remote System Explorer - TEST.RPGLE - IBM Rational Software Development Platform
File Edit Source Compile Navigate Search Project Run Window Help
TEST.RPGLE x TEST2.RPG ANNETEST.RPGLE AED0002.RPGLE
Line 6 Column 32 Replace
.....DName+++++ETDsFrom+++To/L+++IDc.Keywords+++++Comments+++++
000001 H DFNAME (PROOF)
000002 F QSYPRT O F 132 PRINTER
RNF2318: Overflow indicator *INOA is assigned to PRINTER file QSYPRT.
000003
000004 D ARRAY S 8 DIM(3)
RNF7031: The name or indicator ARRAY is not referenced.
000005 D CTDATA PERRCD (1)
000006 D INSTALL C CONST('INSTALLATION')
000007 D DS DS
RNF7031: The name or indicator DS is not referenced.
000008 D OK 1 8 INZ('VERIFIED')
000009
```


Jobs

- ♣ Use the tree view to see jobs
- ♣ Add to the iSeries Job Status view by job, or by default using the preferences
- ♣ Access job information, properties using popup
- ♣ Perform other basic operations such as end, display job log
- ♣ Debug and add user actions too



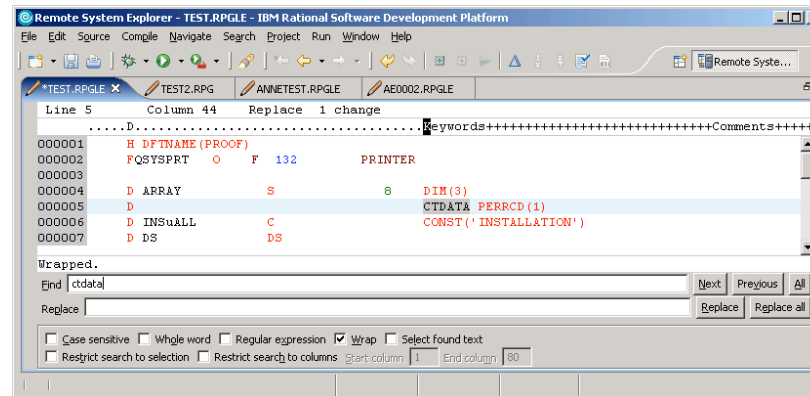
Date/Time Submitted	Job	Connection	Status	Task
10-Apr-2006 10:55:00 AM	522220/QUSER/QRWTSRVR	TORAS3PM	*ACTIVE	

Refresh Interval: Never



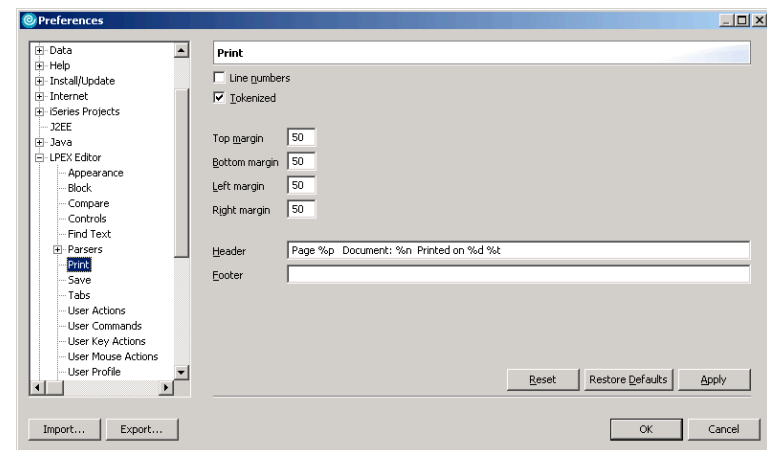
Search and Replace in LPEX

- ♣ Ctrl+F bring up the Find function in LPEX (ctrl
- ♣ Specify search string, and optionally replace string
- ♣ Specify Regular expression to allow you to search for a pattern:
 - ▶ **this|that** (search for **this** or **that**)
- ♣ Ensure column sensitive editing is on, if you don't want your text shifted
- ♣ Use Ctrl+N or Shift+F4 to find next match



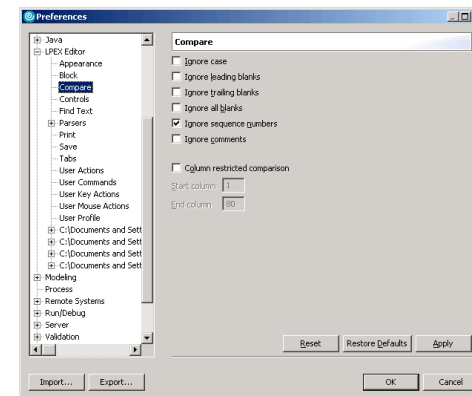
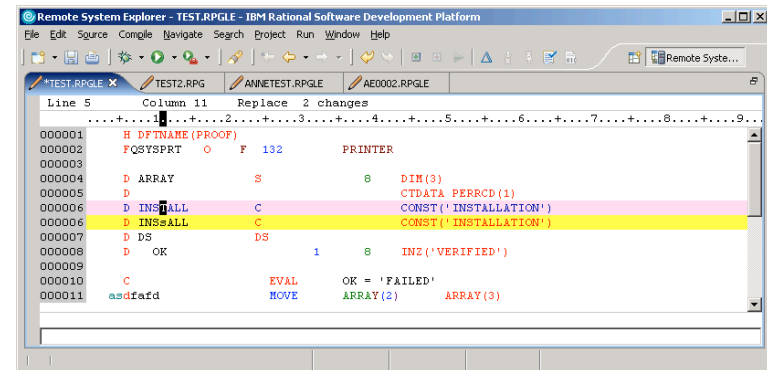
Printing (Option 6)

- ♣ Ctrl+P, print button, File->Print
- ♣ Various print options can be found in
 - ▶ Window->Preferences->LPEX Editor->Print
- ♣ Note that line numbers are not the same thing as sequence numbers
- ♣ Substitution variable allowed in the header & footer:
 - ▶ %p: page number
 - ▶ %n: source name, base file name, or document name
 - ▶ %f: full-path file name or document name
 - ▶ %d: date
 - ▶ %t: time



Compare (Option 54)

- ♣ Open member
 - ▶ Edit->Compare->Compare to file
 - ▶ Compare button in toolbar
- ♣ Source appears merged with differences flagged in different colours
- ♣ Only permitted to modify the source that is opened
- ♣ Ctrl+Shift+N for next mismatch
- ♣ Ctrl+Shift+P for previous mismatch
- ♣ Specify any preferences in LPEX:
 - ▶ Columns to include
 - ▶ Ignore sequence numbers
 - ▶ Ignore blanks
- ♣ Ctrl+Shift+R to refresh the compare
- ♣ Edit->Compare->Clear to end



Additional Useful LPEX Keys

Ctrl+Home	Go to the top
Ctrl+End	Go to the end
Ctrl+L	Go to line number
Alt+S	Split a line
Alt+J	Join a line
Alt+L	Select a line
Alt+R	Select a rectangle
Ctrl+Z	Undo
Ctrl+Y	Redo
Ctrl+S	Save
Ctrl+M	Match
Ctrl+Shift+M	Find match



Internet Resources

♣ Web page:

- ▶ www.ibm.com/software/awdtools/wdt400

♣ Newsgroup:

- ▶ news.software.ibm.com/ibm.software.websphere.studio400

♣ Mailing list:

- ▶ To subscribe, unsubscribe, or change list options, visit:
 - <http://lists.midrange.com/mailman/listinfo/wdsci-l>
- ▶ or email: WDSCI-L-request@midrange.com
- ▶ Before posting, please take a moment to review the archives at <http://archive.midrange.com/wdsci-l>

