



IBM Software Group

Rational Developer for IBM i (RDi) Working offline using i Projects

*Featuring: Using i Projects for: working offline, editing, remote compiling/
building, interfacing with RTCi for source control*

Rational software

Go to IBM

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Agenda

■ i Projects

- ▶ **Overview**
- ▶ How do I use them
- ▶ Working with source files and members
- ▶ Remote actions, compile and build
- ▶ Using RTCi and i Projects

RSE and i Projects

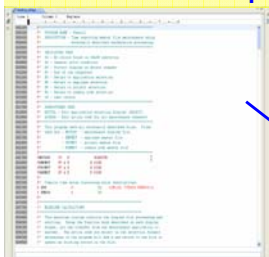
- Remote System Explorer (RSE)
 - Designed to be familiar to PDE / SEU programmer
 - Source members are still kept on IBM i
 - Remote edit, verify, compile, run / debug
- i Projects
 - Designed to be similar to development of Web, Java, and XML in the workbench
 - Source is kept local on the PC in the workspace
 - Local edit and verify then push changes and build on remote system
 - Use any workbench based SCM provider
 - RTCi optimized for IBM i source control and project management

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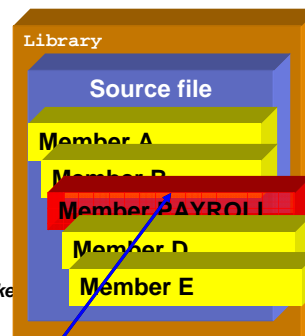
Using Remote Systems Explorer

Source stays on the IBM i server

RSE LPEX editor
Member PAYROLL open



*RSE job on IBM i server
Member PAYROLL is locked*



To edit member:

Select it in RSE and open it in editor
RSE checks for required authority and member locks
Prompted if either check fails
Member is locked on IBM 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

RSE job with your profile

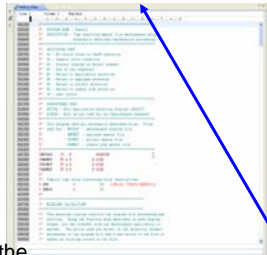


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Using i projects

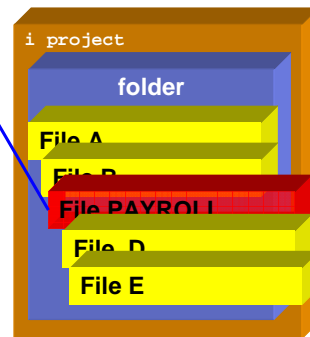
Source is located on PC in an i project

**LPEX editor with
Member PAYROLL open**



To edit member:
 Select it in the i project
 Open it in editor
 The member gets loaded from the workspace and opened in the editor
 No locking on IBM i, no downloading
 Changes written back to local project file

*No RSE job needed on IBM i server
 Member PAYROLL is **not** locked*



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Why use i projects?

- Use for disconnected development
 - If you want to work on source while you're disconnected from an IBM i server
 - On the train
 - At home on the weekend (sorry)
- Use for structured development
 - Organize development into "projects", just like you would for Java, J2EE or Web
 - A project holds the required source and you build the project
 - Easy to develop and maintain versus having source in various locations
 - Version control with RTCi

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i projects and RSE the ideal combination

- Work offline and use RSE features such as:
 - ❖ Re-use RSE connections to remote servers to push for compiles
 - ❖ Advanced editing capabilities in Remote Systems LPEX editor
 - ❖ Outline view for RPG and COBOL
 - ❖ Content Assist
 - ❖ Application Diagram Viewer
 - ❖ Verifying source locally with cached reference information
 - ❖ GUI Screen Design Tool for display files
 - ❖ Integrated, online help for tools and languages

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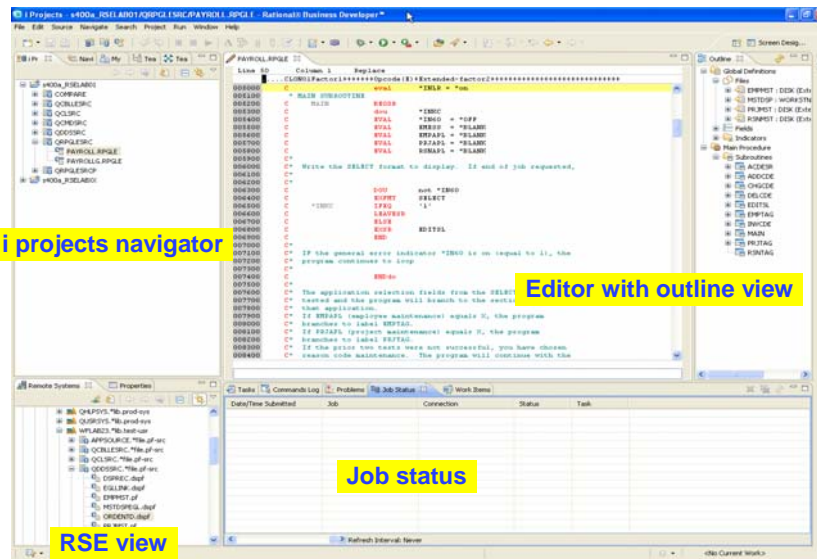
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i Projects

- A dedicated perspective
 - Provides a collection of views and editor
 - i Project Navigator view
- Typical workbench project
 - Contains folders and files, can be shared by a team
 - Has its own tools and perspectives
- But Also
 - Holds source destined to be compiled on IBM i
 - User "Pushes" source periodically to the host, and builds

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i Projects Perspective

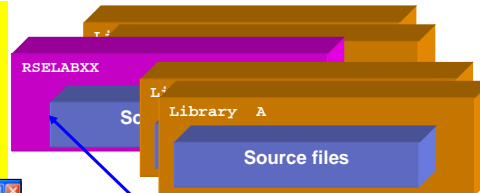
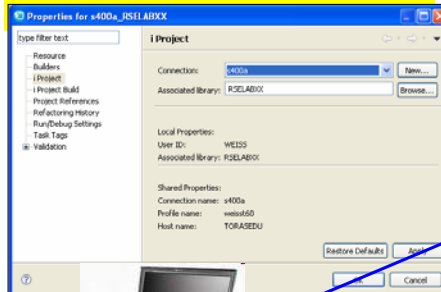


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IBM i Associated Library

• i Project

- Each i project is associated with a single IBM i library (associated library)
- One connection to access the associated library



RSE job with your profile

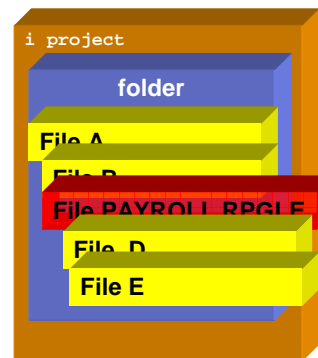
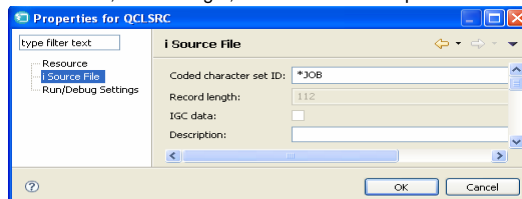
- For compiles a push of source goes to the associated library using the specified connection

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i Projects Library, files, members

IBM i Source Physical File

- Source physical files represented as folders in the project
- CCSID, record length, IGC data and description



IBM i Member

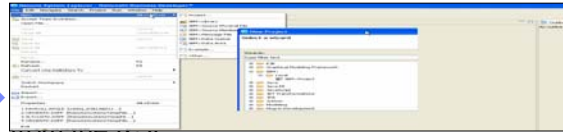
- Members stored as files within "source" folders
- Uses format: memberName.membertype
- ORDRENT. RPGLE



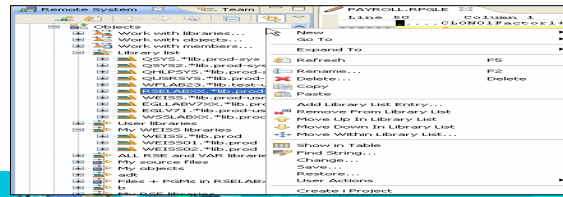
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Setting Up Your i Project

- Multiple ways to setup an i project and add source physical files and members
 - Using the workbench "New" wizard File → New → i project and Using the "Add to Project" actions from the i project

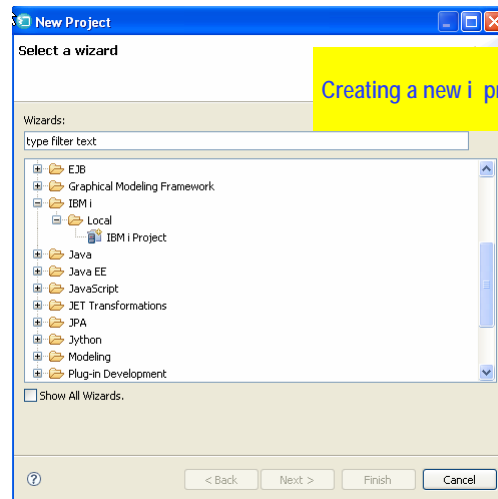


ct" actions



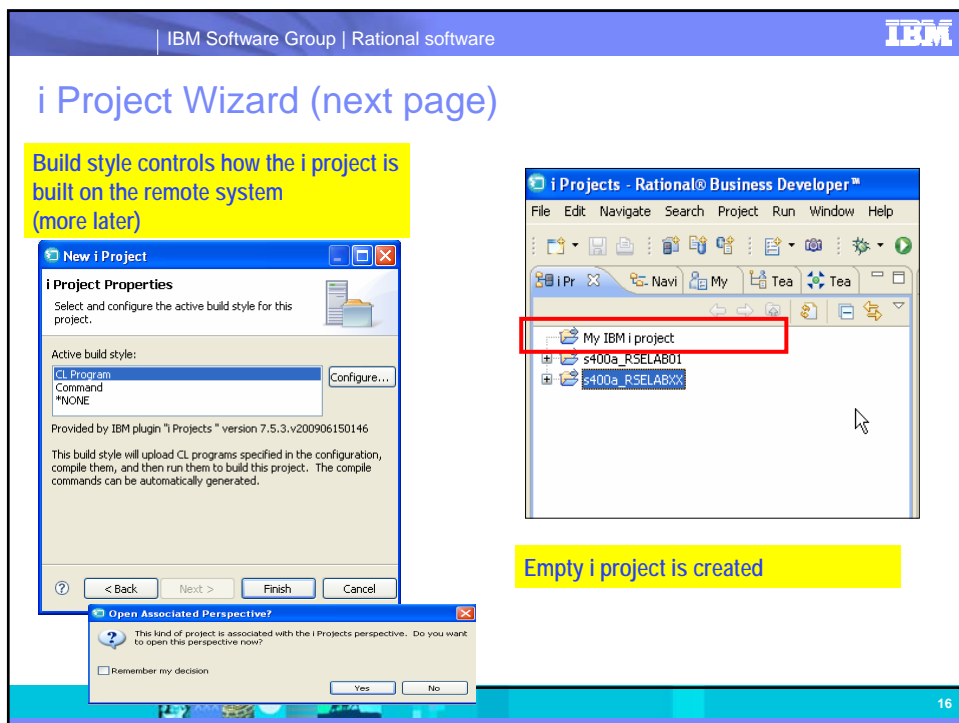
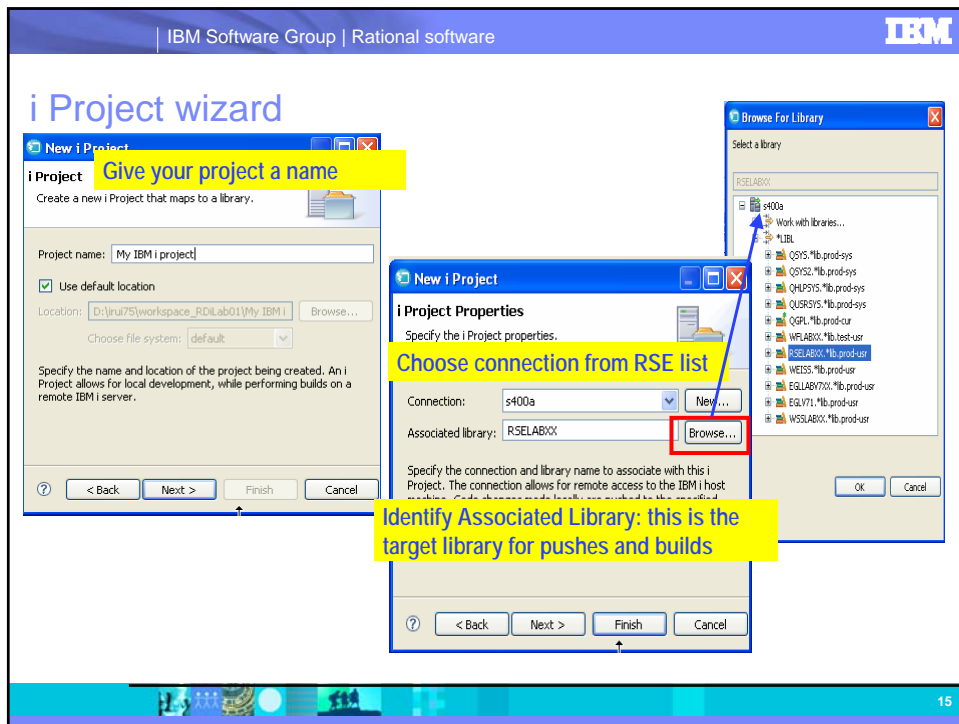
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New i Project



Creating a new i project

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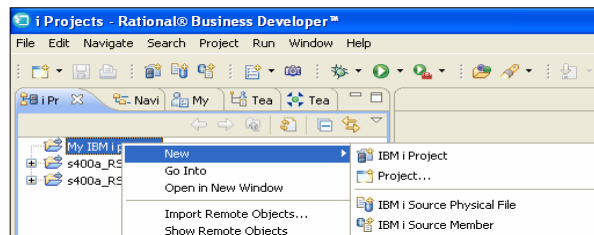
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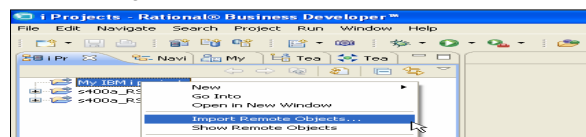
Adding content to the i project

Two choices

- Create new source files and members



- Add existing source files with their members to the project



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Adding a new source file to the i project

Select Project

Specify attributes that are used when file is finally created in associated library

Source File

Specify additional parameters.

Coded character set ID: *JOB

Record length: 112

IGC data: ☐

Description: Contains RPG source for order entry

These attributes are used when the *FILE is created in the associated library of the i Project.

< Back Next > Finish

Source File = a folder in your project
Until you "Push" your changes. Then a CRTSRCPF is done

Project contains a source file (local only)

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Adding a member to an i project source

Select the parent folder (src file)
Specify name
Specify type

Member

Create a new local member under an i Project.

Enter or select a source file under an i Project:

My IBM i project

Member name: ordermain

Source type: RPGLE

Select a source created: The new source selected source

SQLCBL

SQLCBLLE

< Back Next > Finish

Member Parameters

Specify additional parameters.

Description: Main program

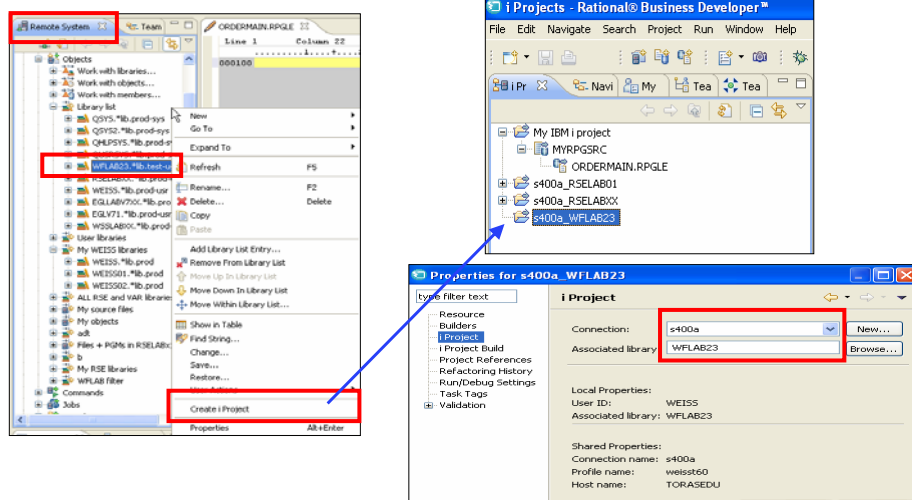
Specify the text description to associate with the

Member = a file in your folder
Until you "Push" your changes.
Then an ADPPFM is done, or
Contents of remote member are replaced

Enter a description

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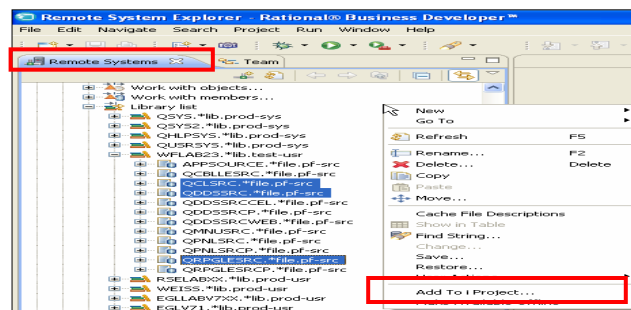
Creating an i project from RSE



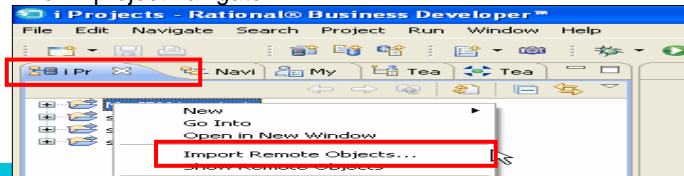
- The connection and associated library information is automatically applied to the i project
- The default project name is the concatenation of connection name and library name

What about adding existing members on IBM i?

- From RSE use Add to Project action to copy them

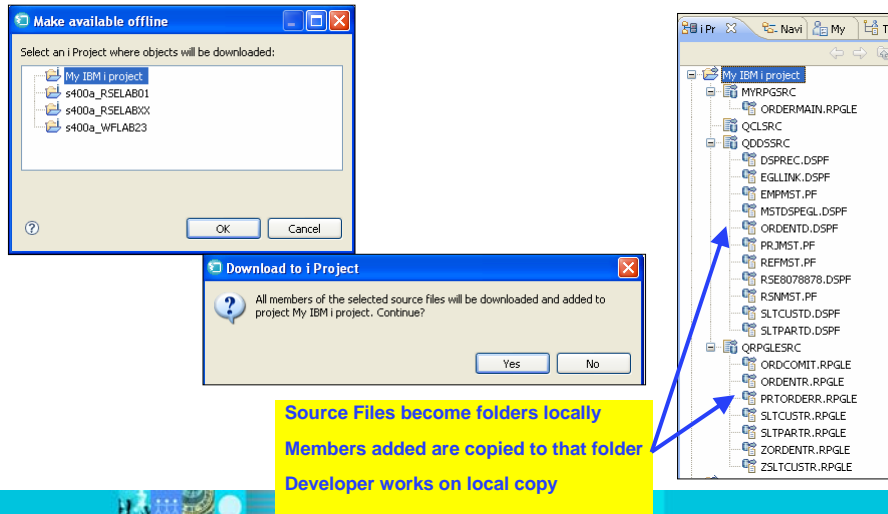


- From i project navigator



Add to i project

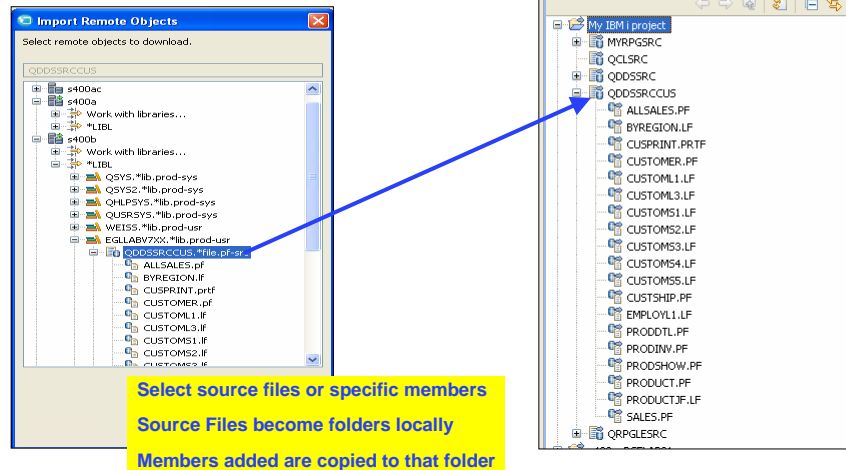
- From RSE use Add to Project action to copy them



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Import into i project

- From i Projects use import remote objects action

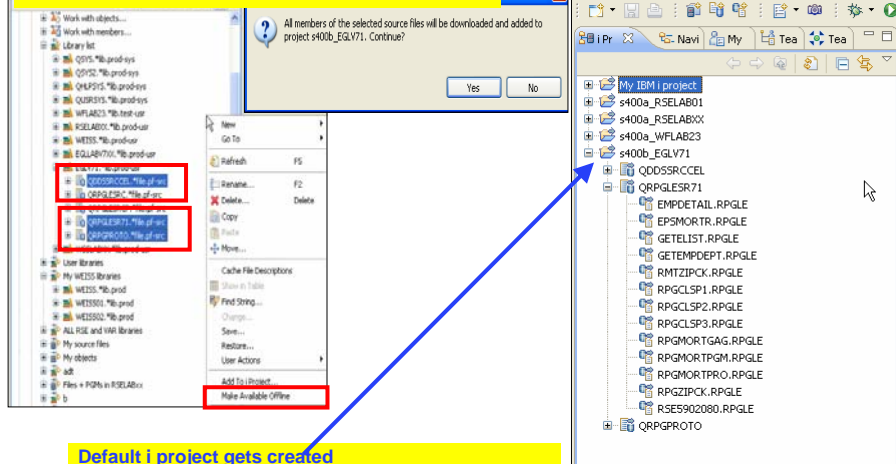


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Creating default i project and adding objects

From RSE view

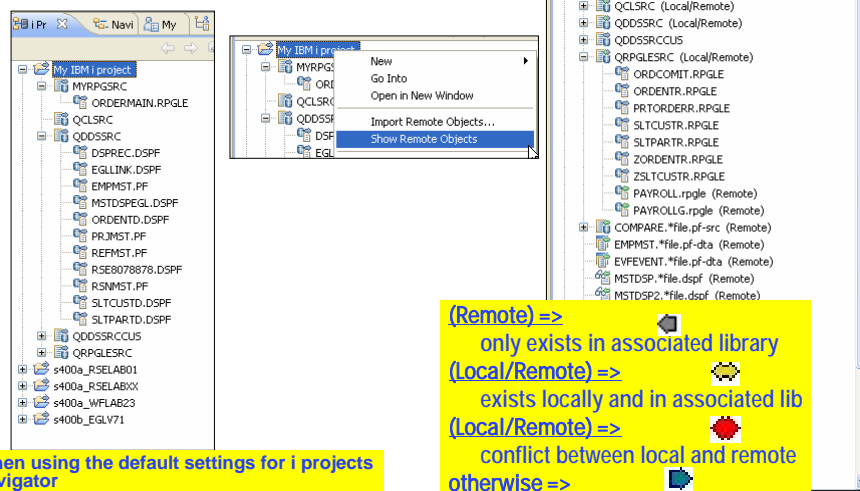
Select action *Make available offline*



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i project navigator Show Remote Objects

Local and remote objects are shown



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Editing members in i projects

All LPEX features are available
Same experience as opening the member from RSE

How about outline view, information seems to be missing

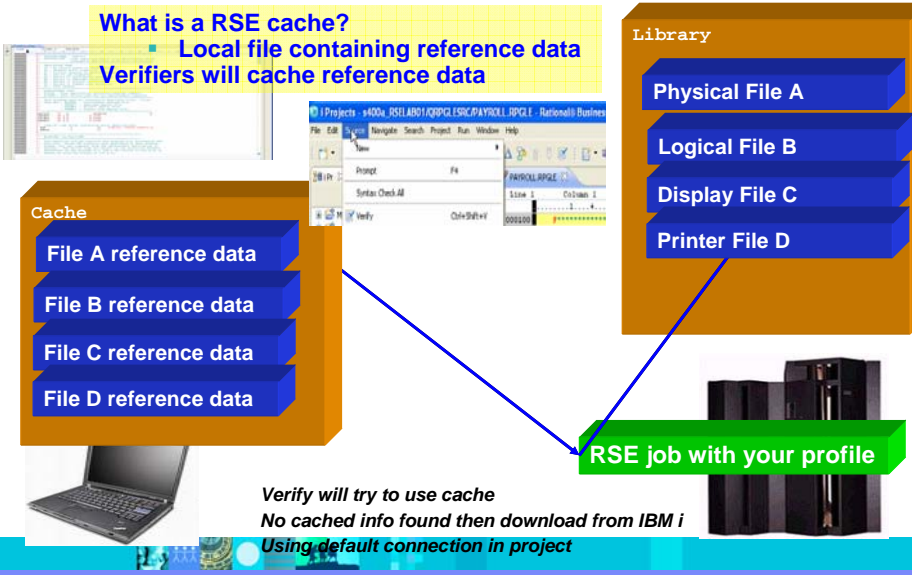
- In i projects **cached** reference data (meta data) is used
- If reference data is not found in cache the connection is used to fetch the information

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Using IBM i reference data in i projects

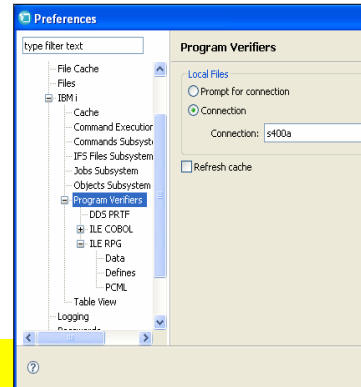
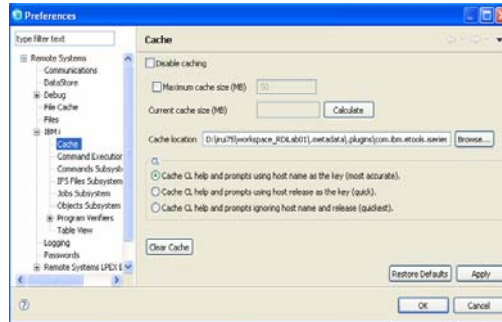
What is a RSE cache?

- Local file containing reference data
- Verifiers will cache reference data



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Looking at cache options

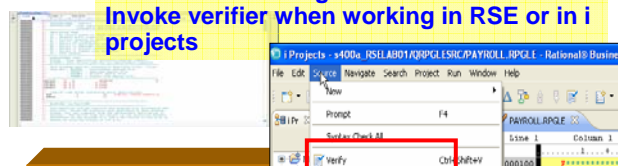


- You can
- Disable caching,
 - Restrict the size of cache on your workstation disk
 - Specify the location of the cache (default the current workspace)
 - Specify how much you want to cache
 - You can clear the cache and dispose of any info in there
 - Use verifier properties to specify to refresh cache when verifying

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Filling the cache

Use the verifier to get reference info
Invoke verifier when working in RSE or in i projects

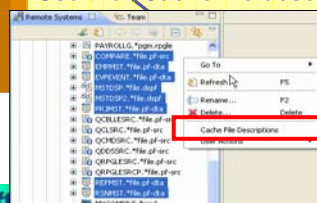


Cache

- File A reference data
- File B reference data
- File C reference data
- File D reference data



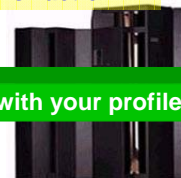
In RSE select files you want cache
information for
Use the "Cache file descriptions" action



Library

- Physical File A
- Logical File B
- Display File C
- Printer File D

job with your profile



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Refreshing the outline view when disconnected

Outline view uses the verifier to get the program and reference information
The verifier will try to fetch the information from cache or connection

Outline view now shows reference information fetched from cache by verifier

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Verifying in i projects

Invoke verifier from workbench Source menu

Error list show verify errors
• Double click on error to position cursor on problem line in source

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Agenda

■ i projects

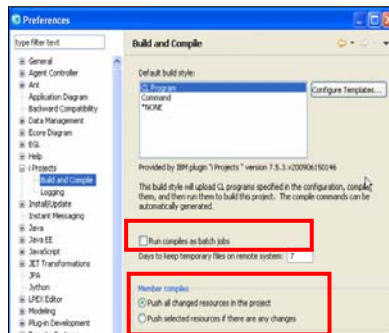
- ▶ Overview
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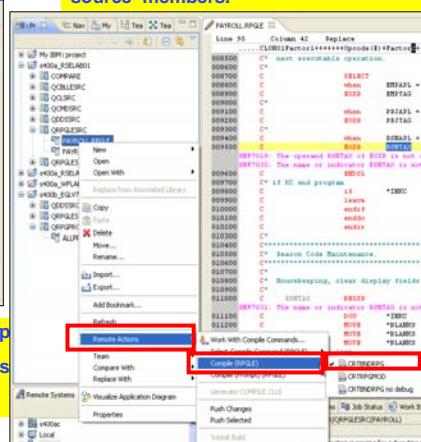
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Remote COMPILE

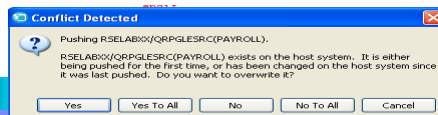
Remember source is kept on workstation
Before compiling the source has to be pushed
(uploaded) to the IBM i server.
Associated library is only target for the Pushed
source members.



Option to not submit to batch, instead compile in RSE job
Option to push all changed resources or just selected changed



The remote compile action will push member(s)
If there is a conflict on the server a message is displayed.
Compile is started after everything is pushed.



Error list

Like for RSE compile, the error list will show any compile errors
Double click on the error and the editor will get focus and the cursor positioned at the error location

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Remote COMPILE using submit to batch

Provided by IBM plugin 'Projects'

This build style will upload CL program, then, and then run them to build automatically generated.

☒ Run compile as batch jobs

Same remote action but submit to batch

- Job status view contains job info
- When job is in OUTQ status
- Retrieve error list

Submitted	Job	Connection	Status	Task
09 1:28:56 PM	142672/WEISS/WEISS	s400a	*ACTIVE	Compile

Submitted	Job	Connection	Status	Task
Sep 15, 2009 1:28:56 PM	142672/WEISS/WEISS	s400a	*OUTQ	Compile

Task Actions: Cancel, Retrieve Errors

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Work With Compile Commands

Work With Compile Commands

Parent profile: weisst60
Source type: RPGLE

Compile Commands:

- mySpecialRPGCreate
- CRTBNDPG
- CRTBNDPGMOD
- CRTBNDPG no debug

New compile command:

Label: mySpecialRPGCreate
Command: CRTBNDPG PGM(WEISS(SA) SRCFILE(84/R) SRCMBR(SA) OP

**Create your own compile command or change existing ones
New compile command will show in context menu of Remote Actions**

Remote Actions

- Team
- Compare With
- Replace With
- Visualize Application Diagram
- Work With Compile Commands...
 - Select Compile Command (RPGLE)
 - CRTBNDPG
 - CRTBNDPGMOD
 - CRTBNDPG no debug
 - mySpecialRPGCreate**

Project Build

**After applying changes to your project files,
you can submit a build on a project level
Build by default will push changes**

Remote Actions

- Team
- Compare With
- Restore from Local History...
- Web Development Tools
- PDE Tools
- Visualize Application Diagram
- Submit Build**

Progress Information

Pushing Changed Resources.

CODELAB\QDSSRC(MSTDSPV)

Build Styles

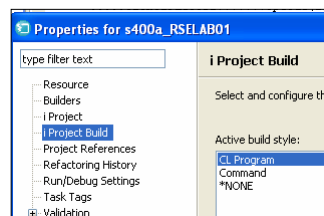
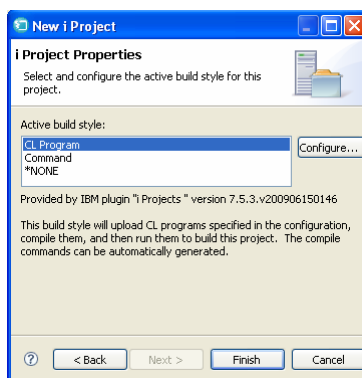
- Specify how to build the i project on the remote system
- Three IBM supplied build styles
 - CL program
 - I project automatically creates CL program
 - CRT statement for each changed member in project
 - Uses last CRT command from RSE for each source type
 - Command
 - You specify a command to run your own build script
 - *NONE
- ISVs can plug-in additional build styles

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i Projects defining the build style

Build style controls how the i project is built on the remote system
Defined when project is created
CL program is the default

Change in project properties
Specify Build Style and style configuration parameters for i Project
more information on next slide ...



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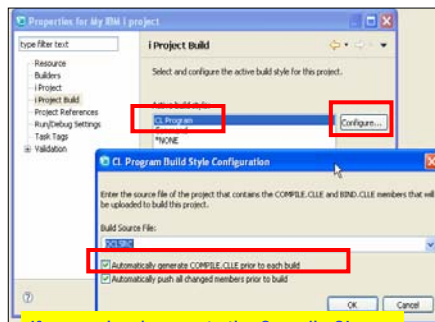
i Projects configure build style

For CL Program specify:

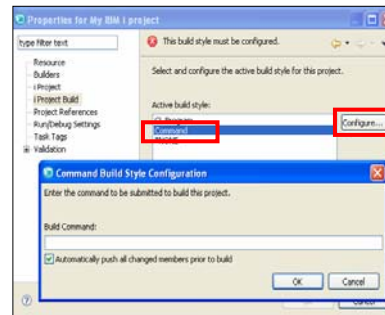
- Source file
- Automatically create compile CL program
- Push all changed members before build program runs

For command specify:

- The command to run, to execute your build script
- Push all changed members before build program runs



If you make changes to the Compile CL program, uncheck the automatic creation checkbox

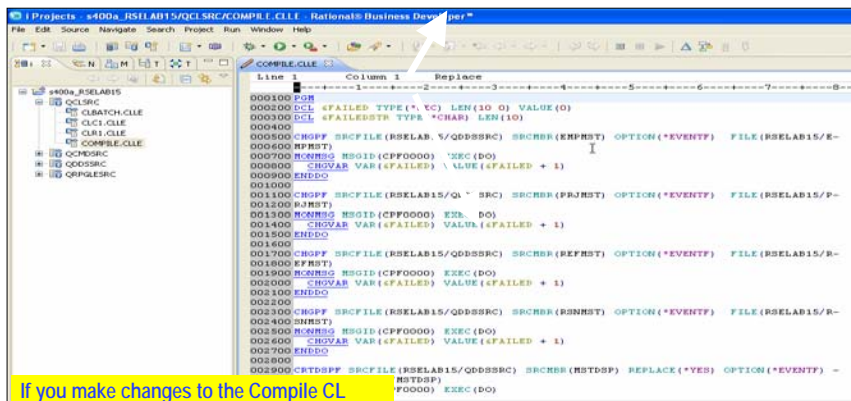


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i Projects Sample Compile CL program

COMPILE CL program gets created
Source generated

- For each member in the project a CRT command is added
- This program is the build script and runs when you submit a build



If you make changes to the Compile CL program, uncheck the automatic creation checkbox

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i Projects Changing the order of member type

Use preference settings to change the order of CRT commands in COMPILE CL depending on the member type

Default order

Compile member types in this order:

- RPGLE
- LF
- DSPF
- DOCT

Now RPG gets compiled first

```

Line 1      Column 1      Replace
-----
000100  BEGIN
000200  DCL  (*FAILED TYPE(*DEC) LEN(10 0) VALUE(0)
000300  DCL  (*FAILEDSTR TYPE(*CHAR) LEN(10)
000400
000500  CRTENDRPG FOR(RSELAB15/PAYROLL) SRCFILE(RSEI
000600  LACE(*YES) OPTION(*EVENTF) DBGVIEW(*SOURCE)
000700  MONMSG MSGID(CPF0000) EXEC(DO)
000800  CHVAR VAR(*FAILED) VALUE(*FAILED + 1)
000900  ENDDO
001000
001100  CRTENDRPG FOR(RSELAB15/PAYROLL) SRCFILE(RSEI
001200  LACE(*YES) OPTION(*EVENTF) DBGVIEW(*SOURCE)
001300  MONMSG MSGID(CPF0000) EXEC(DO)
001400  CHVAR VAR(*FAILED) VALUE(*FAILED + 1)
001500  ENDDO
001600
001700  CHGPF SRCFILE(RSELAB15/QDSSRC) SRCMBR(ENRPS
001800  NPST)
001900  MONMSG MSGID(CPF0000) EXEC(DO)
002000  CHVAR VAR(*FAILED) VALUE(*FAILED + 1)
002100  ENDDO
002200
002300  CHGPF SRCFILE(RSELAB15/QDSSRC) SRCMBR(PRJN
002400  NPST)
002500  MONMSG MSGID(CPF0000) EXEC(DO)
002600  CHVAR VAR(*FAILED) VALUE(*FAILED + 1)
002700  ENDDO
002800
002900  CHGPF SRCFILE(RSELAB15/QDSSRC) SRCMBR(RKPR
003000  NPST)
003100  MONMSG MSGID(CPF0000) EXEC(DO)
  
```

Example Project Build

After applying changes to your project files,

- submit a build
- Compile CL program gets assembled
- CRT commands for all sources run
- Check job status,
 - if OUTQ
- Retrieve errors to show in error list

Date/Time Submitted	Job	Connection	Status	Task
Sep 15, 2009 1:28:56 PM	142672/WEISS/WEISS	s400a	*OUTQ	Compile
Sep 15, 2009 2:46:39 PM	142767/WEISS/WEISS	s400a	*OUTQ	My IBM I proj...
Sep 15, 2009 2:48:59 PM	142770/WEISS/WEISS	s400a	*ACTIVE	My IBM I proj...

Severity	Line	Location	Message
50	0	JUN01/JORPGLSRC(CORCENTR)	Compilation stopped. Severity 40 errors found in program.
40	27	JUN01/JORPGLSRC(CORCENTR)	External descriptions for file ORIENTD1 not found; file is ignored.
30	392	JUN01/JORPGLSRC(CORCENTR)	The name or indicator ALTOICRDR is not defined.
30	170	JUN01/JORPGLSRC(CORCENTR)	The name or indicator CUSTOMER is not defined.
30	122	JUN01/JORPGLSRC(CORCENTR)	The name or indicator PREY is not defined.
30	352	JUN01/JORPGLSRC(CORCENTR)	The name or indicator ITENRSCD is not defined.
30	383	JUN01/JORPGLSRC(CORCENTR)	The name or indicator OPT is not defined.
30	231	JUN01/JORPGLSRC(CORCENTR)	The name or indicator ORDCPL is not defined.
30	506	JUN01/JORPGLSRC(CORCENTR)	The name or indicator ORDCRAB is not defined.
30	357	JUN01/JORPGLSRC(CORCENTR)	The name or indicator ORDCPL is not defined.
30	256	JUN01/JORPGLSRC(CORCENTR)	The name or indicator PARTOSC is not defined.
30	250	JUN01/JORPGLSRC(CORCENTR)	The name or indicator PARTOSC is not defined.

i project Build Job Status view

Job where build is running

Status of the build

Refresh interval determines how frequently status is updated

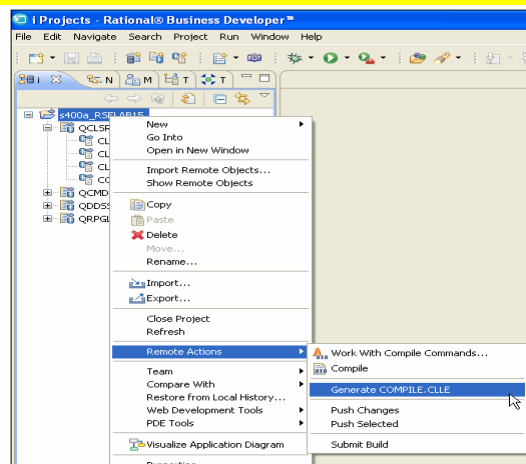
Retrieve errors from build to the i Error List

Date/Time Submitted	Job	Connection	Status	Task
Sep 16, 2009 1:32:52 PM	114463/WEISS/WEISS	#400a	*CULTQ	#400a - RSELA...
Sep 16, 2009 3:29:02 PM	114464/WEISS/WEISS	#400a	*ACTIVE	#400a - RSELA...

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Create COMPILE.CLL

- Can generate COMPILE.CLL for project without building
- Use program as base and change it to your needs



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Agenda

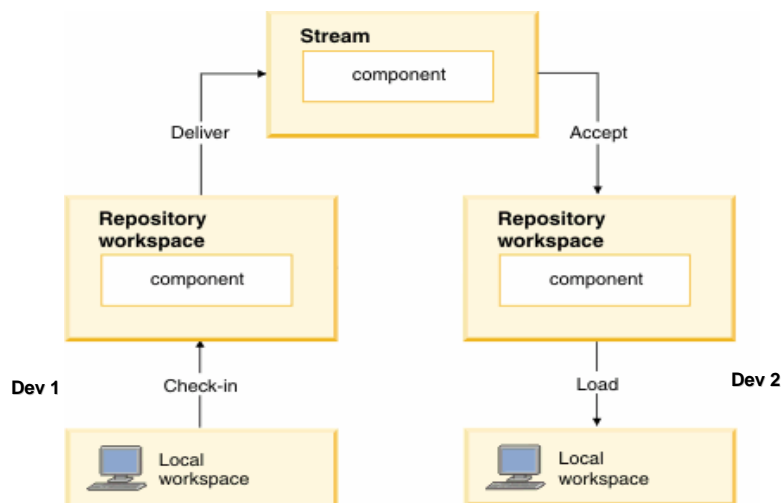
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Working With RTCi SCM in a Team Environment



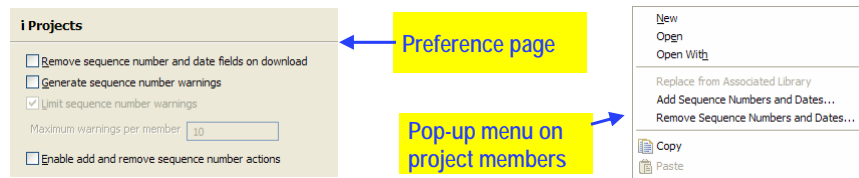
Developers using i projects to work with RTCi

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i Projects – Date Field and Seq Number

- **Automatic remove of date / sequence number fields**
 - ▶ Preference to remove sequence number and date fields on download from IBM i member to project
 - Default values re-added on upload
 - Add / remove date and sequence number actions added to pop-up menu
- **Useful for**
 - ▶ Change management systems
 - ▶ Using editors that don't understand timestamp / sequence number fields



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Summary

i Projects provide a way to work with RPG, COBOL, CL and DDS source locally on your workstation

- ▶ Disconnected development
- ▶ Structured development
- ▶ Change management

Leverages all the power of the RSE

Plus the ability to:

- ▶ Track local change history
- ▶ Automatically remove / add timestamp and sequence number fields

Lots of resources available to get you started:

- ▶ **RPG Café with RDi hub**
 - www.ibm.com/software/rational/cafe/community/rpg/rdi
- ▶ midrange mailing list
 - <http://lists.midrange.com/mailman/listinfo/wdsci-l>
- ▶ Webcasts and System i magazines
- ▶ COMMON and IBM Power Technical Conferences
- ▶ User group meetings

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Summary

- i Projects provide a way to work with RPG, COBOL, CL and DDS source locally on your workstation
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- **email distribution list:**

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