



INTERSYSTEMS LEARNING SERVICES

# InterSystems Change Control



# **InterSystems Change Control**

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# ICC 460: CCR Transport – Perforce Debugging & Advanced Topics



# Objectives

- Be able to use p4V and Swarm to make changes directly to items on the Perforce server.
- Define view paths and how they are used within Perforce.
- Describe Perforce command line interface variables, how they are used and setup.
- Explain how Perforce references files during synchronisation.
- Illustrate how Perforce prevents conflicts using locks.
- Leverage branch hygiene tool.



# Objectives (cont.)

- Setup Perforce notifications to monitor specific branches.
- Demonstrate how to move a changelist to a new CCR using Swarm and P4V.
- Explain how to refresh Perforce branches.
- Demonstrate how to backout changes using Perforce.
- Fix integration history.



# Part 1: Advanced Performance Concepts



# View Paths

- View path: `//depotMapping/... //targetMapping/...`
  - Examples:
    - A Client Workspace View Path between a depot and a client:  
`//MYDEPOT/MyApp/MAIN/... //MYDEPOT_MyApp_MAIN_Dev/...`
    - A Branch View Path between two depot codelines:  
`//MYDEPOT/MyApp/MAIN/....//MYDEPOT/MyApp/BRANCHES/1.0.0/...`
- Overlay & Exclusions – used to remove or add specific locations to a View Path.
  - `+//mapping3/... //mapping4/...`
  - `-//mapping3/... //mapping5/...`



# View Paths (cont.)

- Special characters for View Paths: space, \*, ..., %, @, #.
  - Perforce wildcards – avoid in filenames.
  - Use ASCII code or quote.



# CLI: P4 Session Variables

- To use the CLI (Command Line Interface) it is a good idea to set up your CLI variables:
  - P4CONFIG = p4config.txt (Windows) ; .p4 (UNIX).
    - P4PORT=server:port.
    - P4CLIENT=clientName.
    - P4USER=lanID.
    - P4CHARSET= utf8 (Optional).
- If not logged, must issue “p4 login” command first.
- Always check where you are connected with “p4 info” before issuing commands by the CLI.



# CLI: Perforce Session

- Hierarchy of elements defining your P4 environment and command settings:
  - On the command line, using flags.
  - In a configuration file, if P4CONFIG is set.
  - User environment variables (on UNIX or Windows).
  - System environment variables (on Windows, system-wide environment variables are not necessarily the same thing as user environment variables).



# CLI: Perforce Session (cont.)

- Hierarchy of elements defining your P4 environment and command settings:
  - On Windows, in the Perforce User Registry:
    - `p4 set setting=value.`
  - On Windows, in the Perforce System Registry:
    - `p4 set -s setting=value.`
- You can check your environment variables with “`p4 set`” before issuing commands with the CLI.



# Working on Files: Synchronizing

- p4 sync.
- @, # are the wildcards to use to specify versions:
  - @ = relative reference.
    - changelist.
    - date.
    - Label.
    - etc...
  - # = hard reference (specific revision).
    - Useful for fetching specific revision of one file.
    - Not very useful for group of files.
    - #head specifies the 'latest' revision.



# Preventing Conflicts: Lock

- Optimistic locking.
  - Use Lock command in P4V.
  - Prevents other user checking in the file before you check in the file.
- Pessimistic locking.
  - Handled on the server via specific filetypes.
  - Prevents other user from checking out the file before you check in the file.
    - It is helpful to use pessimistic for certain files types, e.g. PPT and XLS files which can't be merged.
  - Contact Tech Services if there is a specific file type for which you want pessimistic locking in your depot.



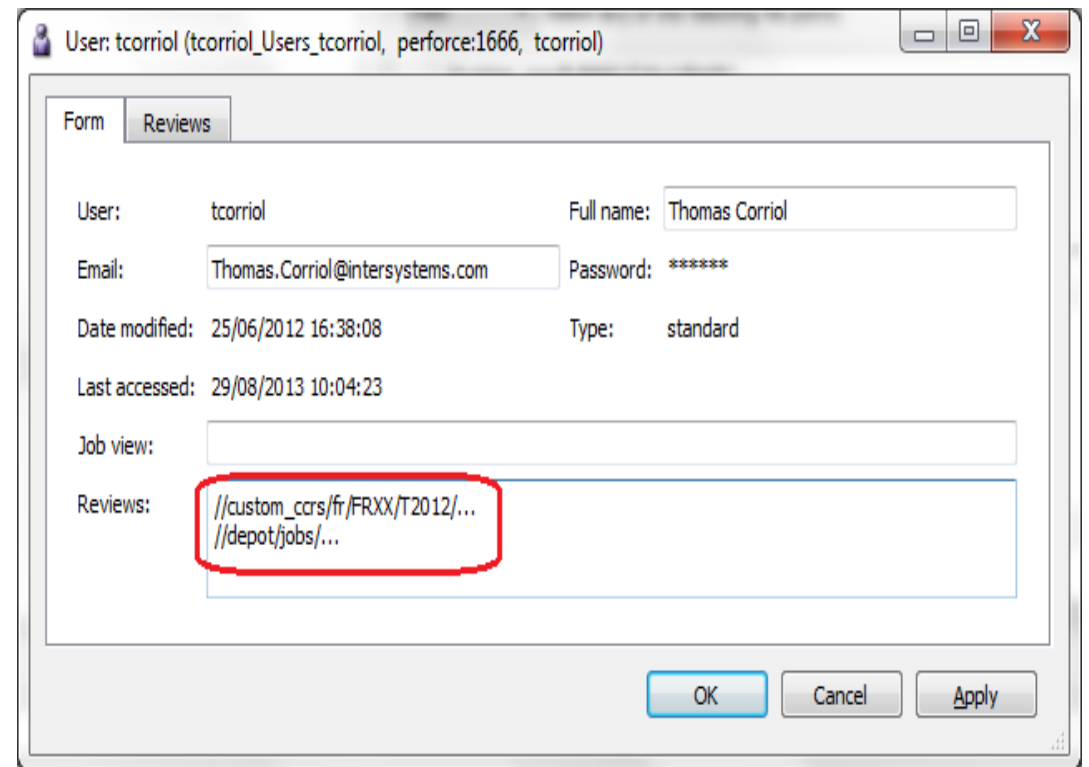
# Performing Very Large Branching Virtually

- There are some cases where a large number of files need to be branched to a new location.
  - E.g., populating environment branches after a CCR Baseline, or making a new Project Branch for a product.
- By default, all files get synced to the local workspace as part of an integration, which can be very time consuming.
  - Especially on remote connections.
- To branch large volumes of files from depot to depot without syncing them locally:
  - Use the -v switch for p4 integrate, which will perform the branching virtually and will be much faster.



# Perforce Notifications via “Reviews”

- Changelists notifications via email can be set up to ‘watch’ a specific branch.
  - Allows specific branches to be ‘monitored.’
  - Configurable by user.
  - Menu “Connection > Edit Current User...”
    - Put a branch under “Reviews.”



The screenshot shows the 'Edit Current User' dialog box with the 'Reviews' tab selected. The dialog box contains the following fields and values:

Field	Value
User:	tcorriol
Full name:	Thomas Corriol
Email:	Thomas.Corriol@intersystems.com
Password:	*****
Date modified:	25/06/2012 16:38:08
Type:	standard
Last accessed:	29/08/2013 10:04:23
Job view:	
Reviews:	//custom_ccrs/fr/FRXX/T2012/... //depot/jobs/...

The 'Reviews' field is highlighted with a red rectangle. At the bottom of the dialog box are three buttons: OK, Cancel, and Apply.



# Perforce Notifications via “Reviews” (cont.)

- Changelists notifications via email can be set up to ‘watch’ a specific branch.
  - When a changelist is submitted against a branch, an email gets sent immediately with:
    - User.
    - Changelist description.
    - Files impacted.
    - Job.
  - “//depot/jobs” to get jobs notification (you will get ALL of them).
  - Metadata is not protected, and shared on a Server.



# Quiz: Advanced Perforce Concepts

## Question:

If the Perforce system default for check-outs is optimistic locking, both John and Sandy can checkout the same file.  
True or False?

Answer: True.

If Sandy wants to prevent John or anyone else from checking out the file, she should use the lock command after checking out the file.



# Part 2:

## Moving a Cancelled Changelist to a new CCR



# Moving a Changelist from One CCR to Another

- There are some cases where a changelist needs to be moved from one CCR to another:
  - An ItemSet was uploaded against the wrong CCR by accident.
  - A CCR was cancelled by mistake (and the changelists were not backed out) and the user wishes to attach the changelist to a new CCR to progress the change.
- Review: changelists are associated with CCRs via Perforce jobs.



# Moving a Changelist from One CCR to Another (cont.)

- Jobs can be edited on submitted changelists via:
  - Swarm.
  - p4V.
- Adding a new job (which references a CCR) can be done only by InterSystems employees as it requires direct access to Perforce.
  - Customers should contact InterSystems Support for assistance in moving a changelist.



# Using Swarm to Change a Job on a changelist

- Click the changelist number on the CCR that you need to move, then it will open it up in Swarm (using your Perforce credentials).
- Add the correct CCR number by clicking the “Add Job” hyperlink.
- Remove the link to the incorrect one by clicking the X beside it.



# Using p4V to Change a Job on a Changelist

- Steps:

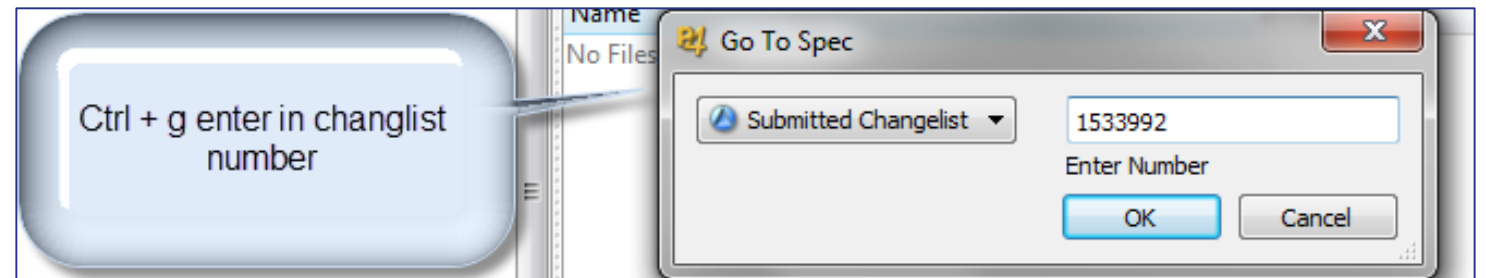
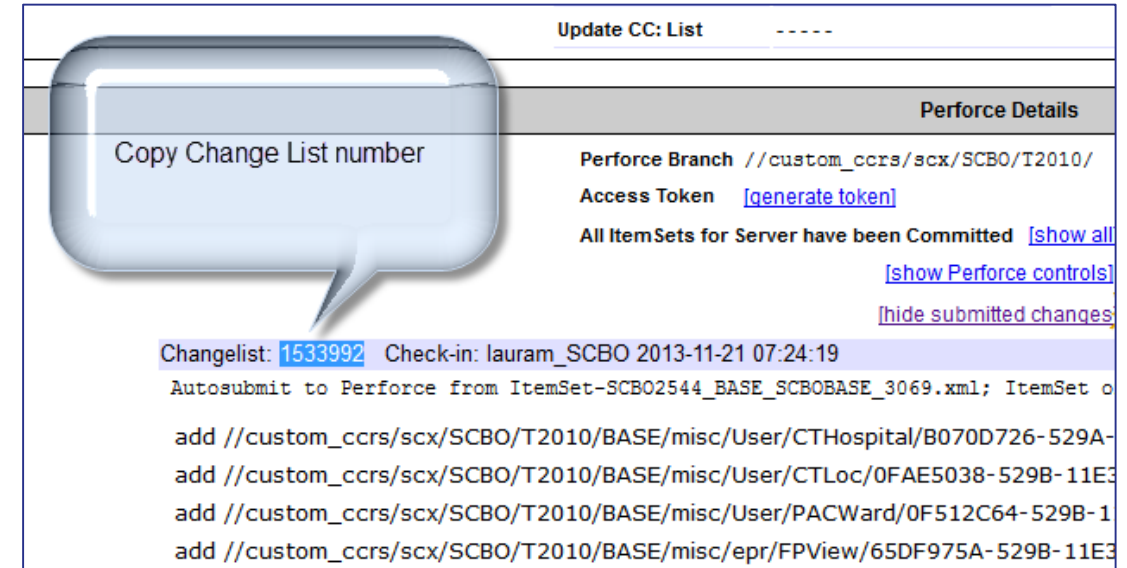
1. Log into CCR online application.
2. Ensure that the new CCR is in a phase of In\_BASE.
3. Open the CCR with which the changelist is currently associated.
4. Select Show Submitted Changes hyperlink within the Perforce Details Section.



# Using p4V to Change a Job on a Changelist (cont.)

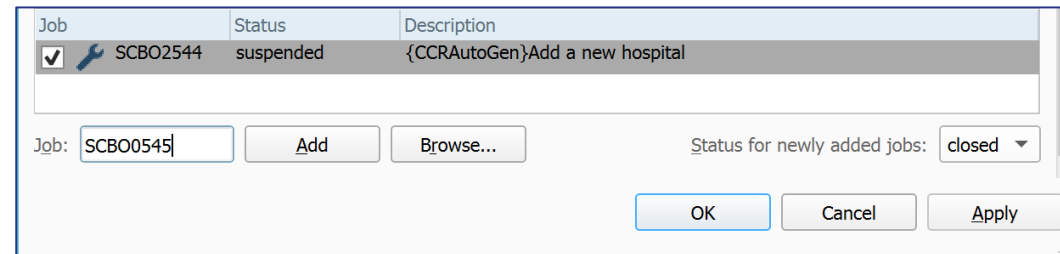
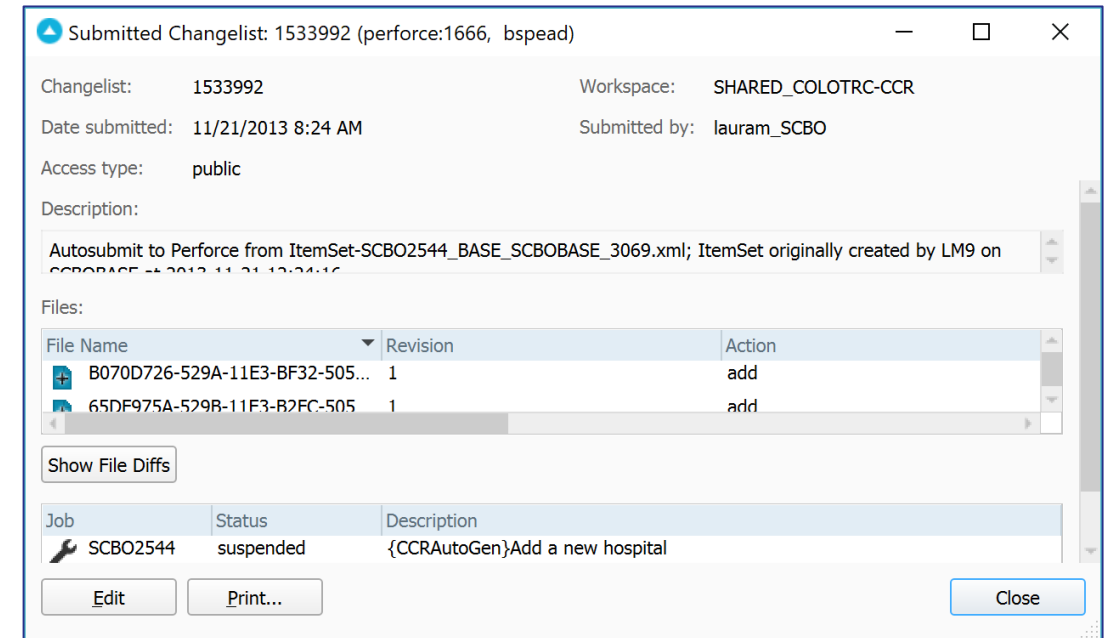
- Steps:

5. Copy the changelist Number.
6. Log into p4V.
7. Open the changelist (CTRL+G).
8. Paste the changelist number.
9. Click on OK.



# Using p4V to Change a Job on a Changelist (cont.)

- Steps:
  10. Click Edit.
  11. Enter new CCR number in Job field.
  12. Click Add.
  13. Confirm the job is now listed.
  14. Right-click the old job > Remove from changelist.
  15. Click OK.



# Using p4V to Change a Job on a Changelist (cont.)

- Steps:

16. Return to new CCR and refresh page.

17. Verify changelist now appears under [show Submitted Changes].

18. Progress CCR according to normal workflow.

[\[hide submitted changes\]](#)

Changelist: 1533992 Check-in: lauram\_SCBO 2013-11-21 07:24:19

Autosubmit to Perforce from ItemSet-SCBO2544\_BASE\_SCBOBASE\_3069.xml; ItemSet originally created by LM9 on SCBOBASE at 2013-11-21 12:24:16

add //custom\_ccrs/scx/SCBO/T2010/BASE/misc/User/CTHospital/B070D726-529A-11E3-BF32-5056A8569F00.xml (1) [view](#) / [diff](#) / [history](#)

add //custom\_ccrs/scx/SCBO/T2010/BASE/misc/User/CTLoc/0FAE5038-529B-11E3-B8DF-5056A8569F00.xml (1) [view](#) / [diff](#) / [history](#)

add //custom\_ccrs/scx/SCBO/T2010/BASE/misc/User/PACWard/0F512C64-529B-11E3-B8DF-5056A8569F00.xml (1) [view](#) / [diff](#) / [history](#)

add //custom\_ccrs/scx/SCBO/T2010/BASE/misc/epr/FPView/65DF975A-529B-11E3-B2FC-5056A8569F00.xml (1) [view](#) / [diff](#) / [history](#)



# Quiz: Moving Cancelled Changelist to a New CCR

## Question:

Moving a cancelled changelist to a new CCR requires re-submitting content in a new changelist with the new CCR number. True or False?

Answer: False.

You are merely updating the same changelist with the new job number. You are not re-submitting the changes.

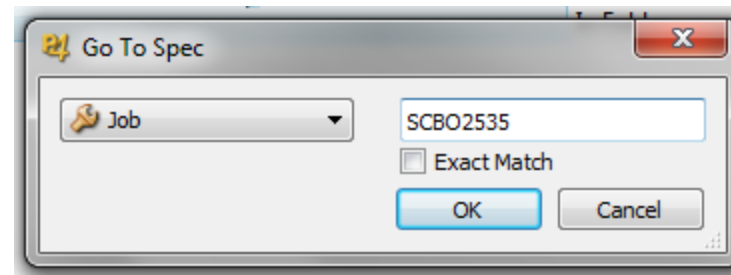


# Part 3: Back out Changes Using Perforce



# Backout Changes using Perforce

- Only way backout some (rather than all) of the changelists submitted while In\_BASE:
  1. Log into Perforce.
  2. Search > Go To...
    - Keyboard shortcut: Ctrl + G.
  3. Choose job.
  4. Enter your CCR number.
  5. Click OK.



# Backout changes using Perforce (cont.)

- Only way backout some (rather than all) of the changelists submitted while In\_BASE:
  6. Right-click > Undo Changes in Changelist #####.
  7. Pending changelist: New.
  8. Click Save to Changelist.
  9. Repeat for each changelist that should be backed out.
    - Note: May need to submit changelist per instructions on next slide before backing out another changelist. Necessary when backing out multiple changelists on same file.



# Backout changes using Perforce (cont.)

- Only way backout some (rather than all) of the changelists submitted while In\_BASE:
  10. Select the Pending Change List Tab.
  11. Right-click changelist with the backout > Submit.
  12. Add in the changelist description.
  13. Enter job number (CCR number).
  14. Click Add.
  15. Click Submit.



# Backout changes using Perforce (cont.)

- Only way backout some (rather than all of the changelists submitted while In\_BASE:
  - 16. Open the CCR.
  - 17. Show Perforce controls.
  - 18. Click [show controls] for Create ItemSet.
  - 19. Select Target environment: BASE.
  - 20. Deploy ItemSet.

Perforce Details		
Performance Branch	//custom_ccrs/scx/SCBO/T2010/	Performance Job SCBO2535
Access Token	<a href="#">[generate token]</a>	Performance Log <a href="#">[view log]</a>
Current ItemSet for Client	SCBO2535_UAT_ColoTRC-CCR_201505(ID=201505) (2014-01-07 06:14:18) <a href="#">[details]</a> <a href="#">[itemset XML]</a>	
All ItemSets for Server have been Committed <a href="#">[show all]</a>		
<a href="#">[hide Performance controls]</a>		
Performance Integration	<a href="#">[show controls]</a>	
Performance Backout	<a href="#">[show controls]</a>	
Create ItemSet	<a href="#">[show controls]</a>	
<a href="#">[show submitted changes]</a>		

Access Token	<a href="#">[generate token]</a>	Performance Log	<a href="#">[view log]</a>
Current ItemSet for Client	SCBO2535_UAT_ColoTRC-CCR_188670(ID=188670) <a href="#">[show all]</a>	(2013-11-15 09:06:55) <a href="#">[details]</a> <a href="#">[itemset XML]</a>	
All ItemSets for Server have been Committed <a href="#">[show all]</a>			
<a href="#">[hide Performance controls]</a>			
Performance Integration	<a href="#">[show controls]</a>		
Performance Backout	<a href="#">[show controls]</a>		
Create ItemSet	Target Environment: <span>BASE ▾</span> <span>Create</span>		
ItemSets are created from Perforce Changelists. Click <a href="#">[show submitted changes]</a> for a preview <a href="#">[hide controls]</a>			
<a href="#">[hide submitted changes]</a>			



# Quiz: Backing Out Changes

## Question:

It is possible to backout changes from within the CCR application. True or False?

Answer: True.

Frequently, changes can be backed out from within the CCR application when cancelling a CCR.

If it's not possible, make sure to follow the previous steps to backout using Perforce.



# Part 4: Resolving merge conflicts in P4V



# Resolving merge conflicts in P4V

- Sometimes you will see integration errors when moving a CCR to the next phase.

performer-sandbox:1999

Perforce Details

logged into Perforce as 'agoldmin'

Perforce Activity

ERROR: Critical error occurred. Aborting ItemSet creation. (PID:13908)

Perforce Branch

//custom\_ccrs/\_common/zTest/us/ISCX/TrakTest/

Perforce Job

devISCX0003-USE7470agoldmin

Access Token

[\[generate token\]](#)

Transport Log

[\[view log\]](#)

[\[show Perforce controls\]](#)

[\[show submitted changes \(1\)\]](#)



# Resolving merge conflicts in P4V (cont.)

- You can check the Transport Log for details of the error.

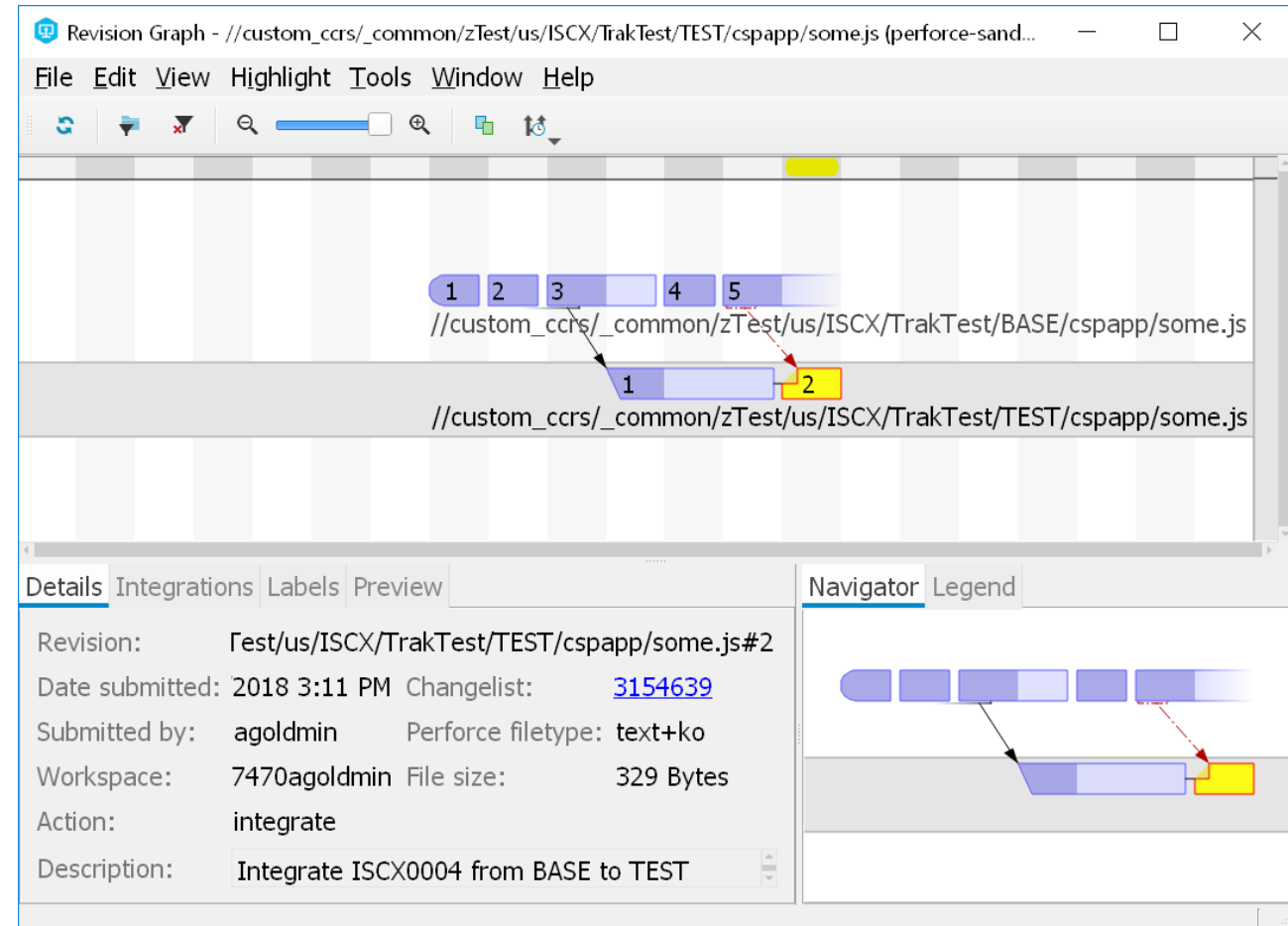
```
Diff chunks: 1 yours + 1 theirs + 0 both + 1 conflicting
//USE7470agoldmin/custom_ccrs/_common/zTest/us/ISCX/TrakTest/TEST/cspapp/some.js - resolve skipped.
ERROR #5001: ERROR: cannot resolve conflicts, unable to perform automatic integration.
Identifying possible source(s) of conflict
```

- This will tell you both what the error was, and which file caused the problem.



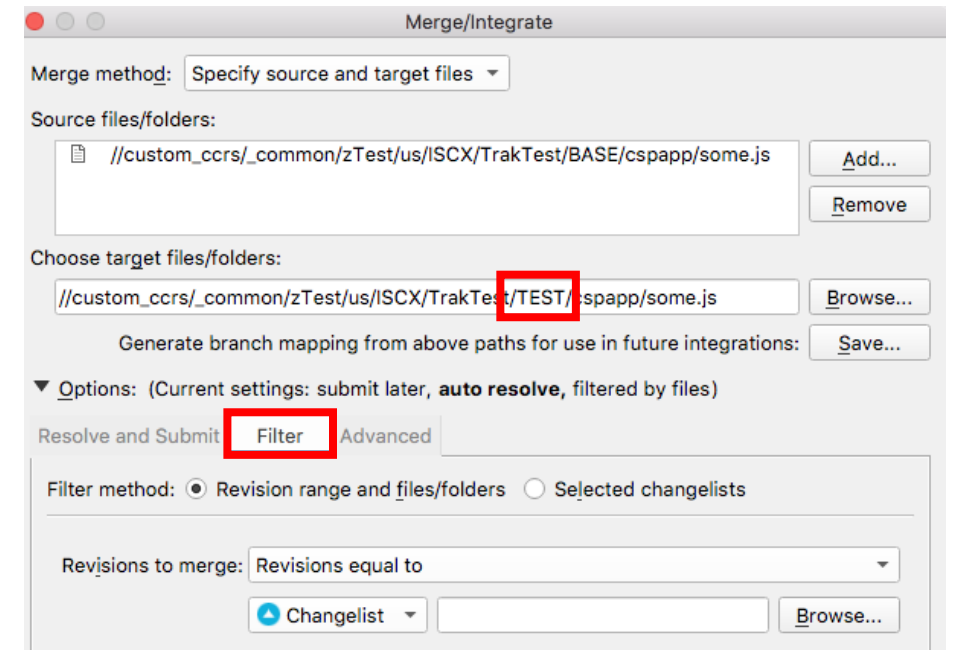
# Resolving merge conflicts in P4V (cont.)

- Looking at the file's integration history can be helpful to understand why there are conflicts.
- In this example, revision 5 needed to progress without revision 4.
  - Screenshot shows the state after manual integration.



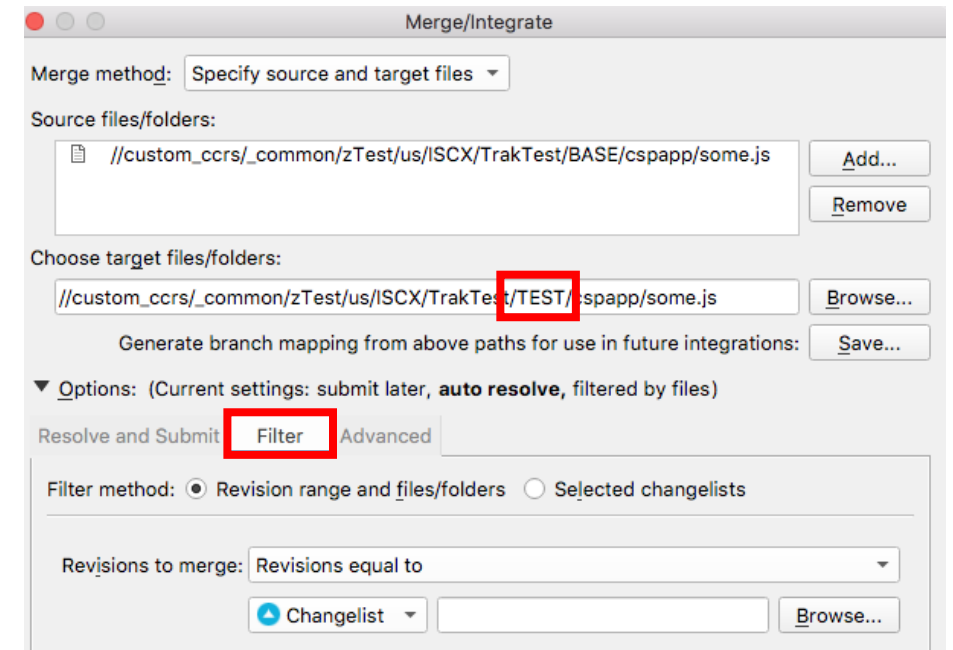
# Resolving merge conflicts in P4V (cont.)

- Find the conflicting file(s) in question in the workspace view in P4V and select “Merge/Integrate” from the context menu.
  - NOTE – this manual step is only for conflicting files; after correcting them by hand use the CCR Integration Tool to manually integrate the remainder of the files.



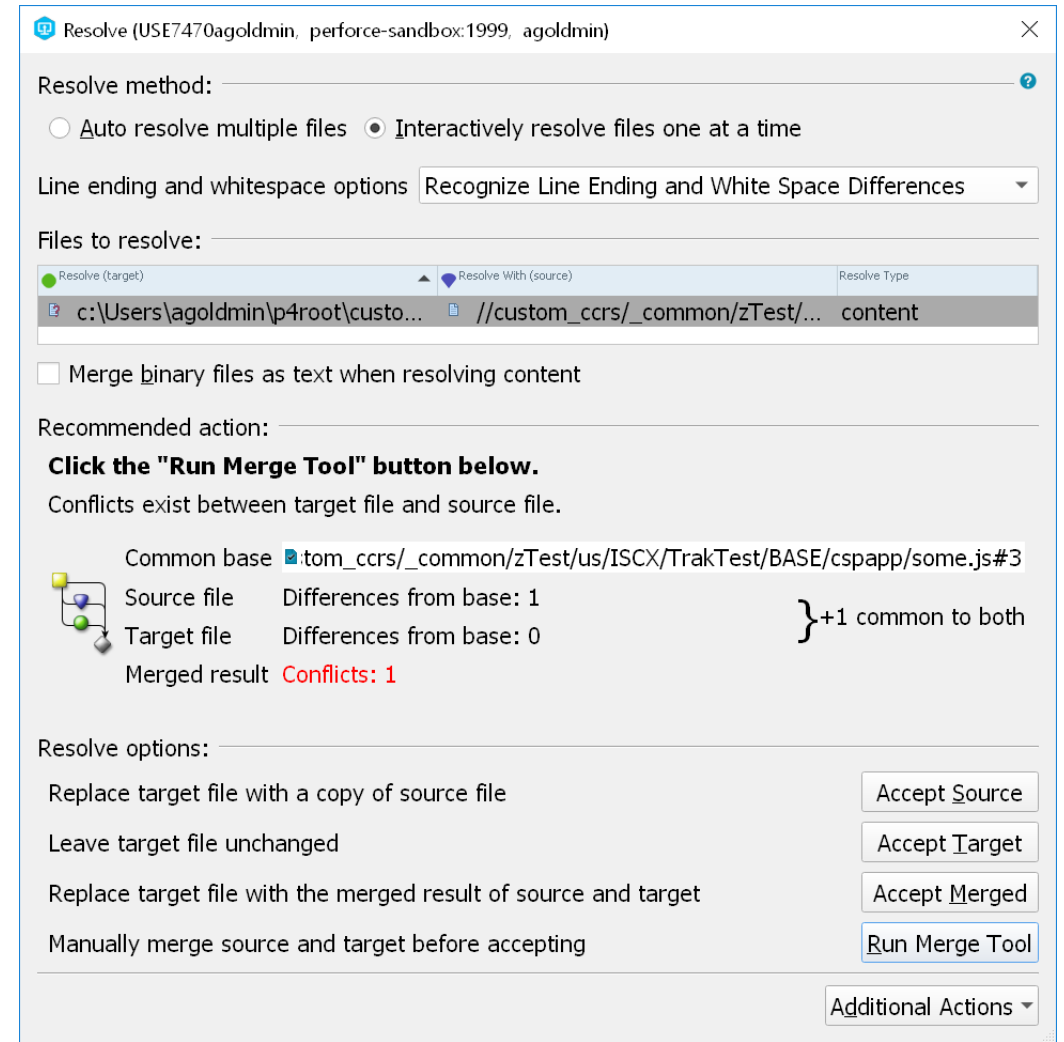
# Resolving merge conflicts in P4V (cont.)

- Make sure the target path is set to the corresponding file in the TEST branch.
  - Target is *\*case sensitive\** (i.e. 'TEST' not 'test').
- On "Filter" tab, select just the changelists you want to integrate.
- NOTE: After finishing the merge, the merged file(s) will need to be resolved before they can be submitted.



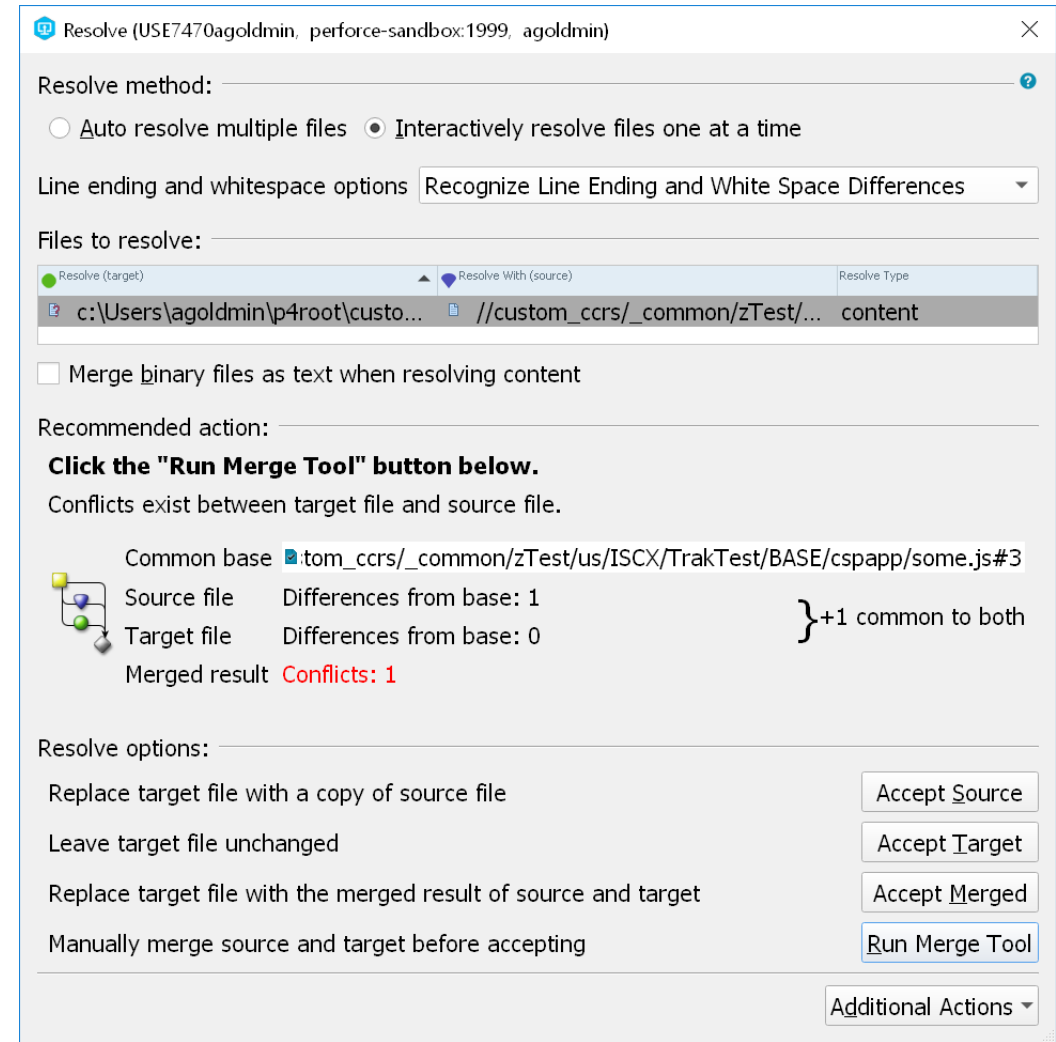
# Resolving merge conflicts in P4V (cont.)

- Find the file in the target branch and select "Resolve" from the context menu.
- You will see a summary of the changes in the source and target files and options to resolve the merge.



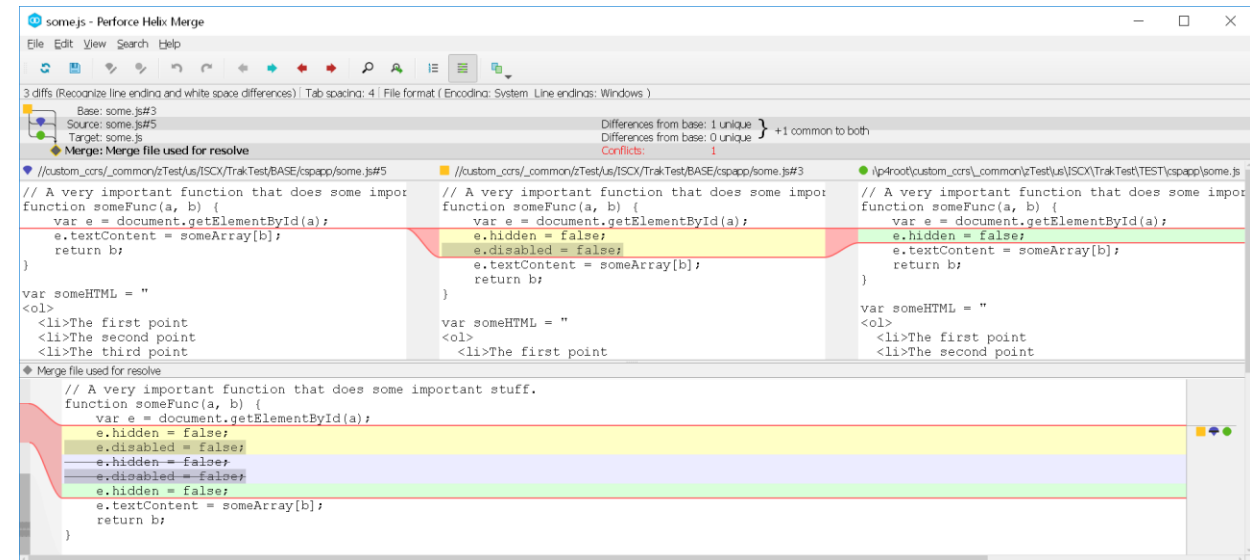
# Resolving merge conflicts in P4V (cont.)

- Run the merge tool to see a view of the file contents in the various versions of the file so that you can decide how best to merge.
- This requires some knowledge of what the contents of the file mean to ensure that the result makes sense.



# Resolving merge conflicts in P4V (cont.)

- The merge tool on the right shows a view of the file contents in the base, source, and target revisions, as well as the diffs between them.
- It is basically a diff view, but with three files rather than two.
- Select the icons to the right of the conflicting lines to select the desired version.
- NOTE: Edits can also be made to get the desired result.



# Resolving merge conflicts in P4V (cont.)

- Click the “Save” icon once the merge is complete.
- When prompted about replacing the item in your workspace with the merged file, answer “Yes.”
- Now the change is ready to be submitted to Perforce.
  - **Don’t forget to attach the Perforce job (i.e the CCR ID) to the changelist so that CCR can see the changelist and include it in the ItemSet.**



# Resolving merge conflicts in P4V (cont.)

- If there are other files that didn't have a conflict, they can be auto-integrated with the CCR Perforce Tools.
- Make sure an ItemSet is created; deploy it and continue moving the CCR forward.



# Quiz: Resolving Merge Conflicts

## Question:

If the integration of one file in the CCR needs to be merged by hand, then all files in that CCR must be manually merged as well. True or False?

Answer: False.

Only the conflicting file must be manually merged; once the conflicting file is integrated, the other files can be integrated using the Perforce tools on the CCR.

---



## Part 5:

# Fixing integration history with p4 integrate -f



# Branch Hygiene Tool

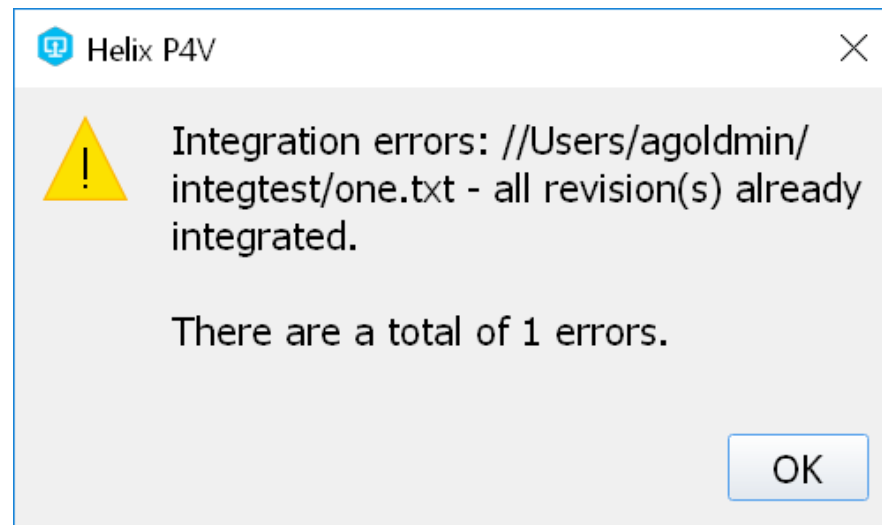
- Branch Hygiene tab on system definition shows files out of sync between branches.
  - Future changes to the files may have merge conflicts.
- To fix discrepancies:
  - For cancelled CCRs not backed out, back them out.
  - Use P4V to manually integrate changes.
    - Be sure to create a CCR and attach changelists.

<div><div>&lt;</div><div>CCR</div><div>Advanced Controls</div><div>Perforce</div><div>Field Audit</div><div>Undeployed Itemsets</div><div>Baselines</div><div>Branch Hygiene</div></div>						
<div>Run Hygiene Check</div>						
Filepath ^	Changelist ^	PerforceUser ^	DiffBranches ^	RelatedCCRs ^	JobPhases ^	DateTime ^
<a href="#">cls/AppS/UnitTest/Manager.xml</a>	<a href="#">5547111</a>	jsmith@SHARED_MYAPPBASE	[BASE#17,TEST#1]	<a href="#">ISCX22398</a>	[LIVE]	2022-08-18 16:53:02 -04:00



# Fixing integration history with integrate -f


- Sometimes there are mistakes in p4 integrations.
  - E.g. resolving “accept target” instead of “accept source”.
  - Or integrating from the wrong source.




# Fixing integration history with integrate -f (cont.)

- Perforce won't let you integrate the same change twice into the same file.
- Possibly more changes were checked into the source file, causing merge conflicts.

Conflicts exist between target file and source file.

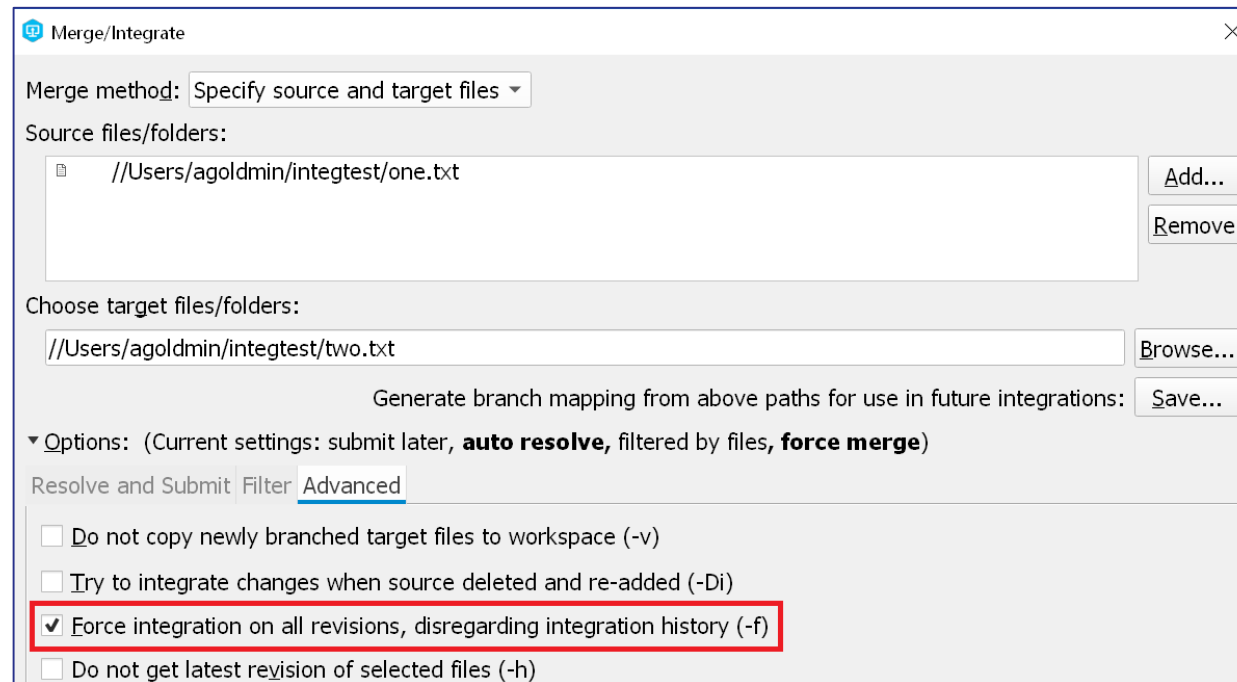


Common base	 //Users/agoldmin/integtest/one.txt#2
Source file	Differences from base: 0
Target file	Differences from base: 0
Merged result	<b>Conflicts: 1</b>



# Fixing integration history with integrate -f (cont.)

- “p4 integrate -f” can help if you have a version of the file you want to copy forward to all branches.
- It will copy all the file contents and use it as a basis for all future integration history.



The screenshot shows the 'Merge/Integrate' dialog box. The 'Merge method' is set to 'Specify source and target files'. Under 'Source files/folders', the path '//Users/agoldmin/integtest/one.txt' is listed. Under 'Choose target files/folders', the path '//Users/agoldmin/integtest/two.txt' is entered. The 'Options' section shows 'Force integration on all revisions, disregarding integration history (-f)' selected, which is highlighted with a red rectangle. Other options include 'Do not copy newly branched target files to workspace (-v)', 'Try to integrate changes when source deleted and re-added (-Di)', and 'Do not get latest revision of selected files (-h)'.

Merge/Integrate

Merge method: Specify source and target files

Source files/folders:

//Users/agoldmin/integtest/one.txt

Add... Remove

Choose target files/folders:

//Users/agoldmin/integtest/two.txt

Browse...

Generate branch mapping from above paths for use in future integrations: Save...

Options: (Current settings: submit later, **auto resolve**, filtered by files, **force merge**)

Resolve and Submit Filter Advanced

☐ Do not copy newly branched target files to workspace (-v)

☐ Try to integrate changes when source deleted and re-added (-Di)

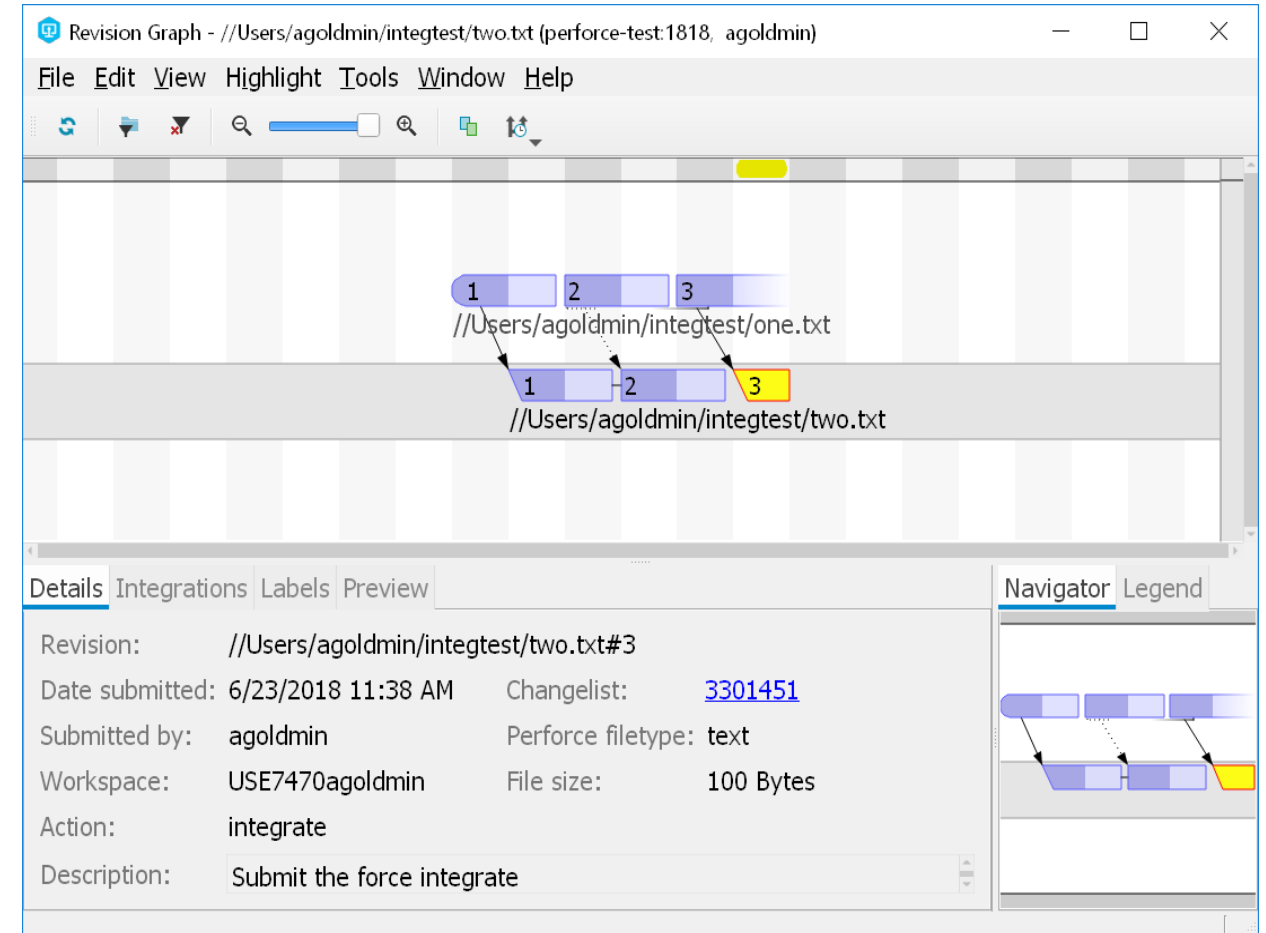
☒ Force integration on all revisions, disregarding integration history (-f)

☐ Do not get latest revision of selected files (-h)



# Fixing integration history with integrate -f (cont.)

- Results in Revision Graph like this:
- Note the diagonal corner on two.txt#3.
- The integration from one.txt#3 overwrites two.txt#2.



# Part 6: Perforce Refresh



# Perforce Refresh

- Refreshing the Perforce branches based on contents of LIVE:
  - To ensure that all configuration matches in each Perforce branch.
  - Clears integration history to prevent merge conflicts.
  - Can be done during working hours as it will have no impact on performance for users.
  - Before refresh ensure that:
    - Source Control Hooks (Tier 1) and/or Change Control Hooks (Tier 2) have been Locked.
    - Progress all CCR's to terminal state (Closed, Merged, or Cancelled).



# Perforce Refresh (cont.)

- Refreshing the Perforce branches based on contents of LIVE:
  - Perforce refresh done as part of rebaseline.
  - See rebaselining in ICC520 for details on how to perform refresh as part of rebaseline.



# Quiz: Perforce Refresh

Question:

A Perforce refresh should be done during off hours because it can affect performance for the client. True or False?

Answer: False.



# Summary

- What are the key points for this module?

