INTERSYSTEMS LEARNING SERVICES

InterSystems Change Control

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ICC 460: CCR Transport – Perforce Debugging & Advanced Topics

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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 Perforce 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

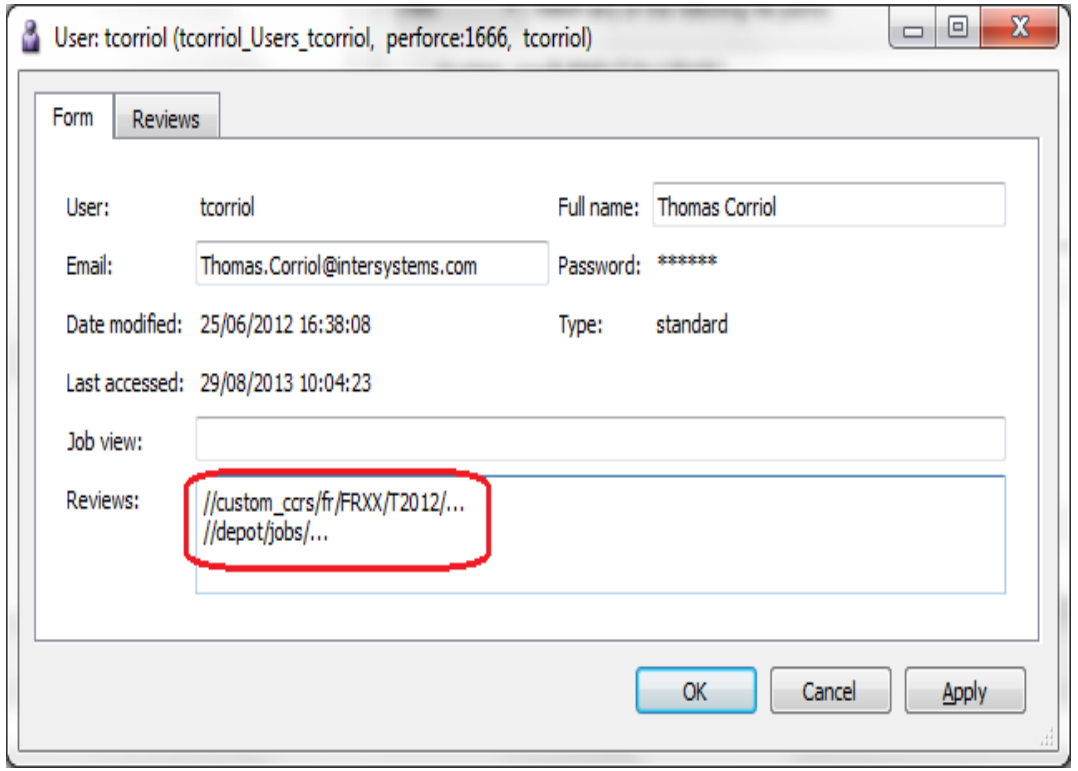
- Optimistic locking.
  - Use Lock command in P4V.
  - Prevents other user checking in the file before you check in the file.
- Pessimistic locking.
  - Handled on the server via specific filetypes.
  - Prevents other user from checking out the file before you check in the file.
    - It is helpful to 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.”



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

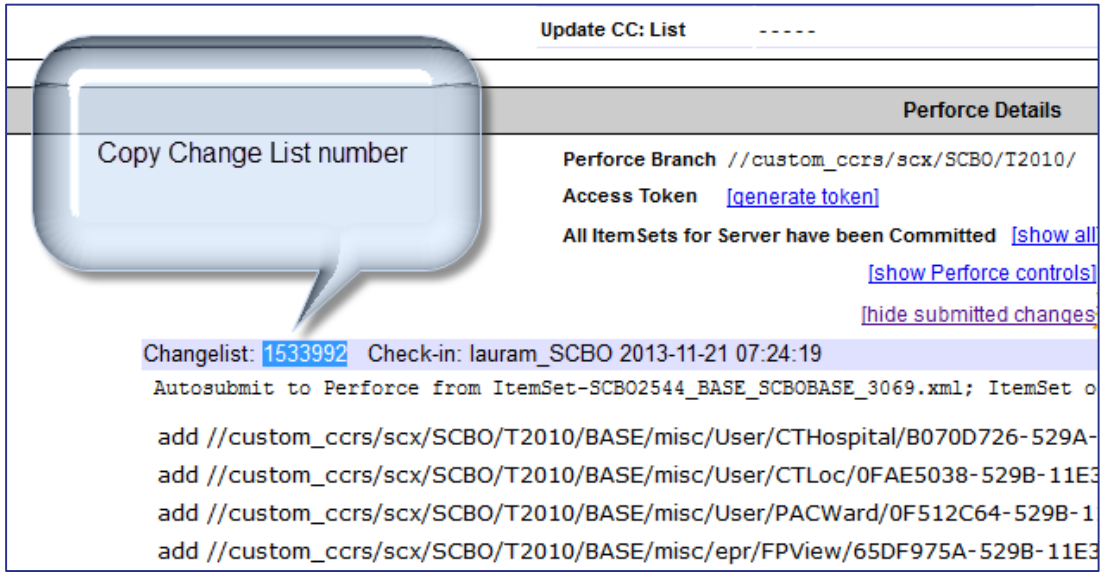
- Click the changelist number on the CCR that you need to move, then it will open it up in Swarm (using your Perforce credentials).
- Add the correct CCR number by clicking the "Add Job" hyperlink.
- Remove the link to the incorrect one by clicking the X beside it.

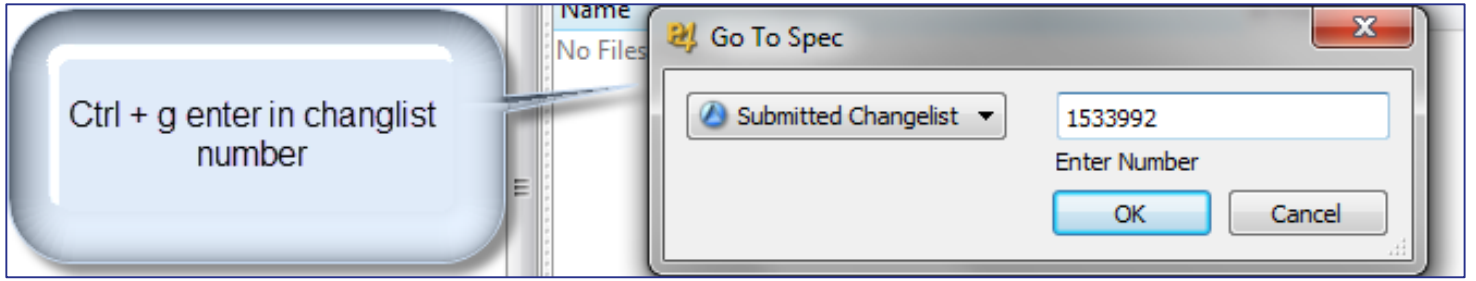
Using p4V to Change a Job on a Changelist

- 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.)

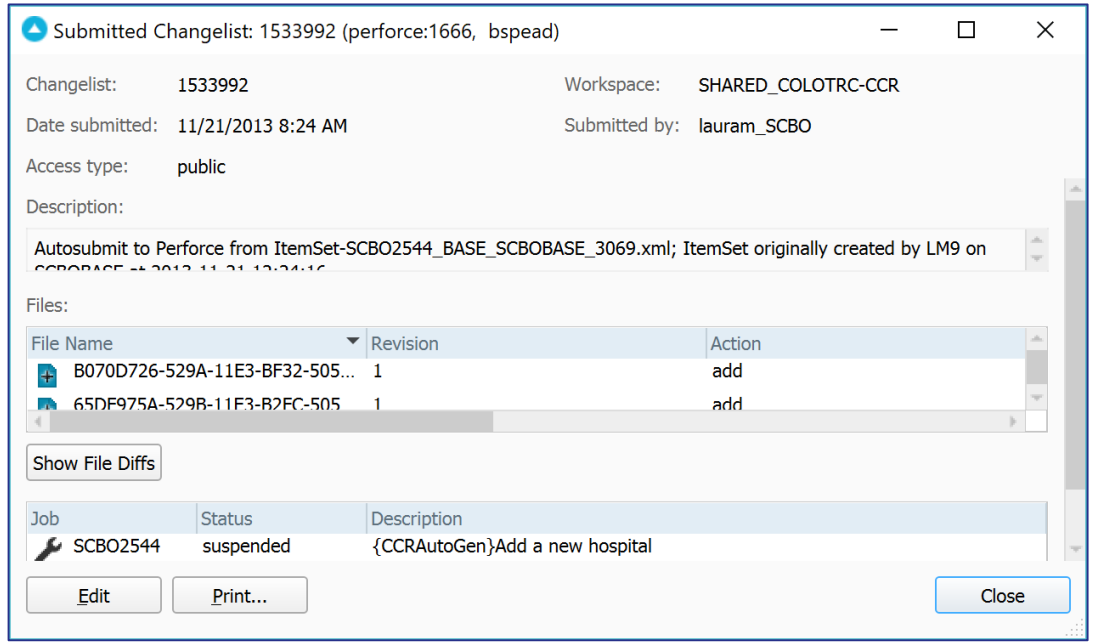
- Steps:
  5. Copy the changelist Number.
  6. Log into p4V.
  7. Open the changelist (CTRL+G).
  8. Paste the changelist number.
  9. Click on OK.

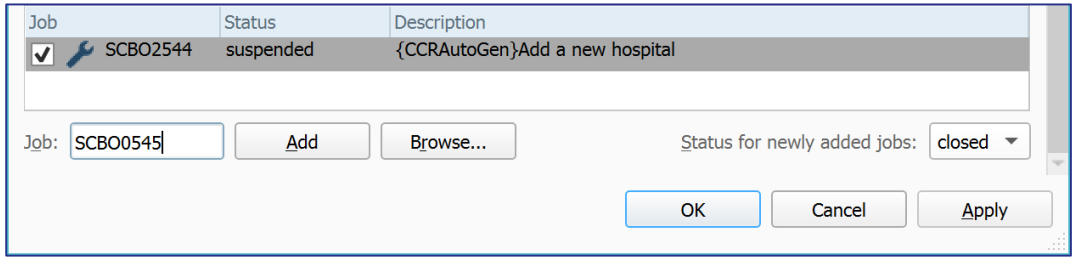




Using p4V to Change a Job on a Changelist (cont.)

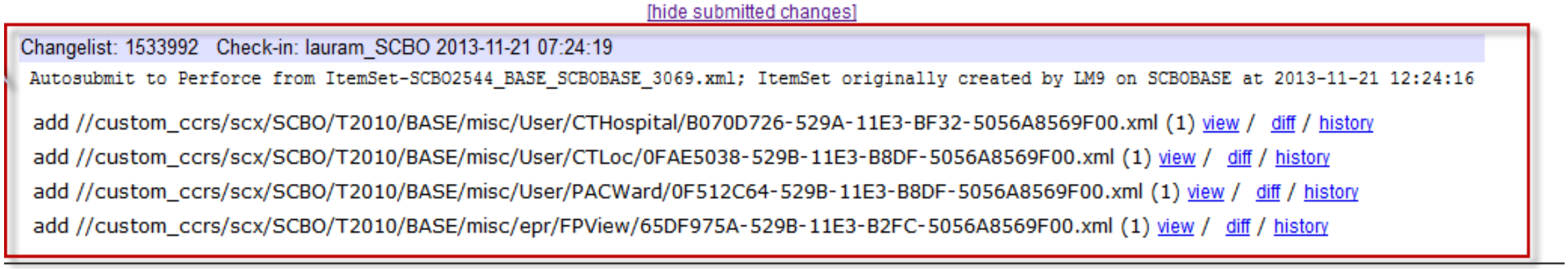
- Steps:
  10. Click Edit.
  11. Enter new CCR number in Job field.
  12. Click Add.
  13. Confirm the job is now listed.
  14. Right-click the old job > Remove from changelist.
  15. Click OK.





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.



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?

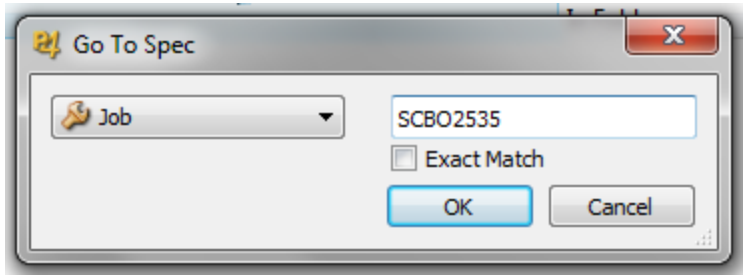
Answer: False.

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.)

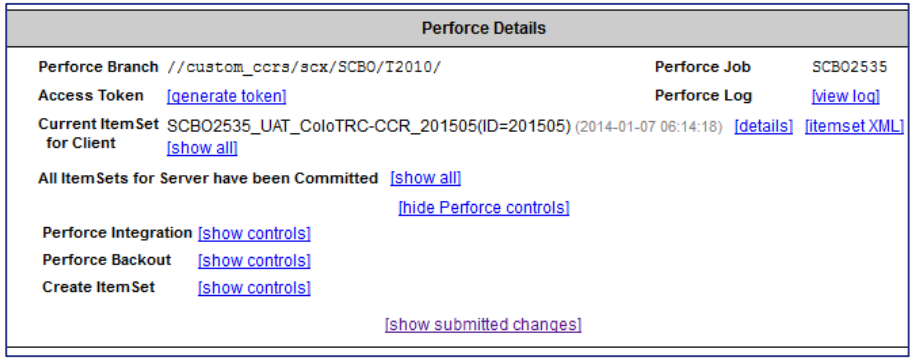
- Only way backout some (rather than all) of the changelists submitted while In_BASE:
  6. Right-click > Undo Changes in Changelist #####.
  7. Pending changelist: New.
  8. Click Save to Changelist.
  9. Repeat for each changelist that should be backed out.
     - Note: May need to submit changelist 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.



Quiz: Backing Out Changes

Question:

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

Answer: True.

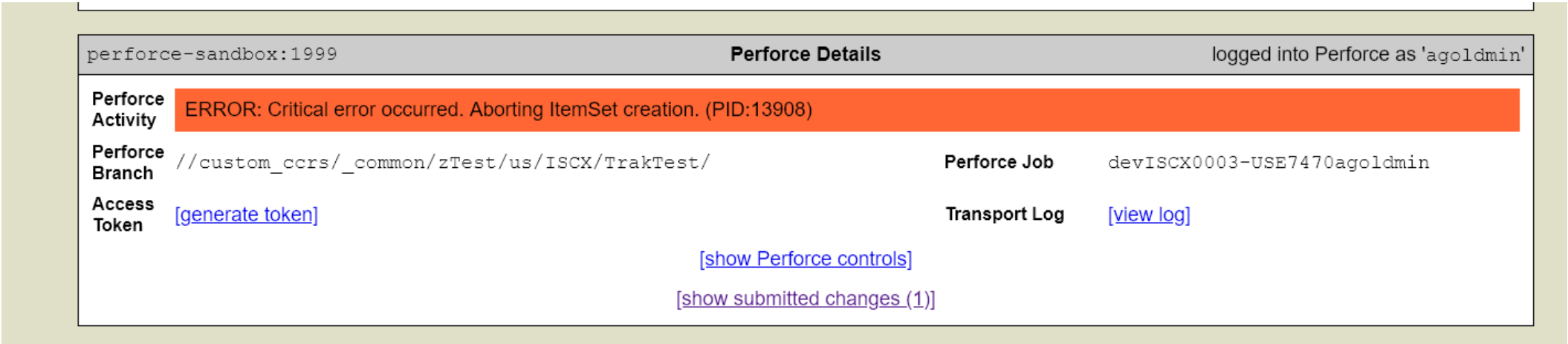
Frequently, changes can be backed out from within the CCR application when cancelling a CCR.

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

Part 4: Resolving merge conflicts in P4V

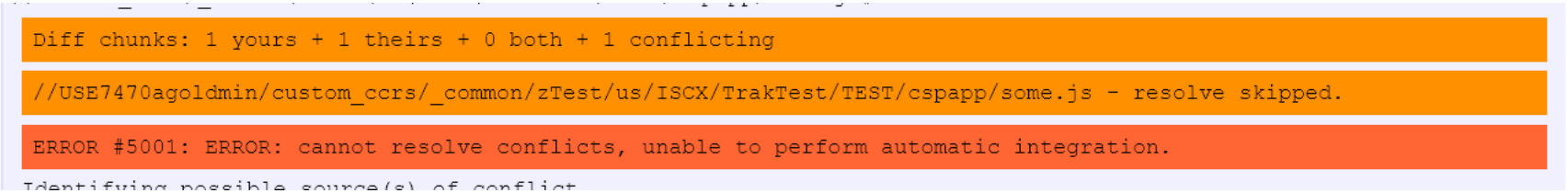
Resolving merge conflicts in P4V

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



Resolving merge conflicts in P4V (cont.)

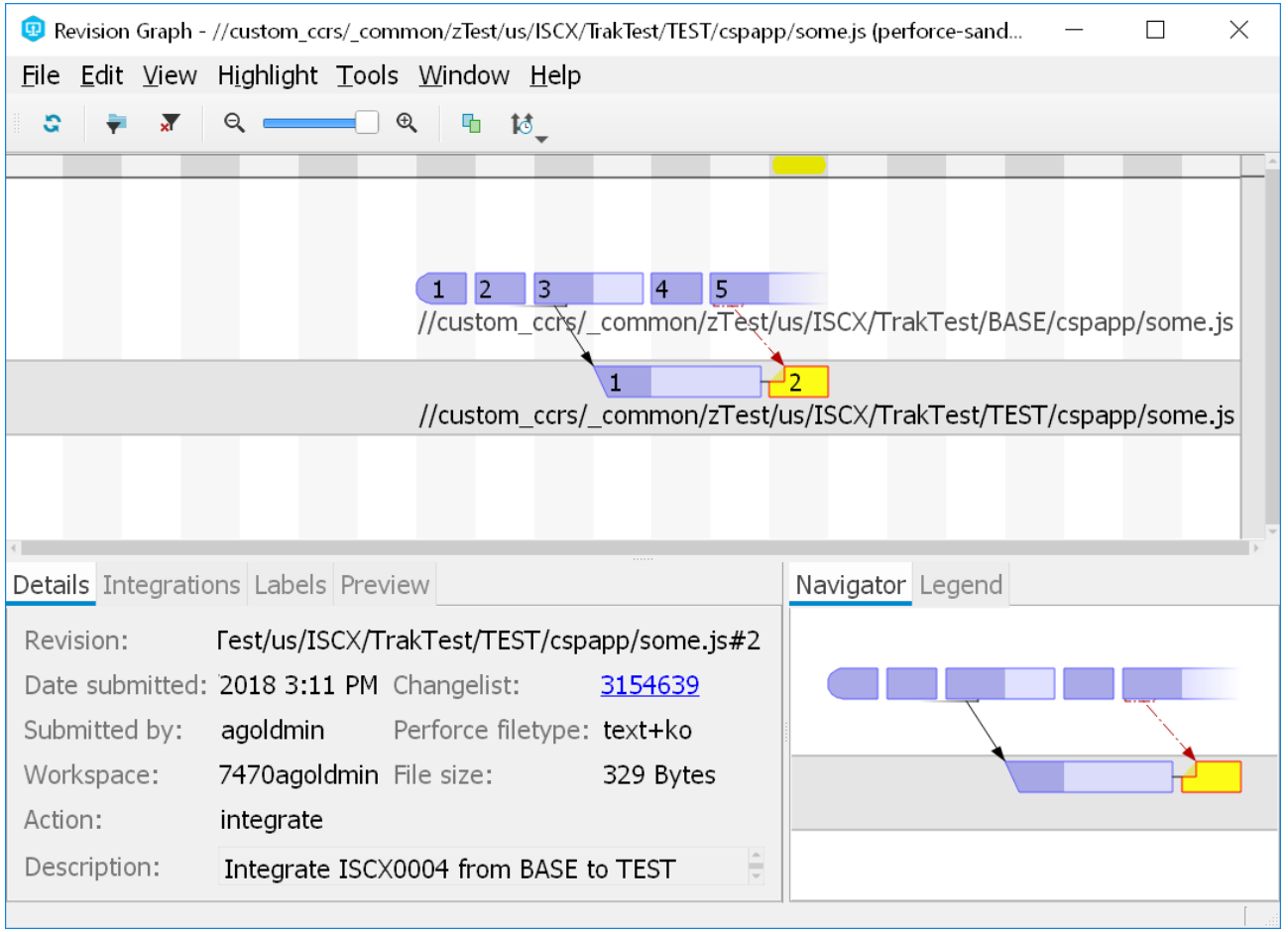
- You can check the Transport Log for details of the error.



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

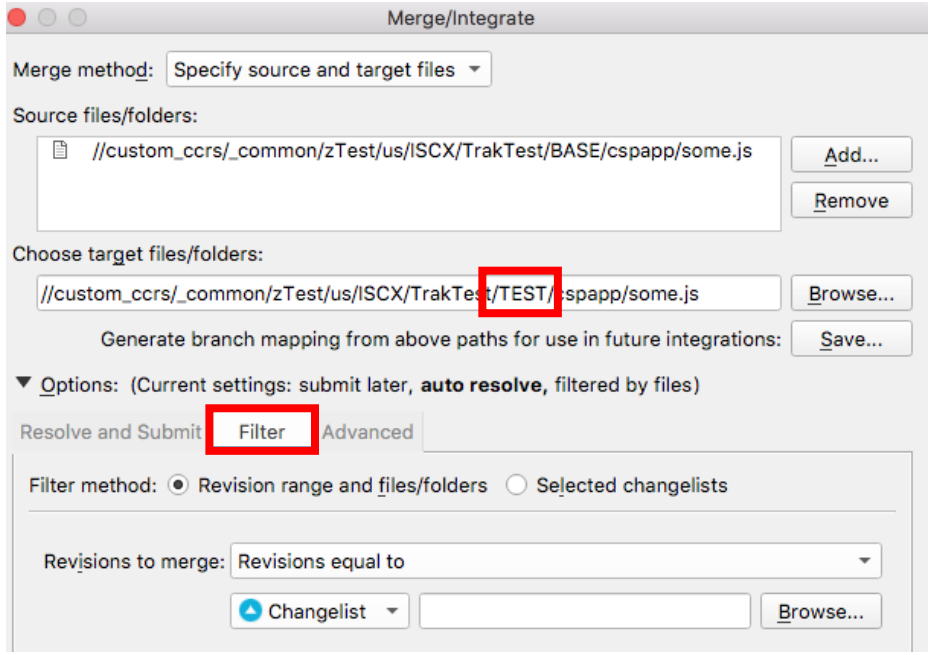
Resolving merge conflicts in P4V (cont.)

- 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.



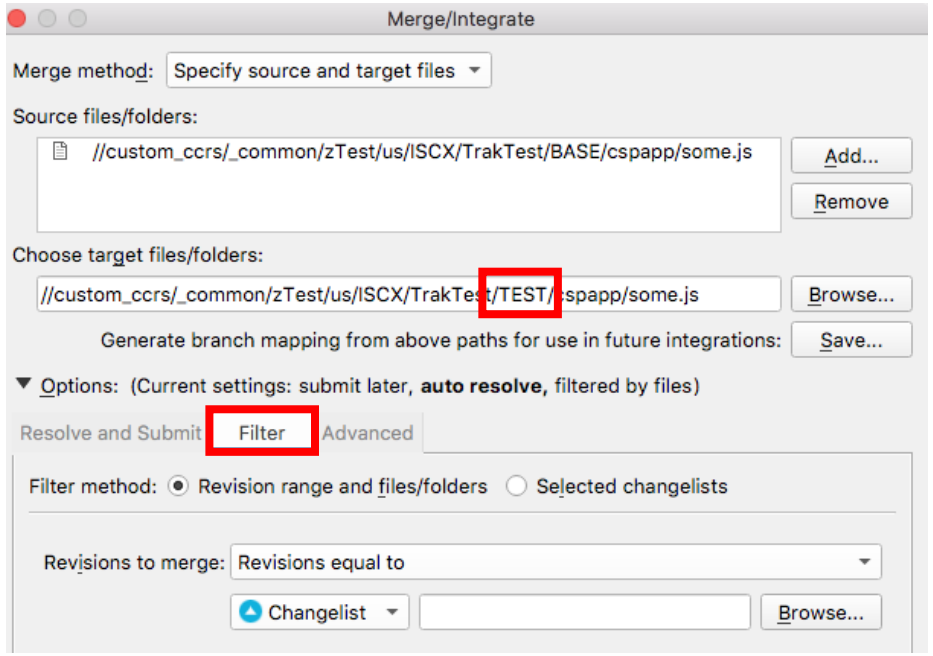
Resolving merge conflicts in P4V (cont.)

- 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.



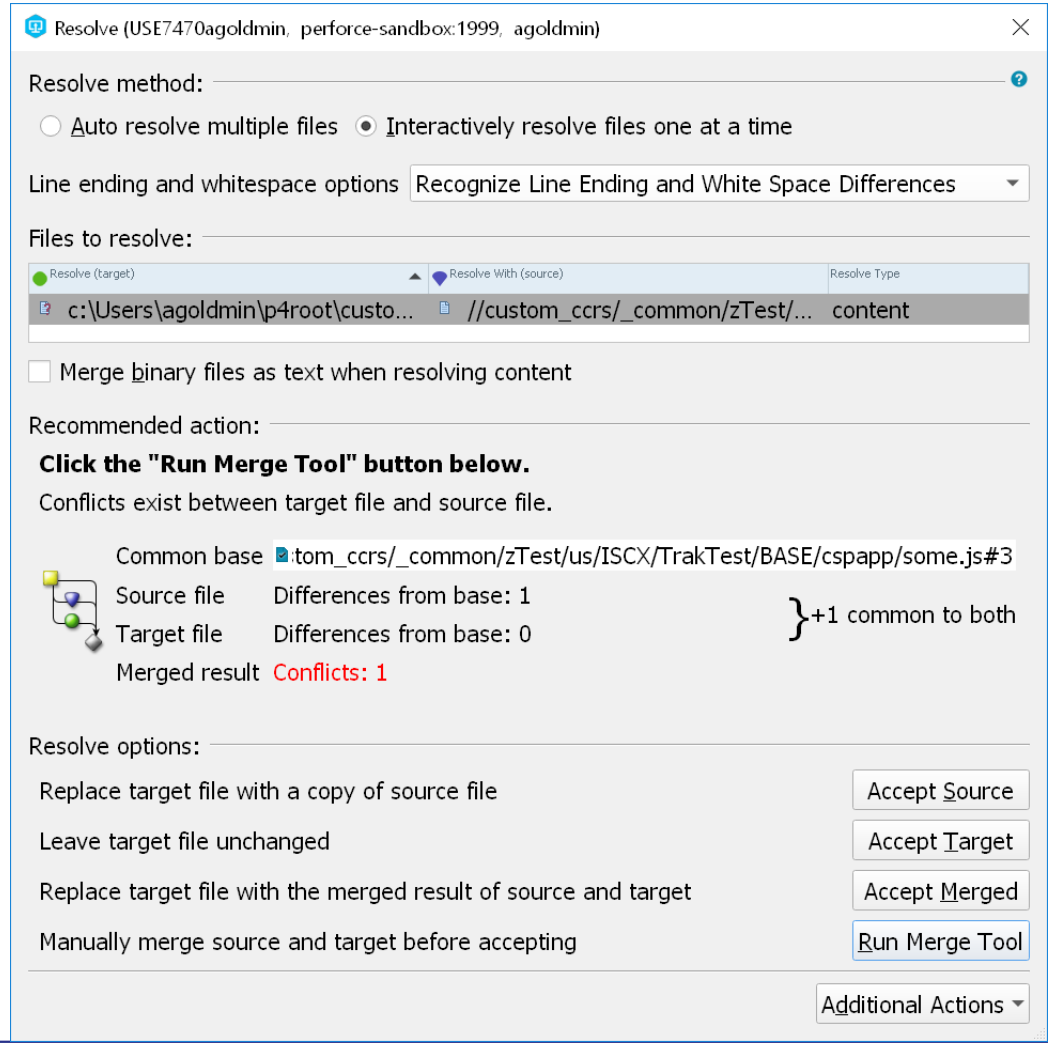
Resolving merge conflicts in P4V (cont.)

- 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.



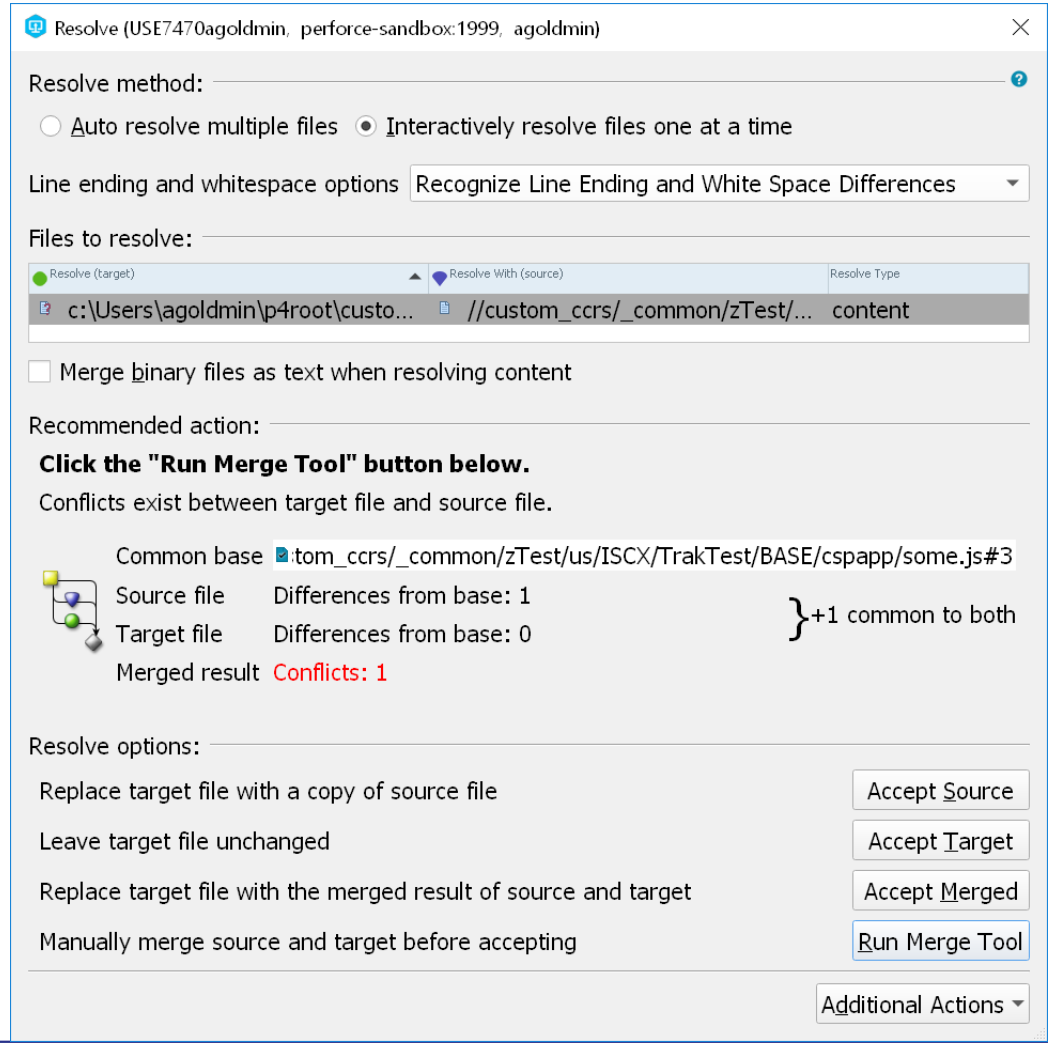
Resolving merge conflicts in P4V (cont.)

- 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.



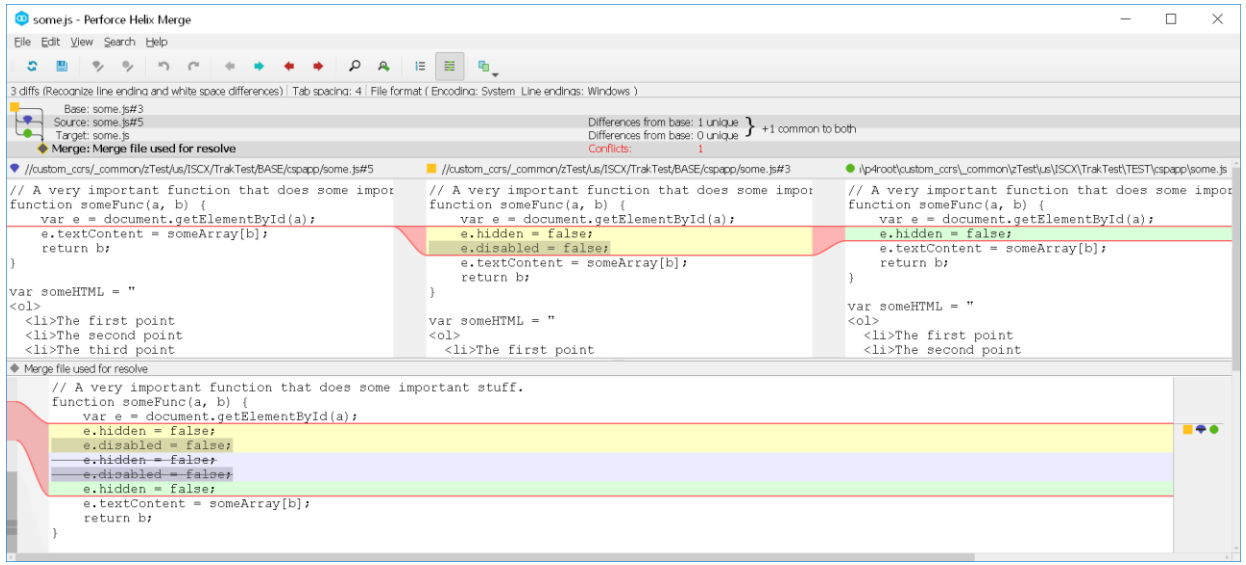
Resolving merge conflicts in P4V (cont.)

- 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?

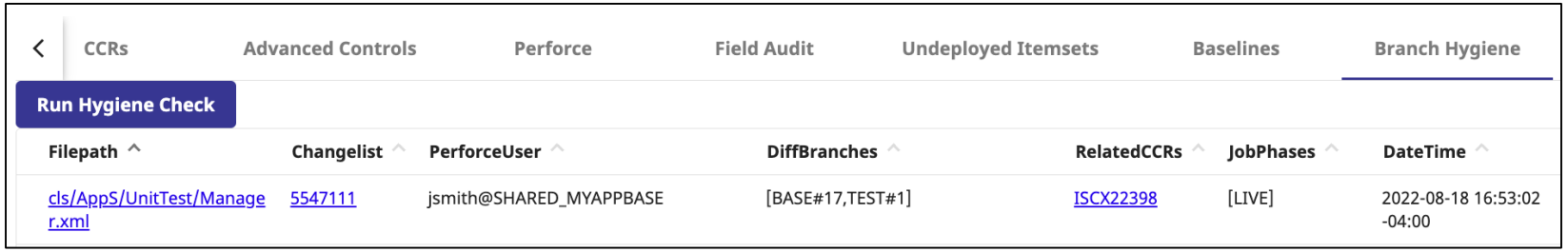
Answer: False.

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

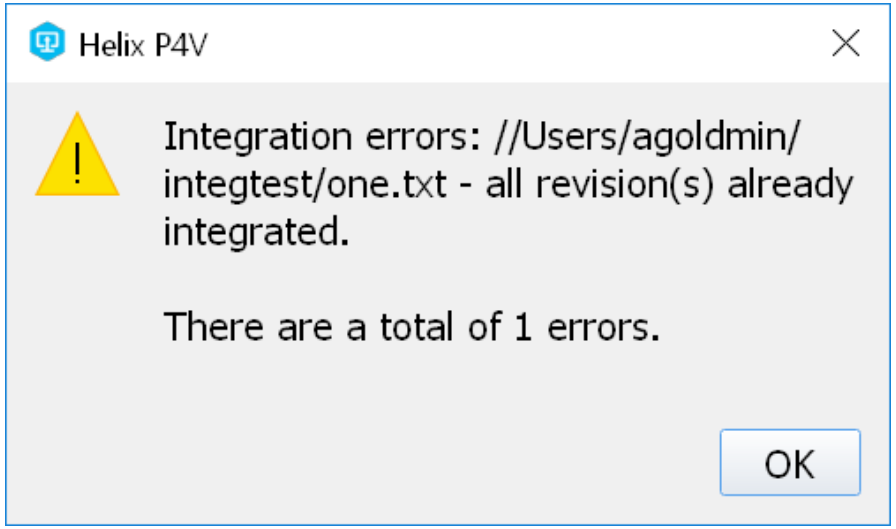
Branch Hygiene Tool

- 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.



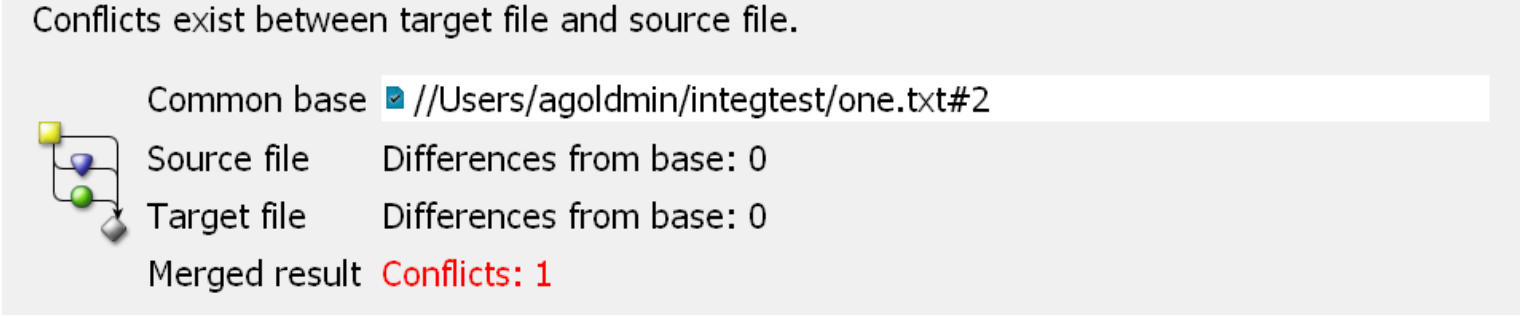
Fixing integration history with integrate -f

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



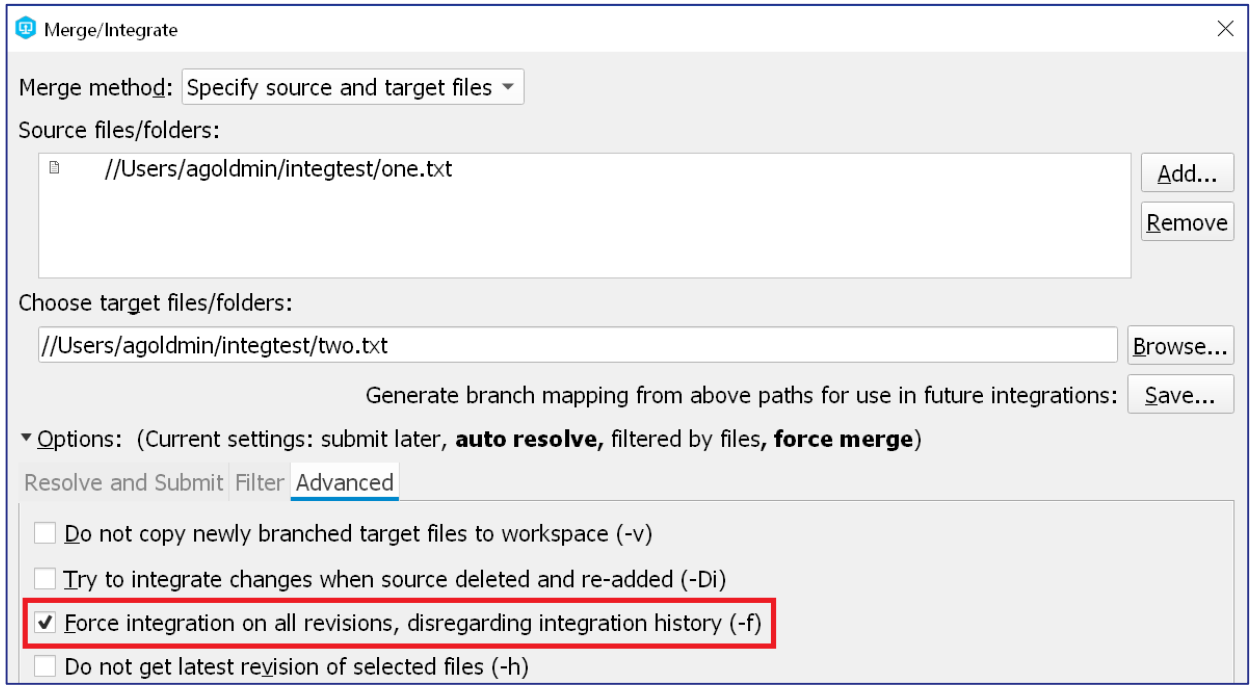
Fixing integration history with integrate -f (cont.)

- 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.



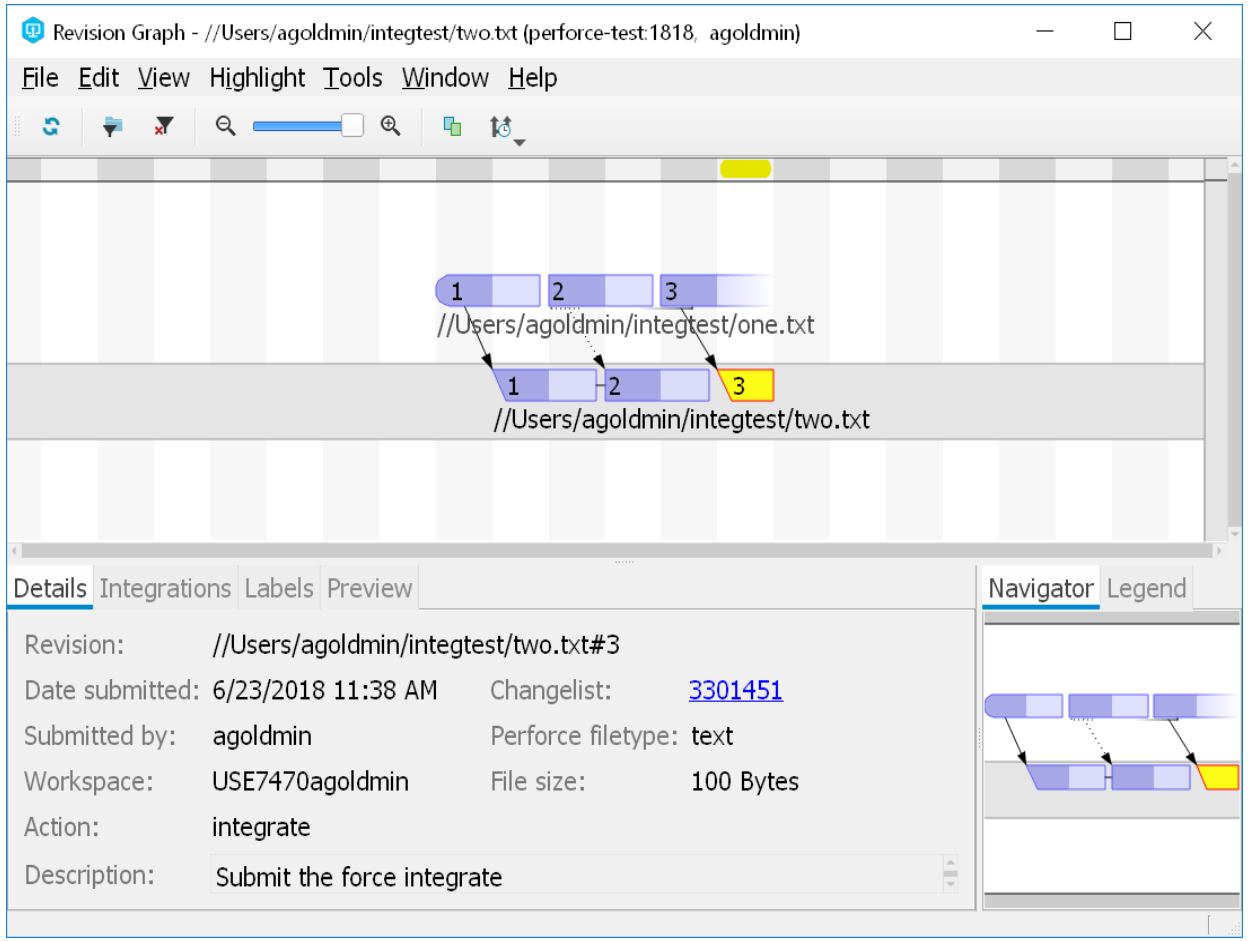
Fixing integration history with integrate -f (cont.)

- "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.



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?