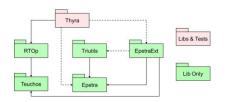
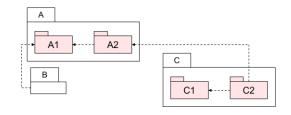




# CDash query tutorial for triaging systemic Trilinos PR build and test failures





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## **Current Trilinos Pull Request Testing Process?**



#### Most common observed Trilinos Pull Request (PR) process outline:

- 1. Push a topic branch to GitHub Trilinos fork
- 2. Create a Trilinos GitHub PR against the target branch 'develop'
- 3. Wait for PR autotester to run a set of PR builds which post to internal (SRN) CDash site trilinos-cdash.sandia.gov
- 4. Examine PR build & test failures on trilinos-cdash.sandia.gov (SRN only)
  - 1. Are these failures likely due to changes in the PR?
- 5. Resolve PR build & test failures:
  - 1. If failures are likely unique to this PR topic branch:
    - 1. Create new commit(s) to address the failures (offline testing common or rare?)
    - 2. Push new commits topic branch
  - 2. If failures are likely **not** unique to this PR topic branch':
    - 1. Assume failures are random and will go away if you run enough PR build iterations
- 6. Set the 'AT: RETEST' label on the PR and go to Step 3

#### **Problems with setting 'AT: RETEST' without any further investigation/actions:**

- Errors may not be random and may take out your next PR build & test iteration
  - The computational cost of running the builds will be wasted
  - These doomed PR builds may actually be blocking a PR build for another PR that may fix things!
- Systemic problem with PR builds or testing process is not triaged and will break future PR test iterations (including your own future PRs!)

### **(1)**

# Who should be responsible for triaging and reporting systematic Trilinos PR testing failures?

#### **Should the Trilinos Framework Team members do it?**

- Trilinos Framework team members don't monitor the raw CDash results.
- Trilinos Framework team members are not familiar with the Trilinos test suite and understand how to interpret failures.
- Trilinos Framework team members don't understand the nature of the changes in a PR topic branch and are not well qualified to know what failures may be due to these changes.

#### Should the Trilinos Developers associated with the failing PR builds do it?

- Trilinos developers **do** understand the nature of the changes in the PR topic branch and can typically determine if a build or test failure is due to the topic branch changes or not.
- Trilinos developers **do** understand the Trilinos test suite.

Conclusion => The Trilinos developers looking at the PR build & test results on CDash are in the best place to triage and report systemic errors!

## Proposed Trilinos Pull Request Process



- 1. Push a topic branch to GitHub Trilinos fork
- 2. Create a Trilinos GitHub PR against the target branch 'develop'
- 3. Wait for PR autotester to run a set of PR builds which post to internal (SRN) CDash site trilinos-cdash.sandia.gov
- 4. Examine PR build & test failures on trilinos-cdash.sandia.gov (SRN only)
  - 1. Are failures unique to this PR topic branch or are they impacting other recent PR builds as well?
  - 2. Are these infrastructure failures not related to any problem in Trilinos itself?
- 5. Resolve PR build & test failures:
  - 1. If failures are likely unique to this PR topic branch:
    - 1. Reproduce PR build and test failures offline
    - 2. Create new commit(s) to address the failures and verify in offline builds
    - 3. Push new commits topic branch
  - 2. If failures are due to problems in Trilinos 'develop':
    - 1. Run CDash queries to determine how wide spread and how long failures occurring
    - 2. Create Trilinos GitHub Issue for the failure and inform responsible parties
    - 3. Pin the new GitHub Issue to inform other Trilinos Developers
    - 4. Wait for someone to address the problem causing the failures (if the failures are not random)
- 6. Set the 'AT: RETEST' label on the PR and go to Step 3

## Trilinos Failure Reporting and Resolution Process

https://github.com/trilinos/Trilinos/wiki/Addressing-test-failures

First, create a Trilinos GitHub Issue that lists the full names for the failing tests and what builds they are occurring (e.g. Issue #10847). (This allows any Trilinos developer to search the GitHub issues to see if an issue already exists for the failure.)

• NOTE: GitHub Issue searches do **not** support partial string matching (e.g. "Ifpack\_Container" will not match GitHub Issues/PRs that list "Ifpack\_Container\_MPI\_4")

Once the Trilinos GitHub issue has been created, the test failures can be addressed by one of following processes:

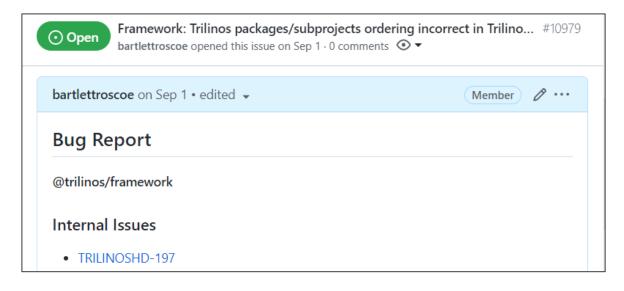
- A. Fix the failure (if the defect can be fixed quickly):
- B. Temporarily disable the failing code or test (if the defect is not critical or if it is a defective test)
  - Set the GitHub label "Disabled Tests"
- C. Back out the merge commit that caused the failures (if it is a build failure or some other critical defect)

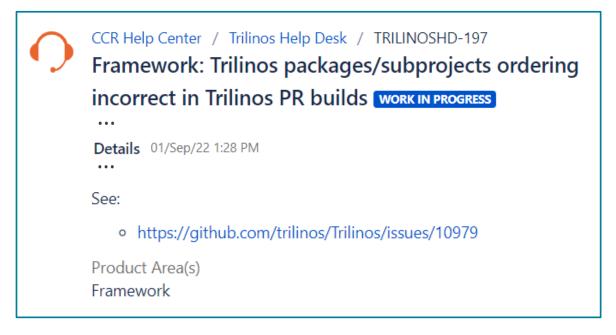
## Reporting Trilinos Infrastructure Failures Process?



- 1. Create Trilinos GitHub Issue describing the problem (with appropriate level of details for external GitHub, consider pinning the issue)
- 2. Create internal Trilinos HelpDesk issue duplicating the GitHub Issue title and put in link to the GitHub Issue
- 3. Put in link from the GitHub Issue to the internal Trilinos HelpDesk issue

#### **Example:**





**Request for Trilinos Framework Team members:** Please update the linked GitHub issue to inform all Trilinos developers about the status of a systematic framework failures?

## Triaging Trilinos PR build failures on CDash

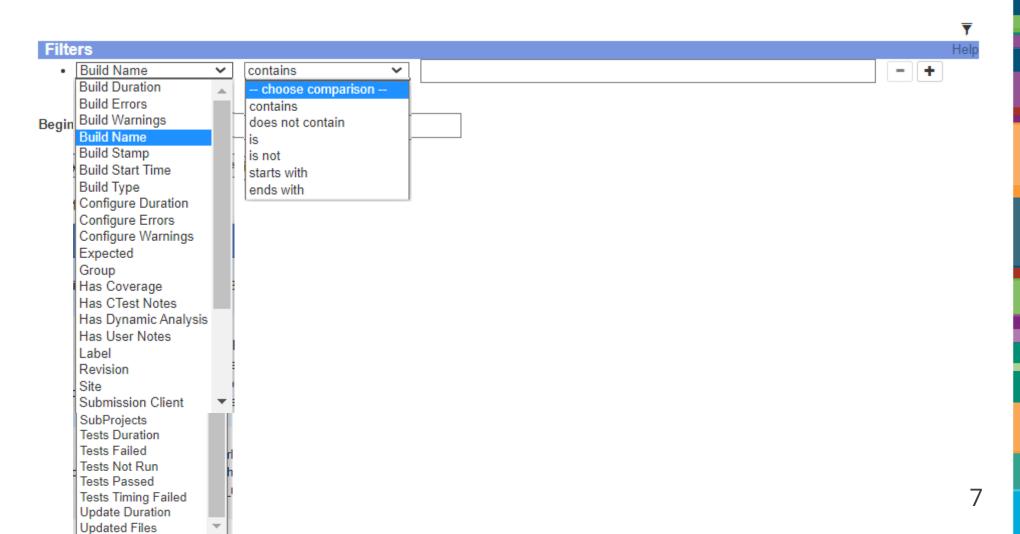


### Are the build errors seen in my PR also seen in other PRs recently?

⇒ Run queries on <a href="https://trilinos-cdash.sandia.gov/index.php?project=Trilinos">https://trilinos-cdash.sandia.gov/index.php?project=Trilinos</a>

#### Useful fields:

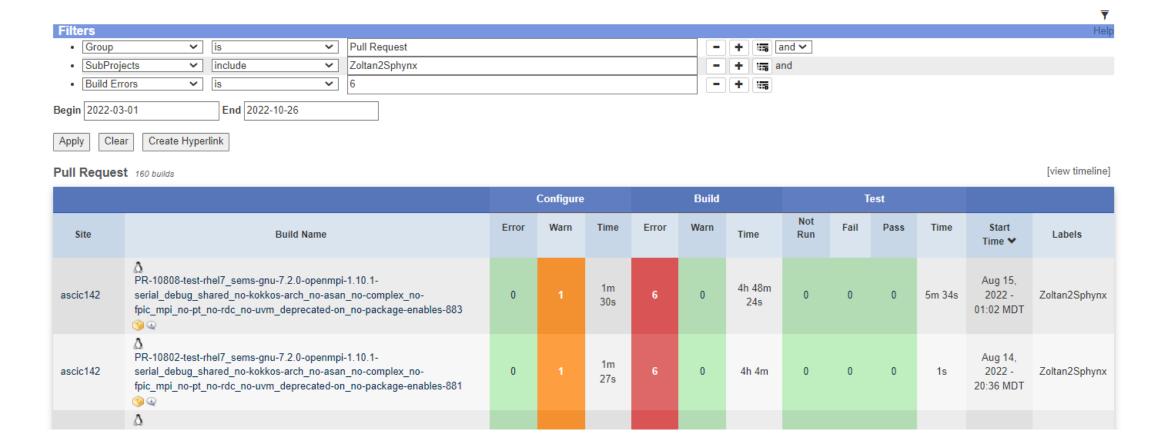
- "Group"
- "Site"
- "Build Name"
- "Build Errors"
- "Subprojects"



## Example CDash build queries



<u>Trilinos GitHub #10836</u>: Framework: Mysterious 6 failures in package Zoltan2Sphynx with no data on CDash going back to at least 2022-05-18



## Triaging Trilinos PR test failures on CDash



Hide Filters

Output

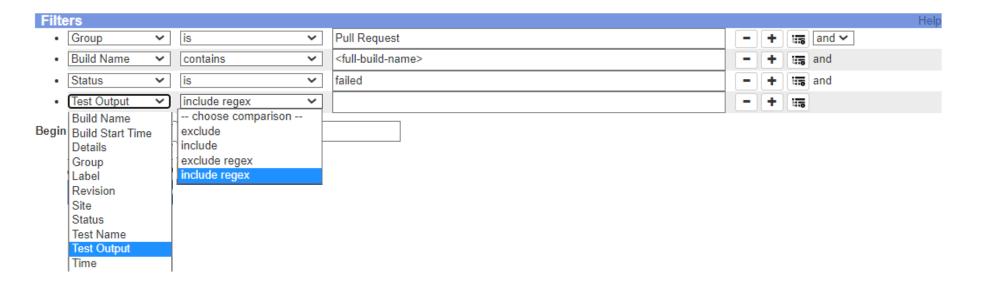
Show Matching

#### Are the test errors seen in my PR also seen in other PRs recently?

⇒ Run queries on <a href="https://trilinos-cdash.sandia.gov/queryTests.php?project=Trilinos">https://trilinos-cdash.sandia.gov/queryTests.php?project=Trilinos</a>

#### Useful fields:

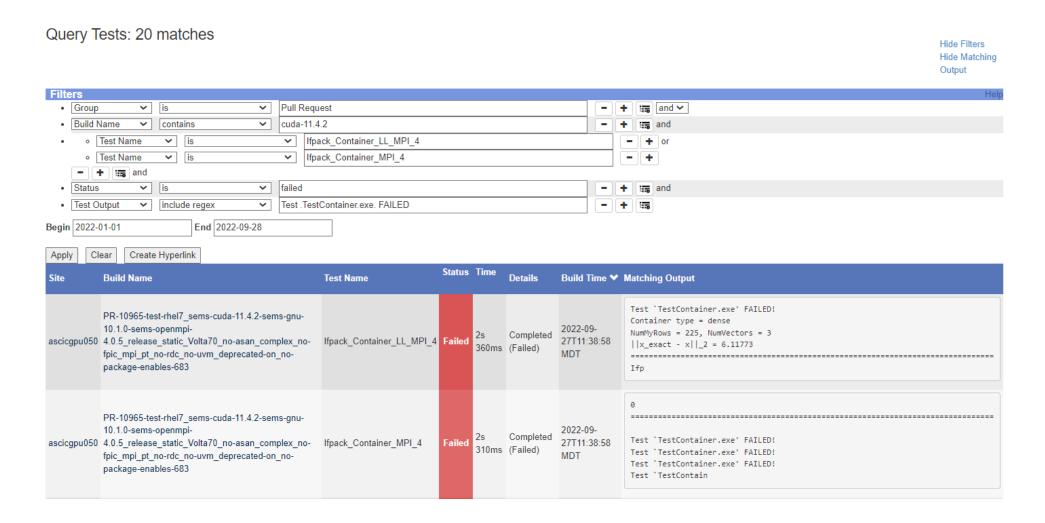
- "Group"
- "Build Name"
- "Site"
- "Status"
- "Test Output"



## Example CDash test query



<u>Trilinos GitHub #11072</u>: Ifpack: Ifpack\_Container tests failing in cuda-11.4.2 PR builds for all recorded history



## Creating Trilinos GitHub Issue for PR test failures



Filte	Filters Help								
•	Group	~	is 🗸	Pull Request	-	+	धन	and 🗸	
•	Build Name	~	contains	ats2_cuda-10.1.243-gnu-8.3.1-spmpi-rolling_release_static_Volta70_Power9_	-	+	117	and	
•	Test Name	~	is 🗸	Stokhos_KokkosViewUQPCEUnitTest_Serial_MPI_1	-	+	::E	and	
•	Status	~	is 🔻	failed	-	+	i i i	and	
•	Test Output	~	exclude regex 💙	(Error initializing RM connection jsrun return value: 255)	-	+	ii.	5	
Begin         2022-05-01         End         2022-10-26           Apply         Clear         Create Hyperlink									
https://trilinos-cdash.sandia.gov/queryTests.php?project=Trilinos&begin=2022-05-01&end=2022-10-									
26&filtercount=5&showfilters=1&filtercombine=and&field1=groupname&compare1=61&value1=Pull%20Request&field2=buildname&compare2=63&value2=ats2_cuda-10.1.243-gnu-8.3.1-spmpi-rolling_release_static_Volta70_Power9_no-asan_no-									
complex_no-fpic_mpi_pt_no-rdc_uvm_deprecated-on_no-package-enables-									
&field3=testname&compare3=61&value3=Stokhos_KokkosViewUQPCEUnitTest_Serial_MPI_1&field4=status&compare4=61&value4=failed&field5=testoutput&compare5=96&value5=									
(Error%20initializing%20RM%20connection%7Cjsrun%20return%20value%3A%20255)									

#### Generate the Markdown for a new GitHub issue for these failing tests:

```
cd <some-base-dir>/

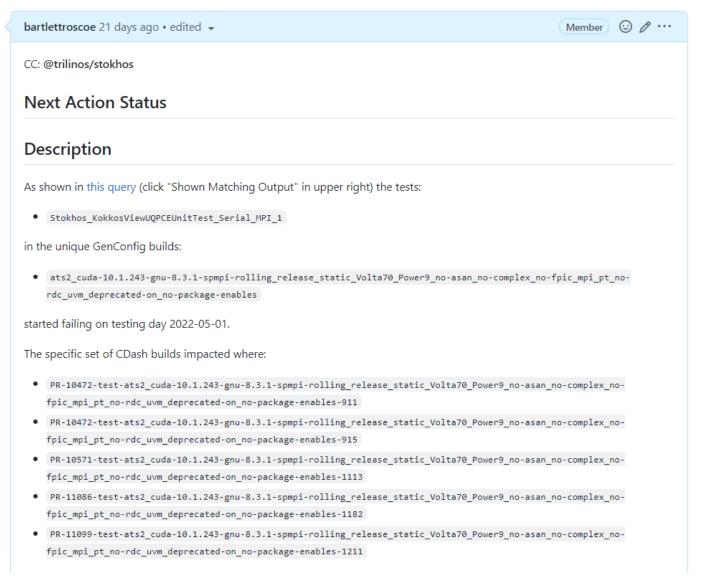
trilinosDir>/commonTools/framework/github_issue_creator/create_trilinos_github_t
est_failure_issue_driver.sh -u "https://trilinos-
cdash.sandia.gov/queryTests.php?project=Trilinos&begin=2022-05-01&end=2022-10-
26&...)"
```

emacs newGithubMarkdownIssueBody.md

## Creating Trilinos GitHub Issue for PR test failures









# **Questions and Comments?**