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TRILINOS DEVOPS UPDATES

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TRILINOS FRAMEWORK RENAMED TO "DEVOPS"

Align nomenclature with other Sandia ASC teams





FY24 ACCOMPLISHMENTS

- SAST Scanning investigation (CodeQL), co-developing with Tpetra/MueLu teams
- Enabled using multiple GPUs in PR testing to speed turnaround and increase robustness
- Initial support for OneAPI compiler
 - Containerized build
 - Floating-point flags
- Tool to track PRs that had tests fail and pass for same commit hash
- Added a CUDA UVM build-only to PR testing
- Nightly build against ASC DevSecOps Unified Environment (leveraging container provided by ASCDSO team)
- Added nightly CUDA build for Kokkos/KokkosKernels integration section
- Added non-blocking Spack PR build
- Increased warnings around building/using deprecated packages
- Added DCO Signoff check
- Accommodated upgrade of all testing hardware RHEL7->RHEL8 (which also involved upgrading toolchains)
- Work open-source process for pieces of GenConfig system
- Upgrade nightly C++20 build to use GCC >8
- Design and implement warnings/errors policy



AT2-SPECIFIC ACHIEVEMENTS

- Added GCC, GCC+OpenMPI, CUDA+GCC+OpenMPI (A100) builds to GitHub
- Enabled ccache in GitHub Actions builds
- Enhanced reporting (e.g. CDash, links)
- Set up automated image rebuilds
- Add 'fmt'*
- Investigate external registries
- Correct red update column
- Document/test internal developer usage of AT2 containers
- Eliminate duplicate runs
- Use clear CDash site name



FY25 PLANS

- Promote AT2 experimental builds to replace corresponding AT1 builds
- Promote C++20 build to PR status (ensuring readiness for next standard advancement)
- Enhance support for Spack package.py from internal Trilinos developers
- Migrate from SEMS Autotester to GitHub Actions for CI/PR builds
 - Will also involve moving from SEMS TPL environment modules to containerized environments
- Add testing for CompSim and RAMSES configurations of Trilinos
- Add advanced hardware builds as hardware becomes available
 - AMD ROCm (hopefully + GPU tests)
 - Nvidia H100



DCO SIGNOFF REQUIREMENT

Example of workflow check:

https://github.com/trilinos/Trilinos/pull/13437/checks?check_run_id=31102516264

What am I signing off on?

<https://github.com/trilinos/Trilinos/blob/develop/CONTRIBUTING.md#sign-off-your-work>

Options for commit signing:

- **git commit -s # --signoff**
- Commit template
- Shell alias (oh-my-zsh has **gcas** and a few others)



DCO SIGNOFF COMMIT TEMPLATE EXAMPLE

```
sebrown@hpws0361:~ $ cat .gitconfig
[user]
    name = Samuel E. Browne
    email = sebrown@sandia.gov
[push]
    default = tracking
[color]
    ui = auto
[commit]
    template = ~/.gitcommit_template.txt
[init]
    defaultBranch = main
[pull]
    rebase = false
[submodule]
    recurse = true
```

```
sebrown@hpws0361:~ $ cat .gitcommit_template.txt
name: summary

Signed-off-by: Samuel E. Browne <sebrown@sandia.gov>
sebrown@hpws0361:~ $
```

Plain `git commit` automatically adds the DCO sign-off for all of my commits now!



EPETRA DEPRECATION MECHANICS

Added deprecation warnings to all deprecated packages. The warnings are able to be disabled via the ``Trilinos_SHOW_DEPRECATED_WARNINGS`` option (this is also available as a per-package option). These warnings are intended to notify users that package capability they are using will be removed in upcoming releases.

There are also configure-time warnings that inform user that deprecated packages have been enabled and which ones (always on, unable to be hidden).

Using the ``Trilinos_HIDE_DEPRECATED_CODE`` option with deprecated packages enabled yields a configure-time error.

Packages will be removed in FY25 (plan is currently late FY25, e.g. July)



CONFIGURE-TIME WARNING EXAMPLE

```
*****
***** WARNING WARNING WARNING WARNING WARNING WARNING *****
*****
* Several Trilinos packages are scheduled for deprecation in 2025.
* The following deprecated packages are enabled (either explicitly
* or implicitly due to a dependency)
*
* Triutils
* ThyraEpetraExtAdapters
* ThyraEpetraAdapters
* ShyLU_DDCore
* Pliris
* ML
* Isorropia
* Intrepid
* Ifpack
* EpetraExt
* Epetra
* AztecOO
* Amesos
*
*****
CMake Warning at CMakeLists.txt:81 (message): Deprecated packages that are enabled:
Triutils;ThyraEpetraExtAdapters;ThyraEpetraAdapters;ShyLU_DDCore;Pliris;ML;Isorropia;Intrepid;Ifpack;EpetraExt;
Epetra;AztecOO;Amesos
```