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TRILINOS DEVOPS/CI UPDATES

Samuel E. Browne

Sandia National Laboratories

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FY25 ACCOMPLISHMENTS

- Remove deprecated packages (Trilinos 17.0)
- Release all pieces of GenConfig system as open-source on GitHub
- Upgrade all compiler + MPI toolchains to be C++20 compatible
- Update Spack check to use `develop` version constantly to get immediate feedback about `spack install trilinos` compatibility/state
- Advance minimum C++ standard to 20 (part of upgrading to Kokkos 5.0)

GITHUB-ACTIONS CI SPECIFIC ACHIEVEMENTS

- All legacy CI builds are converted to container-based GitHub Actions
- Add run artifacts to GitHub Actions to aid reproduction
  - GenConfig build ID
  - Dockerfile
  - Configure (CMake) command
  - packageEnables file
- Use inspect-by-label (for developers familiar with legacy system)
- Add automatic re-run tool for previously-failed but subsequently inspected-by-label
- Pass CI builds purely on configure/build/test status (i.e. do not fail if only CDash submission fails)
- Add step to output `ccache` statistics to GHA logs for cache effectiveness determination
- Add instructions on building our container images to GitHub (open) Dockerfile repository
- Add GPU architecture tags to GHA runners
- Upgrade Spack in dev containers to ~v1.0

CURRENT CI CONFIGURATIONS

Descriptor	Build Type	Link Type	OS	Toolchain
CUDA	Release	Static	UBI8	CUDA 12.4.1, GCC 12.3.0, OpenMPI 4.1.6
CUDA UVM (no tests)	Release	Static	UBI8	CUDA 12.4.1, GCC 12.3.0, OpenMPI 4.1.6
GCC	RDebug	Shared	UBI10	GCC 14.3.1
GCC + OpenMPI	Debug	Shared	UBI8	GCC 12.3.0, OpenMPI 4.1.6
OpenMP	RDebug	Static	UBI8	GCC 12.3.0, OpenMPI 4.1.6
Clang	RDebug	Shared	UBI9	Clang 19.1.6, OpenMPI 4.1.6
OneAPI	RDebug	Shared	UBI9	OneAPI 2024.2.1, OneAPI MPI 2021.17.2
Framework unit tests	N/A	N/A	UBI8	Python 3.9
Spack	Release	Shared	UBI8	GCC 12.3.0, OpenMPI 4.1.6 --- **not required to pass**

RDebug = CMAKE_BUILD_TYPE=Release, but some runtime debug checking enabled

UPCOMING NIGHTLY TEST CONFIGURATIONS

Descriptor	Build Type	Link Type	OS	Toolchain
Kokkos BoundsCheck	Release	Static	UBI8	CUDA 12.4.1, GCC 12.3.0, OpenMPI 4.1.6
Kokkos Develop	Debug	Shared	UBI8	GCC 12.3.0, OpenMPI 4.1.6
Kokkos Develop	Release	Static	UBI8	CUDA 12.4.1, GCC 12.3.0, OpenMPI 4.1.6
Kokkos Develop	RDebug	Shared	UBI9	OneAPI 2024.2.1, OneAPI MPI 2021.17.2
Code Coverage	Debug	Shared	UBI8	GCC 12.3.0, OpenMPI 4.1.6
Upcoming Warnings-as-errors	Debug	Shared	UBI8	GCC 12.3.0, OpenMPI 4.1.6
Address Sanitizer	Debug	Shared	UBI9	Clang 19.1.6, OpenMPI 4.1.6
CUDA H100	Release	Static	UBI8	CUDA 12.4.1, GCC 12.3.0, OpenMPI 4.1.6
ATS4 (MI300A)	Release	Static	UBI8	ROCm

These will be informative only (run nightly, not blocking Pull Requests), but are configurations we either want to stay working or will provide information to developers for strategic-level decisions

Trilinos Compiler Support Roadmap												
Intel Classic 2021												
Intel OneAPI 2024												
Intel SYCL 2023												
GCC 8												
GCC 10												
GCC 12												
GCC 14												
Clang 11 (GCC 8 Fortran)												
Clang 19 (No Fortran)												
CUDA 11.2												
CUDA 11.4												
CUDA 12												
ROCm 6												
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	FY2025				FY2026				FY2027			

	Supported
	Upcoming
	Deprecated

DEPRECATED PACKAGE REMOVAL STATUS

- All deprecated packages have been removed as of Trilinos 17.0.0
- Enabling any deprecated package generates yields a configure warning
- Secondary Tested packages are auto-ENABLED by default
- Packages are archived on GitHub as separate repositories
- Packages still exist in pre-17.0.0 git version control history

- **Deferred to Trilinos 18.0: All references to deprecated packages are removed from source code and build system files**

FY26 PLANS

- Enhance support for Spack package.py from internal Trilinos developers
- Drive towards a common Trilinos Spack package.py(s) to enable simple sharing of customer configurations (e.g. easily test Sandia application configurations on the Trilinos side) – *see Joe Frye's presentation at 11:25AM today*
- Transition Kokkos/KokkosKernels integration testing to GitHub Actions (scheduled job)
- Transition code coverage job to GitHub Actions (scheduled job)
- Add testing for Sandia customer configurations of Trilinos (x2)
- Add advanced hardware builds as hardware/infrastructure becomes available
  - AMD ROCm (hopefully with tests on MI300A hardware)
  - Nvidia H100 – 4xH100 machine in-place for nightly testing via GitHub Actions
- Host and publish compiler/MPI roadmap to enable discussions about toolchain alignment
- Enhance static analysis jobs in GitHub Actions (CodeQL currently, times out due to large builds and analysis)
- Publish binary distributions of Trilinos via containers

QUESTIONS/ DISCUSSION