

# Extreme-scale Scientific Software Stack (E4S)

<https://e4s.io>

E4S basics:

- Community effort to provide
  - Open source software packages
  - For developing, deploying, and running scientific applications on HPC platforms
- Exists to
  - Accelerate the development, deployment and use of HPC software,
  - Lower barrier for HPC users
- Containers & turn-key from-source builds of 80+ popular HPC products including:
  - MPI: MPICH and OpenMPI
  - Development tools: TAU, HPCToolkit, and PAPI
  - Math libraries: PETSc and Trilinos
  - Data and Viz tools: Adios, HDF5, and Paraview
  - ML/AI: TensorFlow, PyTorch, Horovod

# Extreme-scale Scientific Software Stack (E4S)

- E4S: HPC Linux Ecosystem – a Software Portfolio
- A **Spack-based** distribution of software tested for interoperability and portability to multiple architectures
- Available from **source, containers, binary caches**
- Not a commercial product – an **open resource for all**
- Oct 2018: E4S 0.1 - 24 full, 24 partial release products
- Jan 2019: E4S 0.2 - 37 full, 10 partial release products
- Nov 2019: E4S 1.0 - 50 full, 5 partial release products
- Feb 2020: E4S 1.1 - 61 full release products
- Nov 2020: E4S 1.2 - 67 full release products

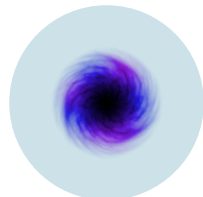


# E4S: Better Quality, Documentation, Test, Integration, Delivery, Build & Use

*Delivering HPC software to facilities, vendors, agencies, industry, international partners in a brand-new way*



**Community Policies**  
Commitment to software quality



**DocPortal**  
Single portal to all E4S product info



**Portfolio testing**  
Especially leadership platforms



**Curated collection**  
The end of dependency hell



**Quarterly releases**  
Release 1.2 – November



**Build caches**  
10X build time improvement



**Turnkey stack**  
A new user experience



<https://e4s.io>



**E4S Strategy Group**  
US agencies, industry, international

# E4S and Tools Opportunities

- E4S is a complete HPC Linux installation
  - Available as source, from containers (Docker, Singularity, ...) and cloud (AWS, Google, ...)
  - Adding new products requires:
    - Spack package – Spack invokes your product build (CMake, configure/make, ...) and manages dependencies
    - Addressing E4S community policies
    - Sufficient interest from HPC user community
  - Provides a “quick path” delivery to the HPC user community
- Potential:
  - Tool developers can contribute to E4S
  - Tool users can benefit from quick distribution of new tools