

The Vanguard Advanced Tri-lab Software Environment (ATSE) Project

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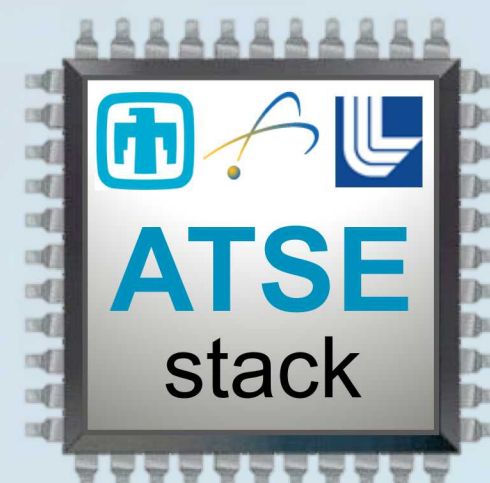


Problem

- Sandia Vanguard program is fielding large-scale prototype HPC platforms for ASC
 - First system is “Astra”, based on 64-bit Arm compute nodes, > 2 PF/s peak and > 500 TB/s memory bandwidth
 - Primary objective to demonstrate readiness of new technologies for ASC mission computing
- New technologies require focused R&D effort to mature the software stack, fill gaps, address issues, and optimize performance

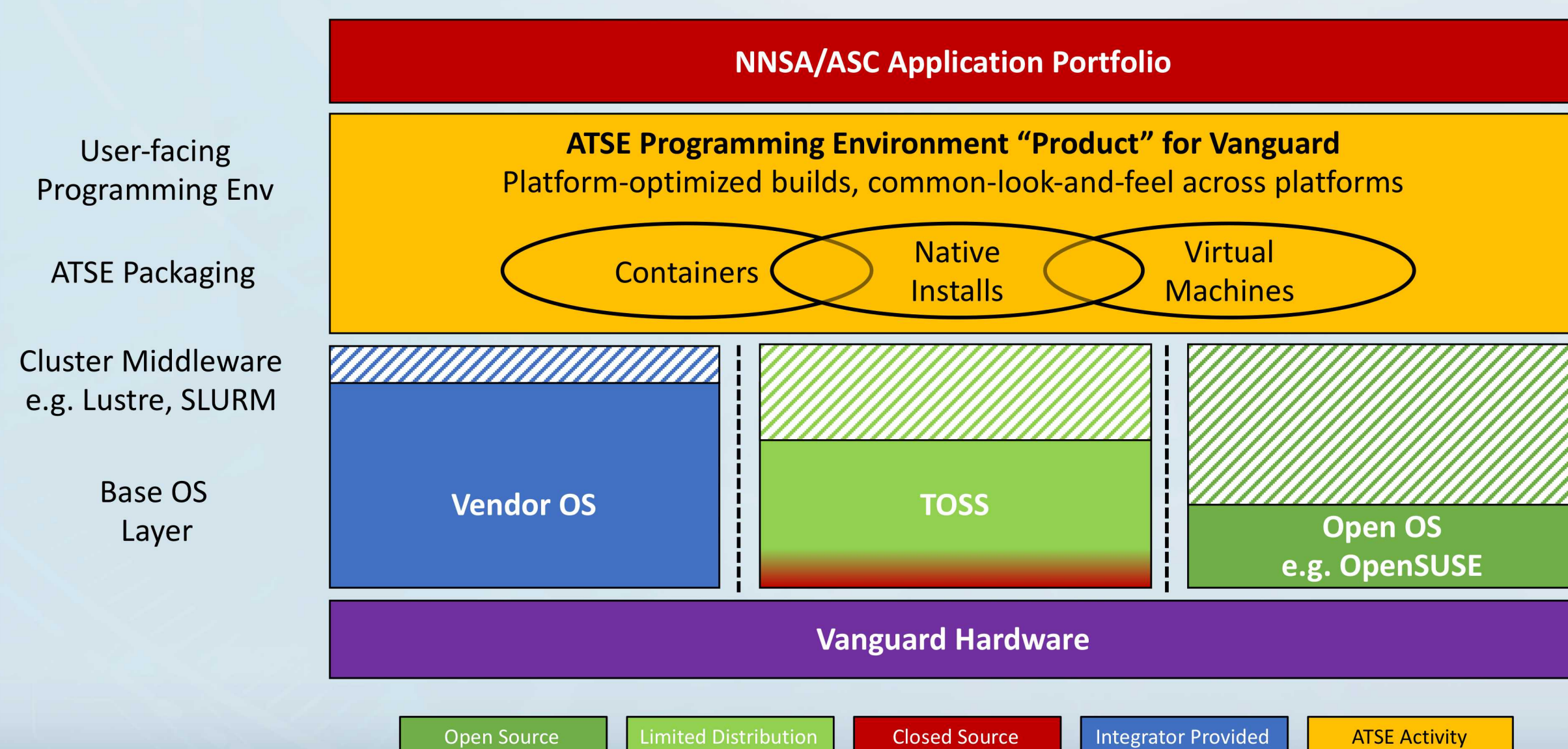
Approach

- Sandia leading NNSA Tri-lab team to develop the Advanced Tri-lab Software Environment



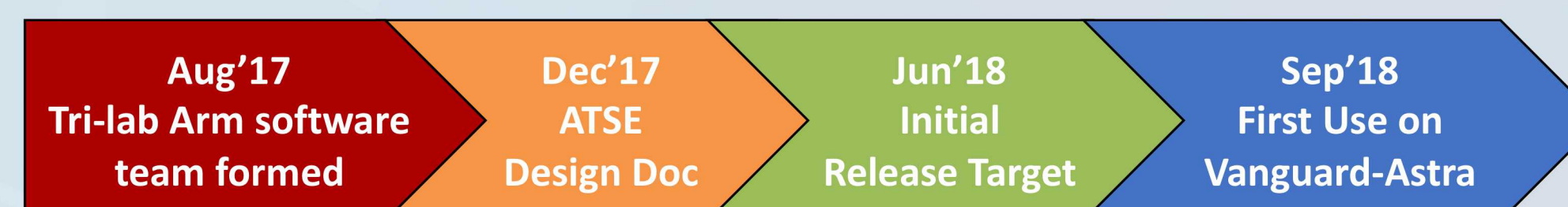
For Vanguard-Astra + future prototype platforms

- High-level goals
 - Build an open, modular, extensible, community-engaged, and vendor-adoptable ecosystem
 - Prototype new technologies that may improve the ASC computing environment (e.g., ML frameworks, containers + virtual machines)
 - Improve ability to deploy Tri-lab R&D on ATS+CTS
 - Leverage existing efforts such as TOSS and ECP ST

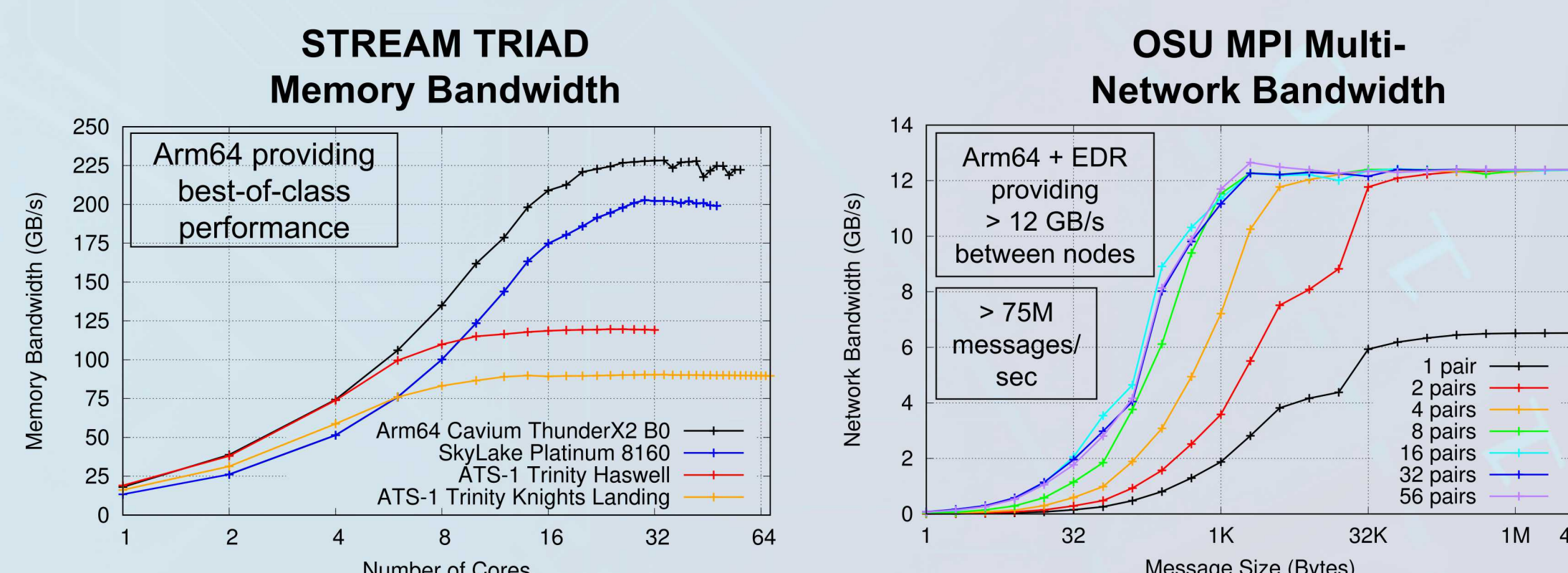


Results

- Schedule, Past and Projected



- Placing collaborative vendor contracts to harden Arm64 compilers, math libraries, and tools – both for Astra and Arm ecosystem in general
- Early performance results:



- Early application porting:

Workload	GCC 7.2.0	Arm HPC Compilers
LAMMPS		
SPARTA		
SPARC		
NALU		
CTH		FORTTRAN issue
Drekar		
Xyce-UUR		
VPIC		
SNAP		

Most codes build without trouble, work remains to optimize

Significance

- The ATSE project is building the software stack for Vanguard-Astra now to shorten the runway once it arrives
- Coupling large-scale prototype systems with long time-scale Tri-lab software development efforts
- Pulling in Tri-lab team to support the national ASC program and future NNSA platform strategy

Vanguard Collaboration

