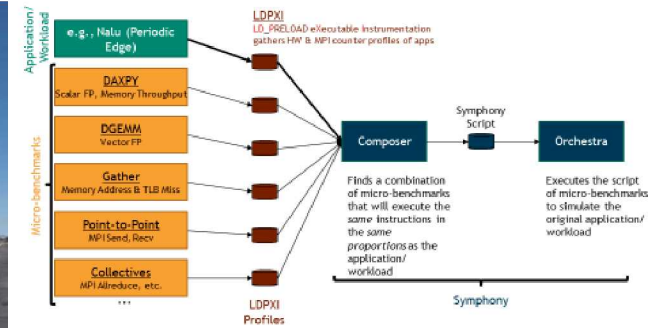




FOUS Highlights at Sandia

FY19

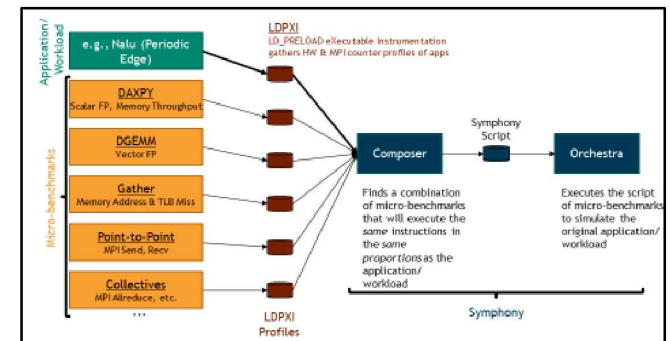
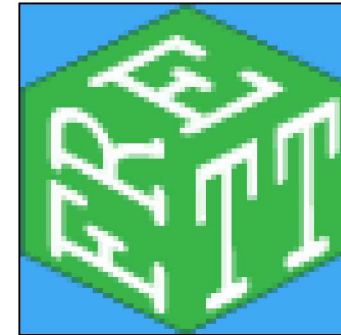
Tom Klitsner, FOUS Program Element Lead
Sandia National Laboratories



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What's New?

- New HPC Facility Update/Status (725-East)
- New File Transfer Tool (FrETT*)
- New Benchmarking Project (Symphony)



* FrETT development funded under CSSE

New HPC Computing Facility (725-E)



- LEED Gold Design
 - Energy, Water, Solar Farm, North-Facing High Windows,
- 85% liquid cooling 15% air cooling
- Thermosyphons & Air-Side Economization for Water/Energy Savings
 - ~3.5 Million gallons/year water usage reduction per thermosyphon
- Non-load-bearing, movable west wall for expansion (14,000 – 20,000sf)
- 6 MW power, studies for 8 MW expansion to 14 MW total
- First system (Astra) installed 2 weeks before occupancy readiness certification

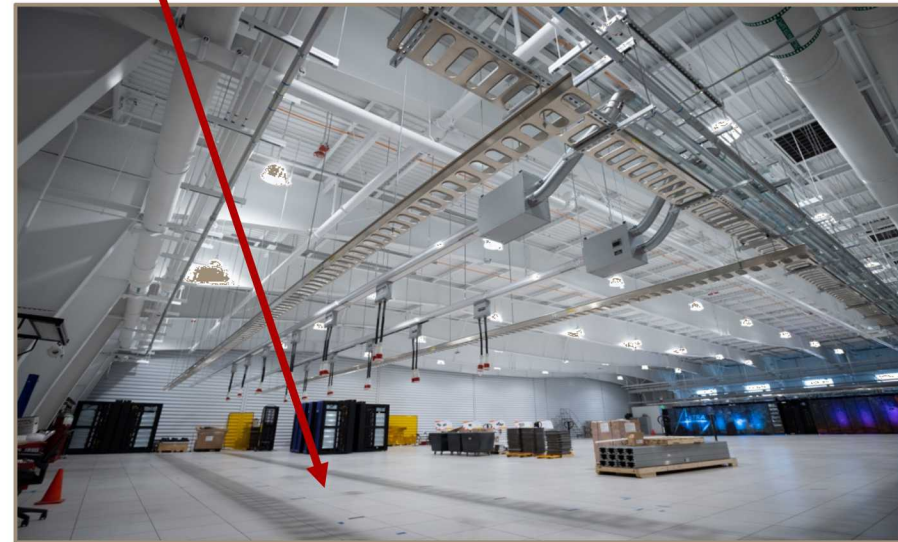
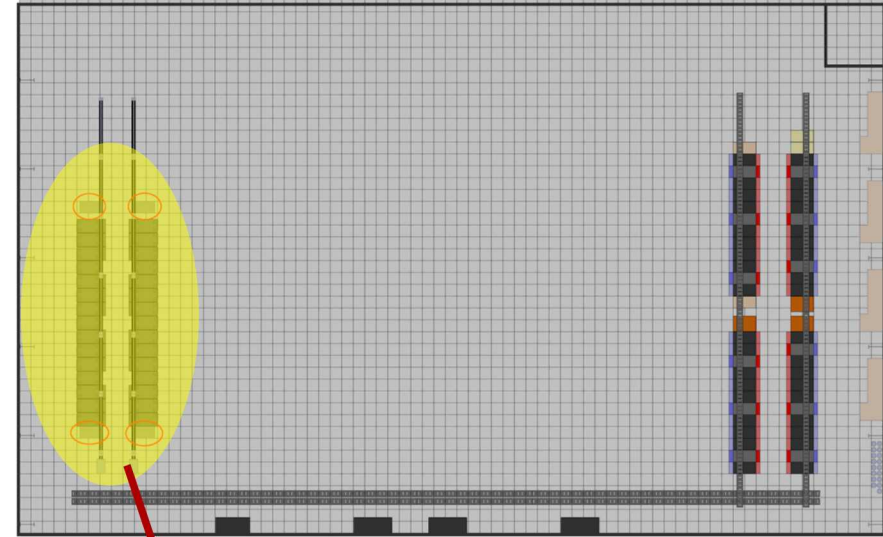


- Initial PUE ~ 1.09 – 1.12
 - Warm water cooling: 67F (Astra) – 85F
- Oct - April {
- Thermosyphon performance is dependent on liquid-cooling efficiency
 - Uncooled outside air



“Attaway”

- **1,488 compute nodes (8 scalable units)**
 - **1.93 PFLOPs peak**
 - **Will be the fastest production cluster at Sandia**
- **2.3 GHz processors**
 - Nodes have dual sockets with 18 cores each
 - Intel Xeon Gold 6140 “Skylake”
 - ~1.3 TFLOPs per node
- **192 GB RAM per node (5.3 GB per core)**
- **Next generation water cooling (Chillydyne):**
 - Processors are directly cooled by cold plate
 - Fins provide additional air cooling/heat exchange
 - Floor based CDU’s provide negative pressure to prevent leaks and to improve system resilience.
 - ~70% of node heat is removed via water
- **Delivery in August/September 2019**



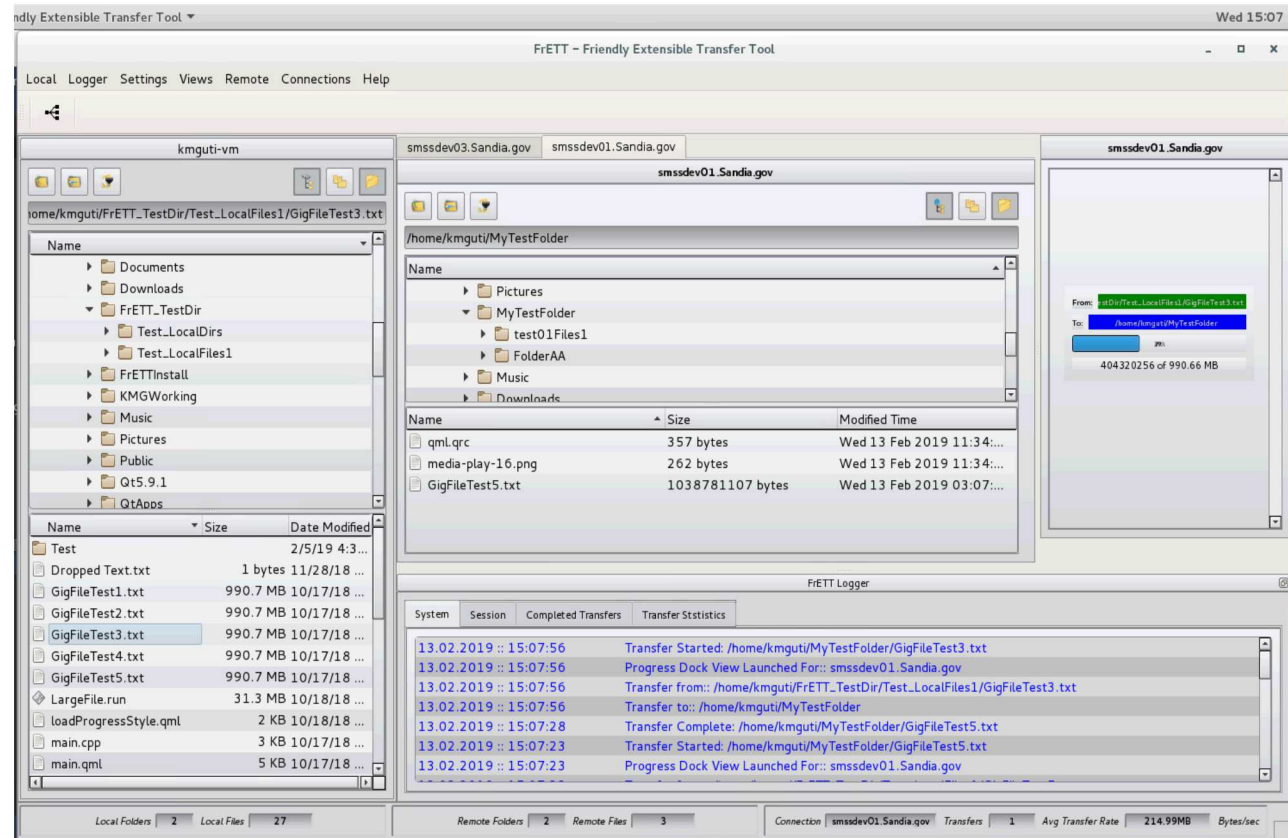
FrETT: Friendly Extensible Transfer Tool*

(*Development funded under CSSE)

- Existing tools lack the breadth/performance for Extreme-Scale
 - Increasing diversity of data clients (e.g., OS, architecture) and targets (e.g., HPC filesystems, campaign or archival storage)
 - Increasing demand for network efficiencies
 - file count, file size and fixed network infrastructure
- FrETT provides the same GUI regardless of target
 - Multi-platform client (Unix-portable, Planned: Mac and Windows)
 - Modular interfaces: storage targets, authentication, encryption, batch
 - Rich expressions: Program API, command, GUI
- FrETT – increased performance/efficiency
 - high parallelism, reduced overhead and latency
- FrETT can replace existing legacy transfer tools (20+ years old)
 - HSI/HTAR, PFTP (each platform specific.)

FrETT Deployment Timeline

- FY19 Q3:
 - SNL Friendly Users
 - LANL SysAdmin testing
- FY19 Q4:
 - SNL Production
- FY20:
 - External lab Production
 - SNL decommissions legacy data transfer tools

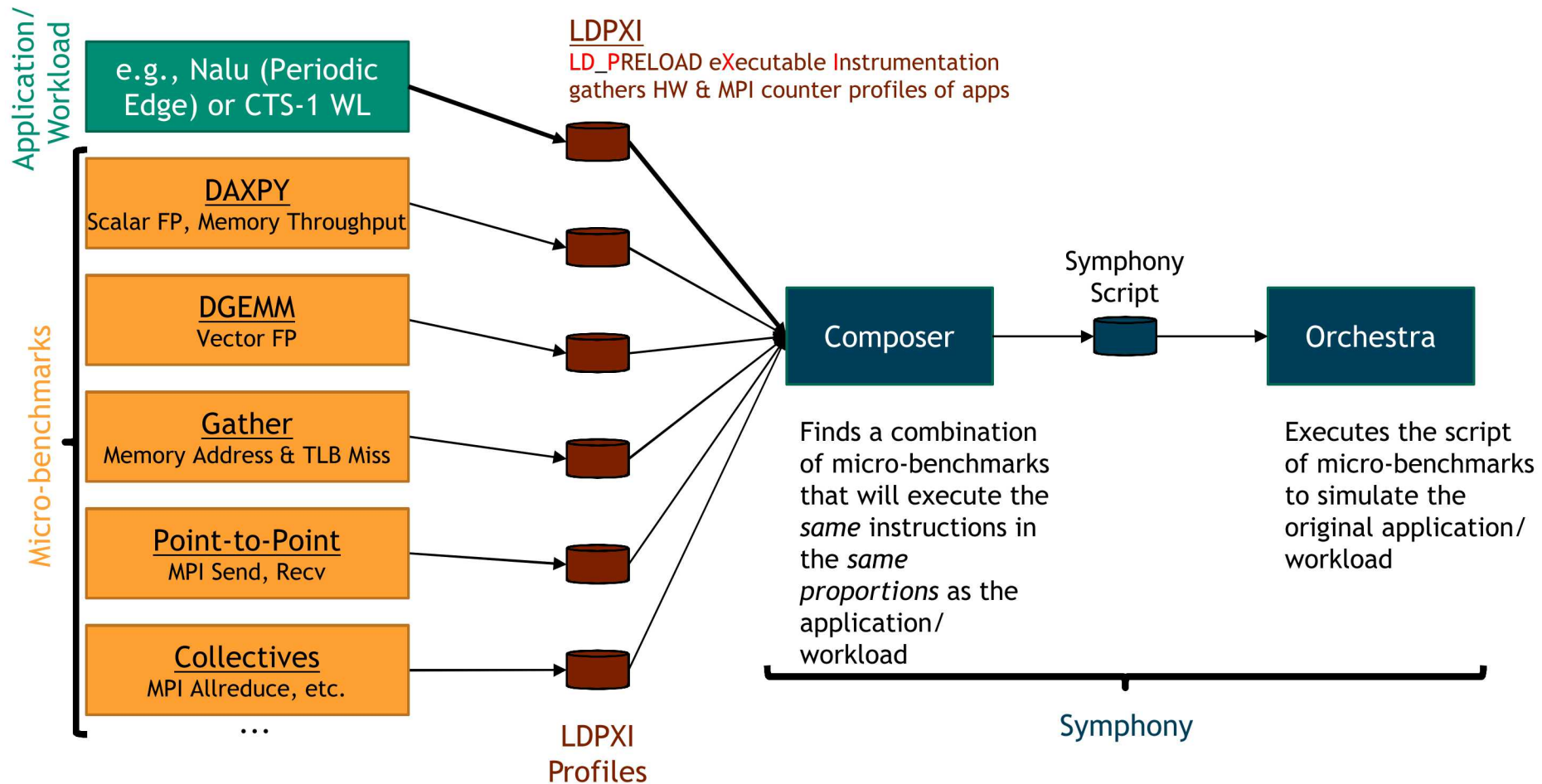


FrETT GUI

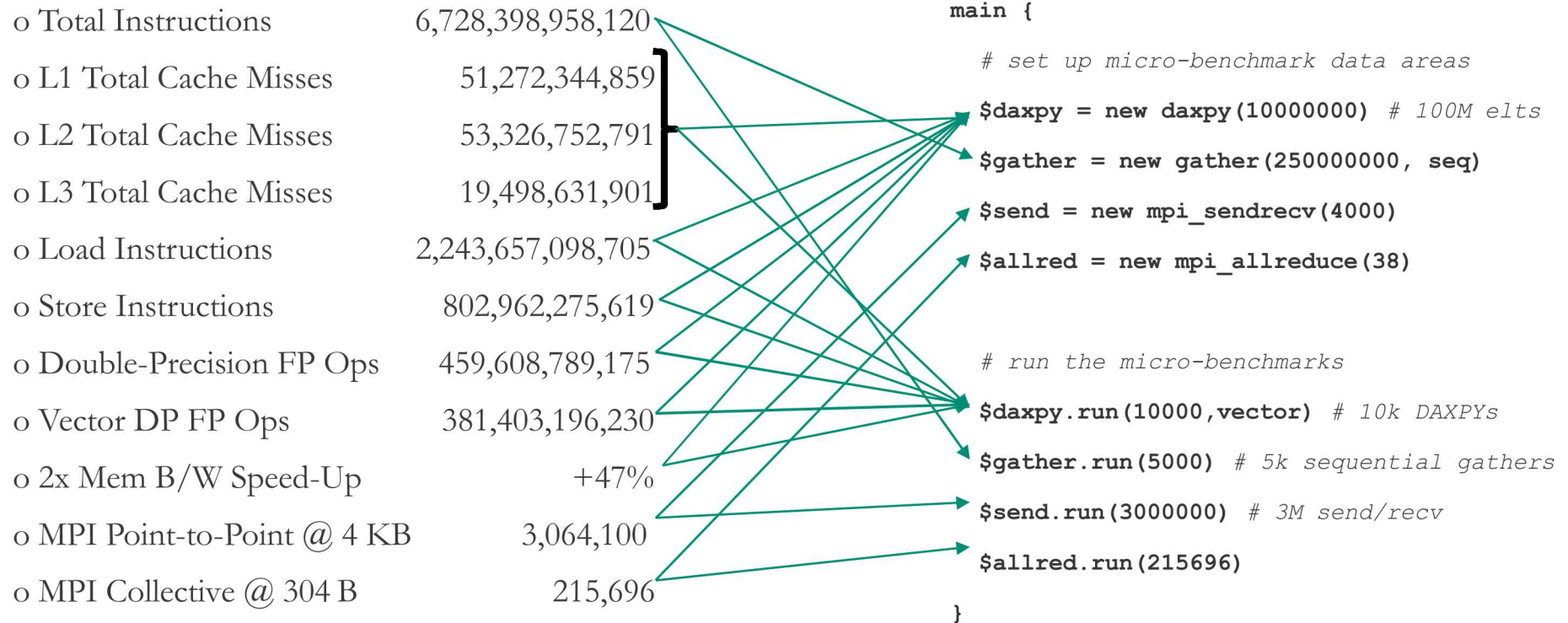
More info: wg-frett-feedback@sandia.gov

Benchmarking with “Symphony”

Proposed Synthetic Application Methodology



Example: Nalu (Periodic Edge), 288 Ranks



Application Per-Rank Profile Excerpt from LDPXI

Corresponding Symphony Script
(actual syntax)

Questions?