ACE: Advanced Computing Ecosystem Testbed

OAK RIDGE National Laboratory

Test. Validate. Evolve.

A flexible, cutting-edge high-performance compute and data testbed for exploring the future of computing — without compromising production.

WHAT IS ACE?

The Advanced Computing Ecosystem Testbed (ACE) is an open-access, centralized environment for testing and developing emerging technologies in HPC, quantum computing, cloud computing, AI and machine learning. ACE offers researchers and system architects a safe, sandboxed space to rapidly prototype, evaluate, and refine experimental computing and data methods and technologies.

ACE supports the Department of Energy's American Science Cloud and Integrated Research Infrastructure by providing a bridge that seamlessly connects DOE's world-class research tools across the national labs.

CORE CAPABILITIES

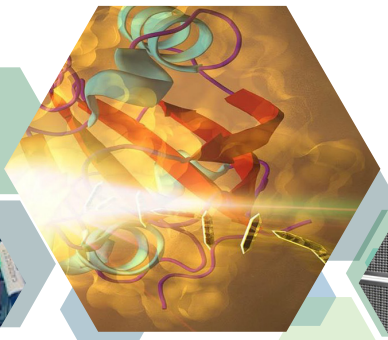
Non-Disruptive Testbed – Explore new ideas without impacting production systems
Support Small-team Projects – Ideal for small teams doing early-stage R&D
HPC-Capable Resources – Test real workloads on powerful, flexible systems
Accelerate Productization – Shortens path from concept to production-readiness
AI/ML Ready – Build, train, and optimize AI and machine learning models
Streaming Infrastructure – Enable high-throughput, low-latency pipelines
Quantum Integration – Develop hybrid HPC + quantum workflows
Heterogeneous Architectures – CPU, GPU, and emerging accelerators supported

ACE AT-A-GLANCE

Access	Open to researchers, collaborators, and vendors
Use Models	Rapid prototyping, innovative R&D, system integration
Compute Hardware	CPU/GPU clusters
Networking & I/O	High-speed, low-latency, optimized for data movement
Software Stack	Full HPC/AI/quantum ecosystem + streaming tools
Artificial Intelligence	Flexible platform for AI training and research on next-gen GPUs
Workflows & Data	User and project storage options for collaborative data management

Website: https://www.olcf.ornl.gov/olcf-resources/compute-systems/wombat/






COMPUTE

- **Defiant**
  20 CPU-only nodes, 2 GPU nodes featuring 8 H200 GPUs each (16 total), Infiniband for MPI & Filesystem traffic, high-speed Ethernet for data streaming
- **Wombat**
  AArch64 testbed with multiple node configurations
  Fujitsu A64fx CPU, EDR IB (8 nodes)
  Ampere Computing Altra CPU, 2 NVidia Ampere GPUs, 2 BlueField-2 DPUs (6 nodes)
  8 Grace Hopper nodes with Bluefield-3 DPUs
- **Holly**
  Single Supermicro server with 8 Nvidia H100 GPUs
- **Quokka**
  16 nodes with Xeon CPUs
- **Quoll**
  3 Quantum Brilliance nodes with 2 qubits each

STORAGE

- **Polis – Lustre**
  3.6 PB
  Primarily spinning disk with some flash, connected to Defiant
- **VastData – NFS**
  ~600 TB
  NFS-over-RDMA storage appliance
  Flash, connected to the IB fabric
- **DAOS – Object Storage**
  8 servers with ~30 TB flash each and dual NDR200

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ORNL contact information

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