

# Introduction to the Oak Ridge Leadership Computing Facility (OLCF)



ORNL is managed by UT-Battelle LLC for the US Department of Energy



# We are one of the DOE's Office of Science computation user facilities



- DOE is leader in open high-performance computing
- Provide the world's most powerful computational tools for open science
- Access is free to researchers who publish
- Boost US competitiveness
- Attract the best and brightest researchers

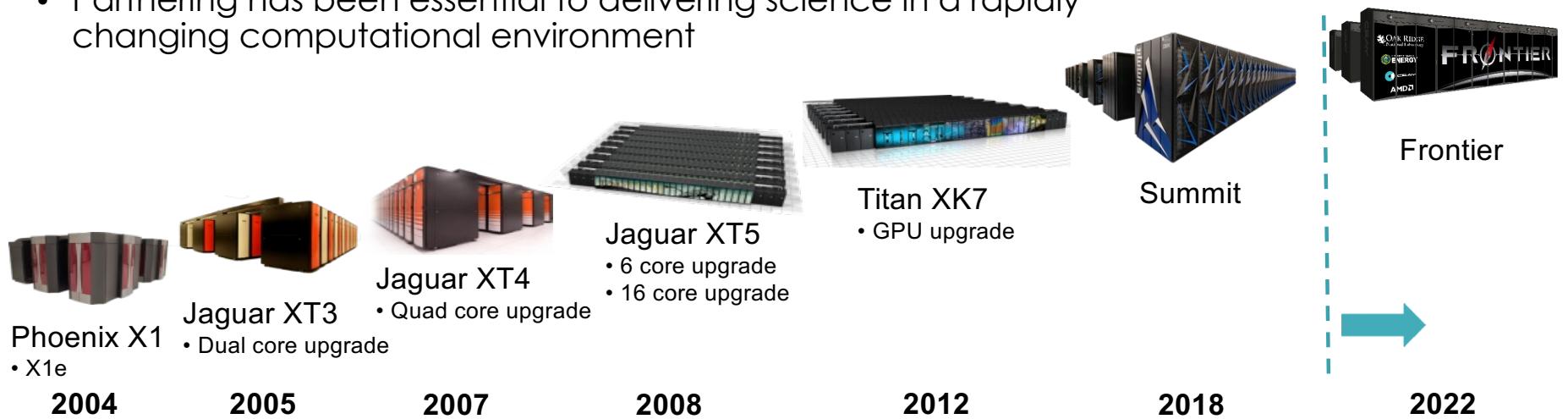
# What is a Leadership Computing Facility (LCF)?

- Collaborative, multi-lab DOE initiative (2 centers / 2 architectures)
- Mission: Provide an ecosystem that enables capability computing opportunities to solve the most challenging problems.
- Administer and support two highly competitive user allocation programs
  - Innovative and Novel Computational Impact on Theory and Experiment (INCITE)
  - ASCR Leadership Computing Challenge (ALCC)
  - Computational allocations typically 100x larger than generally available in university, laboratory, and industrial (scientific and engineering) environments.



# The OLCF has Successfully Delivered Six Systems Since 2004

- Frontier is system number seven. It debuted in the 2022 TOP500 List at No. 1 with 1.1 exaflops. Undergoing testing and will be available for users later this year.
  - Tomorrow 1:00 pm: <https://www.olcf.ornl.gov/calendar/introduction-to-the-frontier-supercomputer/>
- Large part of success has been strong user partnerships to scale & refactor codes/methods
- Partnering has been essential to delivering science in a rapidly changing computational environment



# Summit IBM AC922

## Specifications and Features

- Processor: IBM Power9™ (2/node)
- GPUs: 27,648 NVIDIA Volta V100s (6/node)
- Nodes: 4,608
- Node Performance: 42TF
- Memory/node: 512GB DDR4 + 96GB HBM2
- NV Memory/node: 1600GB
- Total System Memory: >10PB DDR4 + HBM + Non-volatile
- Interconnect Topology: Mellanox EDR 100G InfiniBand, Non-blocking Fat Tree
- Peak Power Consumption: 13MW



# Andes Cluster Overview

Conduit for large-scale scientific discovery via pre/post processing and analysis of simulation data

- Contains 704 compute nodes and 9 GPU nodes in two partitions
- InfiniBand interconnect, with a maximum theoretical transfer rate of 200 Gb/s.

Partition	Node Count	Memory	GPU	CPU
batch (default)	704	256 GB	N/A	[2x] AMD EPYC 7302 16Core Processor 3.0 GHz, 16 cores (total 32 cores per node)
gpu	9	1 TB	[2x] NVIDIA® K80	[2x] Intel® Xeon® E5-2695 @2.3 GHz - 14 cores, 28 HT (total 28 cores, 56 HT per node)



Questions?