

# Frontier Status and Updates

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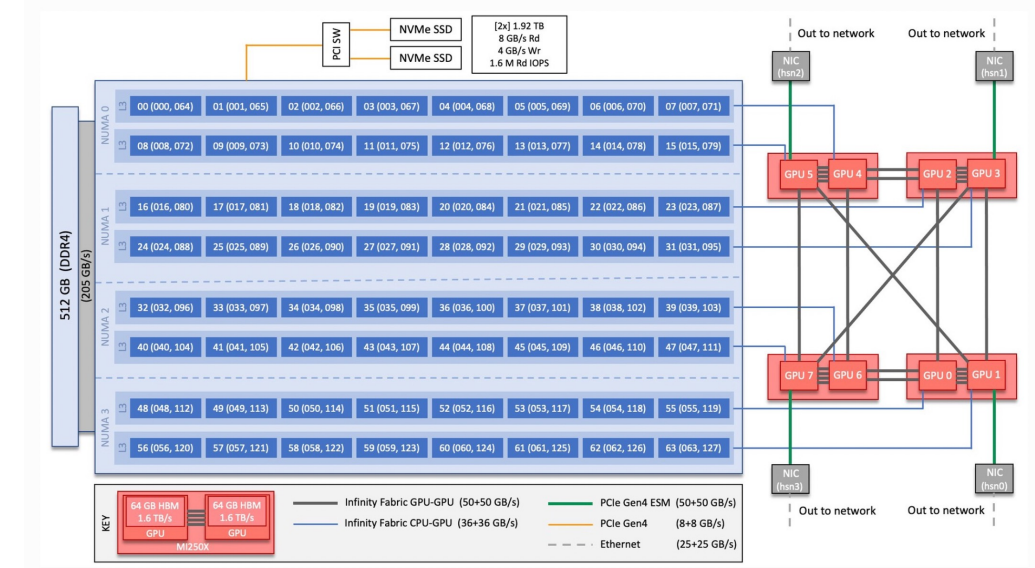
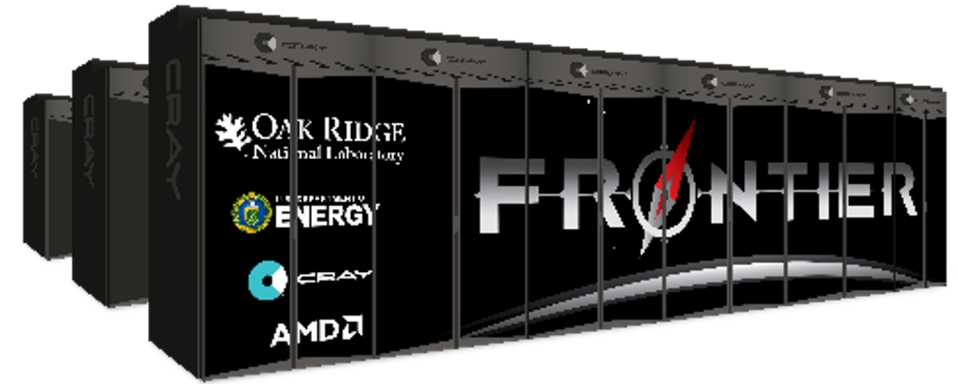
U.S. DEPARTMENT OF  
**ENERGY**

# Outline

- Frontier system
- System status
- System software
- Science at scale
- Know before you go launch jobs

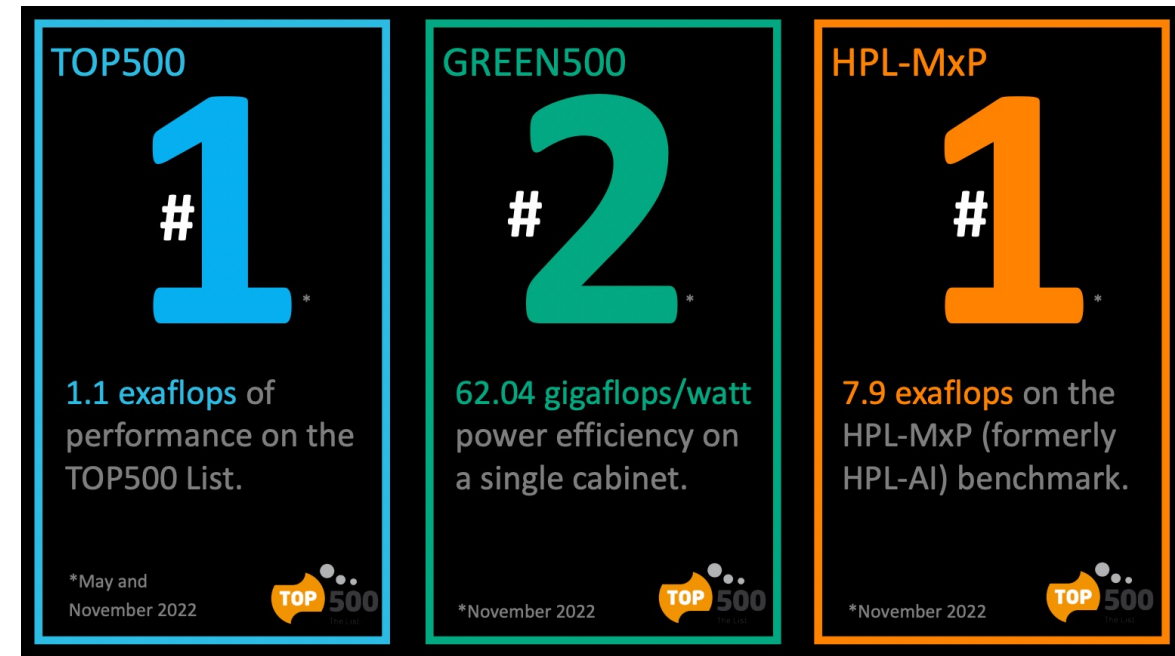
# Frontier: System description

- Compute: Frontier
  - 74 Cray EX cabinets
  - 9,408 compute nodes
    - 1x 64-core AMD “Optimized 3rd Gen EPYC” CPU
    - 4x AMD MI250X Instinct GPUs (each with 2 GCDs)
  - Compute nodes connected with [4x] HPE Slingshot 200 Gbps (25 GB/s) NICs
- Storage: Orion
  - Lustre parallel scratch file system
  - 679 PB of usable space
  - Mounted as /lustre/orion/
- Software stack:
  - HPE/Cray Programming Environment
  - AMD ROCm software stack



# Frontier: System status

- Frontier debuted broke the Exascale barrier in the June 2022 TOP500 list
  - Happy Exascale Day!
- Between May and November of 2022 achieved 92 PF increase
- System was accepted in December 2022
- Frontier transitioned to early production in April 2023
- System software upgraded twice since production
- System status available at:  
<https://www.olcf.ornl.gov/for-users/center-status/>



Frontier

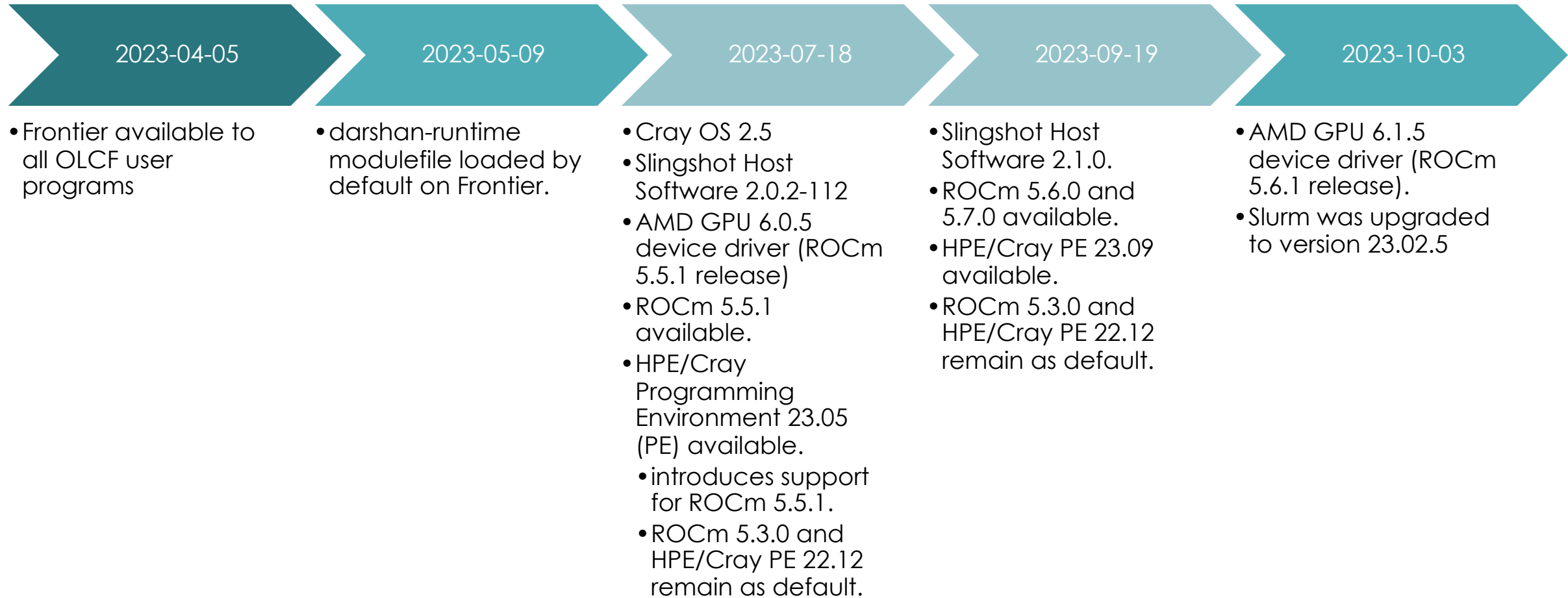
✓ Operational

Up since Oct 12, 2023

Next 10 days scheduled downtimes



# Frontier: Software updates





# Frontier: Science at scale

- Industry Partners:

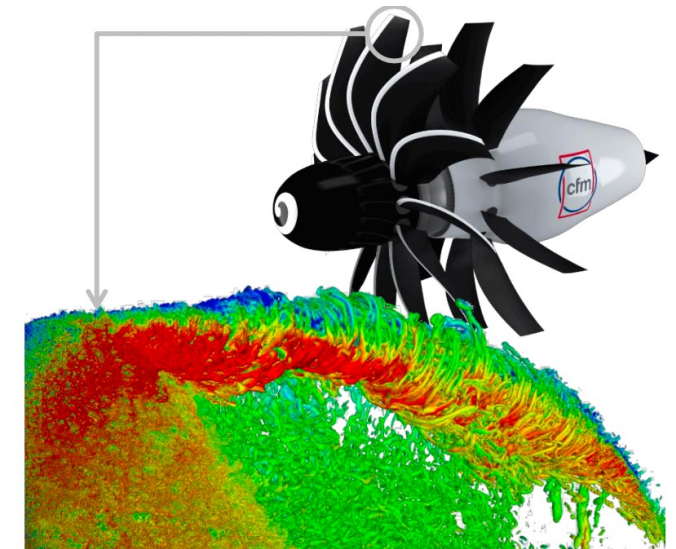
- Flight-scale Aeroacoustic Simulations to Advance Breakthrough Propulsion Design
  - “Frontier has unlocked the ability for us to numerically fly our fans during the design phase, years in advance of actual flight testing, with a level of detail previously unattainable.”
- Dr. Stephan Priebe, Senior Engineer in Computational Fluid Dynamics & Methods, GE Research

- Gordon Bell 2023 Finalists:

- Large-scale Materials Modeling at Quantum Accuracy: Ab Initio Simulations of Quasicrystals and Interacting Extended Defects in Metallic Alloys
  - Sambit Das, Bikash Kanungo, Vishal Subramanian, and others (eight authors total) as part of a team that includes the University of Michigan, Indian Institute of Science, and Oak Ridge National Laboratory
- Exascale Multiphysics Nuclear Reactor Simulations for Advanced Designs
  - Elia Merzaria, Steven Hamilton, Thomas Evans, and others (12 authors total) featuring a team from Pennsylvania State University, Oak Ridge National Laboratory, Argonne National Laboratory, and University of Illinois at Urbana-Champaign

- Gordon Bell 2023 Special Prize Finalist

- The Simple Cloud-Resolving E3SM Atmosphere Model Running on the Frontier Exascale System
  - Authors: Mark Taylor, Peter M. Caldwell, Luca Bertagna, Conrad Clevenger, Aaron S. Donahue, James G. Foucar, Oksana Guba, Benjamin R. Hillman, Noel Keen, Jayesh Krishna, Matthew R. Norman, Sarat Sreepathi, Christopher R. Terai, James B. White III, Danqing Wu, Andrew G. Salinger, Renata B. McCoy, L. Ruby Leung, and David C. Bader



*The RISE engine featuring open fan blades (top). GE visualization of turbulent flow in the tip region of an open fan blade only made possible using the Frontier supercomputer (bottom). [Credit: CFM, GE Research]*

PI(s)/Facility Lead(s): Dr. Stephan Priebe  
ASCR Program/Facility: ALCC / OLCF

Credit: Courtesy of GE Aerospace team

# Know before you ~~go~~ launch jobs

What has recently changed?

- System Updates section in the Frontier User Guide: [https://docs.olcf.ornl.gov/systems/frontier\\_user\\_guide.html#system-updates](https://docs.olcf.ornl.gov/systems/frontier_user_guide.html#system-updates)

I'm seeing an error, what should I do?

- Check the Known Issues section: [https://docs.olcf.ornl.gov/systems/frontier\\_user\\_guide.html#known-issues](https://docs.olcf.ornl.gov/systems/frontier_user_guide.html#known-issues)
- OLCF can help, contact us :)

Where to get help?

- [help@olcf.ornl.gov](mailto:help@olcf.ornl.gov)
- OLCF Office Hours in MyOLCF: Mon at 2pm ET, Wed at 1pm ET



An aerial photograph of the Oak Ridge Reservation campus. The image shows several large, modern buildings with red brick and white accents, interconnected by a central corridor. A large, open green lawn with a white 'X' pattern is in the center. There are numerous parking lots filled with cars and trucks. Trees and landscaping are scattered throughout the campus. The word "Questions?" is written in large white letters at the top center.

Questions?

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