Intro to Summit

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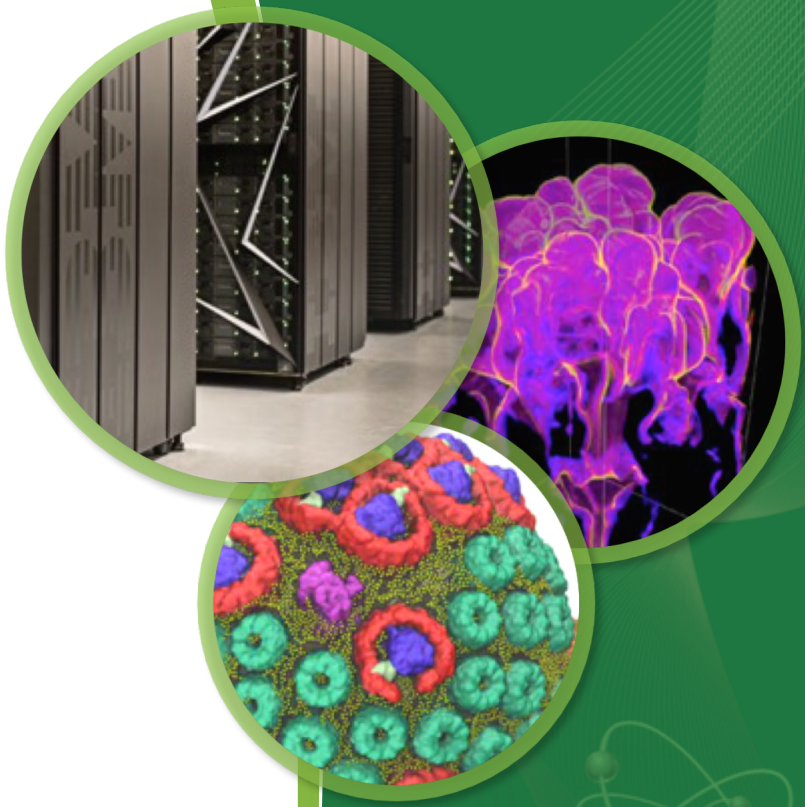


This research used resources of the Oak Ridge Leadership Computing Facility at the Oak Ridge National Laboratory, which is supported by the Office of Science of the U.S. Department of Energy under Contract No. DE-AC05-00OR22725. Some of the work presented here is from the TOTAL and Oak Ridge National Laboratory collaboration which is done under the CRADA agreement NFE-14-05227. Some of the experiments were supported by an allocation of advanced computing resources provided by the National Science Foundation. The computations were performed on Nautilus at the National Institute for Computational Sciences.

Welcome and Logistics

Welcome to the “Introduction to Summit Webinar”

We welcome your questions during the webinar, but since we are recording the session and are expecting many participants, we encourage you to ask your questions using the Google document located at: https://goo.gl/xPGjhF. We plan to make the Q&A document available along with the recording soon after the webinar completes.

Topics Covered

- System Overview
- File Systems & Data Transfers
- Programming Environment
- Batch Scheduler: LSF
- Job Launcher: jsrun
- NVMe / Burst Buffers
- SHARP & Adaptive Routing
- Python Environment

What is a Leadership Computing Facility (LCF)?

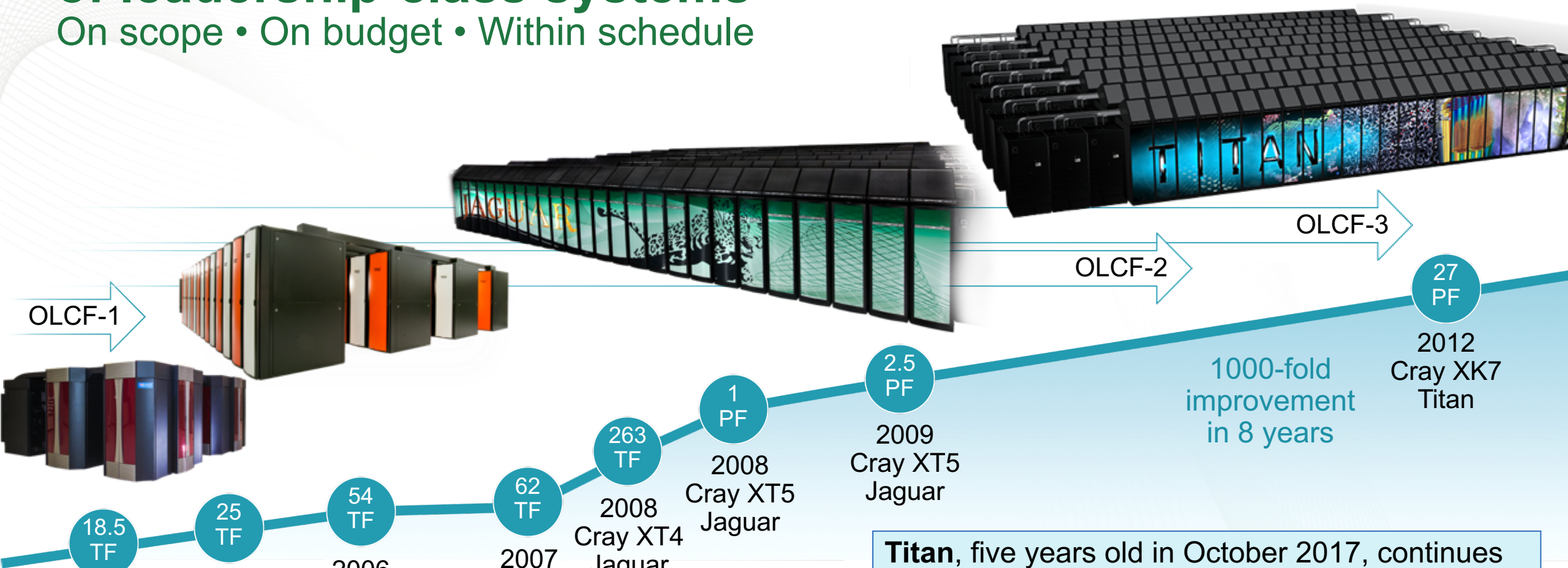
- Collaborative DOE Office of Science user-facility program at ORNL and ANL
- Mission: Provide the computational and data resources required to solve the most challenging problems.
- 2-centers/2-architectures to address diverse and growing computational needs of the scientific community

- Highly competitive user allocation programs (INCITE, ALCC).
- Projects receive 10x to 100x more resource than at other generally available centers.
- LCF centers partner with users to enable science & engineering breakthroughs (Liaisons, Catalysts).

OAK RIDGE National Laboratory | LEADERSHIP COMPUTING FACILITY

ORNL has systematically delivered a series of leadership-class systems

On scope • On budget • Within schedule



Titan, five years old in October 2017, continues to deliver world-class science research in support of our user community. We will operate Titan through 2019 when it will be decommissioned.

We are building on this record of success to enable exascale in 2021

Coming in 2018: Summit will replace Titan as the OLCF's leadership supercomputer

- Many fewer nodes
- Much more powerful nodes
- Much more memory per node and total system memory
- Faster interconnect
- Much higher bandwidth between CPUs and GPUs
- Much larger and faster file system

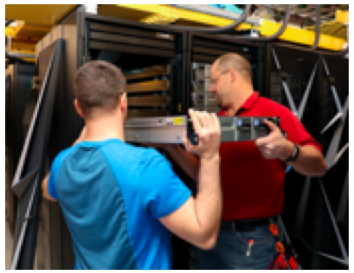
Feature	Titan	Summit
Application Performance	Baseline	5-10x Titan
Number of Nodes	18,688	4,608
Node performance	1.4 TF	42 TF
Memory per Node	32 GB DDR3 + 6 GB GDDR5	512 GB DDR4 + 96 GB HBM2
NV memory per Node	0	1600 GB
Total System Memory	710 TB	>10 PB DDR4 + HBM2 + Non-volatile
System Interconnect	Gemini (6.4 GB/s)	Dual Rail EDR-IB (25 GB/s)
Interconnect Topology	3D Torus	Non-blocking Fat Tree
Bi-Section Bandwidth	15.6 TB/s	115.2 TB/s
Processors	1 AMD Opteron™ 1 NVIDIA Kepler™	2 IBM POWER9™ 6 NVIDIA Volta™
File System	32 PB, 1 TB/s, Lustre®	250 PB, 2.5 TB/s, GPFS™
Power Consumption	9 MW	13 MW

Installation Nearing Completion

- Hardware installation completed in March
- Continuing to stabilize nodes, disks, and network
- In December, accepted 1,080 of 4,608 nodes to port codes
- OLCF is working with IBM, NVIDIA, Red Hat, and Mellanox to stabilize and debug system software

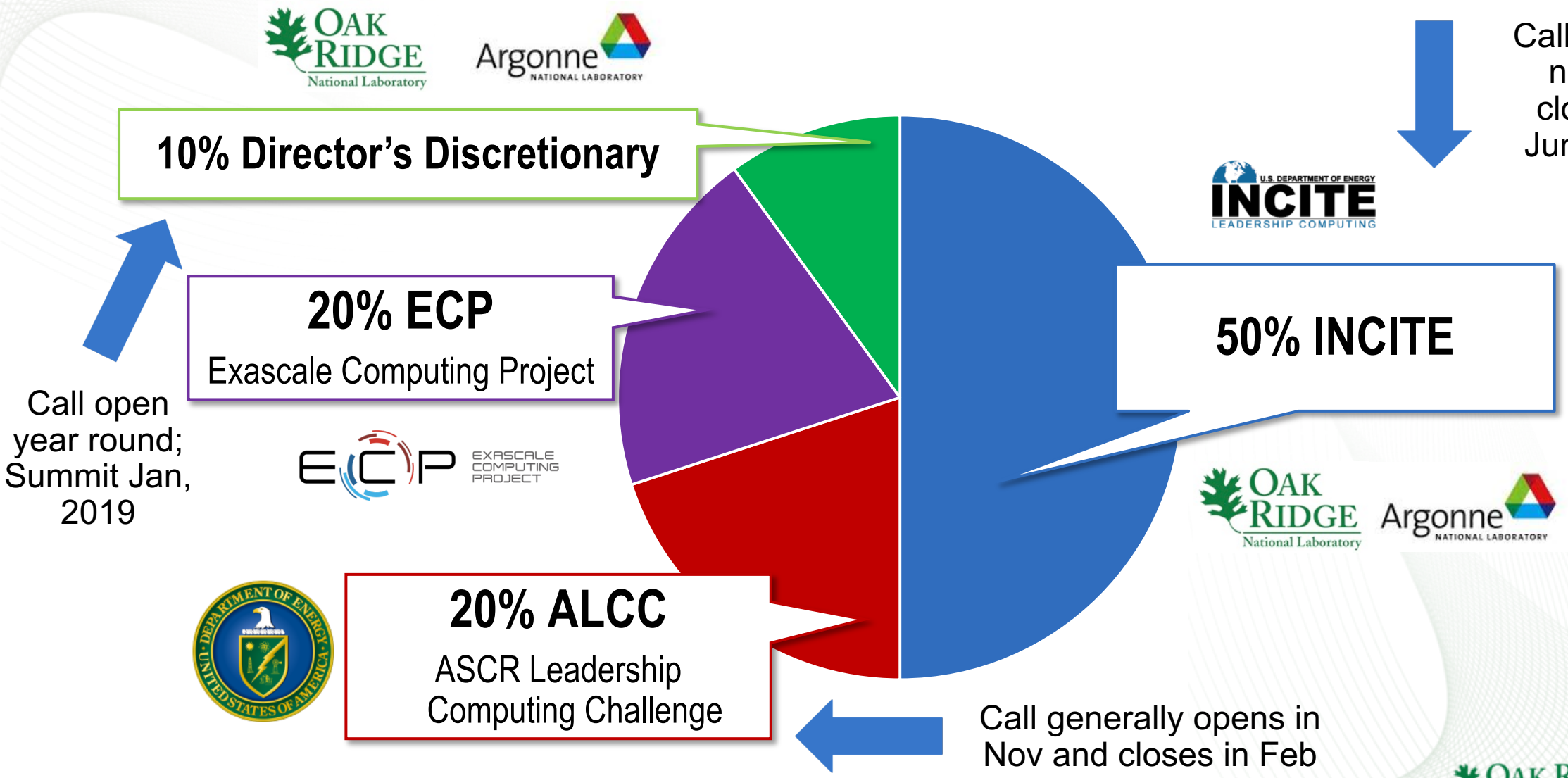
When will Summit Installation be Complete?

- Our plan of record calls for us accepting the system by September 30, 2018. After acceptance, we will allow early Science users on this year, and allocate our first users through the INCITE program in January 2019.



Four primary user programs for access to LCF

Distribution of allocable hours



Innovative and Novel Computational Impact on Theory and Experiment (INCITE) Program for 2019

- Access to the most capable, most productive, fastest open science supercomputers in the nation
- Call for proposals submission window:
  - Apr 16 – Jun 22, 2018
- Applicable to a broad array of science, engineering, and computer science domains
- Proposals must be:
  - High-impact, computationally and/or data intensive campaigns
  - Must take advantage of unique HPC architectures
  - Research that cannot be performed anywhere else.
- INCITE Webinar will be held June 7th
- For more information visit http://www.doeleadershipcomputing.org/

Four primary user programs for access to LCF

Distribution of allocable hours