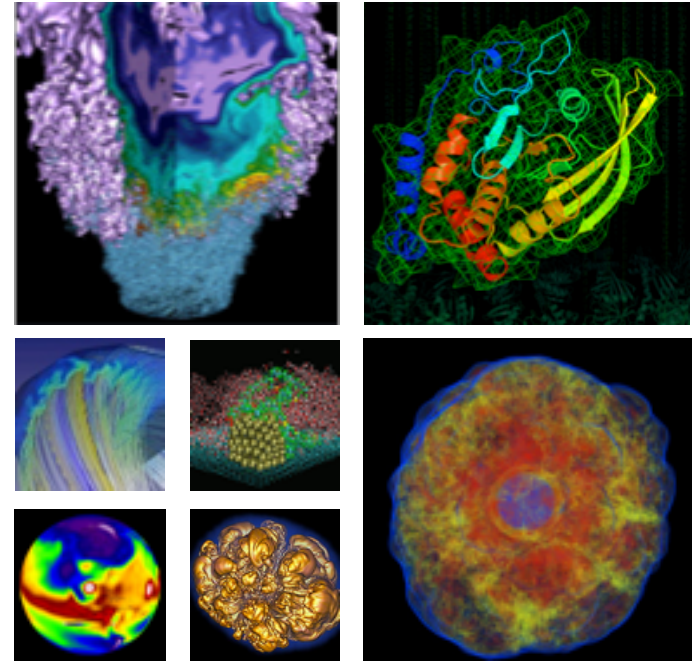


Benefit and fun providing system details



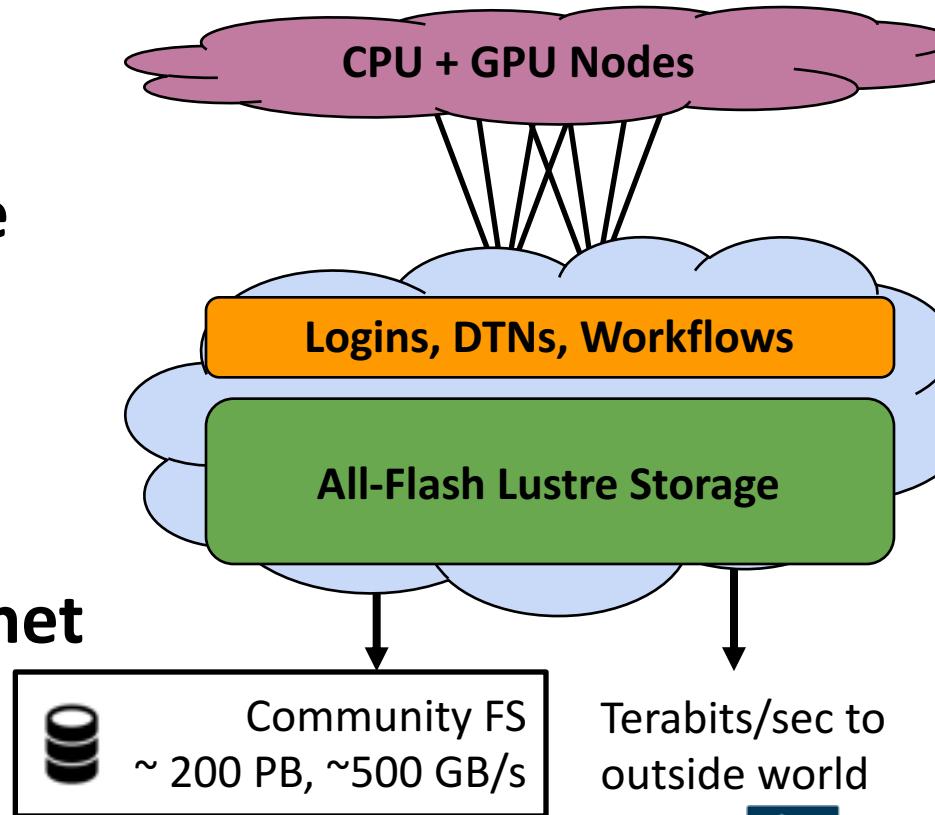
Glenn K. Lockwood, Ph.D.
Advanced Technologies Group

November 14, 2018

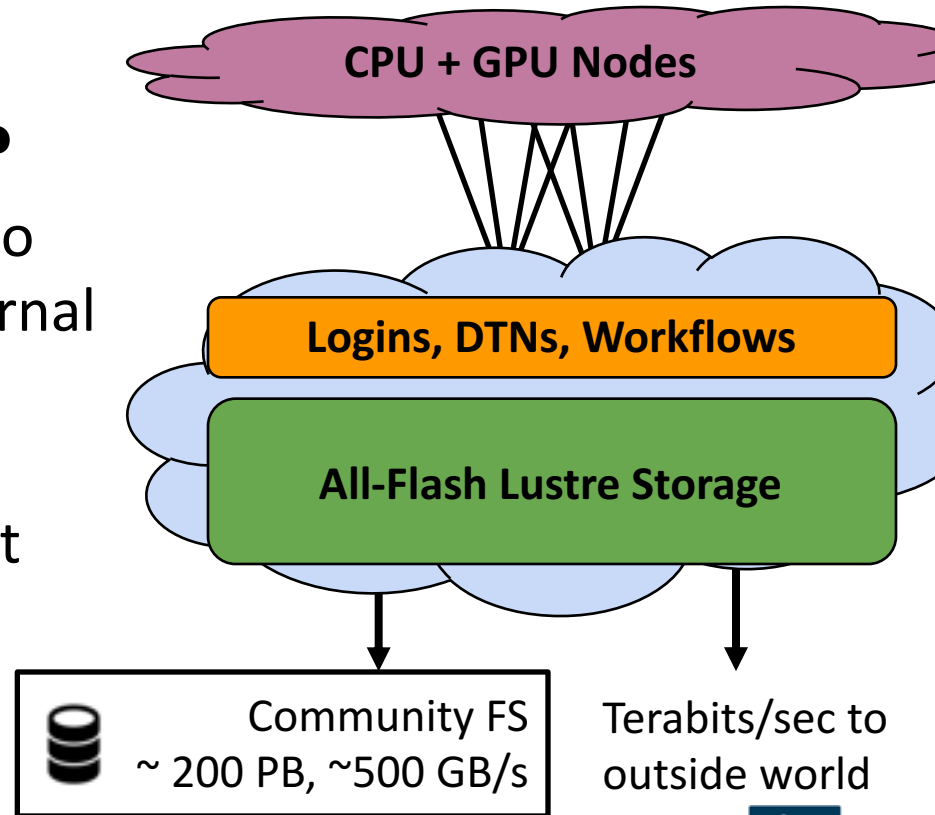
NERSC-9 and NERSC Center in 2020



- **CPU-only and CPU+GPU nodes**
- **30 PB, all-flash parallel file system**
- **200 PB, disk-based Community File System**
- **Cray *Slingshot* network directly connects to Ethernet network**



- **But how do we rigorously describe this architecture?**
 - How are nodes connected to each other? Storage? External networks?
 - What are the data center facility requirements to host this all?
- **CDCL to the rescue!**



Comprehensive Data Center List (CDCL)



- Like Top500 but without competitive angle
- Who should I ask about...
 - scaling Lustre?
 - deploying tape?
 - tiering storage?
- Your center may already be on it!

The current list

#	site.institution	site.storage system.net capacity	site.supercomputer peak
		<i>in PiB</i>	<i>in PFLOPS</i>
1	Oak Ridge National Laboratory	250.04	
2	National Energy Research Scientific Computing Center	197.65	
3	Los Alamos National Laboratory	72.83	
4	German Climate Computing Center	52.00	
5	Lawrence Livermore National Laboratory	48.85	
6	RIKEN Advanced Institute for Computational Science	39.77	

<https://www.vi4io.org/hpsl/start>

NERSC on the CDCL



NERSC

This site describes the systems deployed at the [National Energy Research Scientific Computing Center](#).

Site characteristics

site	>
abbreviation	nersc
institution	National Energy Research Scientific Computing Center
location	Berkeley, CA
webpage	http://www.nersc.gov/users/computational-systems/cori/
nationality	USA
annual staff costs	25.8 M\$

supercomputer Cori	>
supercomputer Edison	>
network Cori Aries interconnect	>
network External	>
network Cori storage interconnect	>
network Edison Aries interconnect	>
network Edison storage interconnect	>
storage system Cori scratch	>
storage system HPSS	>
storage system Edison scratch1	>
storage system Edison scratch2	>
storage system Edison scratch3	>
storage system Cori Burst Buffer	>
storage system Project2	>
building Shyh Wang Hall	>
building Oakland Scientific Facility	>

Center-wide metadata

Two large HPC systems

Four major networks

Seven major storage systems

Two buildings

Drill-down into details

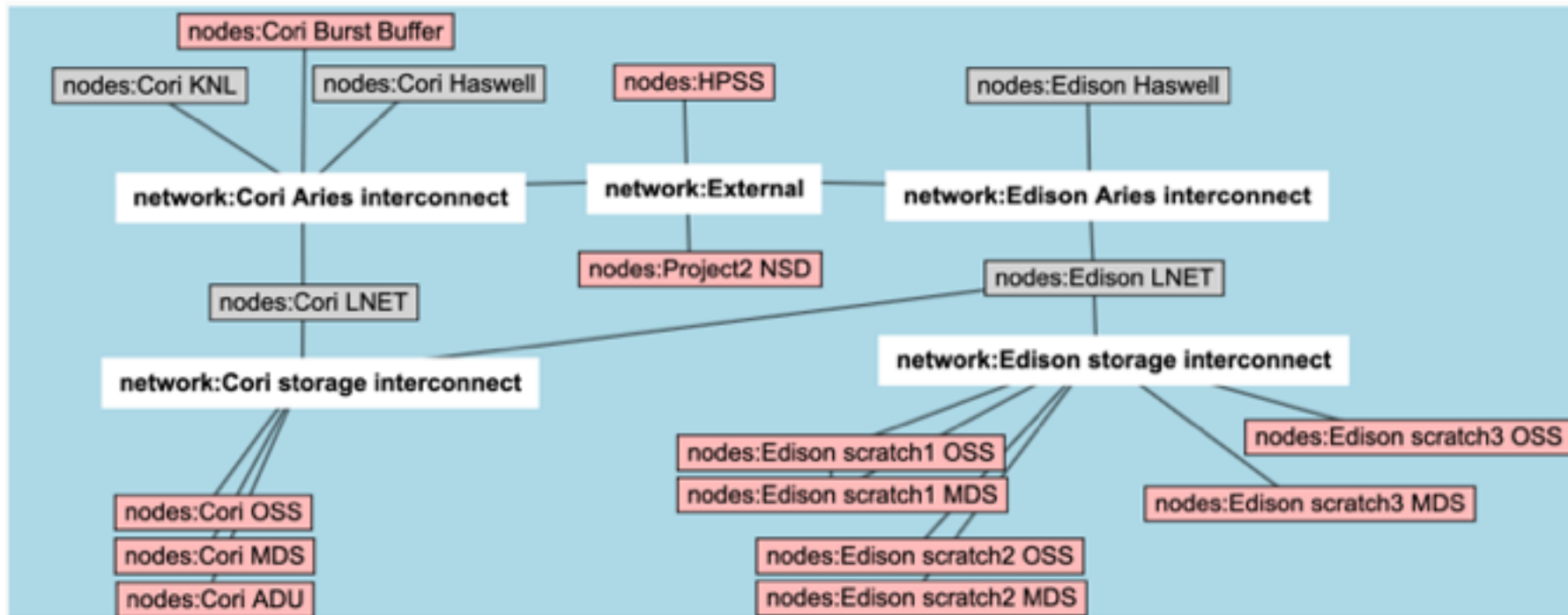


NERSC
occupies two
data centers

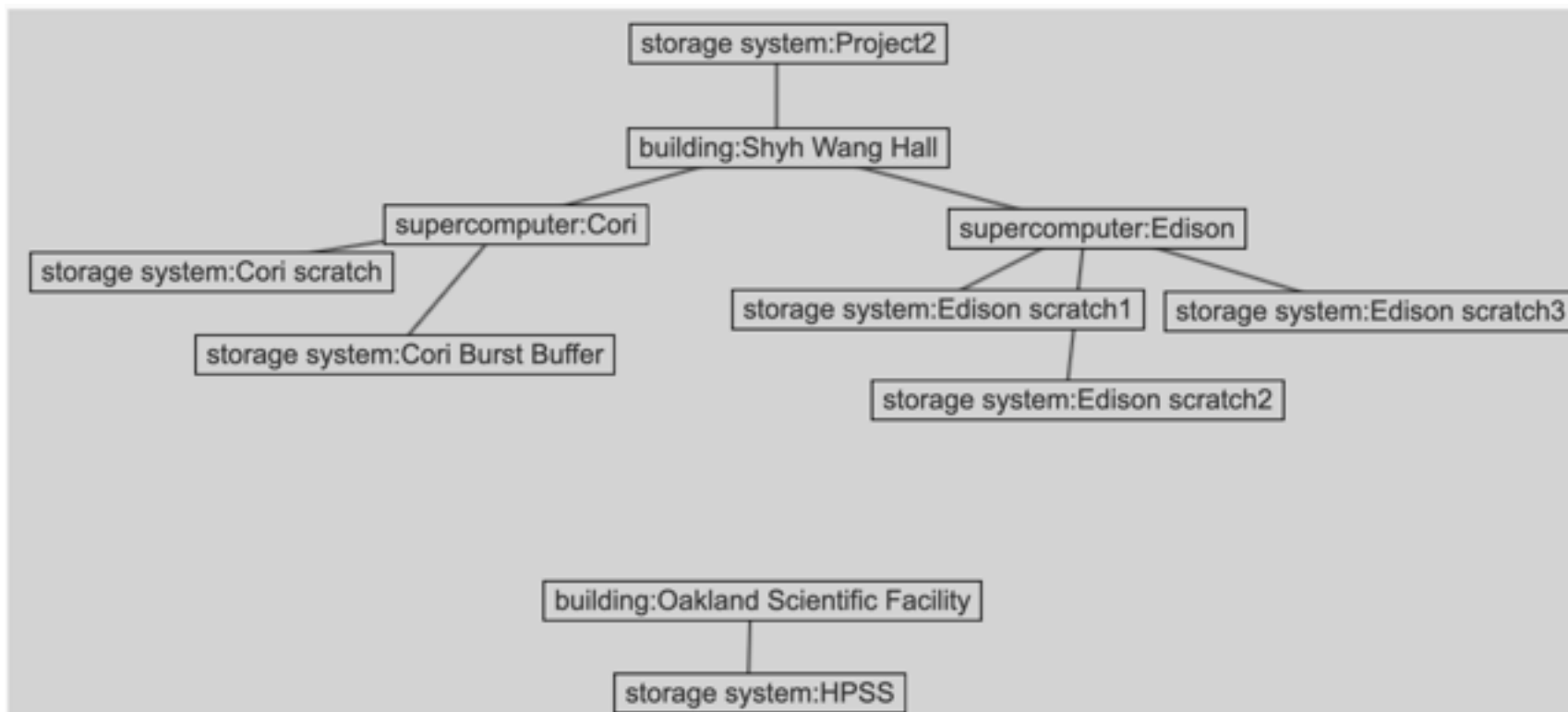
building Shyh Wang Hall	
construction date	2015
max power supplied	12.5 MW
energy	
max power supplied	12.5 MW
pue	1.1
cost	
initial costs	143 M\$
building Oakland Scientific Facility	
construction date	1999
max power supplied	11.5 MW

- Green data center
- On a hillside
- Over a fault zone
- Not cheap!

CDCL Network Graph



CDCL Building Graph



- **Point-n-click interface to describe your data center**
- **JSON-based schema under the hood**
- **Complete description data center features:
HPC, storage, infrastructure**
- **Identify centers facing the same scaling issues**
 - Connect with peers using the same technologies as you
 - or experts who have already hit the issues coming for you