ECOSYSTEM for RESEARCH NETWORKING

ERN All Hands Meeting

Architecture & Federation Working Group

March 23, 2023

Architecture & Federation Work Group Mission

The vision of the federated collaboratories will require the development of many layers of abstractions ranging from hardware, networking, federation architecture, scientific workflows, and domain-specific models and tools to enable collaborative discovery.

The ERN Architecture and Federation working group is focused on gathering information and discussing what the “federated collaboratory” might look like from both a hardware and software perspective as well as what federation should look like as we strive for a seamless collaborative sharing experience.

Working Group Members

- Tom Barton
- Steve Cousins
- Ewa Deelman
- Heidi Dempsey
- Bala Designhu
- Maureen Dougherty*
- Janemarie Duh
- Adam Focht
- Forough Ghahramani
- Jim Griffioen
- Ventsi Gotov
- John Goodhue
- Wolf Hey
- Vasant Honavar
- Dave Hudak
- Ron Hutchins
- Mahmut Kandemir
- Orran Krieger
- Eric Lyons
- John McNutt
- Barr von Oehsen
- Chuck Pavloski
- Bruce Segee
- Marc Sugarman
- Robert Settlage
- Scott Valcourt
- Ann West
- Boyd Wilson
- Scott Yockel
- Matt Zekaukas
- Mike Zink*

RUTGERS

PennState

UMassAmherst

USC University of Southern California

Ohio Supercomputer Center
An OH·TECH Consortium Member

BOSTON UNIVERSITY

Massachusetts Institute of Technology

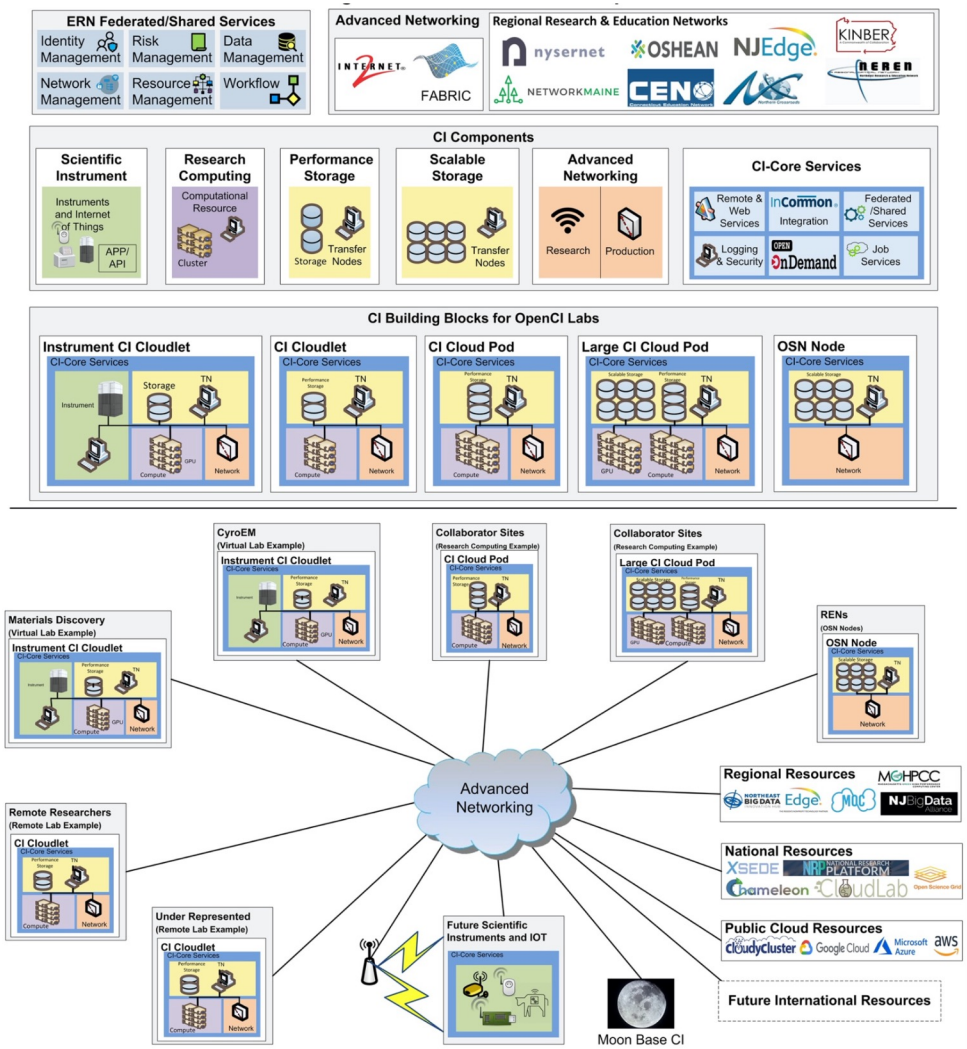
THE UNIVERSITY OF MAINE

LAFAYETTE COLLEGE

HARVARD UNIVERSITY

Red Hat

ERN Federated Open CILabs

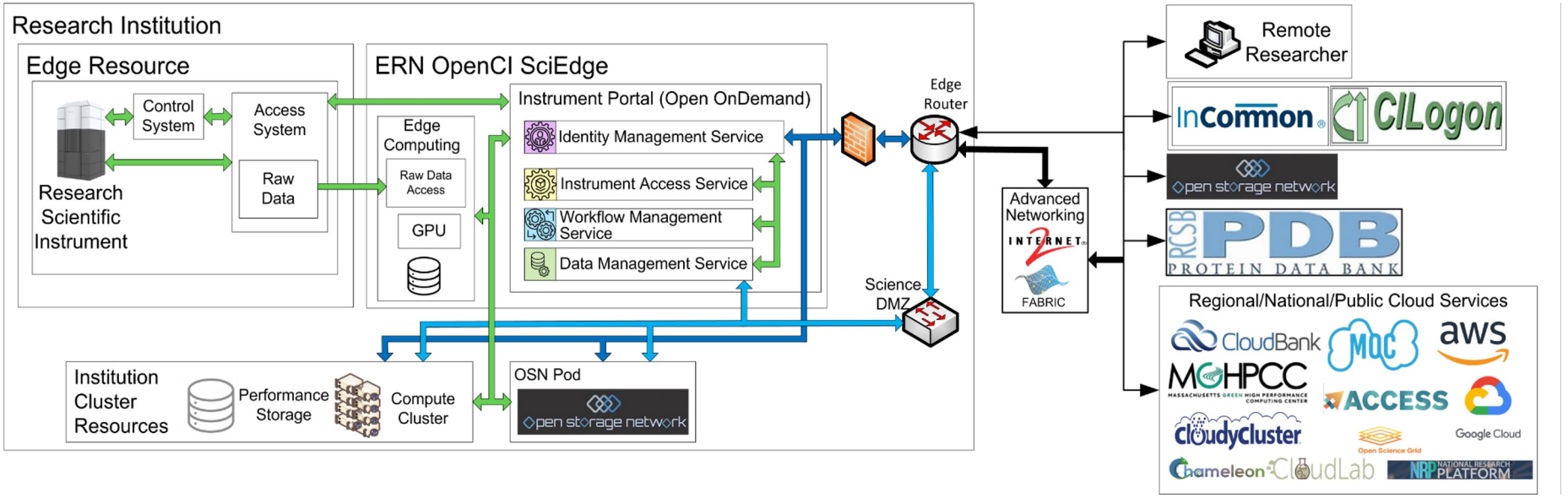


ERN Federated CryoEM Remote Instrument Pilot Project

The ERN Federated CryoEM Instrument Pilot Project Team

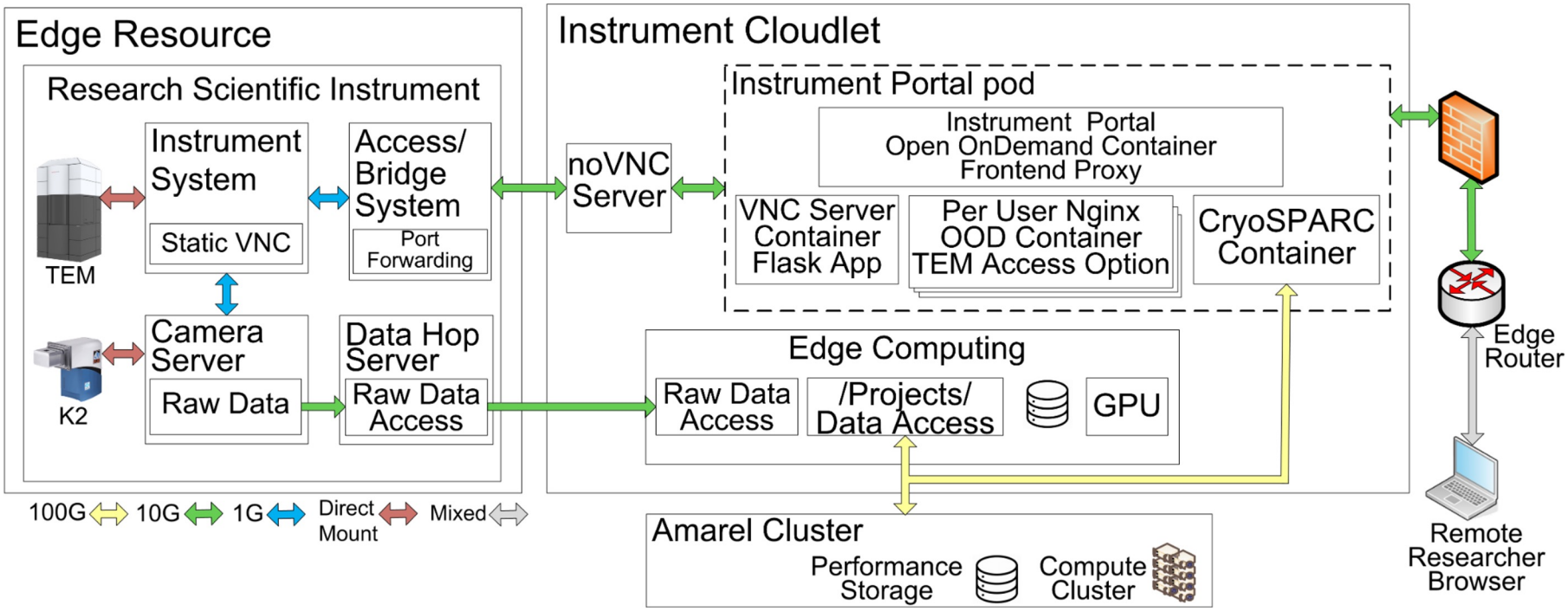
- Ken Dalenberg, Bala Desinghu, Jason Kaelber, Jeremy Schafer, and James Barr von Oehsen - Rutgers University
- Wolf Hey - Penn State University
- John Goodhue - MGHPCC
- Morgan Ludwig - TechSquare
- Boyd Wilson and Cole McKnight - Omnibond
- Michael Zink - University of Massachusetts, Amherst
- Ewa Deelman and Mats Rynge - University of Southern California
- Maureen Dougherty - Ecosystem for Research Networking
- The Open OnDemand team
- The FABRIC team

ERN Federated Instrument Pilot Project Design

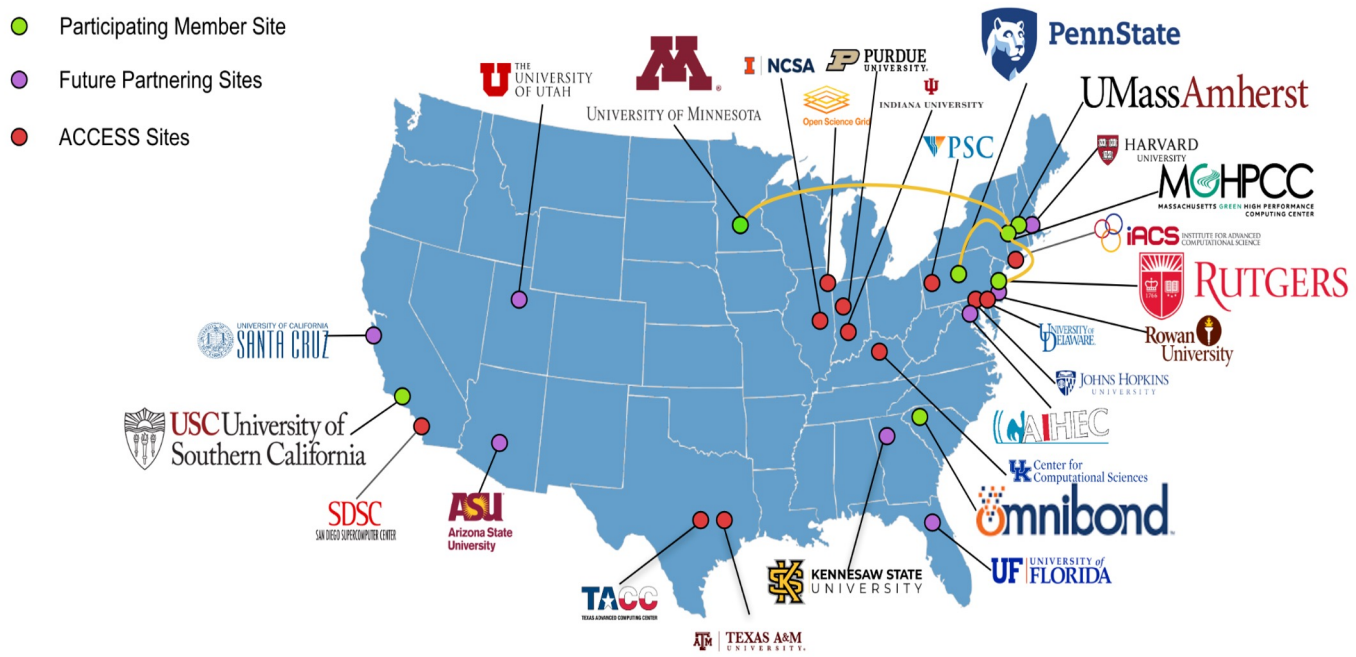


- Secure environment across pathway/workflow
- Common framework for federated authorization, authentication, and access
- Reproducible, reliable, portable, simplified support
- Edge computing
- Open Source project
- Github Repository: https://github.com/mghpcc/ERN-Remote-Scientific-Instrument

Phase 1


Edge Resource
Research Scientific Instrument
Instrument System
Static VNC
Access/ Bridge System
Port Forwarding
TEM
Camera Server
Raw Data
Data Hop Server
Raw Data Access
K2
100G
10G
1G
Direct Mount
Mixed
Instrument Cloudlet
noVNC Server
Instrument Portal pod
Instrument Portal
Open OnDemand Container
Frontend Proxy
VNC Server Container
Flask App
Per User Nginx
OOD Container
TEM Access Option
CryoSPARC Container
Edge Computing
Raw Data Access
/Projects/ Data Access
GPU
Amarel Cluster
Performance Storage
Compute Cluster
Edge Router
Remote Researcher Browser

The ERN Federated CryoEM Instrument Pilot Project Site Map



Participating Member Sites (alphabetical order)

- Massachusetts Green High Performance Computing Center
- Omnibond
- Pennsylvania State
- Rutgers University
- University of Massachusetts, Amherst
- University of Minnesota
- University of Southern California

Future Partnering Sites (alphabetical order)

- American Indian Higher Education Consortium
- Arizona State University
- Harvard University
- Kennesaw State University
- Rowan University
- University of California, Santa Cruz
- University of Florida, Gainesville
- University of Utah

CryoEM Remote Instrument Demonstration

Acknowledgements

- Workshop Participants - the ERN Community
- Members of the ERN Architecture and Federation Working Group
- Members of the ERN Federated Instrument Pilot Project
- The ERN Working Groups:
  - Broadening The Reach
  - Materials Discovery
  - Policy
  - Structural Biology
- The ERN Steering Committee
- Joylynn Almeida
- Kristin Lepping

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Thank You!

Interested in learning more or participating, please contact info@ernrp.org

Website: https://ernrp.org