CENTER FOR COMPUTATIONAL RESEARCH: OVERVIEW

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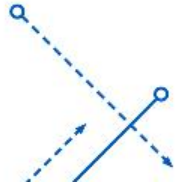
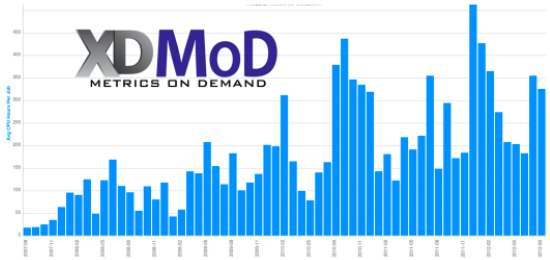


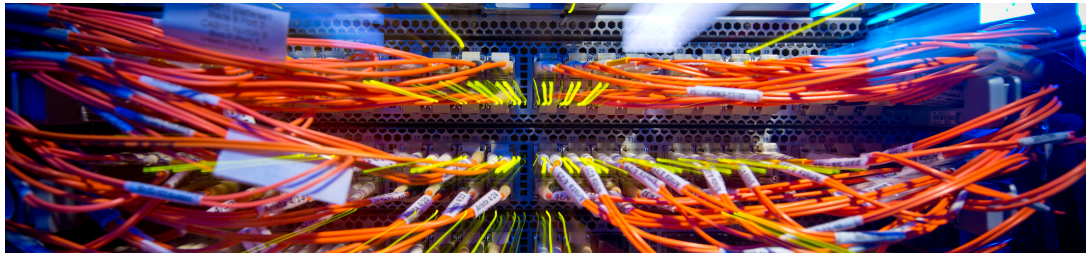
Center for Computational Research

- Leading Academic Research Computing Center:
  - 20+ years delivering research computing and related services to University at Buffalo
- National Recognition:
  - 10-year NSF XD Metrics Service award granted
    - XDMoD (XD Metrics on Demand) for NSF HPC resource/service portfolio
    - Open XDMoD software used by academic and industrial HPC centers worldwide
    - Monitor, measure and optimize system and application performance
- Personnel:
  - 19 total: Operational (10) and Research Support (9) : Computational Scientists (5), Software Engineers (7), Sys Admin (5), Admin (2)



What is UB CCR?

- CCR provides UB researchers and affiliated partners, including industry, with access to advanced computing resources.
  - Academic, Industrial, and Faculty Compute Nodes
  - High Performance Storage and Networking
  - Cloud Computing Resources
  - Associated Services



Mission

- Enable research and scholarship among UB faculty
- Provide high-tech workforce training
- Foster economic development and job creation among area industries

Researchers

Students

Business Partners

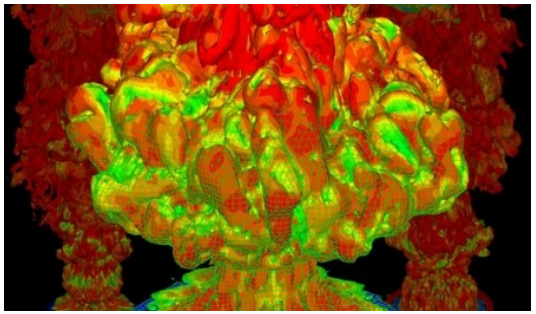
Who is UB CCR for?

UB CCR serves all departments at UB

>1000 total users in 2020, >150 research groups

>1600 CCR-related publications since reporting started in 2016

>250 publications in 2018



No cost for faculty groups to use CCR compute resources

(Cost recovery cloud and for addditional /projects storage beyond 1TB)

CCR Infrastructure Resources

General Compute:

- ~800 nodes, >15000 cores: 48 dual-GPU nodes (V100)

Faculty Compute:

- ~500 nodes, >11000 cores, “condo” model

Industry Compute:

- ~200 nodes, >3000 cores, various use cases intended for economic outreach
- Upgrade in progress, expected 2021Q2/2021Q3

Storage:

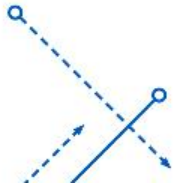
- 1.2 PB Panasas PanFS parallel scratch
- 2 PB VAST Data flash network file system

Networking:

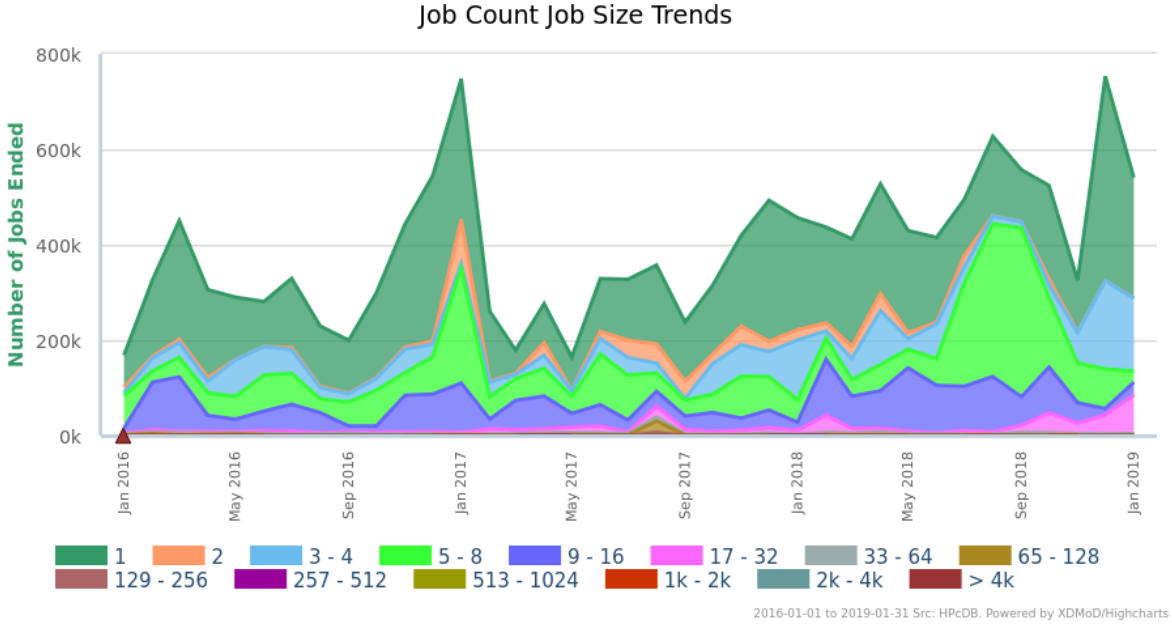
- 40gigE core networking (and edge)
  - 2022 100gigE planned

Cloud:

- OpenStack, >1000 vCPUs, >700GB Ceph object storage

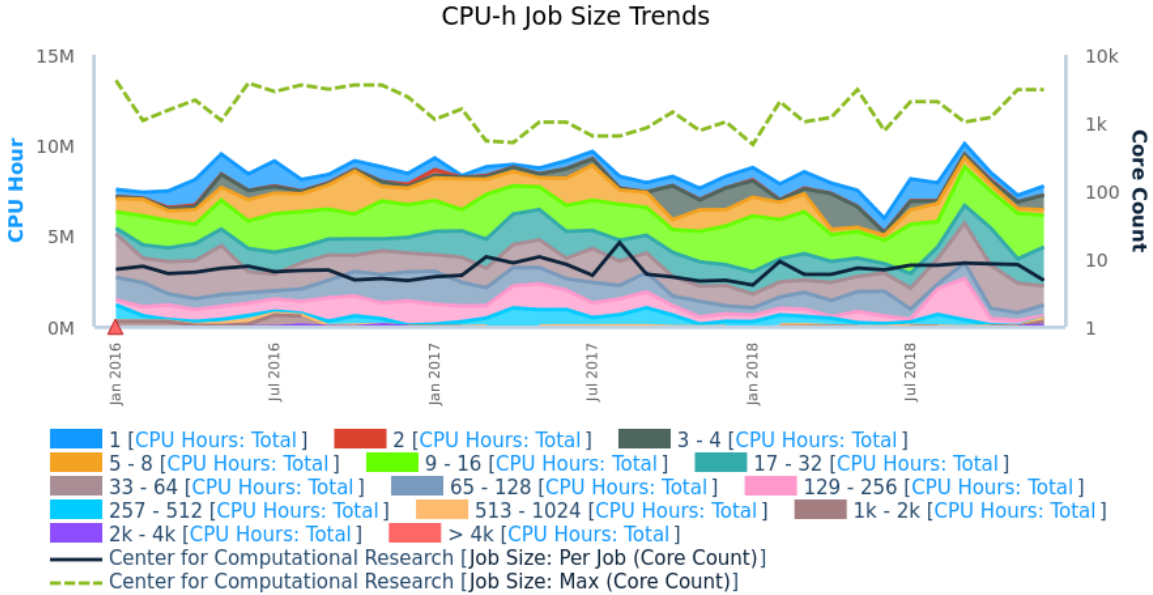


Resource Utilization Trends: Number of Jobs



Overall trend is increasing job count and contribution from serial jobs

Resource Utilization Trends: Job Sizes



Overall trend is steady average cores/job, and max job size has remained about the same

Faculty Resources

- CCR now has >1500 nodes, >30000 CPU cores
- Faculty clusters/nodes now account for >500 nodes, >11000 cores
- “scavenger” partition has been generally well received