NATIONAL CENTER FOR SUPERCOMPUTING APPLICATIONS

SAAC 2020

NCSA

National Center for Supercomputing Applications

- Department of University of Illinois (Urbana/Champaign Campus)
- One of the original National Science Foundation (NSF) HPC funded centers (Est 1986)
  - NCSA's first director wrote the original proposal for the NSF HPC centers.

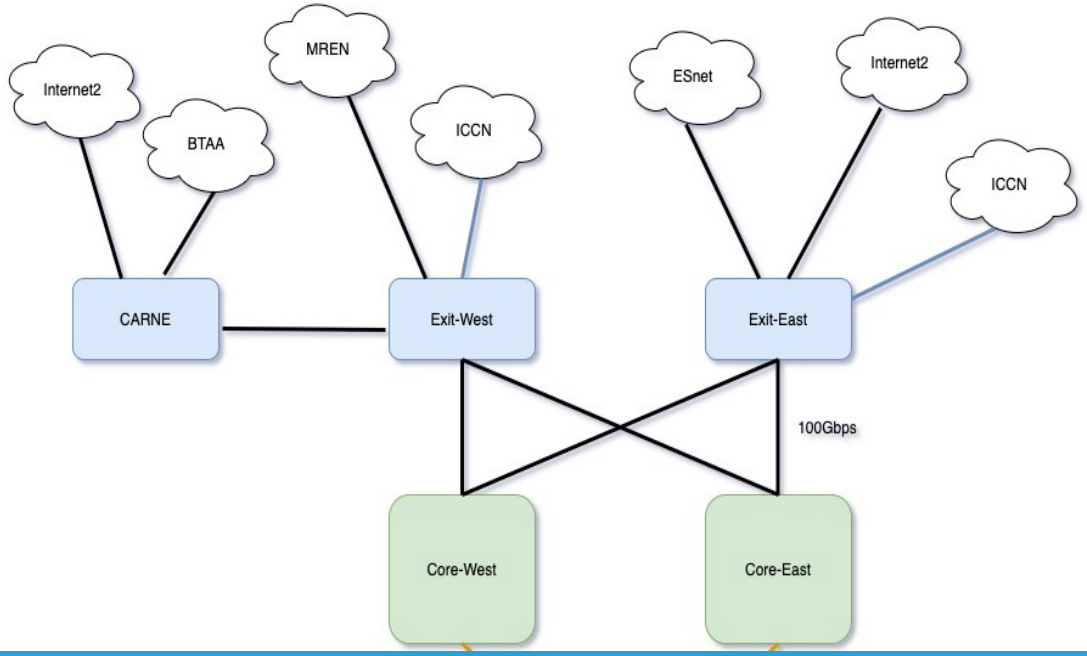
- Provide HPC resources for national researchers through a variety of NSF funded grants, and private funds.
  - XSEDE operations are run via NCSA
  - FABRIC
  - CILogon
  - Currently we have approximately 10-12 clusters
    - Ranging from 100's of CPU/Cores to close to 1,000,000 (CPU and GPU Cores)
      - Range in use
        - Medical (genome sequencing)
        - Industry (fluid dynamics, modeling, etc)
        - Satellite Geography mapping (DoD, U of Minn)
        - General science (Virus, Tornado, galaxy modeling, etc).

National Center for Supercomputing Applications

- National Petascale Computing Facility

NCSA WAN

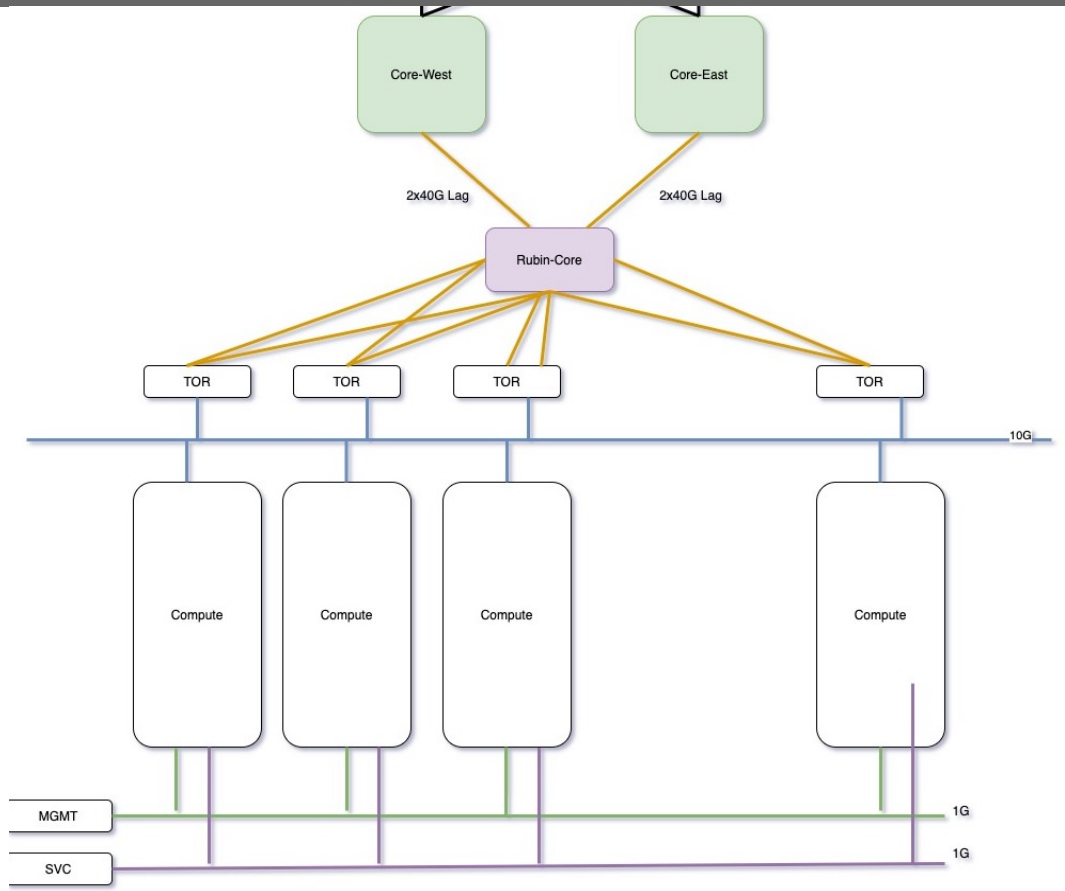
- NCSA currently operates at 420Gb combined WAN connectivity
  - 620Gbps including research UofI research DMZ
  - Connect to major research networks in Chicago
  - Uses ICCN network (University of Illinois optical network)
    - Tuned for 100/200Gb compacity between Urbana and Chicago
    - Support for 400G in the future
    - Cienna system upgraded in 2019



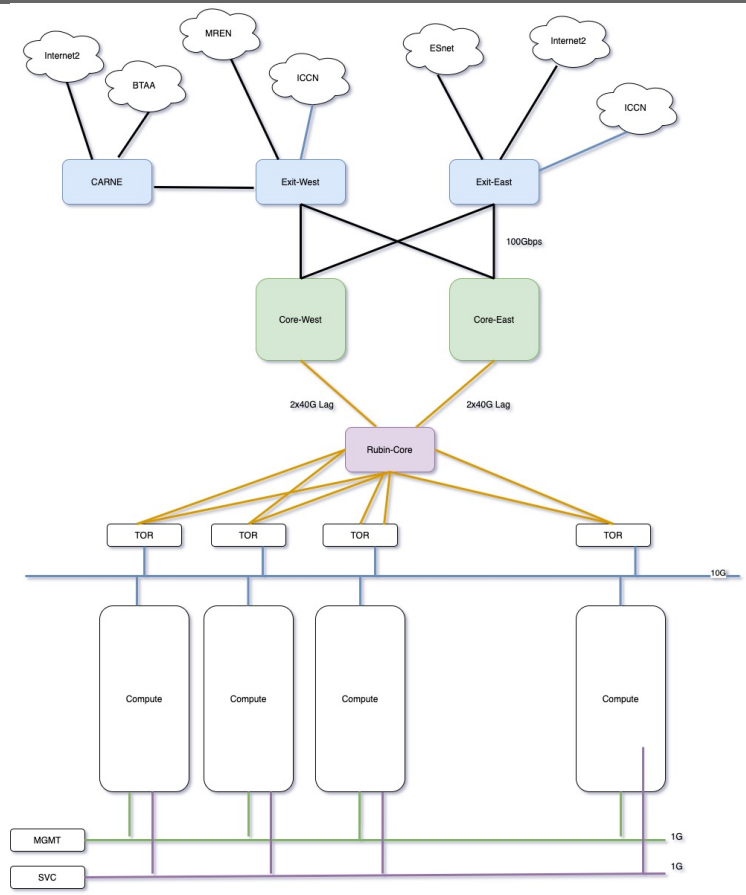
Rubin Observatory Compute

- NCSA currently operates servers for the Rubin Observatory.
  - > 250 servers (across 2 buildings)
  - Compute
    - All servers are connected at 10Gb or 40G
      - Kubernetes clusters
      - DTN nodes
      - DAQ test stand
      - Image transfer nodes (forwarders)
      - Slurm
      - etc
  - Storage
  - 6.5 PB of storage
    - All storage nodes are 40Gb connected. Will expand to 100G later in 2020.

Rubin Observatory Compute



Rubin Observatory Compute



Futures

- 2020 Planned Upgrades.
  - General infrastructure (NCSA)
    - Replace both exit routers currently (MX960)

  - Rubin Observatory Upgrades (Pending decision on LDF)
    - Rubin Core
      - Replaced with a multi 100G chassis switch. Looking to support initially 100x100Gbps ports
        - Future TOR of switches will all connect at 100Gbps
        - Uplinks to NCSA Cores will be Nx100Gbps to each Core switch.
        - Future servers NICS will connect at 25/50/100G
        - All storage nodes will be 100G.

    - Dedicated wave to from NCSA to ESnet dedicated to prompt processing
      - No other generalized traffic will flow over this link.

NCSA