

# KIPAC

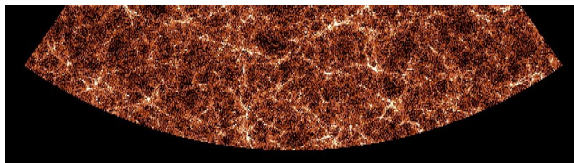
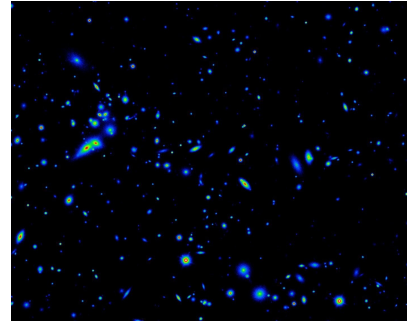


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# KIPAC Computing Profile

- KIPAC community bridges SLAC, SU campus and many off-site collaborators (~150 total)
- Overlaps many projects
- Provide productive computing environment
- Hardware
  - MPI cluster w/fast net/storage
  - GPGPU testbed
  - Small SMP machine
  - NFS storage (>250TB)
  - 3D visualization
  - 48Mpix tiled display

- Software and services
  - ~100 packages for common use
  - Hardware monitoring
  - Tape backups/archive
  - DB and web servers for collaborative use
- Staff
  - Stuart Marshall
  - Glenn Morris
  - Ralf Kaehler
  - Jeff Wade (SU)
  - Yemi Adesanya (CD)



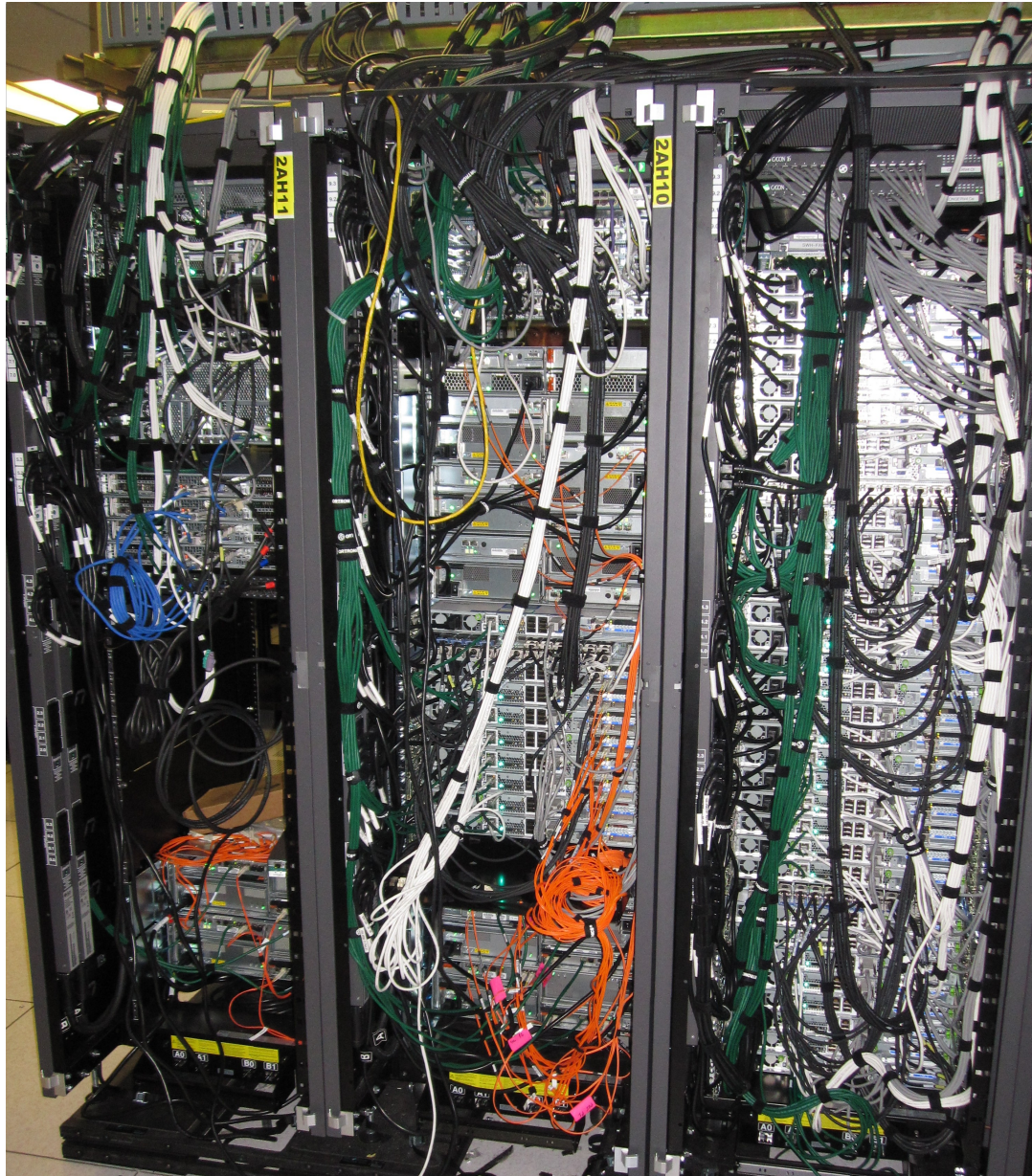
# Existing Systems

- 9 thumper/thors hosting ~250 TB NFS space (Solaris/ZFS)
- 2 older NFS servers w/18 TB (Solaris/UFS)
- orange cluster (2007 w/upgrades 2009)
  - 96 compute nodes (8core/32GBmem Sun X2200)
  - 32 core (8 cpu) X4600 SMP w/256GB memory
  - 42 TB lustre filesystem (8 RAID6 Sun 6140's in parallel)
  - DDR Infiniband interconnect (50% blocking tree topology)
- coma cluster (20 nodes of older Sun's)
- 6 Sun X2200's for interactive use (like noric)
- 1 Sun X4240 in KIPAC server room
- 1 Sun X2200 in KIPAC server room
- 4 GPGPU nodes, 1920 gpu cores (Supermicro w/nvidia)
- 2 Sun Ultra40's for visualization

# Existing Systems



# Existing Systems



# Future Paths

## Storage:

- External vs. internal RAID cost
- NFS: 60d trays, 2TB/disk, 10GigE
  - 2server:1tray → ~\$350/TB, (\$35k)
  - 2server:2tray → ~\$300/TB
- Backup: ~\$100/TB

## Compute cores:

- 2U Twin<sup>2</sup> building block:
  - 4hosts,48core,3GB/core
- 1 rack orange cluster replacement
  - 16 2u blocks w/IB and switches
  - ~20 kW heat, ~\$300k cost

**Networking:** must move to 10GigE

## Issues:

- Support for DES & LSST simulations
  - 1 DES sim: 770k core-hrs; 130TB temp; ~few x10TB archive
  - ~10 DES sims/year for 5 years
  - LSST imsim taxes NFS
- I/O
  - Internal: visualization & SU
  - External: teragrid, NCSA,...
- Need for “Data Management”
  - Really need tools for managing user data over time