LIGO/CACR Collaboration

Advanced Facilties for Analysis, Archiving, and Networking of LIGO Data

Prof. Thomas Prince

Member of the LIGO Project

Associate Director CACR

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What is CACR?

- CACR: Center for Advanced Computing Research at Caltech
  - A major partner in the NSF NPACI (National Partnership for Advanced Computing Infrastructure) recently selected as one of two national supercomputing consortia
  - Significant expertise in parallel computing and networking
  - Major existing facilities for data intensive computing:
    - Compute engines: 512 processor Intel Delta, 512 processor Intel Paragon, 16 processor IBM SP-2, 64 processor HP/Convex Exemplar.
    - 30 Terabyte HPSS (High Performance Storage System)

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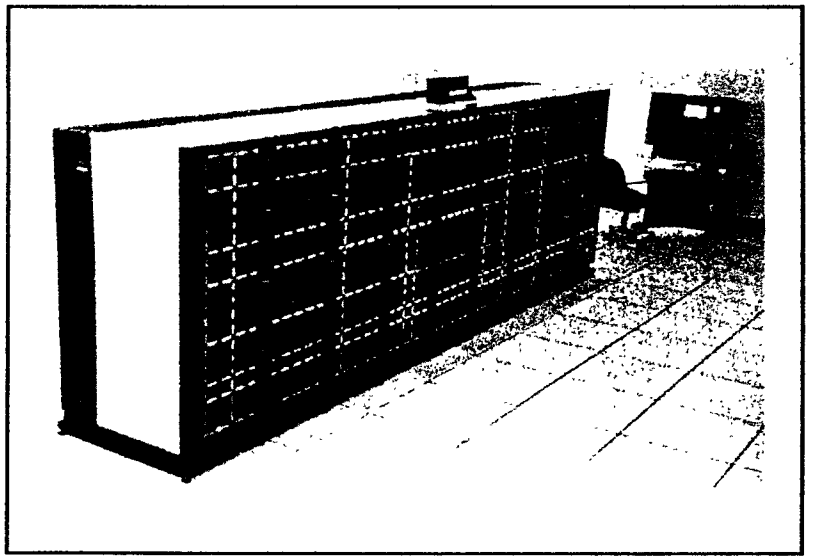
CACR Computing Facilties

- Current Facilities
  - Approximately 30 Gigaflops
    - 512 node Intel Delta
    - 512 node Intel Paragon
    - 64 node HP/Convex SP2000
    - 16 node IBM SP-2
- Future Facilities
  - Advanced HP/Convex: 300 Gigaflops



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CACR Facilties: HPSS

- 30 Terabyte Tape Robot
  - 4 Tape Drives
  - 2400 Tape Cartridges
- 144 Gigabyte Disk Cache
- HiPPI network interface (25 MByte/s)

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LIGO/CACR Relationship

- CACR ***is not*** a computer center
- CACR ***is*** a federation of research projects
  - In addition to LIGO, examples include:
    - Astronomy: IRAS Galaxy Atlas and Digital Sky Project
    - Earth Sciences: Synthetic Aperture Radar Analysis
    - Computational Chemistry, Biology, Fluid Mechanics
- CACR will collaborate with LIGO in design and test of prototype system architectures
  - Ongoing activities:
    - Development of parallel codes for FFT simulation
    - Development of parallel codes for binary inspiral analysis
    - Network based archiving and data access using HPSS
    - Prototype distributed computing environment (Paraflow)

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Future Directions

- LIGO will implement significant compute facilities in collaboration with CACR
  - Parallel computers for intensive analysis tasks
    - Inspiral of low-mass objects
    - Large area sky searches for periodic signals
  - High-capacity archiving and high-throughput data access
- Models
  - Time-sharing on CACR resources
  - Dedicated LIGO resources housed at CACR to take advantage of expertise and infrastructure