BLUE WATERS

BREAKING THROUGH THE LIMITS

NCSA's Petascale Facility

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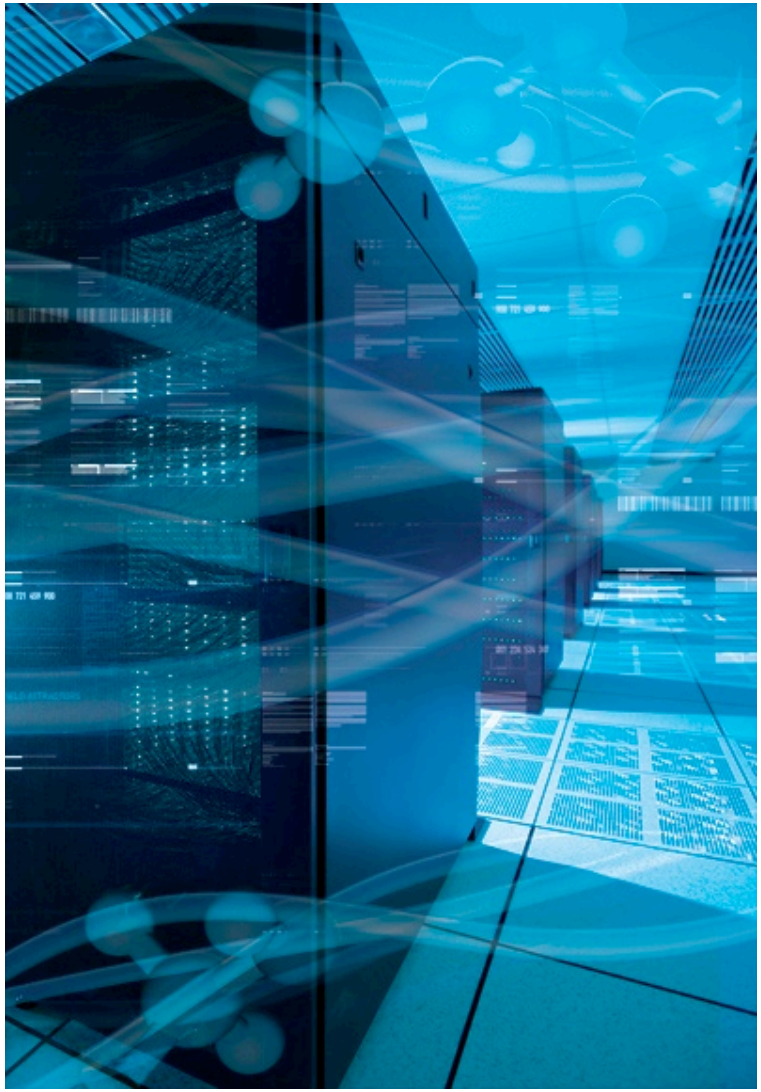
GREAT LAKES CONSORTIUM FOR PETASCALE COMPUTING | NCSA | IBM

Coming in 2011—Blue Waters

- First sustained-petascale system for open science in the world
- Unparalleled national asset will revolutionize scientific research with significant societal impact
- Hundreds of times more powerful than today's supercomputers
- Comprehensive project includes software, application development and optimization, education, and industry interactions
- New, energy-efficient facility
- National collaboration with UI, IBM, and Great Lakes Consortium
- Supported by $208 million grant from National Science Foundation



Details of what I can say:

System Attribute	Abe	Blue Waters
Vendor	Dell	IBM
Processor	Intel Xeon 5300	IBM Power7
Peak Performance (PF)	0.090	
Sustained Performance (PF)	0.005	≥1
Number of Cores/Chip	4	
Number of Processor Cores	9,600	>200,000
Amount of Memory (TB)	14.4	>800
Amount of Disk Storage (TB)	100	>10,000
Amount of Archival Storage (PB)	5	>500
External Bandwidth (Gbps)	40	100-400

Green Building Initiative: Silver Rating

- **20MW of power into the new building**
  - Hopefully this is enough
    - Maybe not?
  - AC all the way to the racks and converted to DC there.
    - Looked into DC conversion at the building, but cost prohibitive.
    - Rack has 4 feeds and can run with 1 dropping out, 4 separate 4 MW feeds into the building
  - Not options:
    - Multiple company power feeds
      - Current facility has AmerenIP and UofI power feeds 2.4MW
    - Power coming from different locations of the building
      - Not an option for this building. Power from UofI power plant.

PCF building continued:

- NCSA has own chilled water towers and from campus
- Uofl will supply chilled water in the summer months, and the outside air will cool our chilled water tanks for the 60% of the year when we have cooler temperatures.
- We wanted to have the heat that is generated from the machine used for the steam tunnels of the university, but the heat conversion was too costly.
- BW racks are water cooled based on power 7
- Trying to be environmental friendly:
- Use outside air if cold enough
  - Too many contaminates that would cause rusting such as humidity
  - Floating material such as dust would cause too many problems.
  - too costly to clean the air on the way in

PCF Building continued:

- **Cost from the University**
  - Years past all power and cooling were “free”
  - 58% overhead charged to all non-hardware grants
  - New policy for computer labs to pay for power/cooling
- **20,000 ft computer room**
  - Plans on putting other projects on the floor if power allows
    - LSST and other NCSA resources that are required

Other things:

- **Taking a parklot to 70% green space planted with indigent plants to Illinois**