

# Facility Power Management



## ■ EE HPC Working Group - System Metrics

June 16, 2012

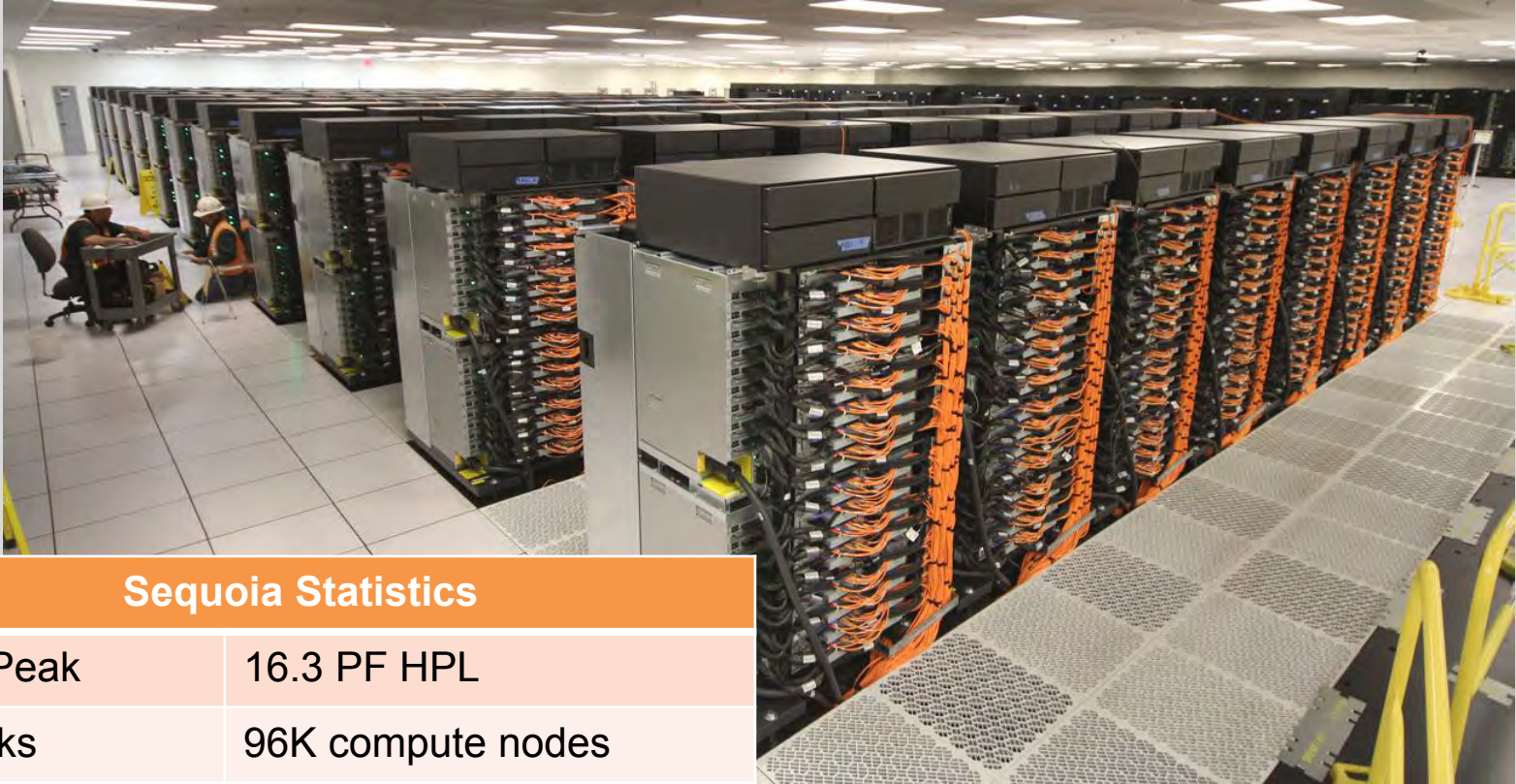
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# The Sequoia system



## Sequoia Statistics

20 PF Peak	16.3 PF HPL
96 Racks	96K compute nodes
1.6 M cores	6 M threads
1.6 PB memory	16 GB memory per node
50 PB disk	512 GB/s → 1 TB/s
9.6 MW peak	9.21 MW HPL (average)

# Power Metering Challenges at Extreme Scale - Sequoia

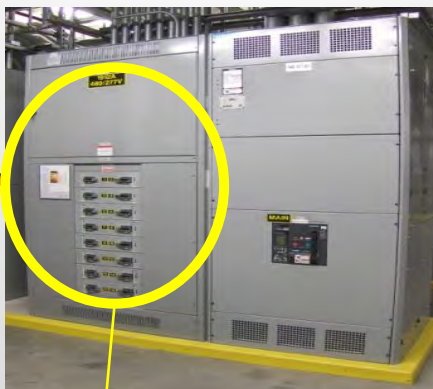
- Sequoia
  - 9.6 MW total
  - 96 fully metered racks at 100kw/rack
- Challenges
  - Coordinating multiple meter vendors
  - Numerous data streams from multiple electrical infrastructure equipment
    - (6) Utility Transformers
      - (6) Main Meters
    - (6) Distribution Switchboards
    - (96) Custom underfloor power distribution units (PDUs)
      - Fed from distribution switchboards
      - (6) total main meters
      - (96) total submeters
  - Aggregating cumulative energy from multiple meters across entire system
  - Programming time stamps effectively

# Sequoia Power Metering Configuration

Utility Transformers



Distribution Switchboards



Underfloor PDUs



Utility Metering



Submetering



Sequoia

# Sequoia HPL Power + Energy

