The first Step to Optimizing HPC's

A Power Monitoring Methodology

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HPM 2015, Power Monitoring Workshop

Power monitoring gives insight to optimizing HPC systems

- **Electrical power monitoring is the first necessary step towards understanding utilization and enabling better use of resources.**
- **This presentation provides background on the work by DoD personnel to provide power monitoring data to decision makers.**
- **The number of DoD HPCs with live power information available is being increased.**
- **Future HPC systems will require power monitoring capability.**

Motivation for power monitoring came from different aspects

- planning for future systems
- planning outages
- optimize resource utilization
- inform data center management logistics

Making new power data available to the right people can get complicated

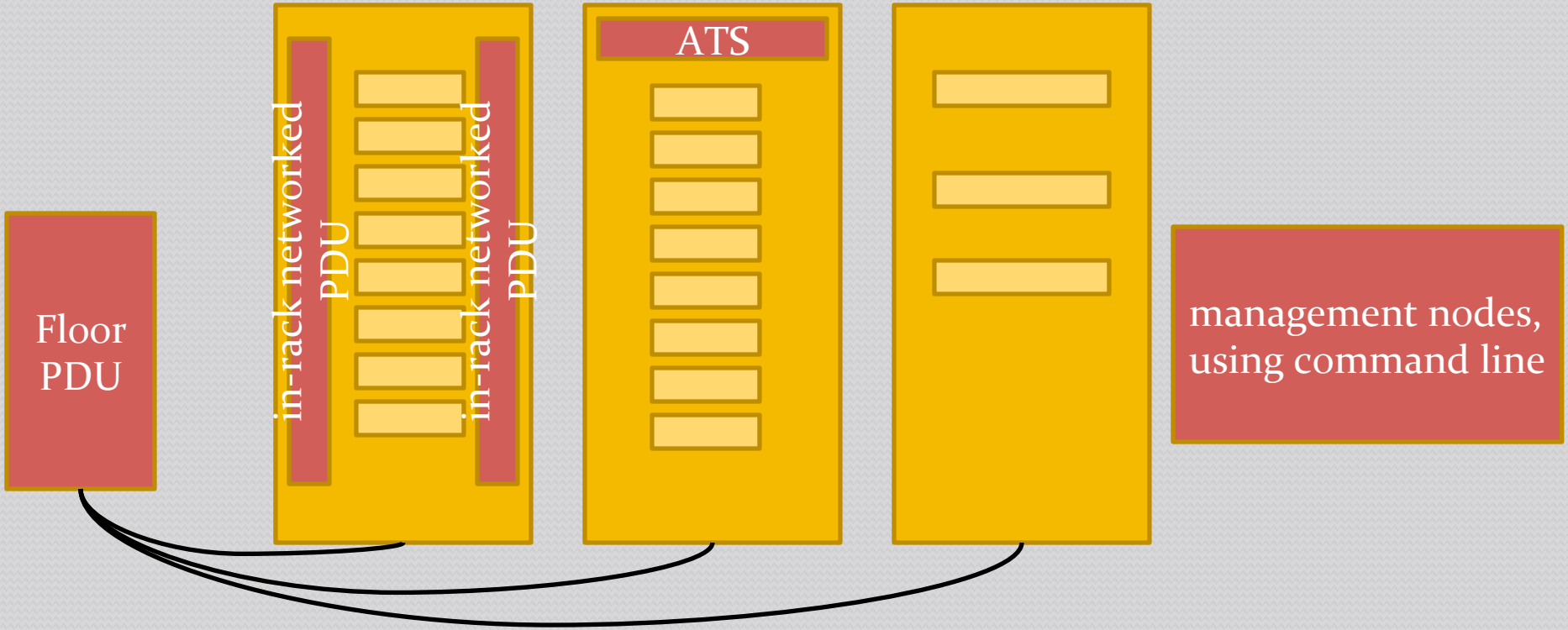
- Classification
- Identify stakeholders
- Establish need-to-know
- Determine well-defined use cases

Developing a power monitoring method required interaction with multiple stakeholders

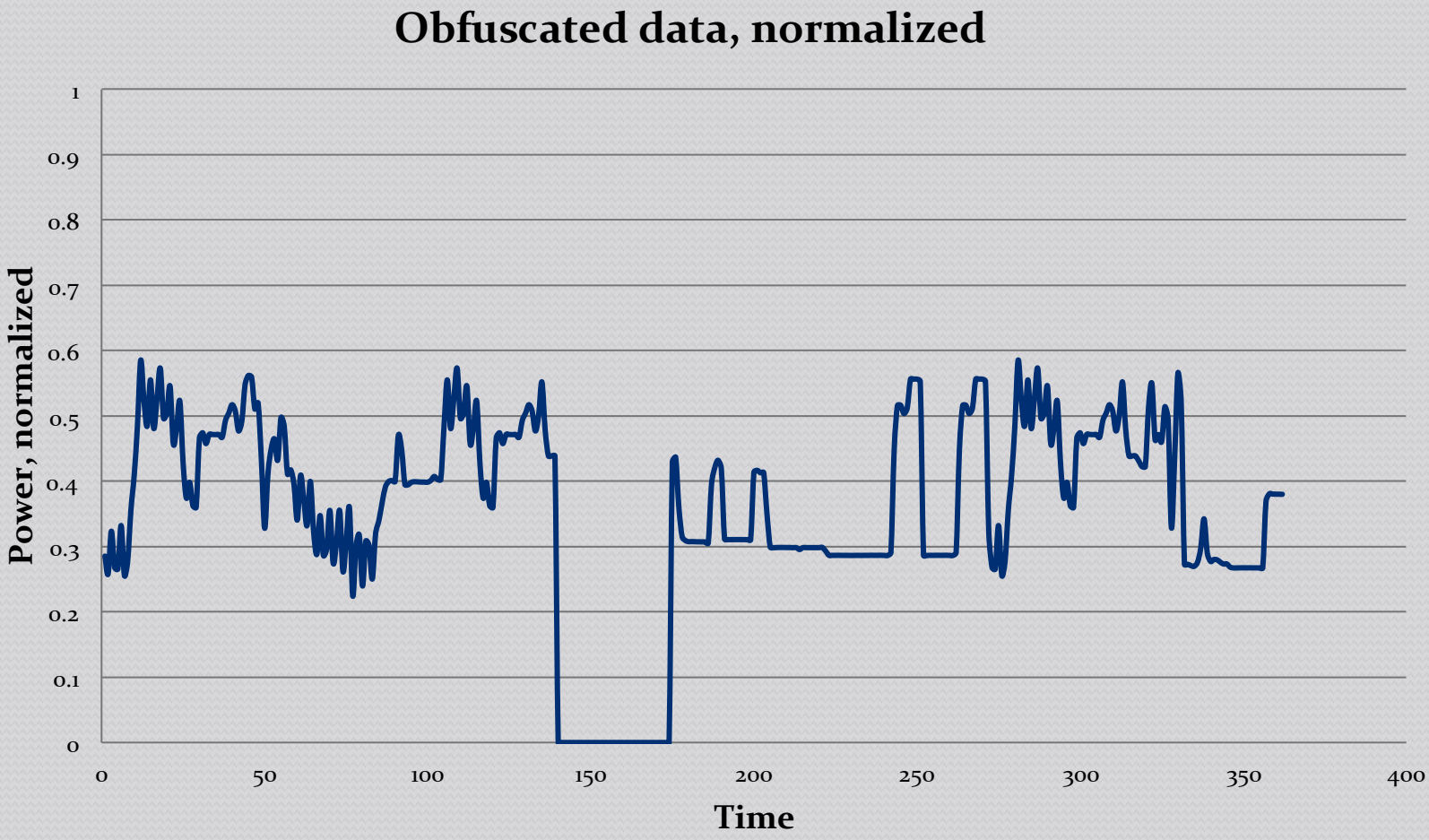
- Users
- Planning team
- Logistics team
- Security
- System administrators
- EE HPC WG
- HPC vendors

Various power monitoring methods were identified by performing an on site survey

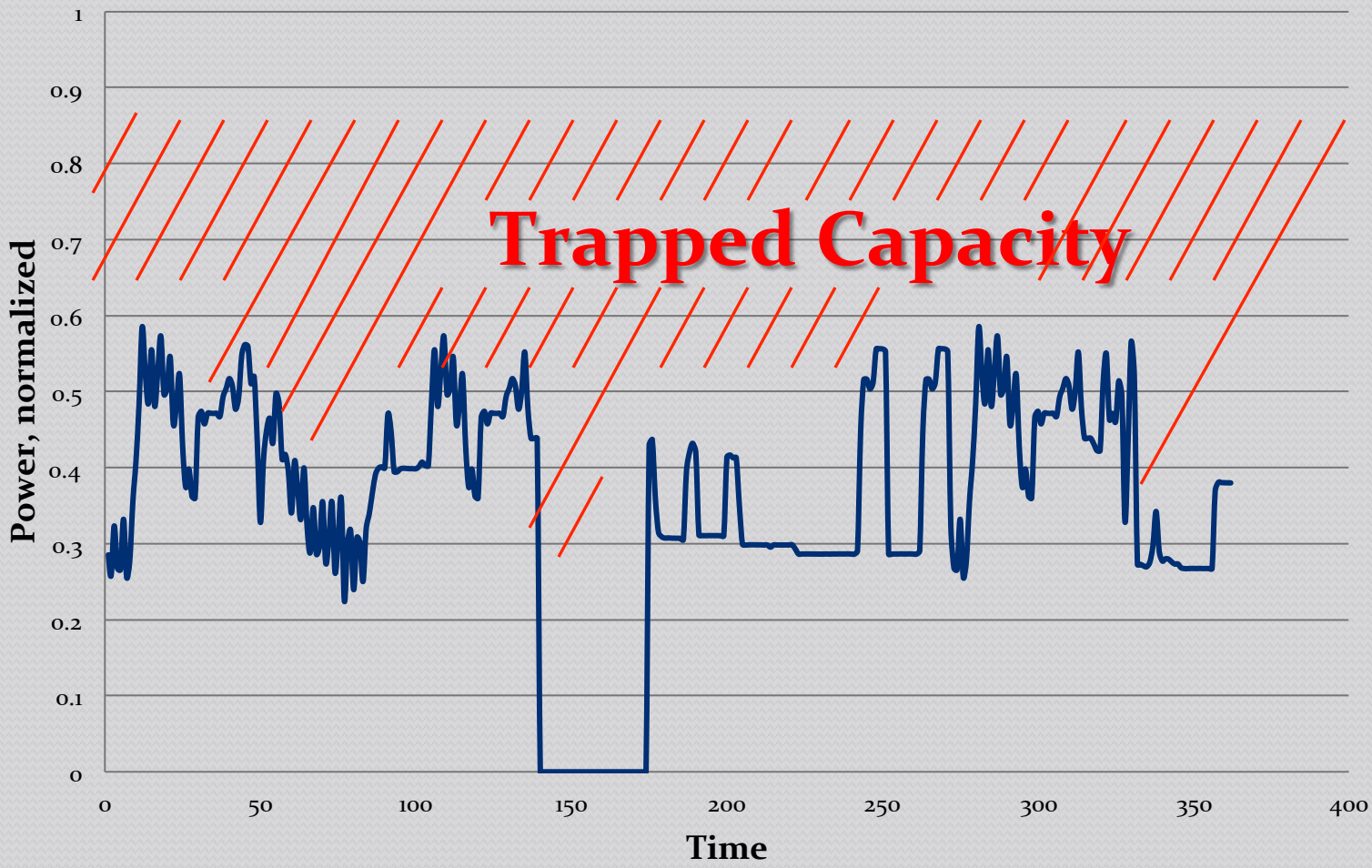
SCADA: not easily accessible to users or manager



Results of a power load profile for full HPC System



System load profile with Trapped Capacity

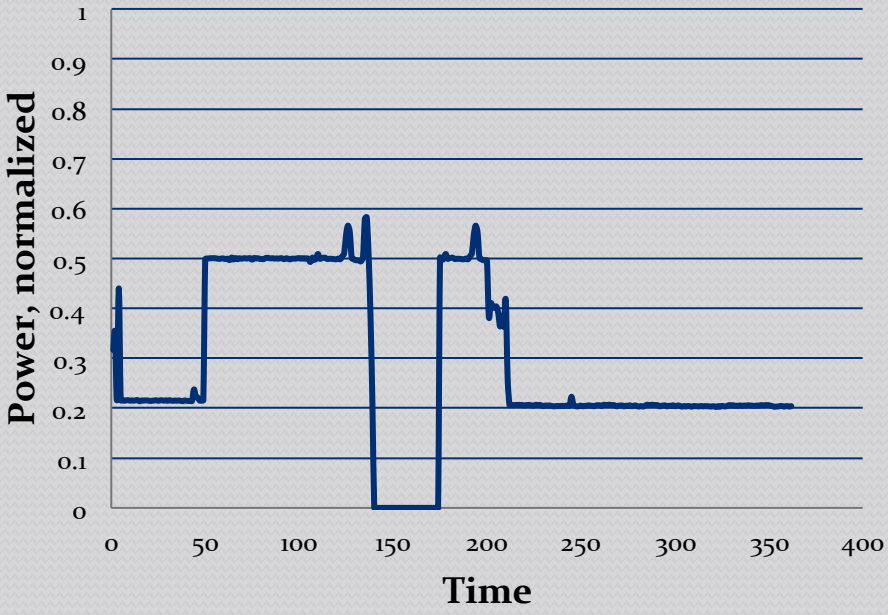


Sample load profile for individual racks

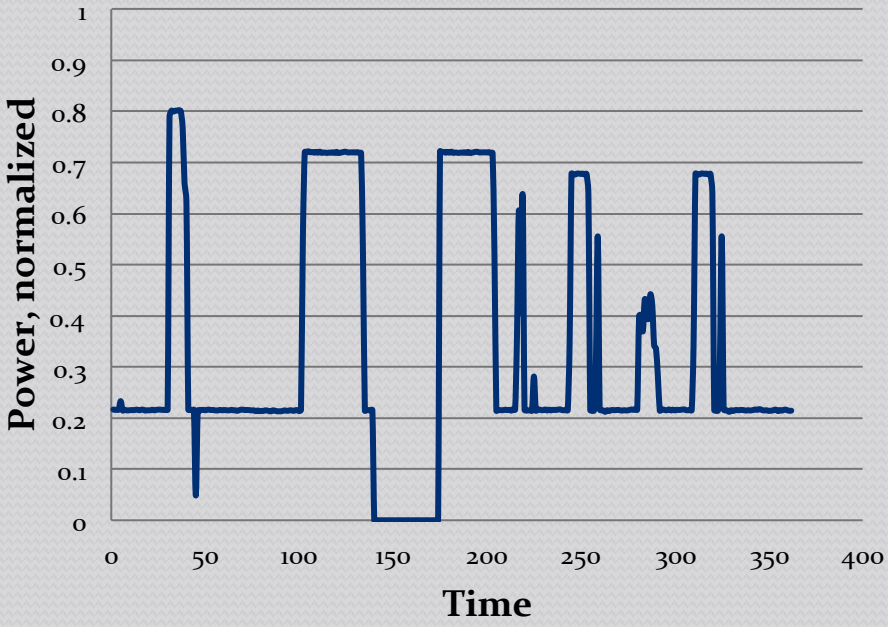
Note!

Power per rack is not uniform across the full system

Rack 1
obfuscated data, normalized



Rack 2
obfuscated data, normalized



Currently approved strategy will implement power monitoring on all existing and new HPC's

- **Instrumenting existing HPC systems and make data available to decision makers**
- **Including a Statement of Work which enables power monitoring on all future acquisitions**

Thank you

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