BLUE WATERS

SUSTAINED PETASCALE COMPUTING

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National Petascale Computing Facility

LIQUID-COOLED SYSTEMS COMMISSIONING LESSONS LEARNED

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NCSA

GREAT LAKES CONSORTIUM
FOR PETASCALE COMPUTATION

CRAY

NCSA

BLUE WATERS

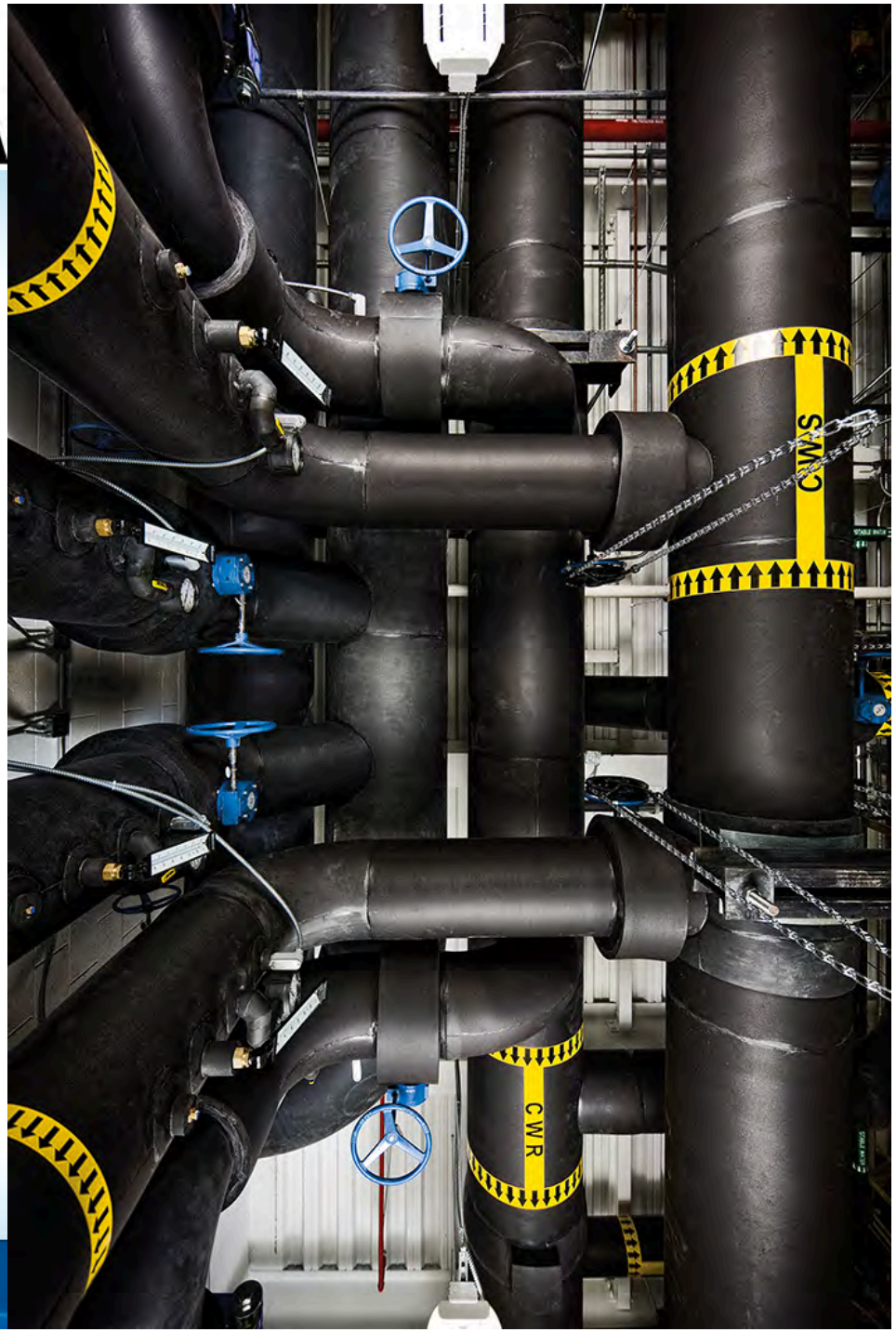
- 288 CRAY CABINETS
- 26,864 COMPUTE NODES
- >49,000 AMD CPUS
- 405,248 CPU CORES
- 4,224 NVIDIA KEPLER GPUS
- 1.5 PETABYTES RAM
- 13.34 PETAFLOPS
- 72 XDP COOLING UNITS
- >95% LIQUID COOLING
- PEAK >3,500 TONS

NPCF

- LEED GOLD CERTIFIED

- PROBLEM STATEMENT:

  CONTROL OF CHILLED WATER FLOW FROM MULTIPLE SOURCES TO ONE LOAD WAS DIFFICULT TO ACHIEVE BECAUSE OF VARYING PRESSURES IN THE TWO SUPPLY PIPES.



CONSEQUENCES

- WHEN CHILLED WATER FLOW TO THE LOAD IS COMPROMISED, THE HPC SYSTEM REACHES HIGH TEMPERATURE ALARM IN LESS THAN 2 MINUTES AND DEACTIVATES.
- IT TAKES SEVERAL HOURS TO REBOOT THE SYSTEM AND JOBS MUST BE RESTARTED.

ROOT CAUSE

- DIFFERENCES IN SUPPLY PRESSURES WERE TOO LARGE WHEN THE CAMPUS SYSTEM PRESSURE DROPPED, CAUSING A DECREASE IN FLOW TO THE LOAD AND FLOW TO REVERSE IN THE CAMPUS SUPPLY PIPES.

CORRECTIVE ACTIONS

- COORDINATE UTILITY OPERATIONS WITH CAMPUS UTILITY PERSONNEL AND MODIFY THE CONTROLS PROGRAMMING

FORWARD ADOPTION

- INCORPORATED INTO SYSTEMATIC APPROACH FOR UNIVERSAL COMMISSIONING FOR LIQUID-COOLED SYSTEMS

QUESTIONS

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