Optimizing Airflow and Reducing Energy in Legacy Data Centers

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Current Notable Designs

Yahoo Computing Coop (YCC)
- 100% Adiabatic Design
- PUE 1.08 – 1.12

Yahoo Thermal Cooling (YTC)
- No Fan Design
- PUE 1.28 - 1.35
Legacy Computer Rooms
Quincy WA.
Computer Room Overview

- 3 Computer Rooms
  - Traditional Raised Floor Design
  - 2MW Each
  - PUE 1.39 – 1.5
  - 9 CRAH units each room
    - 60hp each (2 x 30hp)
    - VFD equipped
    - Cooling coil (served by water cooled central plant)
    - Evaporative media
    - Outside Air Economizer
Problem
Transitional Floor space Make Expensive Containment Options Difficult
CRAH Evaporative Media Had Become Calcified and was Greatly Restricting Airflow
CRAH Filter Media

- Older Pleat filters restricted airflow and did not provide enough filter effect for dusty conditions at GQ
  - Effect the ability to reduce CRAH airflow due to filter loading
  - Reduce the ability to bring in outside air during dusty times of the year to agriculture dust
Solution
CRAH Optimization
Remove Calcified Media
CRAH Optimization
Remove Calcified Media
Install High Efficiency Filters to Improve Airflow
Install Synapsense System to Actively Monitor and Control Temperature and Floor Pressure

Integrated Synapsense Solution
- 900 EZ temperature nodes
- 60 Pressure nodes
- 27 Supply and return sensors
- Removed Approximately 350 high flow floor tiles
Floor Pressure Change
Temperature Control
Results

- Reduced and Optimized Floor Pressure
- Reduced fan speed for maximum savings
  - 15% to 75%
- Increase temperature in rooms
  - Inlet temperatures increased by 2 degrees
- Increased outside air economization
- Real time heat mapping of Data Halls
  - Reduced Hot Spots
  - Strategic repopulation
- 7.5 million kWh saved annually
- Estimated PUE 1.28
Questions?