Adsorption Chillers in the data center

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Can I future Profe my Data Center?
Future Proofing Our Data Centers

- DC life expectancy: 10 – 20 years
- Reduce operating costs over lifetime
- Operate as much IT as possible
Energy as Costs Driver
Can’t live on W3 alone

• HT-DLC (W3-4)
  – not 100% IT heat captured

• Still need for cold water
  – Storage (W1-W2 water)
  – Humidity control
  – Crag (Room air conditioning)
Long term goal: Remove need for mechanical Chillers
Possible solution

Off-set Off

paid for
Adsorption Chiller 101

Condenser

Evaporator

Adsorber

Hot Water (HT)

Cold Water (LT)

Re-Cooling (MT)
CooLMUC-2 and Adsorptions Chiller

For technical details and a description of adsorption chilling visit:
Emerging Technology Booth - ArCTIC
CooLMUC-2 Heat Transfer to hot Water Cooling Circuit
(relative to Cluster Power Consumption)

Cluster Cooling Loop Inlet Temperature (°C)

- 40
- 45
- 50
- 55
Adsorption Chiller Performance December 2015 @ MT = 25°C

Cluster Inlet Temperature (°C)

<table>
<thead>
<tr>
<th>Temperature</th>
<th>LT Performance (kW)</th>
<th>Backup Cooling (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>25.1</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>35.6</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>42.6</td>
<td>20.9</td>
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<tr>
<td>55</td>
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</table>
Performance of Different Cooling Technologies
(September 2016)
(Combined 170kW = 120kW IT Heat + 50kW Storage Cool)

- Free Cooling: 16.09
- Compression Cooling: 2.57
- Mixed (Compression+Free): 5.12
Performance of Different Cooling Technologies
(September 2016)
(Combined 170kW = 120kW IT Heat + 50kW Storage Cold)

- Free Cooling: 16.09
- Compression Cooling: 2.57
- Mixed (Compression+Free): 5.12
- Adsorption Cooling (Total): 18.68
Future Proofing your Data Center 1/2

• Think: „Heat Re-Use“

• Think: Direct Liquid Cooling
Future Proofing your Data Center 2/2

• Think: High Temperature Direct Liquid Cooling (HT-DLC)

• Plan for liquid cooling
Community Activities Required 1/2

• Plan for post PUE=1 era

• Standard liquid cooled rack
Community Activities Required 2/2

• Standard data center liquid cooling connections

• Standard liquid cooling re-use connections
Visit Us At The Emerging Technology Showcase Room 155-B
Thank you!
Please save your questions for the end of the session.