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Developing a Mobile Cart for Datacenter Fluid Servicing
Developing a Mobile Cart for Datacenter Fluid Servicing

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Motivation

Datacenter Need
• As datacenters switch to liquid-cooling from air-cooling, easy-to-use infrastructure must be considered to ensure operator readiness to maintain and service fluids.

Presentation & Whitepaper Goal
• To give guidance to datacenter operators and providers on approaches and considerations to fill, refresh, discharge and otherwise service liquid cooled racks.

Solution
• A mobile cart to charge or discharge cooling fluid from a rack or other liquid cooled chassis as well as rinse it with water and dry with air or nitrogen to prepare for storage/shipment.
Datacenter Requirements

Key considerations

- Drain & Fill
- Material Compatibility
- Interface with Rack
- Leakage Detection
- Safety Controls
- Size and Mobility
- Storage & Logistics
- Reservoir Capacity
Key Cart Capabilities

Flush
• Rinsing a liquid-cooled rack or cold-plate with a rinse-fluid. Used to clean the fluid loop of contaminants or old cooling fluid.

Charge
• Filling a liquid-cooled rack or cold-plate with new cooling fluid.

Purge and Dry
• Pushing out all fluid from a liquid-cooled rack or cold-plate with air or nitrogen. This can also be used to dry the fluid loop.
Cart Piping Diagram

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Flush Cycle
Charge Cycle

Charge Fluid Reservoir → Drain Valve → Pump → Fluid Solenoid → T Union → Needle Valve → Bubble Trap → Flow Meter → Filter → Quick Disconnect → Rack

Rinse Fluid Reservoir → Drain Valve → Pump → Fluid Solenoid → T Union → Needle Valve → Quick Disconnect

Compressed Air → Pressure Regulator w/ Filter → Air Solenoid → Manifold → T Union → T Union → Rack

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Purge & Dry Cycle
Highlighted Design Considerations

Pressure Rating & Material Compatibility

Performance

Size & Mobility

Drip Containment & Detection

Control & Usability

System Performance Curve vs Representative Pressure Drop Curve

<table>
<thead>
<tr>
<th>Height</th>
<th>32 inch 815mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>24 inch 610mm</td>
</tr>
<tr>
<td>Depth</td>
<td>44.42 inch 1128mm</td>
</tr>
</tbody>
</table>
Call to Action

Review the whitepaper for more detail on mobile cart design considerations for a liquid-cooled datacenter

- https://www.opencompute.org/contributions

Get involved in the ACS Coldplate sub-project group

- Monthly meetings 11-12 AM ET
- https://www.opencompute.org/projects/acs-cold-plate
Thank you!