

Liquid Cooling Controls

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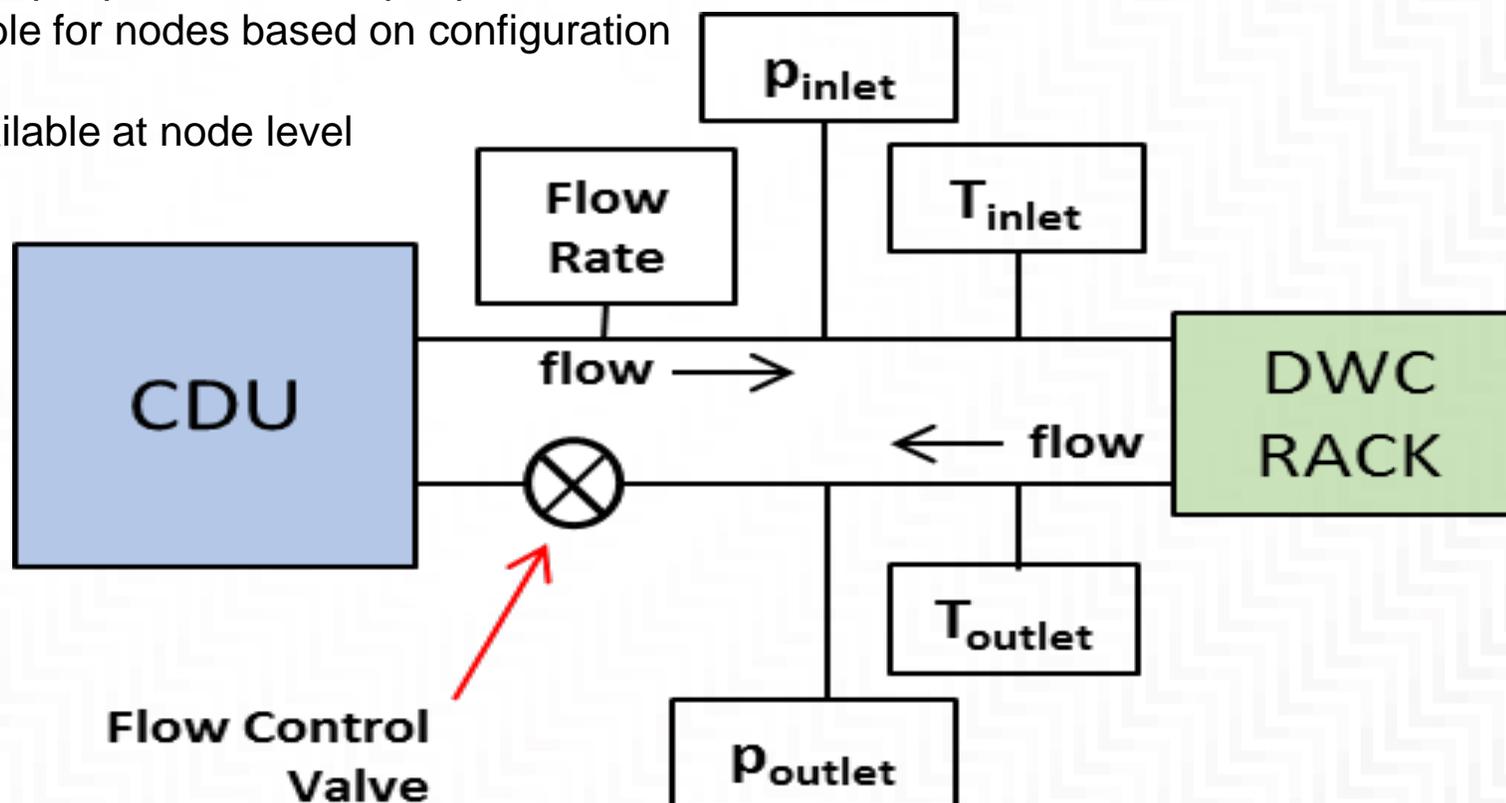


+ Lenovo NextScale Implementation

- Current offering includes Rear Door Heat Exchanger and Direct Water Cooled Node (2 socket server) solutions.
 - 72 Nodes in a standard 42U rack.
- A liquid cooled NextScale HPC Rack is integrated to an external CDU (Coolant Distribution Unit)
- Lenovo has reference CDUs validated for platform cooling and control
 - Examples of CDUs enabled include the Eaton Williams CD6X series
- CDU controls water temperature, flow rate, chemistry.
 - Individual nodes or chassis do not control flow rate
- Water leak detection and monitoring available within Chassis and is expected from the CDU.

+ Lenovo NextScale Example

- CDU controls flow rate and temperature to rack
- Single or Multiple Racks connected to CDU
- Static flow control to nodes @ 0.5 lpm per server, 36 lpm per rack for 72 nodes.
 - Lower flow rate are possible for nodes based on configuration
- Dynamic flow rate control not available at node level





Water Quality Control

- Lenovo NextScale requires water to rack to be controlled for chemistry and quality
 - Specifications are provided to customers
- Requirements for water quality are similar to ASHRAE Liquid Cooling Requirements with additional 50 micron water filter in loop
- Water quality monitoring is recommended at 6 month intervals.

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