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OAI Cooling and OAMTool update



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OAI Cooling and OAM Tool Update

Cheng Chen, Thermal Engineer, Meta
Wei Zhang, Software Engineer, Meta

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OAI Cooling Workstream

- Goal: Establish specification, framework, standardization and best practices of advanced (liquid) cooling solutions for OAI systems and OAM products, from module level to system level.
- 2021 Theme: analysis and prototype practice of single phase liquid cooling solution to support OAM at 1000W level.
- 2022 Theme: advanced technology for performance/efficiency/sustainability



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Content Contributors

- Dennis Trieu, Microsoft
- Allen Guo, CoolerMaster
- Jaylen Cheng, Wiwynn
- Christopher Chapman, Boyd



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Challenges and Efforts

- Challenges
 - Foreseeable OAM power demand growth
 - Compact module and system layouts
 - Variation of boundary conditions & design philosophies
- Efforts
 - Establish basic user requirements and interface guidelines
 - Prototype practice on 1000W level TTV and coldplate solution
 - System level evaluation
 - White Paper – Guidelines for OAM liquid cooling



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PCL and Chassis Practice

- Highlights
 - 1000W OAM TTV
 - UBB1.0 layout
 - Up to 16 LPM per system
- Target
 - Study feasibility of liquid cooling high power OAM
 - Quantify impact of general design parameters
 - Practice system level design for serviceability and robustness



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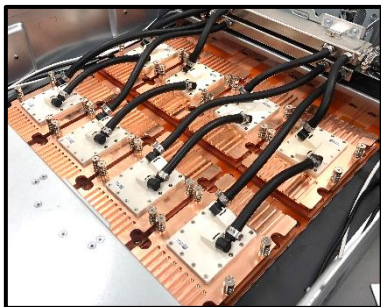
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PCL and Chassis Practice

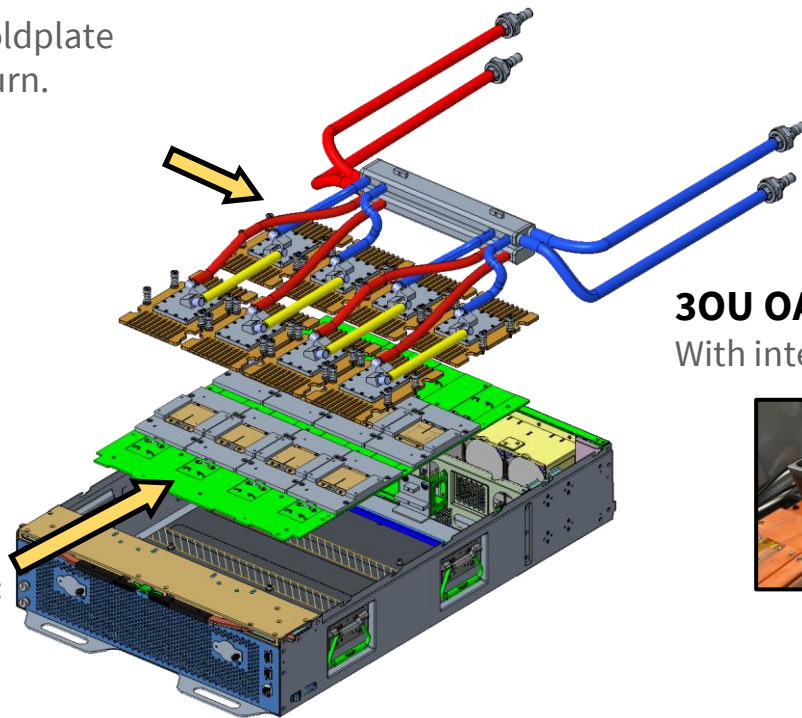
PCL:

Assembly: 4 (parallel) x 2 (series) coldplate
Internal manifolds for supply & return.
2 pairs of manual QCs
Design for up to 8kW load

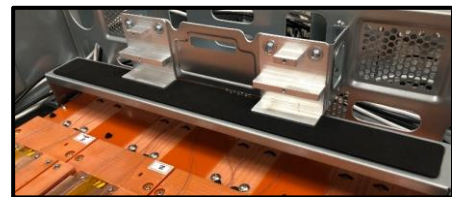


UBB dummy board + OAM TTV :

Follow UBB & OAM 1.0 SPEC
TTV power up to 1000W each



30U OAI liquid cooling chassis
With internal manifold support feature



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Flow Network Study

Two layout options:

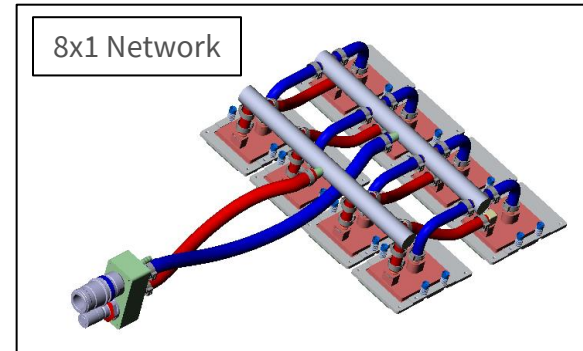
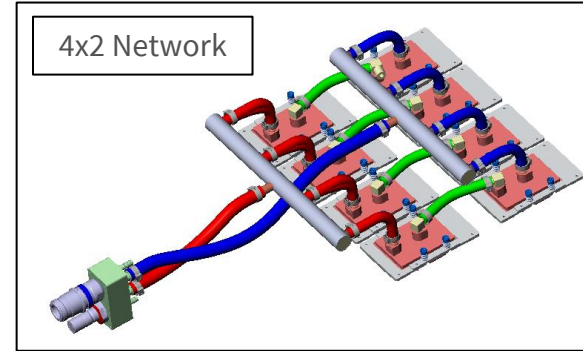
- 4 parallel x 2 series – traditional loop
- 8 parallel x 1 – maximize perf

Trade offs:

- Flow Rate & Pressure
- Preheat
- Temperature uniformity

Analytical predictions showing positive for coolant distribution in 8x1, OAM Temp variation < 1 °C

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OAMTool Update

- Problem Statement
 - Each OCP OAM vendor provides their own tool to manage their accelerator module
 - Operational complexity when dealing with multiple tools in the Hyperscale environment.
- Goals
 - Open-source OAM management utility across OAM vendors
 - Support a common sets of features defined by the OAMTool spec
 - Vendor plugin support through dynamic loading library
 - Initiated in 2020 and more OAM vendors/users are joining the effort



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OAMTool Update - Continued

- Define OAMTool API specification for OAM management, monitoring and diagnosis
 - Module discovery and query
 - Topology creation, management and destroy
 - Module health checks
 - Firmware update and management
 - Stats and error counters
 - Telemetry
- Implement the tool framework and APIs to support the vendor dynamic libraries.
- **Will include a list of partner logos here**



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Call to Action

- How to get involved:
 - OAI Cooling workstream - chengchen@fb.com; dennistrieu@microsoft.com
 - OAMTool workstream – wzhang@fb.com
 - OAI Group – whitneyzhao@fb.com; pankajmakhija@google.com
- Where to find additional information:
<https://www.opencompute.org/wiki/Server/OAI>
- Mailing list: <https://ocp-all.groups.io/g/OCP-OAI>

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Thank you!



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