

Hardware Management for Liquid Cooling

Overview of Progress

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HMLC - Cooling Profiles

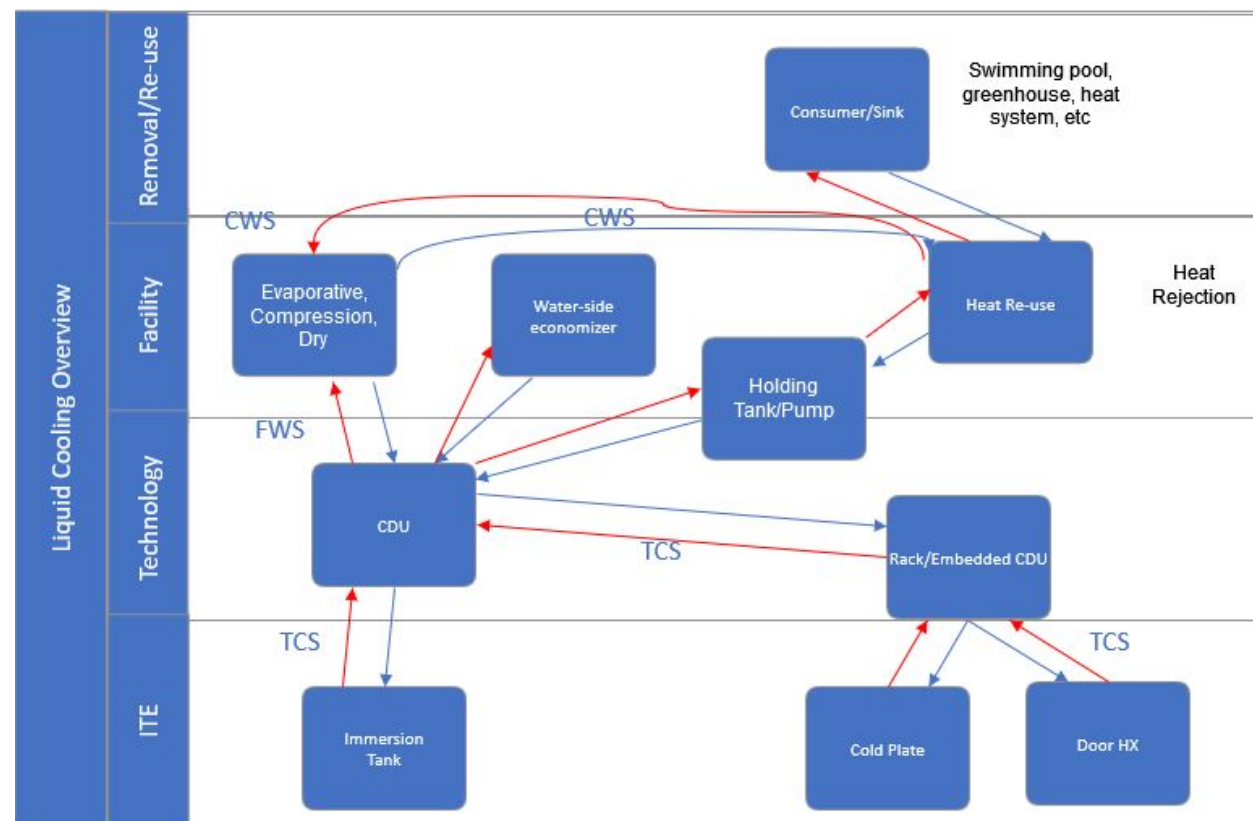
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HMLC - Scope

- Kicked off April 6th, 2022
- Creation of a template and schema which supports all liquid cooling environments within OCP
- Interface with Redfish DCIM taskforce and DMTF
- Harmonize current requirements, whitepapers, specs and other documentation with work done in DMTF Thermal and Power management project
- 6 months for initial deliverables
- Longer period for whitepaper content and descriptive deliverables;
- On-going (low intensity) content maintenance

HMLC – What to manage?

- Illustrative diagram of Liquid Cooling High Level topology
- Does not illustrate all possible scenarios or interconnections



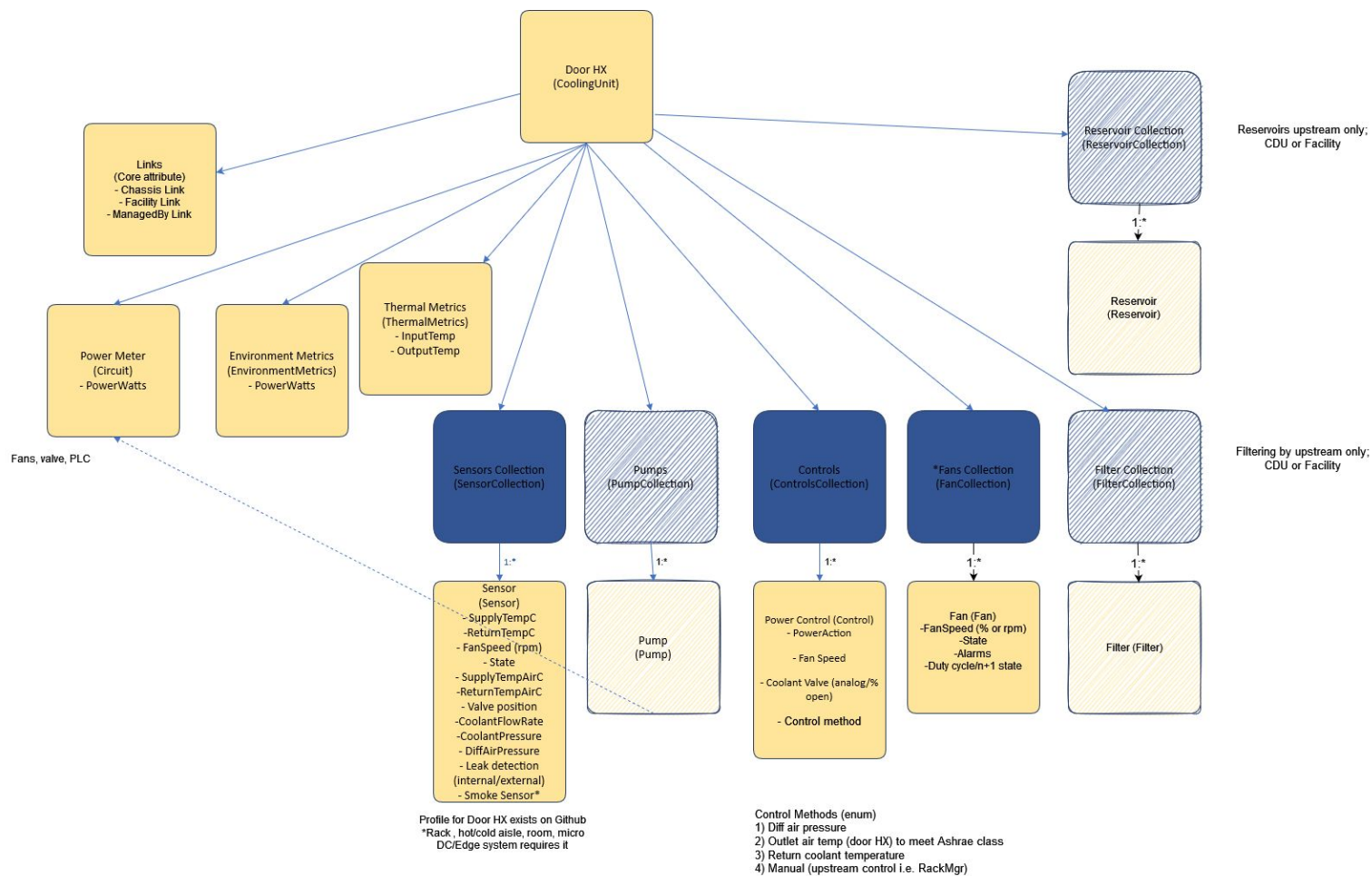
HMLC - Progress

- Full schema for all/any liquid cooling technology;
 - Immersion – Draft released Dec 2021
 - Door HX – In progress
 - Cold Plate – In progress
 - ACF – Pending
 - Heat Re-use - Pending
- Message Registries; Events and Alarms - Pending
- OCP Profile(s) - Pending
- Requirements for qualification - Pending
- Security requirements - Pending

HMLC - Profiles

- Profiles liquid cooling technology;
 - Door HX – Draft v0.5 exists at <https://github.com/opencomputeproject/HWMgmt-OCP-Profiles/tree/master/RackAndPower>
 - To be updated and version sync'ed with latest Redfish schema.
 - Cold Plate – In progress
 - CDU - Pending, maybe a separate profile TBD
 - ACF – Pending; maybe multiple profiles TBD
 - Heat Re-use - Pending
 - Immersion – Pending

HMLC – Door Heat Exchanger



- Door HX mapped to Redfish DCIM WIP schema for Thermal
- Abridged - does not show upstream resources or resource connections

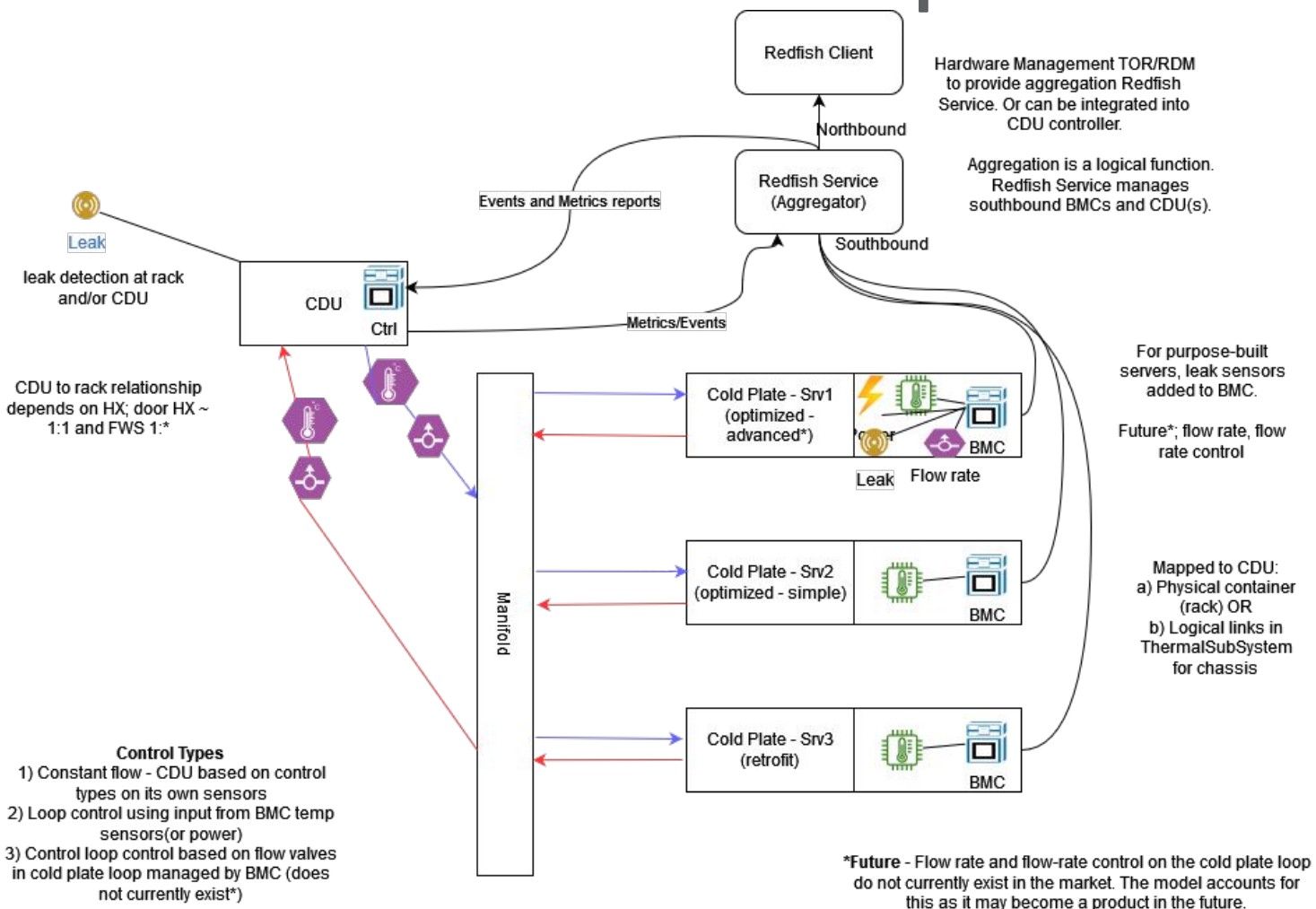
Legend

- A singleton resource
- A collection of resources
- A resource present in schema, but not relevant to Door HX

https://drive.google.com/file/d/16IUmw_hg0sMI3Br1QCwRet5wDjCcGLhYP/view?usp=sharing

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HMLC – Cold plate



- Cold plate mapped to Redfish DCIM WIP schema for Thermal
- Abridged - does not show upstream resources or resource connections

Legend

- A singleton resource
- A collection of resources
- A resource present in schema, but not relevant to Door HX

<https://drive.google.com/file/d/16IUmwHg0sMI3Br1QCwRet5wDjCcGLhYP/view?usp=sharing>

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HMLC – Sensors

Sensors identified for Door HX; commonality to be established

- Supply Temperature (coolant/air °C)
- Return Temperature (coolant/air °C)
- Fan speed (rpm)
- State/Health (Redfish standard)
- Valve position (on/off or %)
- Flow rate (coolant l/s)
- Pressure (Coolant or Δ air PA)
- Leak detection
- Particulate sensor (*subject to local regs)

HMLC – Controls

Controls identified for Door HX; commonality to be established

- Control Method (one of)
 - Diff air pressure
 - Outlet Air temperature
 - Return coolant temperature
 - Manual (cede control to upstream)
- Power Control
 - Safety cut-off to ITE
- Fan Speed
 - %
- Coolant Valve
 - On/Off
 - % open

Next Steps

- Continue discovery for remaining sub-projects; ACF, Heat re-use
- Collaborate with DMTF Redfish to complete and publish WIP schema
- Publish mockups
- Review/Iterate/Approve schema and mockups
- OCP Profiles and qualification requirements
- Security requirements



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Q&A

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