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Immersion Cooling for HPC



 Daniel Pope
Submer - CEO

New HQs for Next Generation Datacenters



Barcelona,
Spain



Ashburn,
Virginia

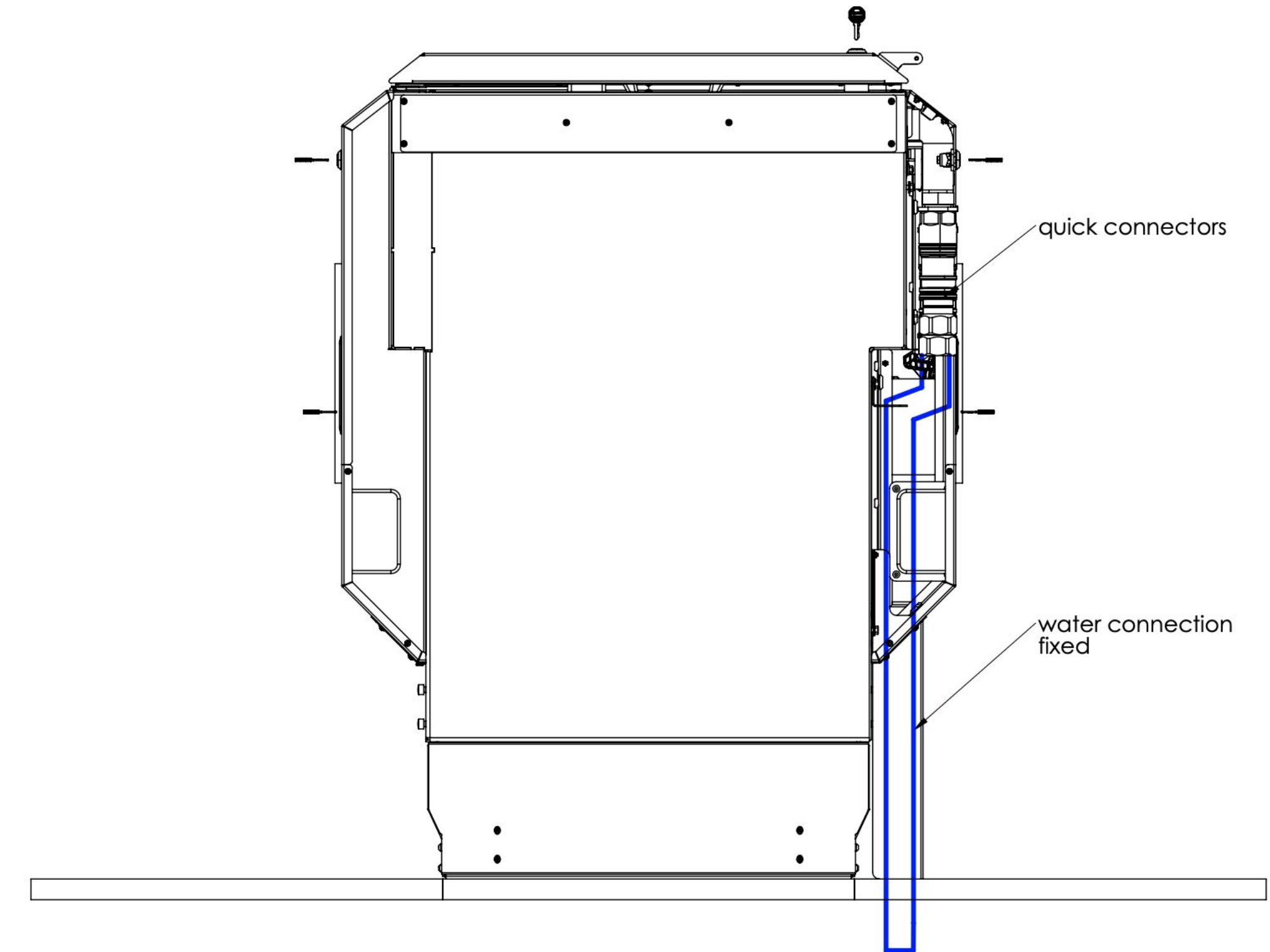
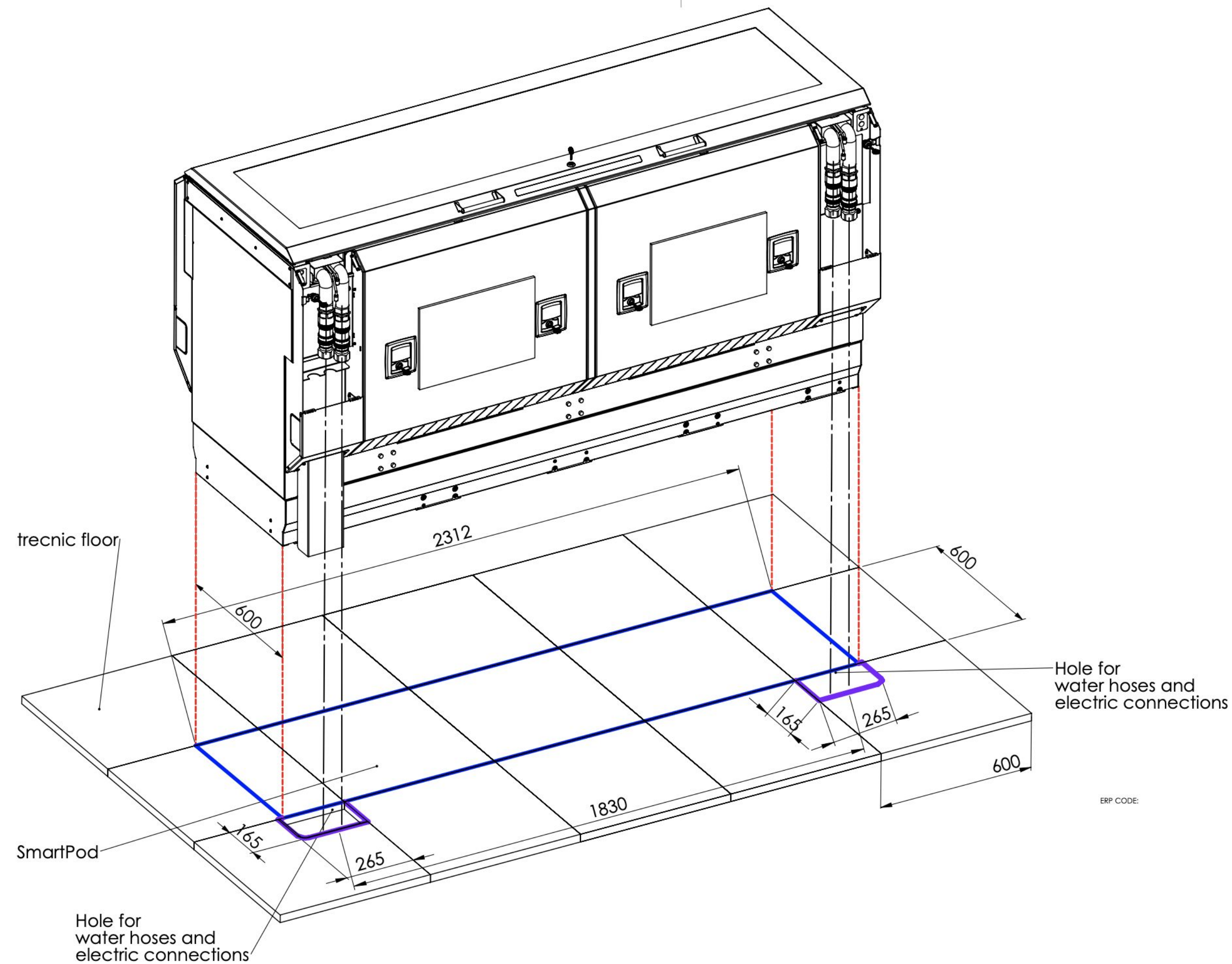
SmartPodX: First OCP Compatible Immersion Cooling Solution



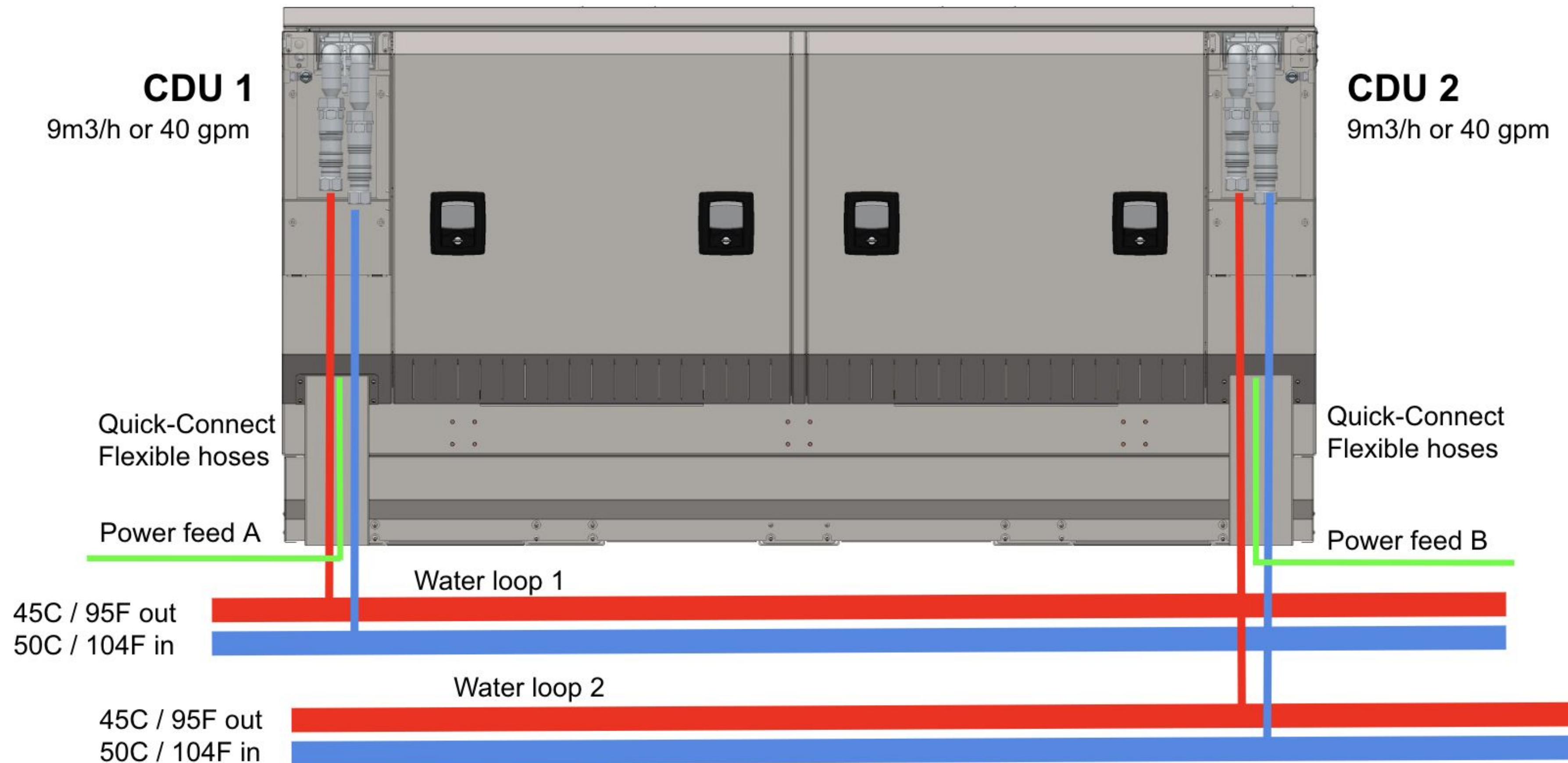
- Launched March 2019 at OCP Global Summit
 - Accommodates 21" and/or 19" HW
 - 21 and 420U configurations
 - 100kW heat dissipation with warm water
 - In-house developed fluid
 - Flexible busbar options:
 - 12V-DC / 48 V-DC
 - 1, 2 or 3 busbars
 - Up to 3 separate Zones
- 40+ Installations across the Globe



SmartPodX: Ready for mission critical



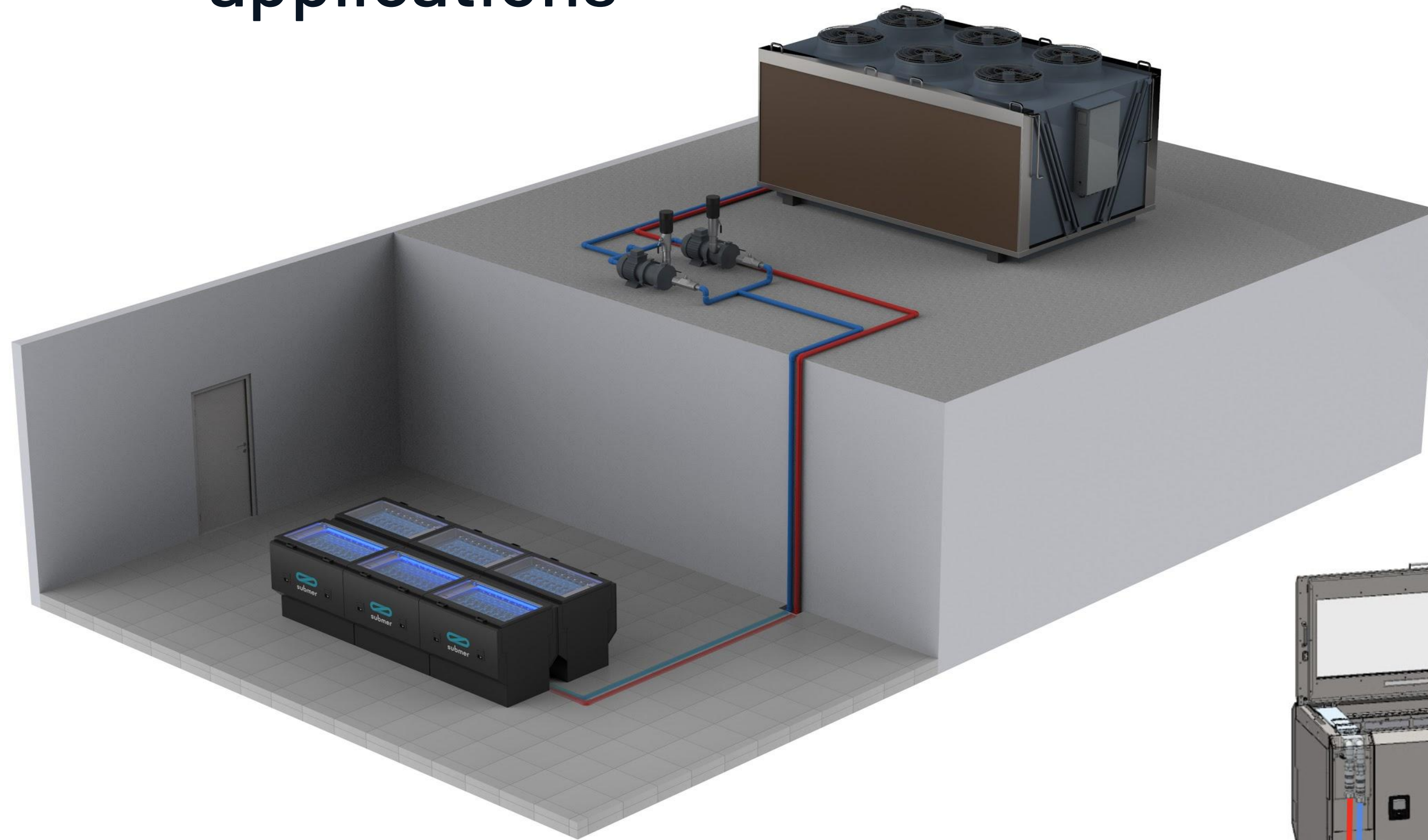
SmartPodX: Ready for mission critical applications



50kW dissipation with one CDU
100kW possible with additional CDU

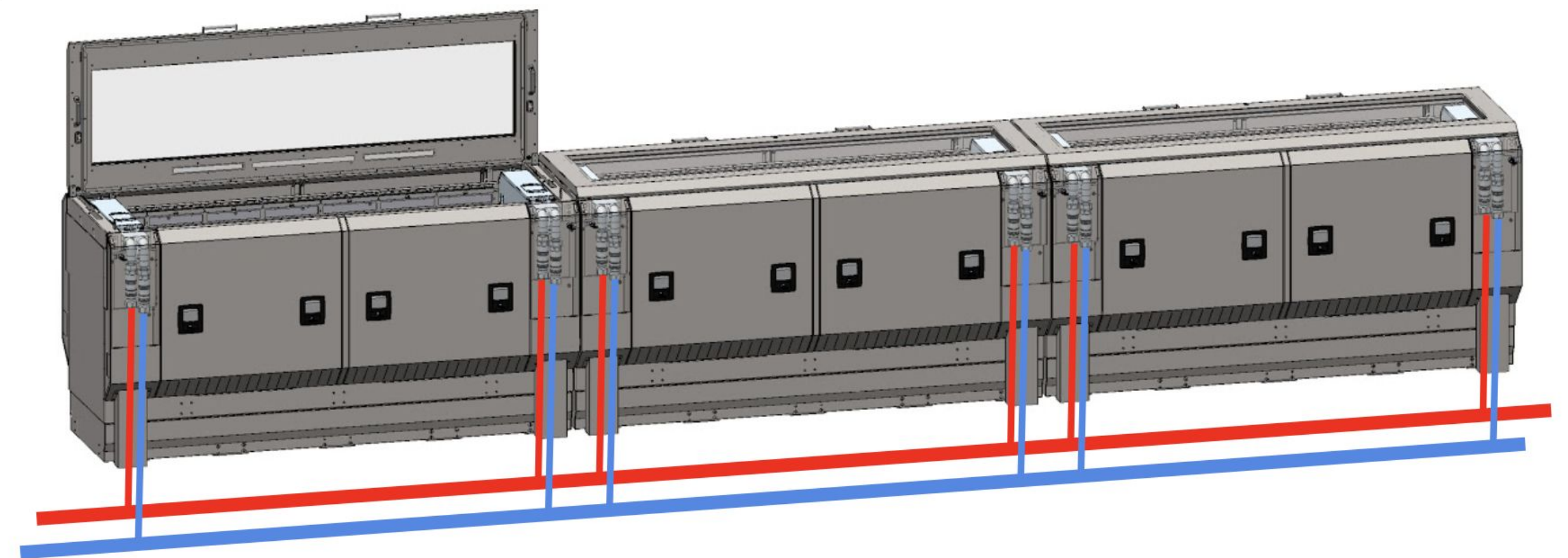


SmartPodX: Ready for mission critical applications



Simplified installation and maintenance:

- Dry coolers over DX
- No air handling required
- Drip-less quick-connects to water collector
- Fully populated racks with no hot-spots
- Silent environment
- Cable-less environment (in the works)
- Ready for "Infrastructure 2.0"



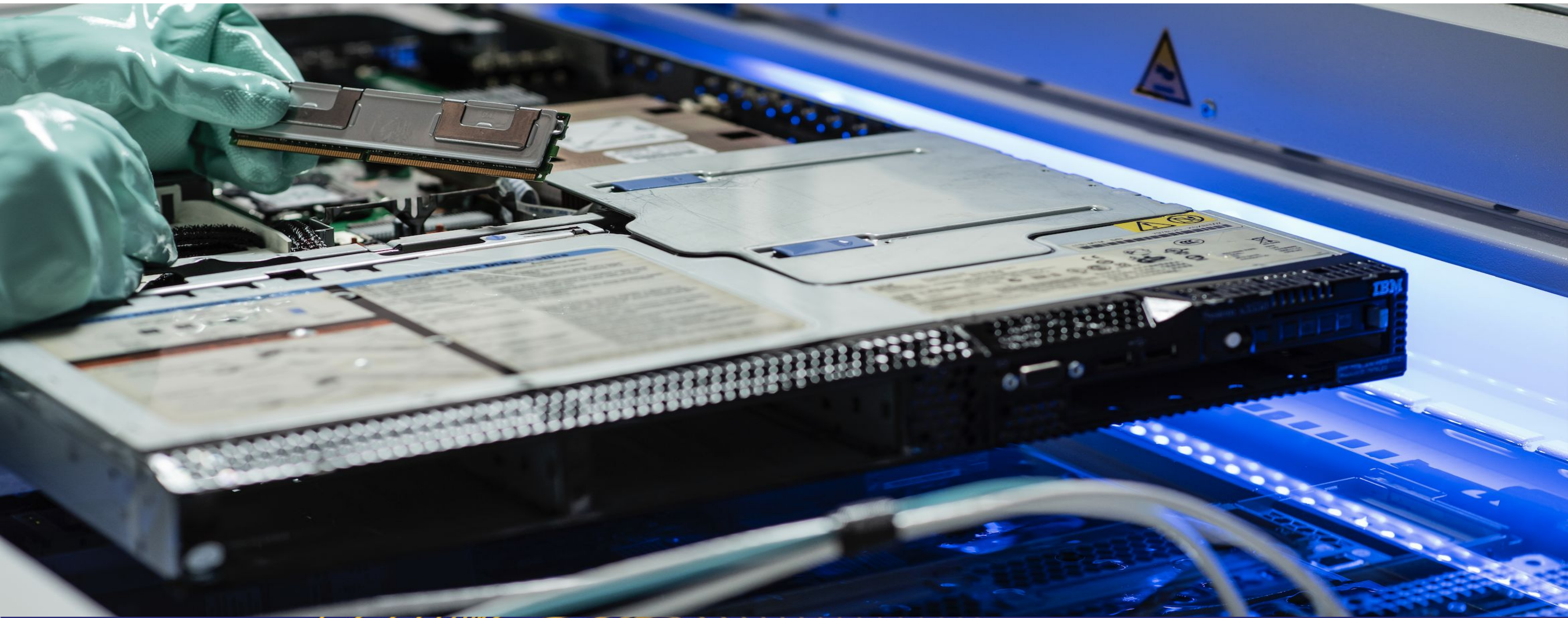
SmartCoolant: “the magic juice”

The Submer SmartCoolant is an in-house developed single-phase synthetic dielectric fluid specifically crafted for electronics Immersion Cooling:

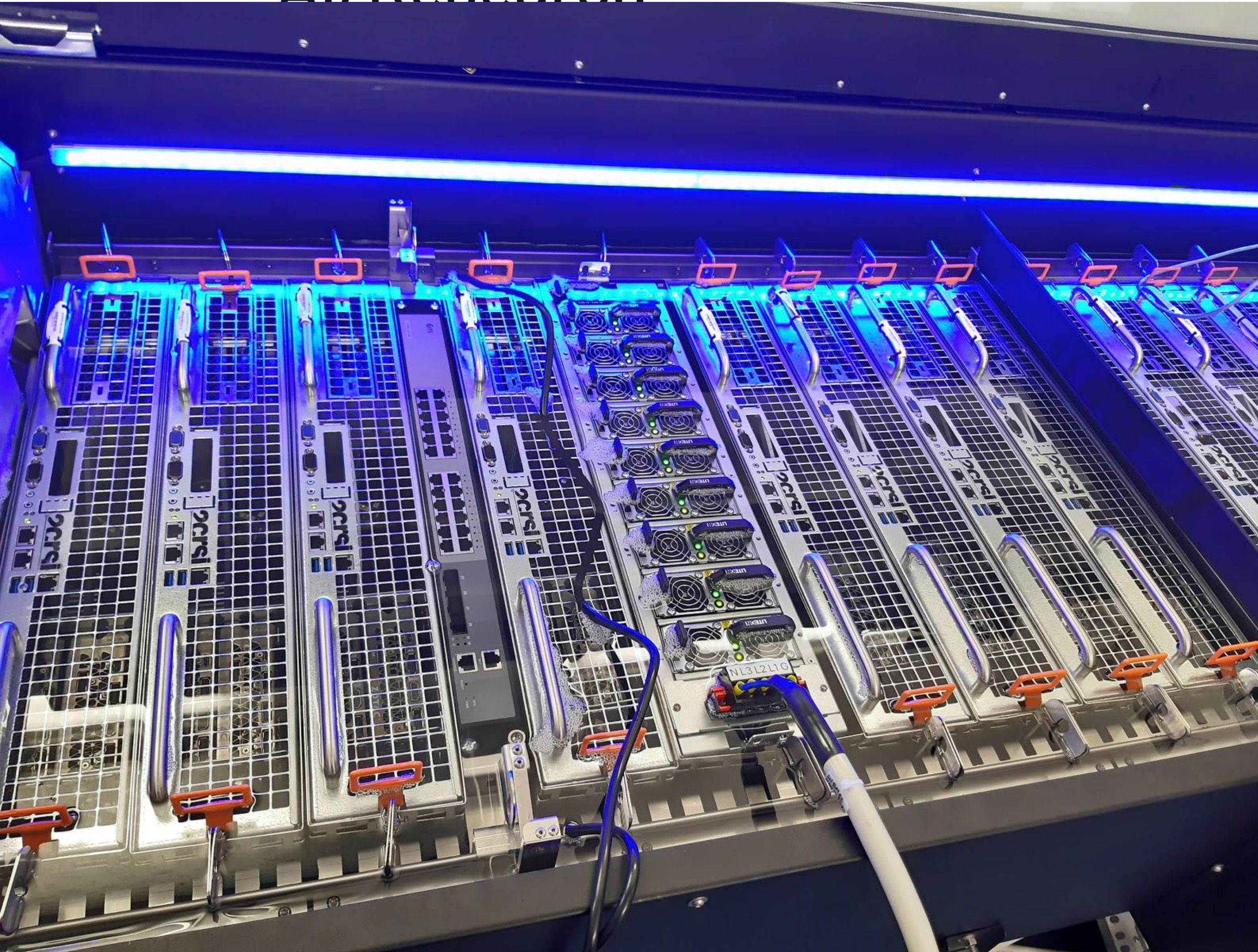
- Clear, Odorless, Biodegradable and Non-Toxic
- Dielectric (not electrically conductive)
- Non-Flammable (flash point $>180^{\circ}\text{C}$)
- Innocuous to hardware (compatible with OEM and commodity hardware)
- Non hydrophilic (does not absorb moisture)
- Classified as a type K3 food-grade fluid according to IEC 61100



Case Study



Case Study: Immersion Cooled OCP for AI/Research



A case-study in cooperation and partnership between:



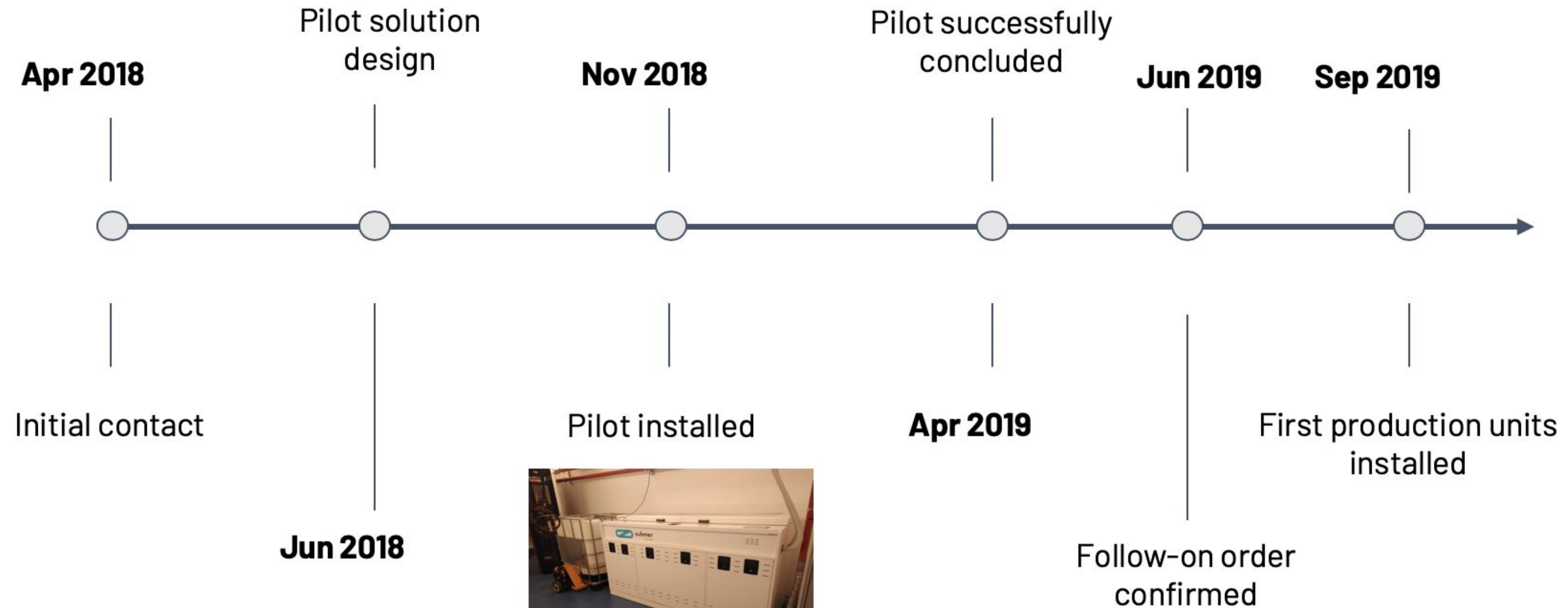
 Excellent Collaboration between Partners



GIGABYTE™

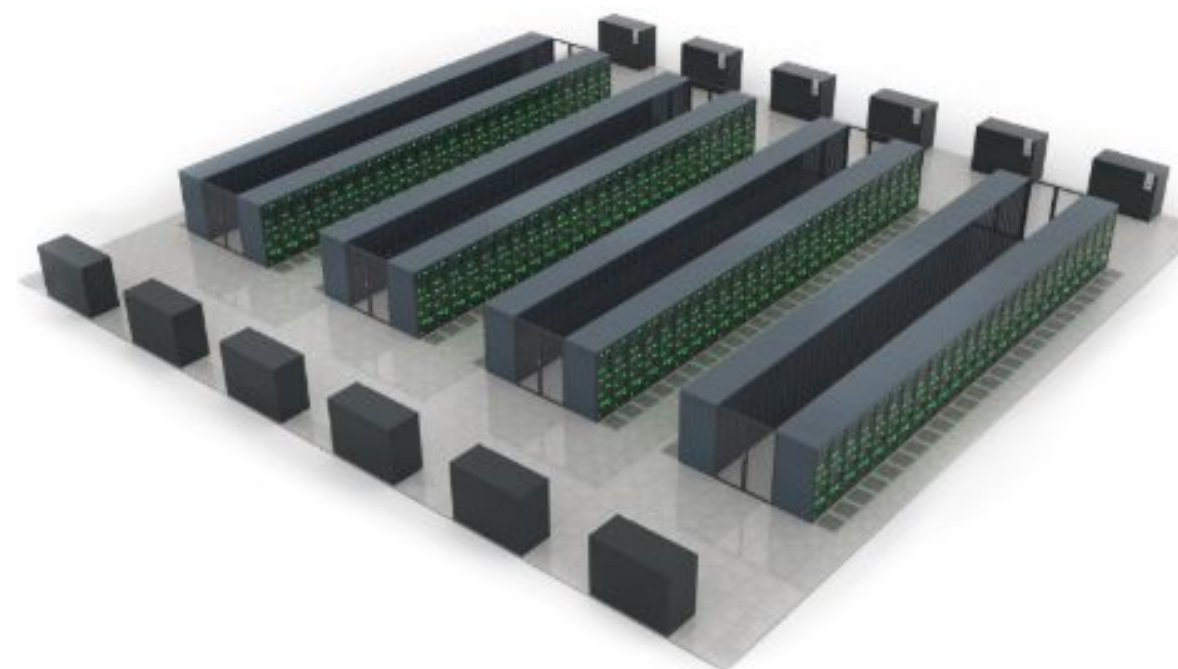
LITEON

Timeline

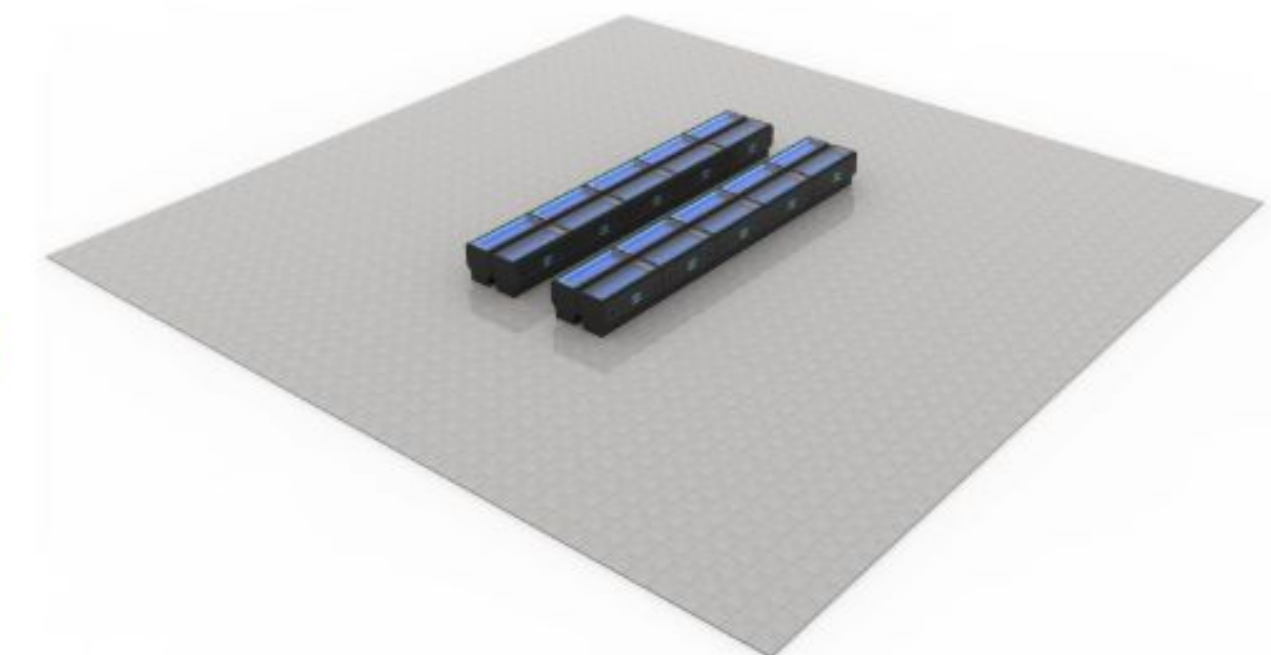


Project Details

- . Immersion Cooled GPUs for accelerated AI HPC
- . Limited OPEX/CAPEX budget
- . Greenfield facility imposing space restrictions
- . Highly secure environment
- . Challenge to cool efficiently in single phase / oil
- . Initially not considering OCP



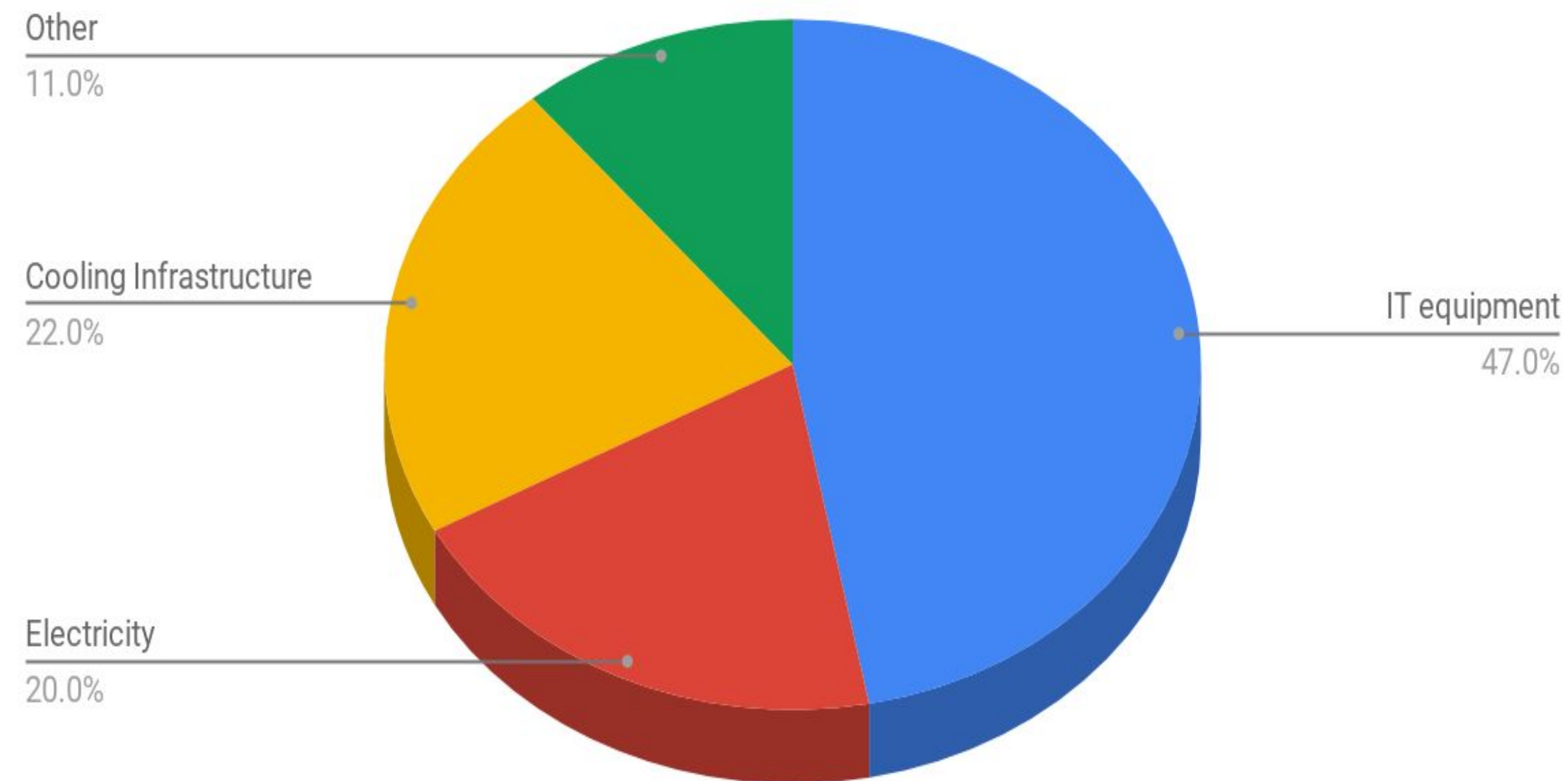
200 regular air-cooled racks (10kW/rack)



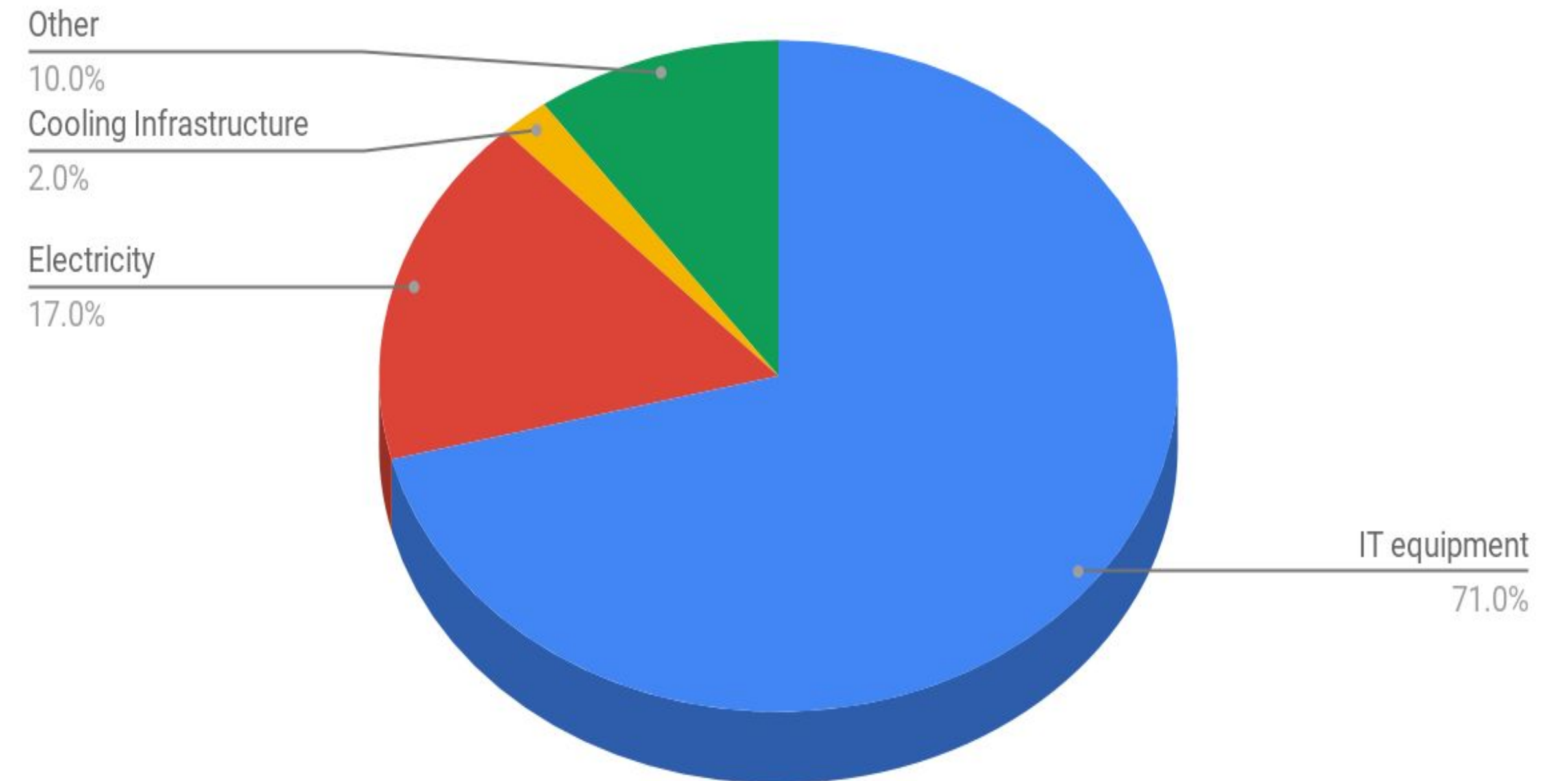
20 Submer SmartPods (100kW/Pod)

Why Submer Immersion Cooling?

Air Cooling



Liquid Immersion Cooling



The Setup

- SmartPodXL 420U
- 2CRSI Octopus 1.8b 20U
- Lite-On OCP power shelf
- FS Fanless switches



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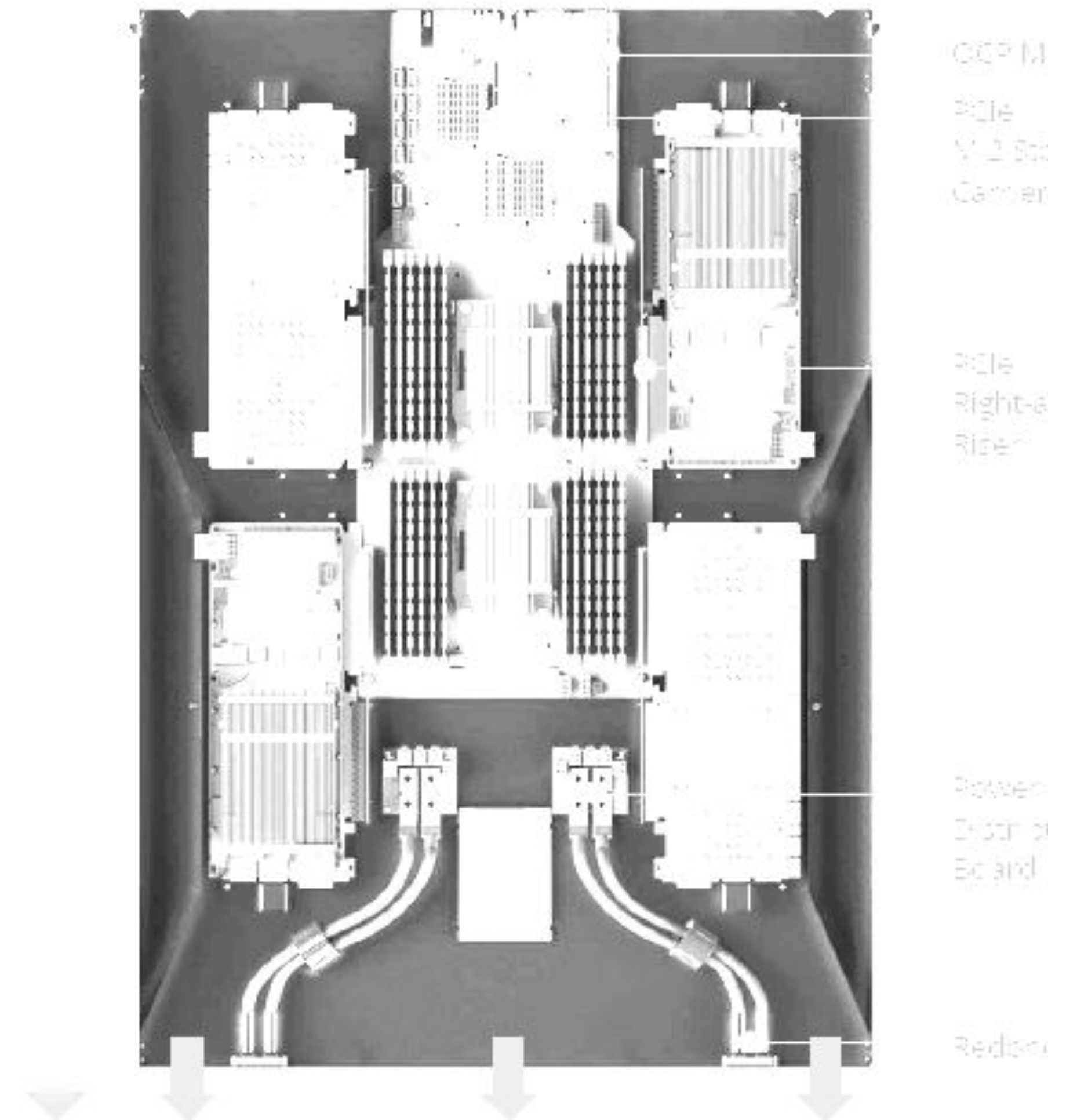


The Configuration Components

- 2CRSI Octopus 1.8b OCP immersion-ready server
- 2CPU, 8GPU
- 21", 12V-DC, 2 busbar connectors
- Low-profile heat-sinks
- No moving parts
- No additional parts for directing air

Result:

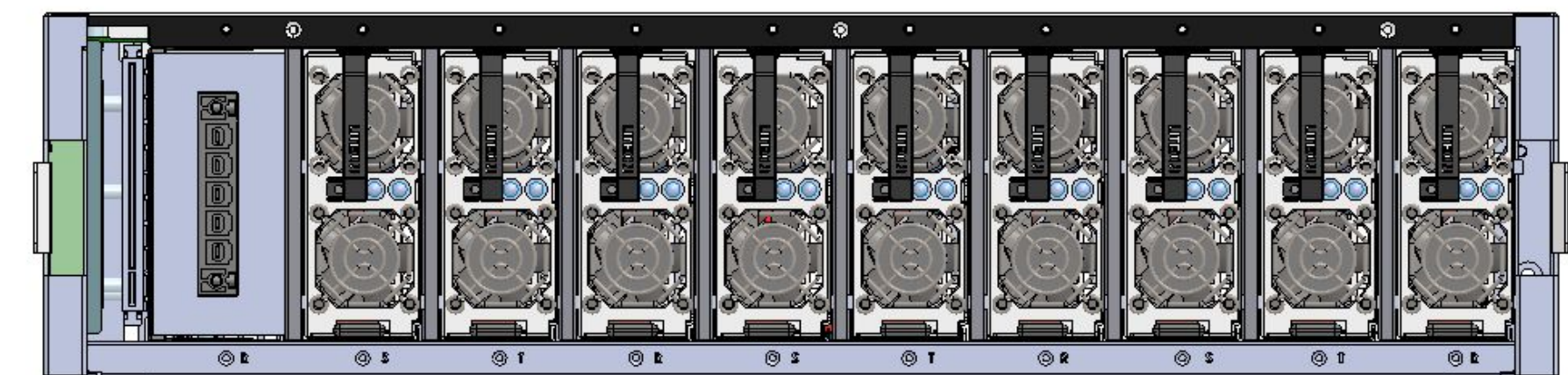
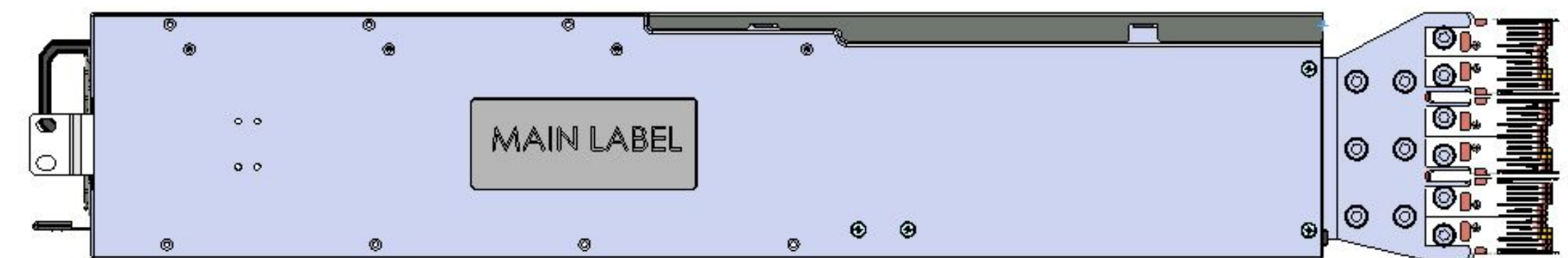
- 8% cheaper than air-based companion, even including power shelf
- 22% less power consumption than its air-based companion!!



— Lite-On: OCP Immersion Ready PowerShelf

- 3-Phase 400V, 12V-DC, 30U
- 27kW (9x3kW PSU) in 2.5 0U
- Connects to busbars without tools
- Power feed via top/front
- Updated PSU firmware
- Hot-swappable Submerged
- Safety developments on busbars (to be disclosed to the Community)

30kW are now possible in 1 0U!!!



Why did the Customer choose an Immersion Cooled OCP solution?

Total Cost of Ownership

- LIC & OCP: >50% CAPEX savings vs traditional
 - LIC: economical build, more density and future proof investment
 - OCP: economical HW (further 8% hardware savings)
- LIC & OCP: >45% OPEX savings
- Simpler maintenance

- European Commission supporting "Open Standards" and EU companies
- Corporate Social Responsibility

By 2023, 50% of HPC deployments
will be liquid cooled.

What are you waiting for?







Open. Together.

OCP Regional Summit
26–27, September, 2019