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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

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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”
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 °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: Immersion Cooled OCP for AI/Research

A case-study in cooperation and partnership between:

submer

European Commission

AIRBUS

Joint Research Centre

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Excellent Collaboration between Partners

2CRI
NVIDIA
GIGABYTE
LITEON
Timeline

Apr 2018
- Pilot solution design

Nov 2018
- Pilot successfully concluded

Jun 2019
- Initial contact

Sep 2019
- Pilot installed

Apr 2019
- First production units installed

Jun 2018
- Follow-on order confirmed
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 air (>2kW / GPU)
- Initially not considering OCP

200 regular air-cooled racks (10kW/rack)  
20 Submer SmartPods (100kW/Pod)
Why Submer Immersion Cooling?

Air Cooling
- Other: 11.0%
- Cooling Infrastructure: 22.0%
- Electricity: 20.0%
- IT equipment: 47.0%

Liquid Immersion Cooling
- Other: 10.0%
- Cooling Infrastructure: 2.0%
- Electricity: 17.0%
- IT equipment: 71.0%

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• SmartPodXL 420U
• 2CRSI Octopus 1.8b 20U
• Lite-On OCP power shelf
• FS Fanless switches
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 OU
- 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 OU!!!
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?
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OCP Regional Summit
26–27, September, 2019