

OPEN POSSIBILITIES.

Immersion Community Update



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SUMMIT

NOVEMBER 9-10, 2021

Immersion Community Update

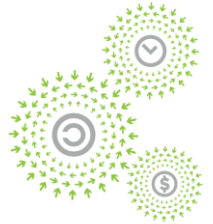
Rolf Brink, Asperitas
John Bean, GRC

OCP Immersion Project leads

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Community sessions



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Immersion Requirements revision 2

- Presented by Rolf Brink, Asperitas
- Full year of work with broad community effort
- Qualification criteria for immersion technology

Material Compatibility project

- Presented by Punith Shivaprasad, Shell and John Bean, GRC
- Large amount of IP being published
- Focus on chemical behaviour of IT equipment in dielectric fluids

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Contributor sessions



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The circular economy meets immersion cooling: an integrated OCP solution

- Presented by Andy Young, Asperitas and Erik Riedel, ITRenew
- In-depth presentation of immersion-optimized second life IT equipment
- Integrated platform solution which will be available on the OCP Marketplace

Panel: One Year of Two Phase (2P) Immersion Cooling in the Cloud: Lessons Learned

- Moderated by Ashish Raniwala, Microsoft
- Panelists include Husam Alissa (Microsoft), Ioannis Manousakis (Microsoft), Mark Shaw (Microsoft), Phillip Tuma (3M), Simon Chen (Wiwynn)
- In-depth presentation and discussion on Microsoft's adoption of 2-phase immersion cooling

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Contributor sessions



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Immersion Cooling- Equipment Certification approach and Safety Compliance

- Presented by Michael Sakamoto, UL
- Immersion solutions certification approach
- Overview of harmonization efforts between OCP and UL

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But first... Why is immersion relevant?



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Quick introduction of the OCP Immersion pitch deck

Presented by Raul Alvarez, Submer

Contributed by:

David Gyulnazaryan – Consultant

Larry Kosch – GRC

Herb Zien - LiquidCool Solutions

Jimil Shah – TMGCore

Emilia Coverdale – Asperitas

Gloria Fluxà – Submer

Allison Boen - Midas Green Tech

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The evolution of datacentre cooling



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CRAC/CRAH/
In-row coolers



Hall / Row

Typically 15 kW/rack

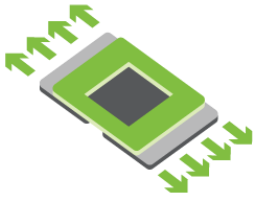
Back door HEX



Rack

Typically 30 kW/rack

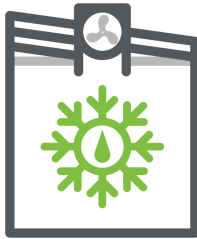
Direct-to-chip



Server

Typically 50 kW/rack

Immersion



Integrated approach

Typically 150-500 kW/rack

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Types of immersion cooling

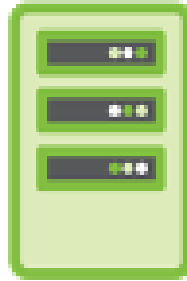


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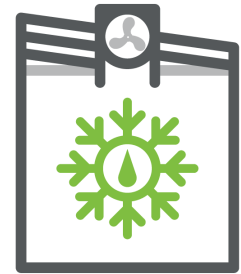
Single phase Immersion
Horizontal Rack



Single phase
Immersion
Vertical Rack



Two phase Immersion
Horizontal Rack



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Datacentre challenges



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DC sustainability &
decarbonisation



Low capacity
per rack



Water consumption



Hot spots &
Server reliability



IT capacity cost reduction



DC safety



Increasing energy costs



EDGE application



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How immersion cooling solves datacentre challenges...

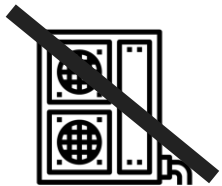
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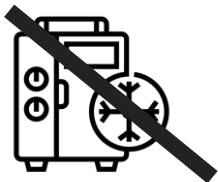
Datacentre sustainability and decarbonisation



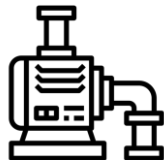
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no coolers



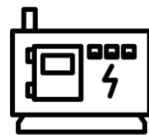
no chillers



pumps
-95%



UPS
-40%



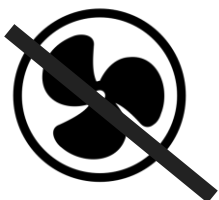
GenSet
-40%



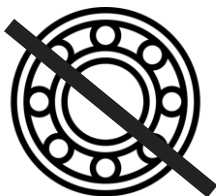
High grade
temperature



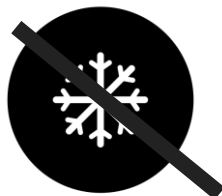
Combined
Heat Compute



no fans



no bearings



no chiller
refrigerants



no evaporative cooling



extended lifetime



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Heavily reduced to no water consumption



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- High temperature of the coolant makes evaporative cooling unnecessary
- Water used at energy source site decreased twice

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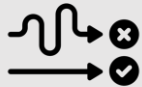
IT-capacity cost reduction



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CAPEX: 20-35%



Simply HEX system
components



Input Power-50%



50 kW/m²



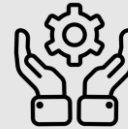
No duplicate



OPEX: 40-50%



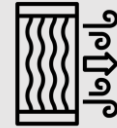
no fans -10%
5%



Supporting system



TCO: 30-40%



Less spare parts
maintenance



Reduced

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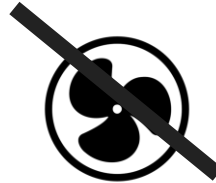
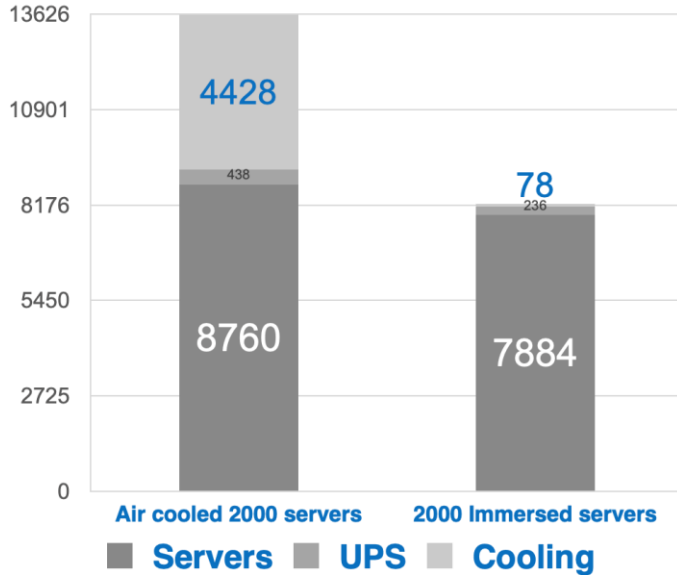


Increasing energy costs

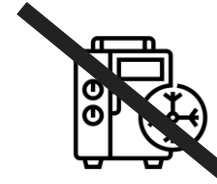


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Total data center energy
consumption,
MWh / year



no fans



no chillers



UPS -10%

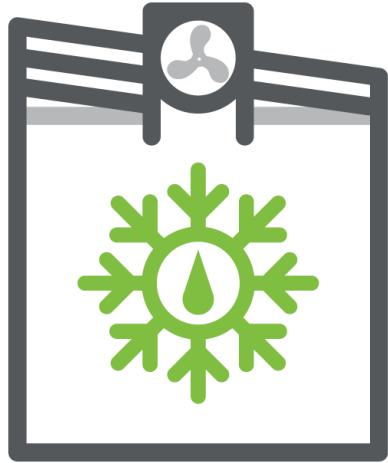


heavily reduced
to no water
consumption

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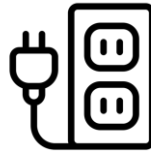
High capacity per rack



92 servers in
200 kW rack



50 kW/m²



less PDU



no raised floor



+10% IT-load



less switches



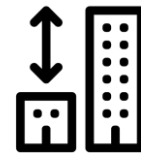
no hot/cold aisles



HPC



less cables



less hall height



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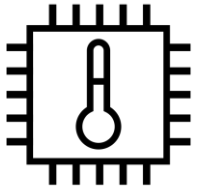
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Hot spots & server reliability



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Lower chip
temperature



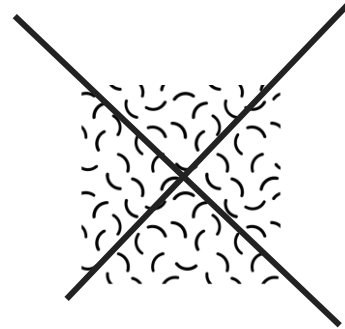
No hot spots



No humidity



No dust



No zinc whiskers



Protective environment

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Datacentre safety



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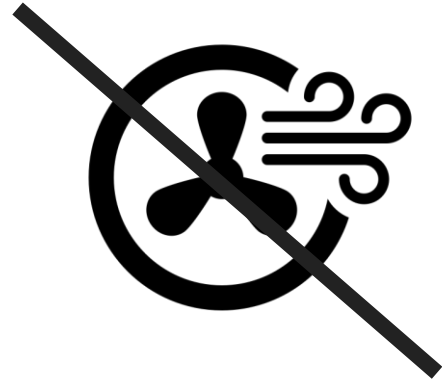
Fire safety



Vibration
elimination



Humidity
protection



No air circulation

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EDGE application



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Workplace
comfort



Residential and
office



Combined Heat
Compute



50 kW/m²



Input Power
-50%



heavily reduced to
no water
consumption



Ready for harsh
environments



Leverage existing
fire suppression

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Thank you!

Contributors:

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Call to Action

- Join and support the immersion community
- Engage in public discussions
- Share your knowledge and expertise with a global assembly of peers

More information:

- Project leads: Rolf.Brink@ocproject.net & John.Bean@ocproject.net

Immersion project participation:

- Check out the project Wiki with all essential information:
[https://www.opencompute.org/wiki/Rack %26 Power/Advanced Cooling Solutions Immersion Cooling](https://www.opencompute.org/wiki/Rack_%26_Power/Advanced_Cooling_Solutions_Immersion_Cooling)
- Join the mailing list and receive all community call invitations:
<http://lists.opencompute.org/mailman/listinfo/opencompute-acsimmersion>

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Next up: Immersion Requirements revision 2



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