Open for All.
Mixed Environment, Hybrid, Edge Data Centres

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What is the data centre of the future?

- Capable of meeting demand of digital expansion to all areas of everyday life.
- Consumer driven: increasingly requiring high density, high performance compute.
Scale
Physical footprint

- Lots of racks.
- Lots of data centres.
Energy footprint

• In 2016, it was estimated that data centres used 3% of the global energy supply, with consumption expected to treble by mid-2020s.
Carbon footprint

• Data centre industry generates up to 2% of global CO₂ emissions = aviation industry (EU, 2017).
Considerations for build

- Location
- Power source
- Heat re-use potential
- IT equipment
- Appropriate cooling.
Modular approach

• All areas can be modularized.
• Build as required.
• IT requirement to drive the design.
Reconceptualising ‘waste’ heat

Chillers

Immersion
Rear Door On-Chip
In-Rack In-Row HPC
Hot Aisle OCP
Hot Aisle
High grade heat

• Usable bi-product.
• Avoid wasting valuable resources.
• Once heat reaches 60°C it has a variety of uses.
Heat exchangers

- Variable flow rates.
- Definable inlet and outlet temperatures.
Cooling Technologies 1

- Mix and match solutions.
- Best match to IT load.
- Aggregated to temperature.

- Hot Aisle OCP
- Rear Door On-Chip
- In-Rack In-Row HPC
- Immersion

Hot Aisle
Cooling Technologies 2

Increase of water temperature through IT deployment
Pipes & cables

- Modular busbar 410/630A.
- Sizing pipes and valves.
Immersed cooling is real

- Chip manufactures taking notice.
- End user confidence growing.
- Engineers love it.
- Can be incorporated into existing DC infrastructures.
Power, money & space

200W
300W
400W
500W
600W
Live example - LDC

- Hybrid Design.
- OCP/HPC.
- EUCoC Award winner, 2019.
- Global DCD Energy Smart winner, 2019
Sample design - LDC

- Mixed-use hybrid environment.
- Raising temperature of surplus heat for in-house energy reuse.
OCP Hot Aisle - LDC

- Rittal LCP.
- 12v and 48v.
- 10kW up to 40kW

- Zuta Core On Chip
DC of the Future: Prerequisites

- Smaller in scale, but with no loss in power density.
- Energy efficient.
- Carbon neutral.
- Maintained by a younger - more agile - generation of engineers competent in both mechanical and IT.
Take away/lessons learnt

• BMS is key.
• MODBUS a necessity.
• Measurement of flow/return per phase.
• Manufacturer partnership.
Call to Action

Timelines for following documents -
• ACS Hybrid DC requirements document – July 2020
• ACS Hybrid DC white paper – Sept 2020
• (Update of Data Centre of the Future – Whitepaper)
• ACS Hybrid DC Design Document – December 2020

Links
• https://www.cooldc.co.uk
• https://www.victaulic.com
• http://www.opencompute.org