Vertiv™ 360AI

High Density Reference Design for AI

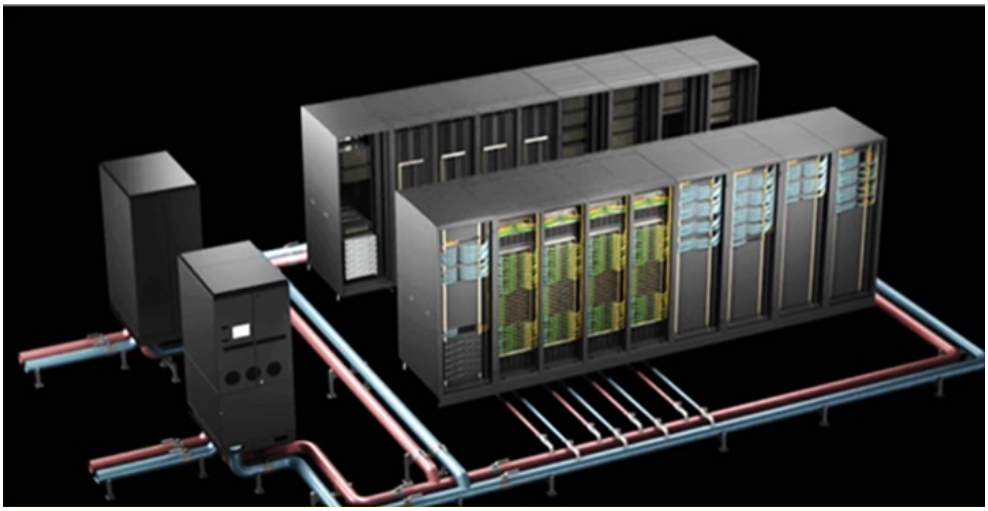
AI Reference Design #026

2x 1.15MW NVIDIA Blackwell DGX SuperPODs

A full data center environment designed for a 2.3MW solution with four to make three redundancy, using two NVIDIA Blackwell DGX SuperPODs.

Vertiv AI Infrastructure Design Principles

1. **Design both Power and Cooling together** to optimize AI infrastructure.
2. **Power is at a premium**. Eliminate stranded power by aligning AI clusters to data center 'capacity blocks.'
3. **Consider total cost of ownership, redundancy, and blast radius** in AI power and cooling designs, and the tradeoffs among them.
4. **Handle AI workload surges** though system-level controls and power and cooling buffers.
5. **Design for a mix of liquid and air cooling**, which have a combined and interdependent impact on the ability to remove heat.
6. **Design for the future**. Anticipate your needs by upgrading to the latest power and cooling technologies today.

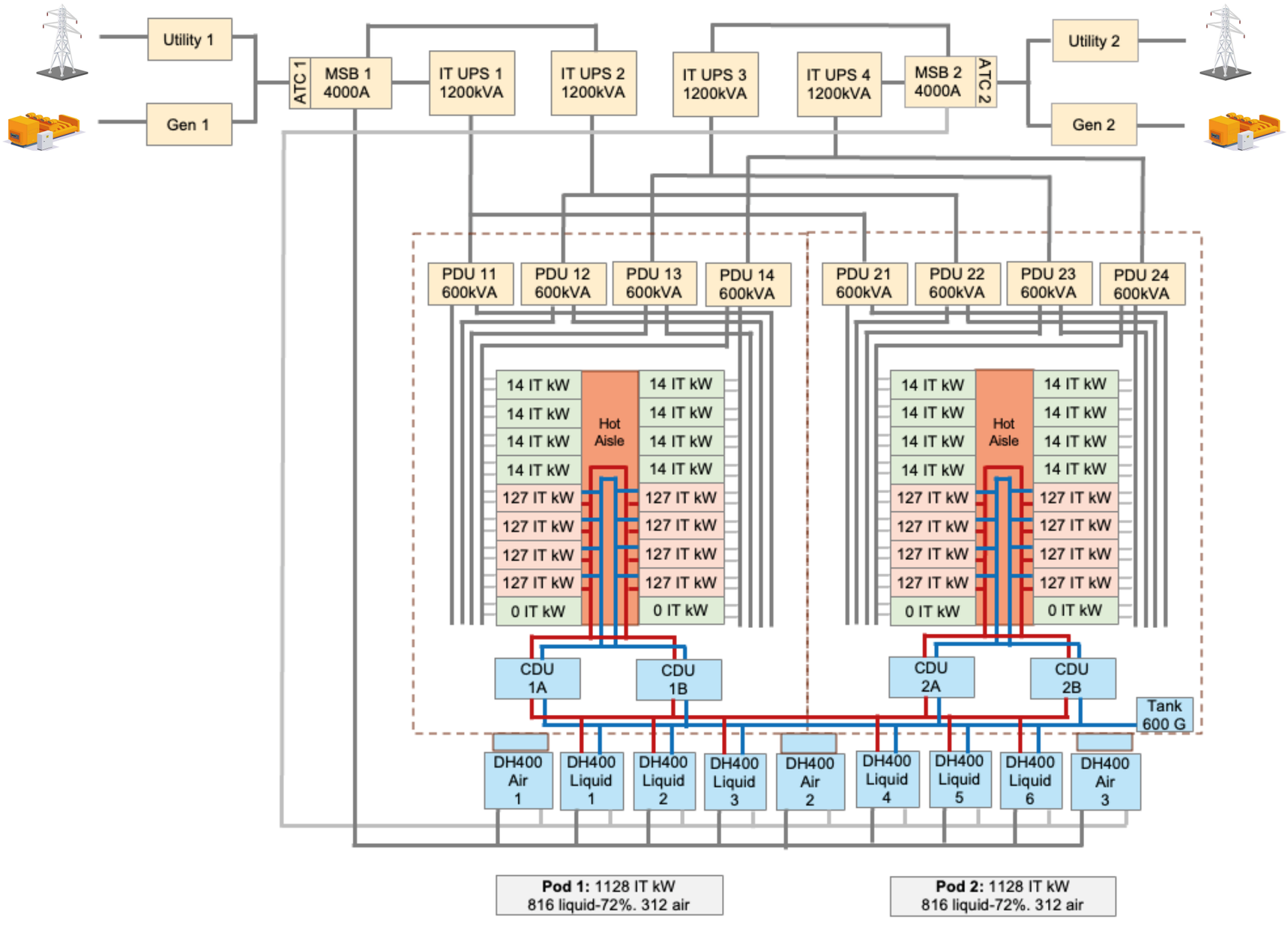


1 POD shown above, design is for 2 PODs

Design Summary

Solution Capacity	2.3MW
Redundancy	4 to make 3 for power, N+1 for cooling
Total IT Load	2,256kW (1128kW per POD)
Rack Density (IT load)	16 racks at 127kW, 16 racks at 14kW, 4 cabling racks
Rack(s)	36
Cooling Topology	72% Liquid (direct-to-chip) 28% Air (perimeter units)
Coolant Distribution	XDU1350
Packaged Cooling System	DH400 for air and liquid
Busway	400A busway, 8 per POD 60A tap-off box, 2 per rack per busway
Power Shelf	33kVA OCP DC power shelf , 8 per rack
Room/Row PDU	600kVA PDU, 4 per POD
UPS for IT	1200kVA UPS, 4 per both PODs
UPS for Cooling System	240kVA UPS, 2N, supplying both cooling loops

Reference Design Schematic



Legend

- Critical Power
- Thermal Management
- Networking & Storage racks
- Compute rack
- Liquid loop, cold/supply
- Liquid loop, hot/return

Utility Supply Generator

Key Terms

MSB: Main Switch Board
UPS: Uninterruptible Power Supply
PDU: Power Distribution Unit
CDU: Coolant Distribution Unit

References: https://www.nvidia.com/en-us/data-center/dgx-superpod-gb200/

Vertiv Components of the Design

Component	Details
MSB	2x 4,000A main switch board input
IT UPS for IT	4x 1,200kVA UPS for two PODs, power from MSB
UPS for Facility	2x 240kVA facility UPS for two PODs, 2N
PDU	8x 600kVA PDU
Busway and Tap-off Boxes (TOB)	8x 400A busway per POD, 2x 60A TOB per rack per busway
Rack Power shelf for compute racks	8x 33kVA OCP HPR ORV3 DC power shelf per compute rack
Rack PDUs for support racks	2x 30A rack PDUs per support rack
Packaged system, liquid cooling	6x DH400 for liquid, liquid cooling loop, N+1 for two PODs
Packaged system, air cooling	3x DH400 for air, perimeter cooling, N+1 for two PODs
CDU	4x 1,368kW CDU (N+1 pumps), two per POD, N+1
Rack Manifolds	16x OCP blind-mate OCP rack manifold sets
Rack for support racks	20x 48U 800x1200mm, 10x per POD
Rack for computing racks	16x OCP ORV3 racks, 8x per POD