arvane
THERMAL

Corvia Cloud Hall C: Proposed Liquid Cooling System, Diagrams and Kitting

Direct-to-chip cooling for AI row 1 | For your design review | November 2026



TP-C1200 in-row CDU

Concept build. Arvane Thermal, Corvia Cloud and every product and spec are fictional.

Air stops at about 40 kW a rack. Your new servers start at 120

Liquid takes the heat off the chips and hands it to the facility water you already run

120 kW

per rack, with room for three more racks on the CDU

32 °C

facility water is all it needs. Dry coolers do most of the work

N+1

pumps in every CDU. A failed pump swaps out with the row running

1 rack

is the most a leak can take offline. The rest keeps flowing

Liquid where the heat is

Cold plates take about 85% of the heat. A rear door catches the rest before it reaches the room.

Two loops that never mix

Facility water stays on one side of the CDU. Filtered coolant runs to the servers on the other.

Built to be serviced live

Dry-break couplings at every tray, valves at every rack, front-service pumps and filters.

Proposed system at a glance

One CDU per row feeds every rack through overhead headers. These colors are used in every diagram

Role	Product	Part	Key point	Power
Cooling, row	In-row CDU	**TP-C1200**	1.2 MW. N+1 pumps. Loops never mix	2x 400-480 VAC
Cooling, rack	In-rack CDU, 4U	**TP-C120**	120 kW. Pilot or single dense rack	2x 208-415 VAC
Distribution	Rear rack manifold	**TP-M48**	24 supply, 24 return ports, sensing built in	None
Distribution	Dry-break coupling	**TP-Q12**	No drip on release. One pair per tray	None
Distribution	Isolation valve set	**TP-V**	Shuts one rack off the header in seconds	24 VDC
Air side	Rear-door heat exchanger	**TP-RD50**	50 kW. Takes the air heat plates miss	208-240 VAC
Safety	Leak controller and rope	**TP-LX / TP-LR**	Finds a leak to 1 m, closes that rack	100-240 VAC
Monitoring	Monitoring software	**TP-View**	Every point, into your BMS	Your VM

Coolant distribution units

Pick by how many racks it feeds: one row, or one rack



TP-C1200 in-row CDU

Sits at the end of the row like a rack. Moves heat from server coolant into facility water.

Capacity	1,200 kW at 6 K approach
Flow	Up to 1,800 L/min
Supply temp	25 to 45 °C, ±0.5 K
Pumps	N+1, variable speed, hot-swap
Filtration	50 µm, live changeover
Power	2x 400-480 VAC, up to 15 kW
Size	800 x 1200 x 2200 mm



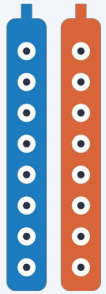
TP-C120 in-rack CDU

One rack on its own: the pilot, a lab, or a single dense rack in an air-cooled hall.

Capacity	120 kW at 6 K approach
Flow	Up to 180 L/min
Pumps	Redundant pair, hot-swap
Filtration	50 µm
Power	2x 208-415 VAC
Size	4U, 1000 mm deep

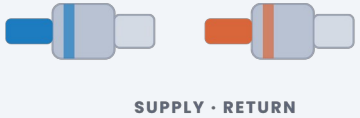
Distribution: manifold, couplings, valves

Everything between the header and the cold plate



TP-M48 rear rack manifold

Ports	24 supply, 24 return
Inlet	1.5" with TP-V valves
Sensing	Flow, inlet and outlet temp
Build	316 stainless, 10 bar



TP-Q12 dry-break coupling

Flow	Up to 30 L/min
Spill	Under 0.05 mL per release
Keyed	Blue and red cannot swap
Seals	EPDM, glycol-rated

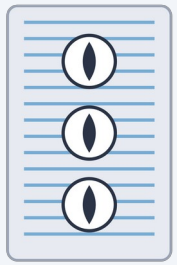


Valves and leak control

Locate	Leak to within 1 m
Action	Closes that rack only
Zones	4 ropes, 150 m each
Alerts	Relay, BACnet, Modbus, SNMP

Rear doors and monitoring

The air heat the cold plates miss, and one screen for every point



TP-RD50 rear-door heat exchanger

Hangs on the back of the rack. Takes the 15% of heat that still goes to air.

Capacity	Up to 50 kW
Fans	EC, speed set by exhaust temp
Water	From the CDU loop
Fit	42U and 48U, 600 or 800 mm
Power	208–240 VAC, under 900 W



TP-View monitoring

Every CDU, manifold, door and leak point, with the same names in your BMS.

Points	Flow, pressure, temps, pumps, leaks
Out	BACnet/IP, Modbus, SNMPv3, REST
Alerts	Email and webhook, by severity
Runs on	Your VM, your network
Cloud	Not required

Manifold port plan

18 of 24 port pairs used per rack. Six spare pairs for added trays or a liquid-cooled switch



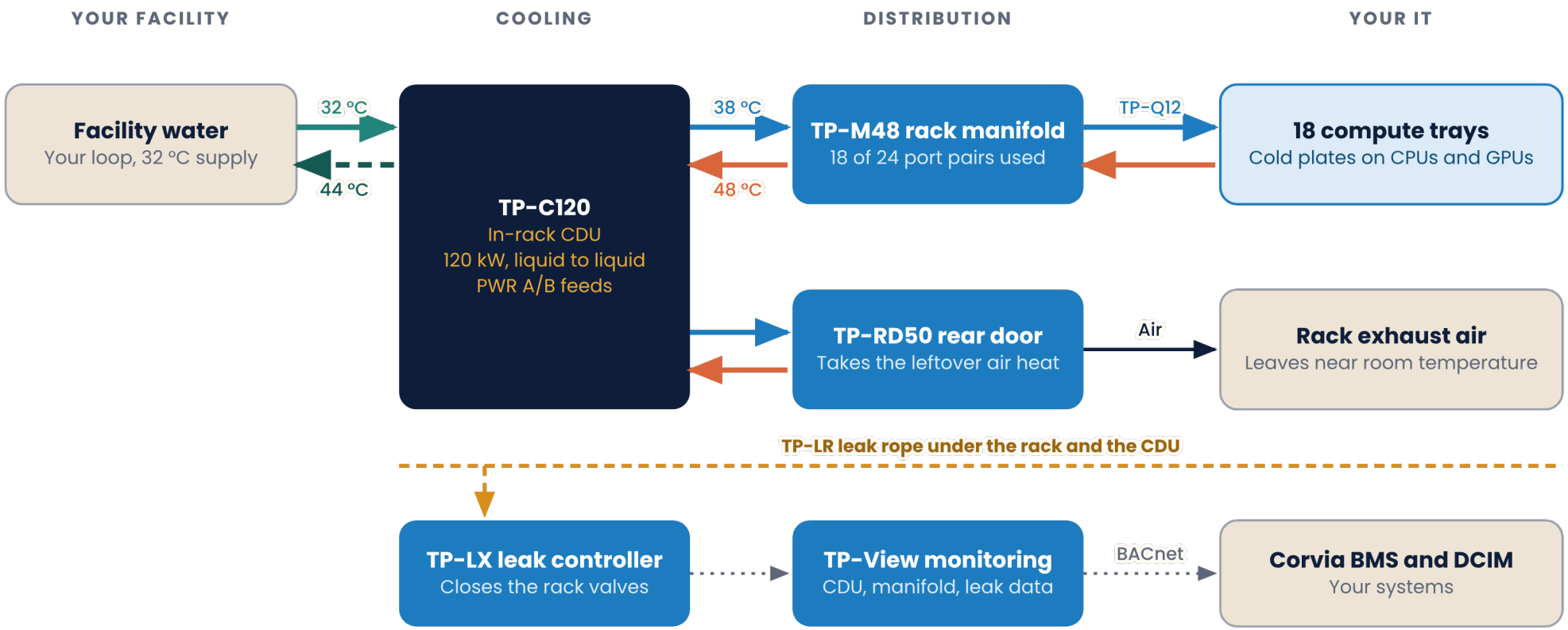
18 pairs used, one per compute tray

6 pairs free with no new manifold

8-10 L/min per tray at full load

Design 1: Pilot rack

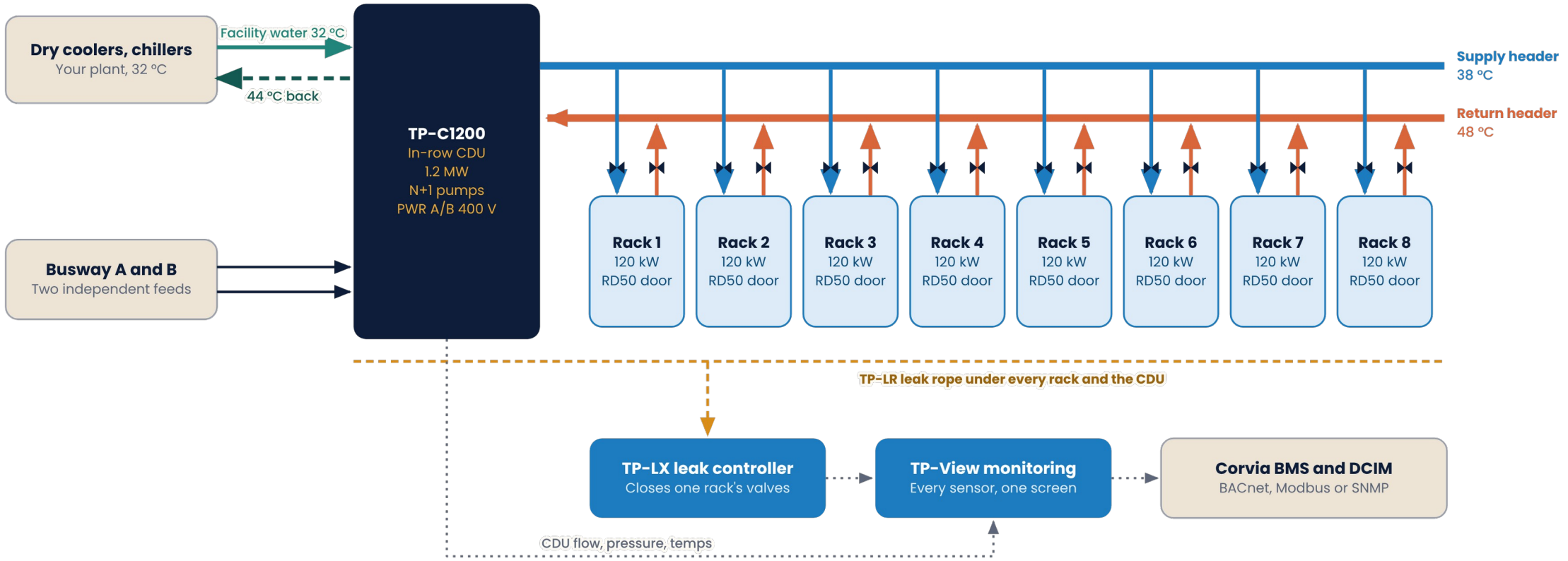
One rack with its own in-rack CDU. Proves cooling, leak response and the BMS link before the row goes in



One rack, full load, before a single GPU arrives. This is the evaluation kit in section 10.

Design 2: One AI row, the Hall C proposal

One in-row CDU feeds eight 120 kW racks. Valves at every drop, rear door and leak coverage on every rack



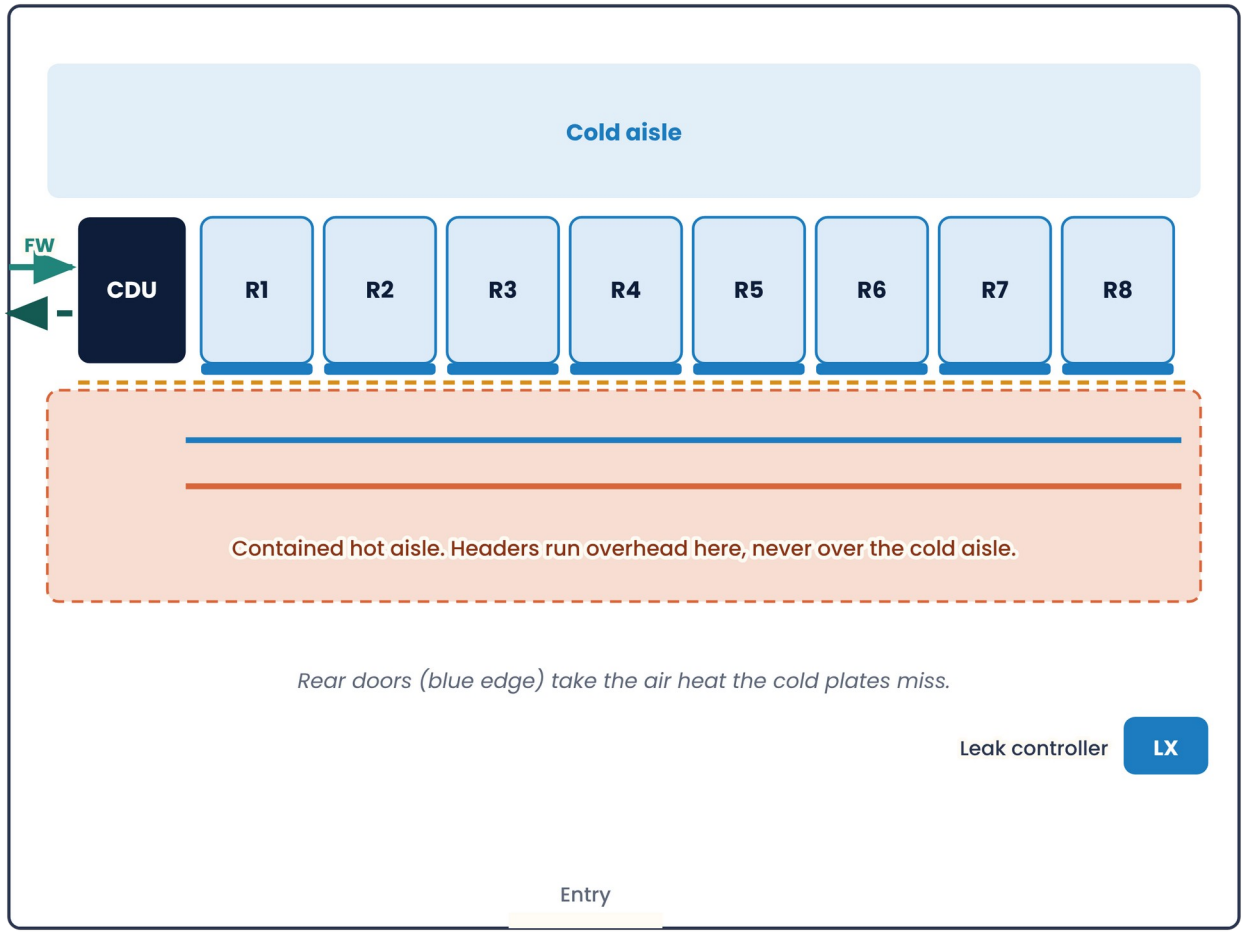
⋈ TP-V isolation valves at every drop: one rack can be shut off while the row keeps running

8 racks x about 102 kW to liquid = 816 kW on a 1.2 MW CDU. Room for three more racks on the same unit.

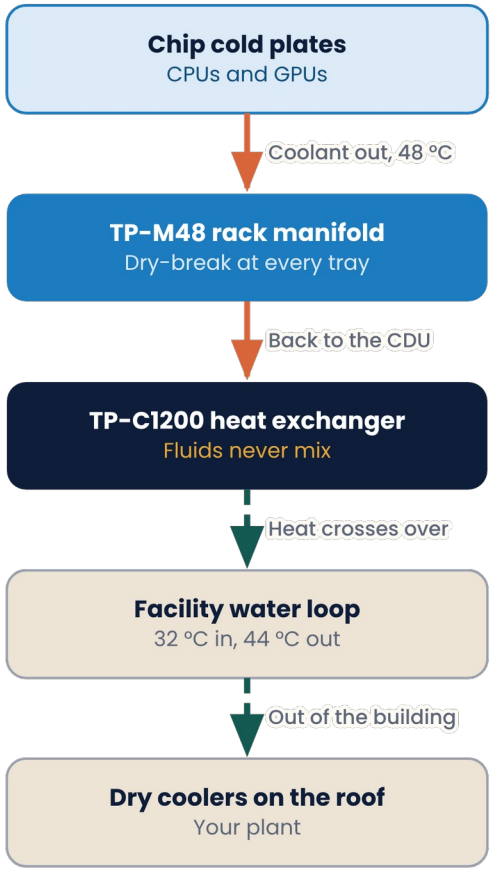
Row layout and the heat path

Headers run overhead in the contained hot aisle, never over the cold aisle

AI ROW, TOP VIEW

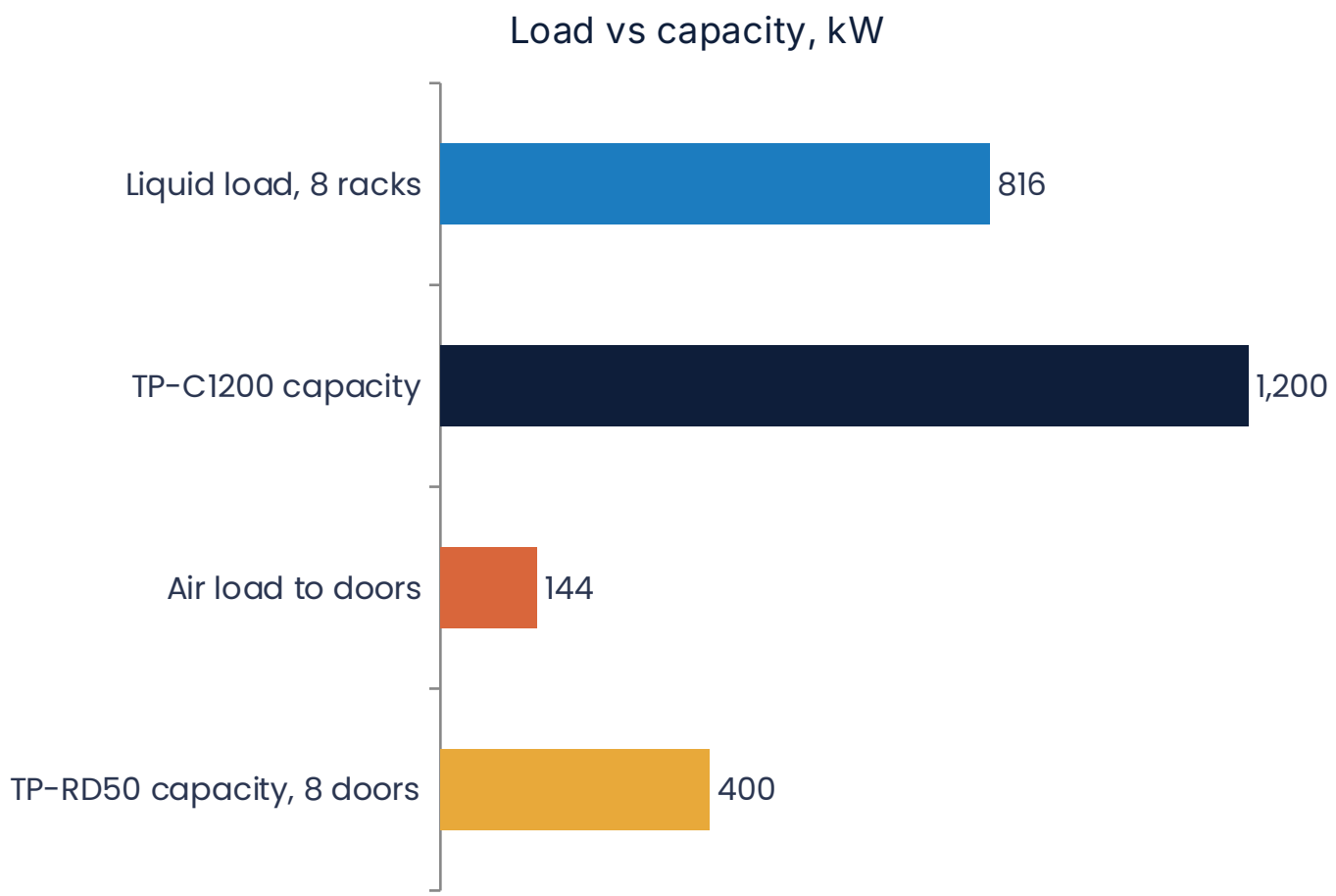


THE HEAT PATH



Where one row’s heat goes

Example load from typical AI servers. We redo this from your server specs before the quote



384 kW

headroom on the same CDU. About three more racks

85 / 15

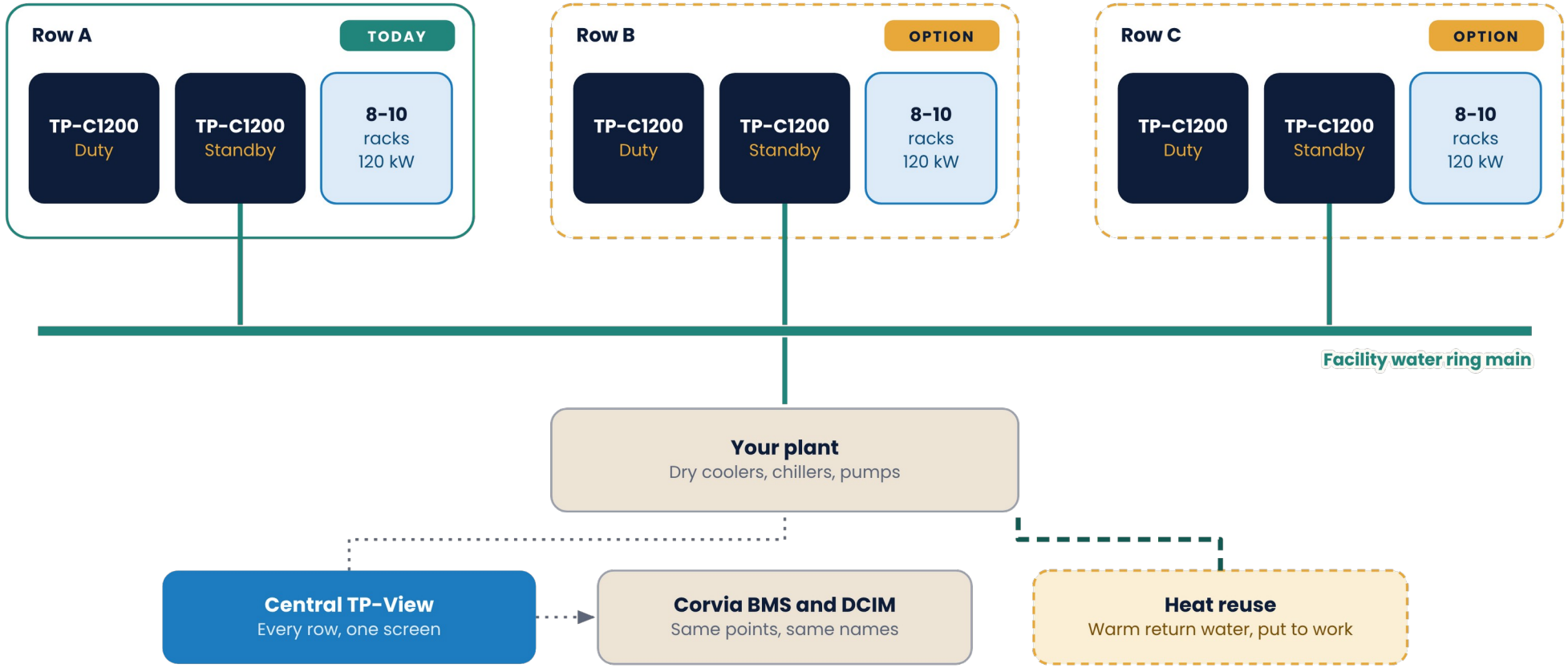
split of each rack’s heat between liquid and air

8 × 120

racks and kW per rack, as drawn

Design 3, option: the whole hall

Each row gets two CDUs for N+1. A facility water ring main joins them to your plant



Two loops. Each has its own rules

Your facility water and our server coolant meet only inside the CDU

Facility water (FW): yours

Runs	Your plant to each CDU
Temps	32 °C in, about 44 °C back
Flow	About 1,500 L/min per CDU
Fluid	Your treatment, untouched
Tap	DN100 grooved at the CDU

Server coolant (TCS): ours

Runs	CDU to every cold plate
Temps	38 °C supply, 48 °C return
Flow	About 1.5 L/min per kW
Fluid	PG25, filtered to 50 µm
Build	316 stainless, EPDM hoses

Rules for every loop

- Fluids never share a pipe. The plate heat exchanger is the only place they meet.
- Blue is supply, red is return, everywhere. Couplings are keyed so they cannot swap.
- Every header, drop and hose is pressure-tested at 1.5x working pressure, flushed and capped before it ships.

Every pipe, hose and connection

Short hoses at the rack. Stainless headers everywhere else

Part	Where it goes	Guidance
FW mains	Your plant to the CDU	Your pipe and spec. DN100 grooved at the CDU
TCS headers	CDU to the row, overhead	316 stainless, DN80. Pressure-tested before it ships
Rack drops	Header to TP-V valves	1.5" braided hose, cut to your drawings
Tray hoses	Manifold port to server	EPDM, 1/2", TP-Q12 on both ends
Leak rope	Under every rack and the CDU	TP-LR on clips, away from joints you cannot reach
CDU power	Busway A and B	2x 400-480 VAC, 3-phase, internal transfer
Monitoring	CDU, TP-LX, doors to TP-View	Your management VLAN. RJ45 or RS-485

Pilot rack for Corvia

Design 1 with a 120 kW liquid load bank in place of servers. Quantities are a starting point

Item	Part	Qty
In-rack CDU	**TP-C120**	1
Rear rack manifold	**TP-M48**	1
Isolation valve set	**TP-V**	1
Dry-break couplings, pairs	**TP-Q12**	24
Rear-door heat exchanger	**TP-RD50**	1
Leak controller / ropes	**TP-LX / TP-LR**	1 / 2
Liquid load bank, 120 kW	**TP-LB120**	1
Monitoring, pilot license	**TP-View**	1
Coolant, PG25	**PG25**	200 L
Fill and service cart	**TP-FILL**	1

How it ships

- Pressure-tested, flushed and capped
- CDU set to your temps, on your network
- Every part labeled to the drawing
- Arvane engineer on site to fill and start

To decide with Corvia

- Pilot length and terms. We suggest six weeks
- Rack position and facility water tap
- Who from your team runs the tests

What a pass looks like

We draft this list. Corvia edits it. The pilot passes when their team checks every line

1. Holds 38 °C supply at 120 kW for 72 hours
2. Rack ΔT stays between 8 and 10 K
3. Pull one pump: the other carries full load
4. Release a TP-Q12 under flow: nothing on the pad
5. Wet the rope: alert in seconds, valves close
6. Every point in the BMS with the agreed names
7. Facility water stays inside agreed temps
8. Change a filter with the loop running

Production kitting: one crate per rack

Arvane builds, pressure-tests and labels each rack kit, then ships it to your integrator ready to install

1. Order
One kit per rack

2. Build
Cut to your drawings

3. Test
1.5x working pressure

4. Flush and cap
Clean, dry, sealed

5. Label and pack
By row, rack, port

6. Ship
Serials and test reports

Kit numbers

- KIT-RACK-DLC: manifold, valves, hoses
- KIT-RDHX: rear door with hoses
- KIT-ROW-8: CDU, headers, 8 racks
- KIT-LEAK and KIT-FILL

In every crate

- Parts for that rack position
- Labels by row, rack and port
- Packing list and rack drawing
- Pressure test report with serials

What your integrator gets

- One kit per rack type to stock
- Serial list for DCIM records
- No cutting or fitting on the floor
- Optional spares kit per row

Open items before the quote

Corvia’s decisions on the left. What Arvane confirms on the right

For Corvia to decide

- Facility water supply temp and the row 1 tap
- Headers overhead or under the floor
- Rack density target. 120 kW is drawn
- Rear doors on every rack, or only where needed
- N+1 inside one CDU, or two CDUs per row
- Coolant: PG25 or treated water
- BMS link: BACnet or Modbus

For Arvane to confirm

- Heat load per rack from your server specs
- Pipe sizes and pressure drop, end to end
- CDU power against your busway
- Lead time for each kit, in writing

From design review to a cool row

Nine weeks to a firm quote, with a pilot rack in the middle

1

WEEK 1

Design review

2

WEEK 2

Site walk

3

WEEKS 3–8

Pilot rack

4

WEEK 9

Final design and quote

5

AFTER PO

Kits built and shipped

6

GO LIVE

Fill, flush, load test

Account lead

Proposal and quote
sales@arvane.example

Applications engineer

Design and pilot
design@arvane.example

Kitting and commissioning

Build, test, fill, start-up
kits@arvane.example

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THERMAL

Cool every AI rack in Hall C. Keep the hall you have.

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Concept build for a portfolio. Company, customer, products and specs are fictional.