Carel Vision for Datacenter Ecosystem

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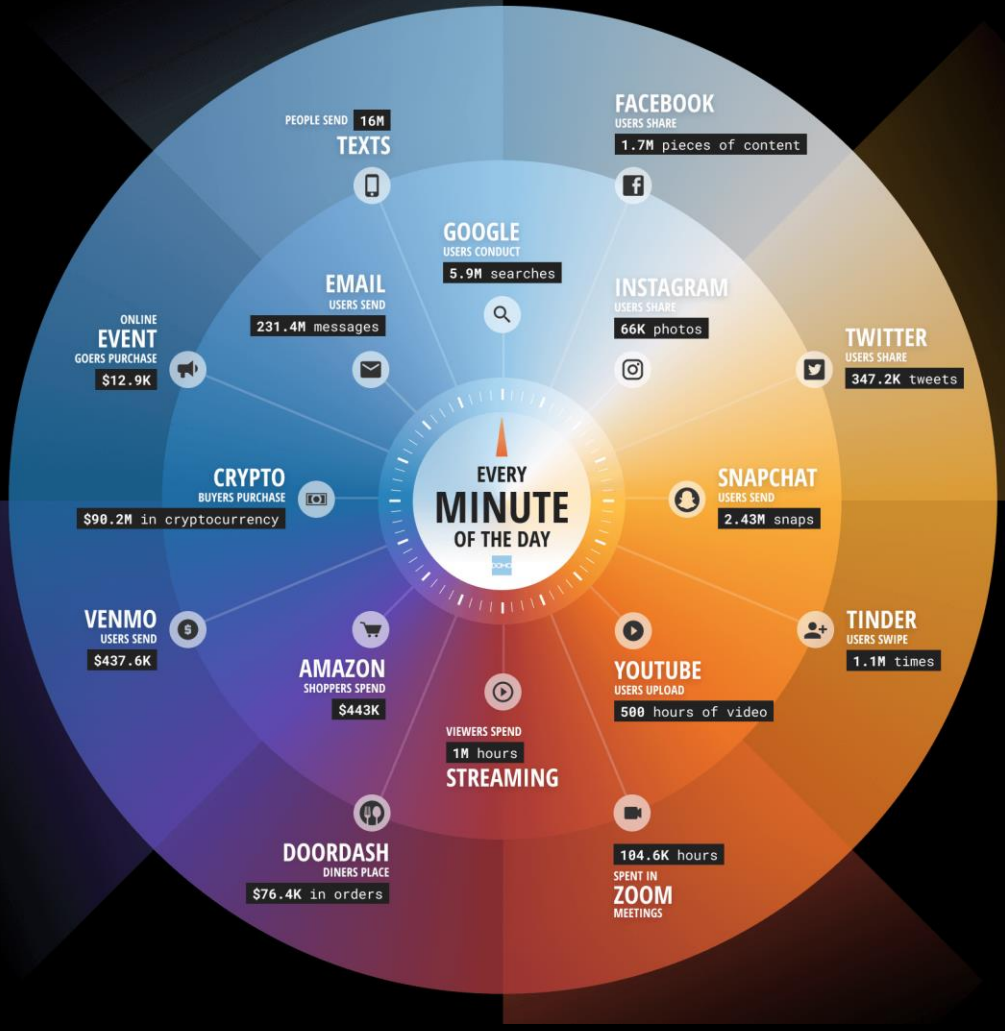
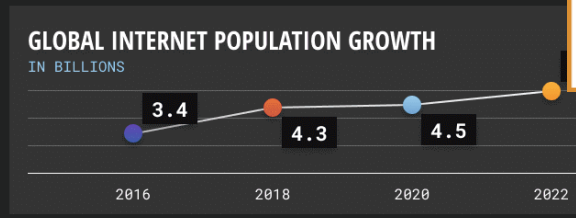




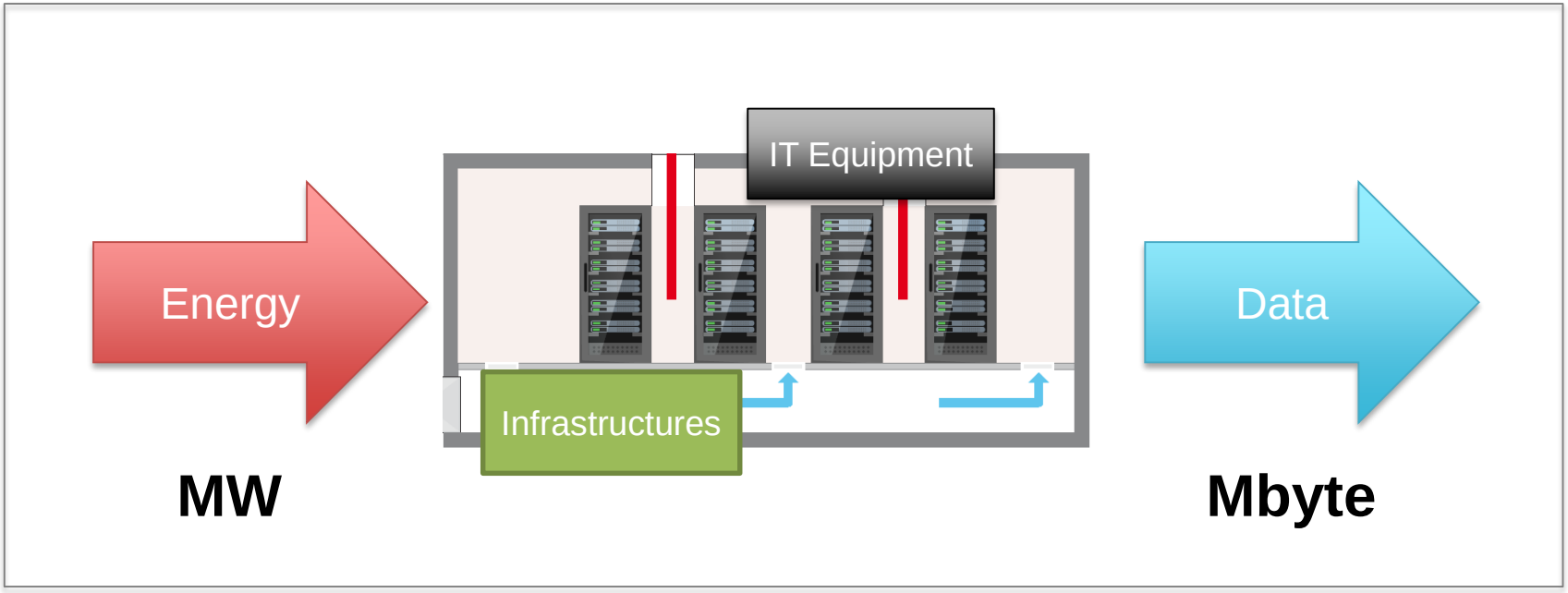
As of April 2022, the internet reaches 63% of the world's population, representing roughly 5 billion people. Of this total, 4.65 billion - over 93 percent - were social media users. According to Statista, the total amount of data predicted to be created, captured, copied and consumed globally in 2022 is 97 zettabytes, a number projected to grow to 181 zettabytes by 2025.

Data are more and more present in our daily life

Emerging technologies are using **data**

2023 Gartner Emerging Technologies and Trends Impact Radar

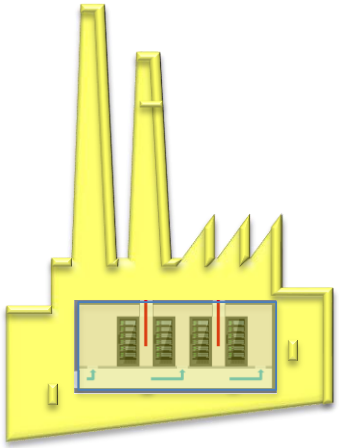
What is a Datacenter?



$$PUE = \frac{\text{total power}}{\text{IT power}}$$

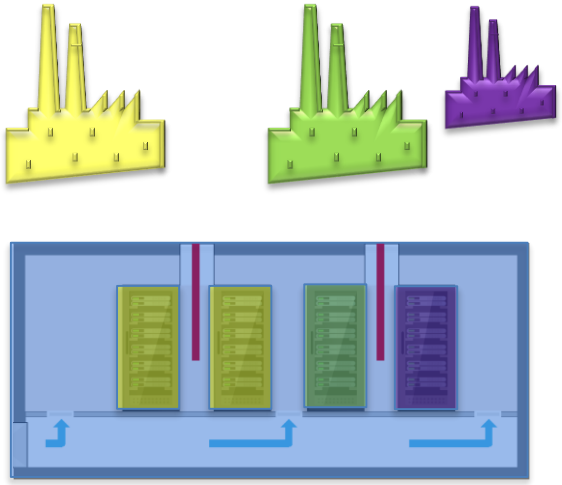
Datacenter business models

Enterprise datacenter



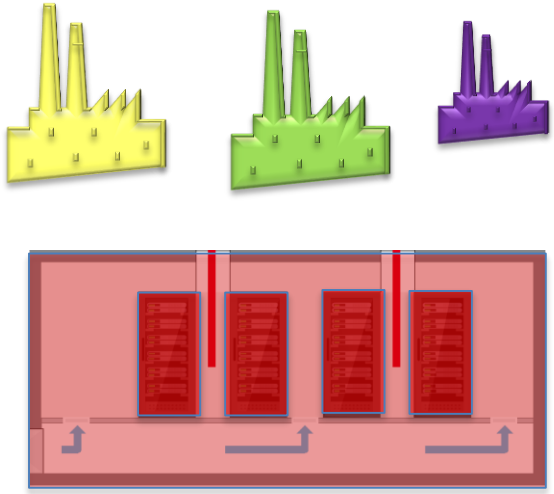
Fully owned

COLO (Common Location)



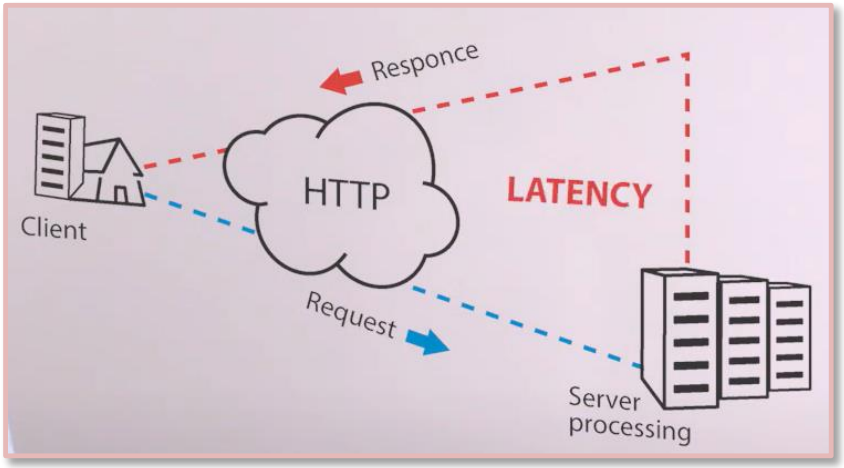
Infrastructure rental

Cloud Computing

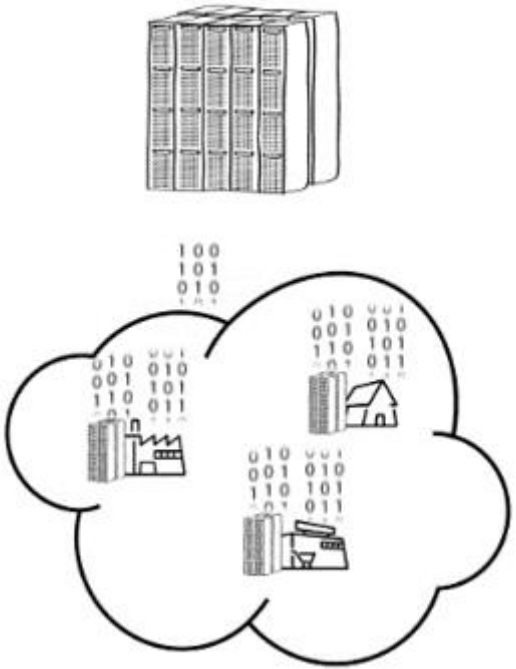


Web Service

An emerging paradigm



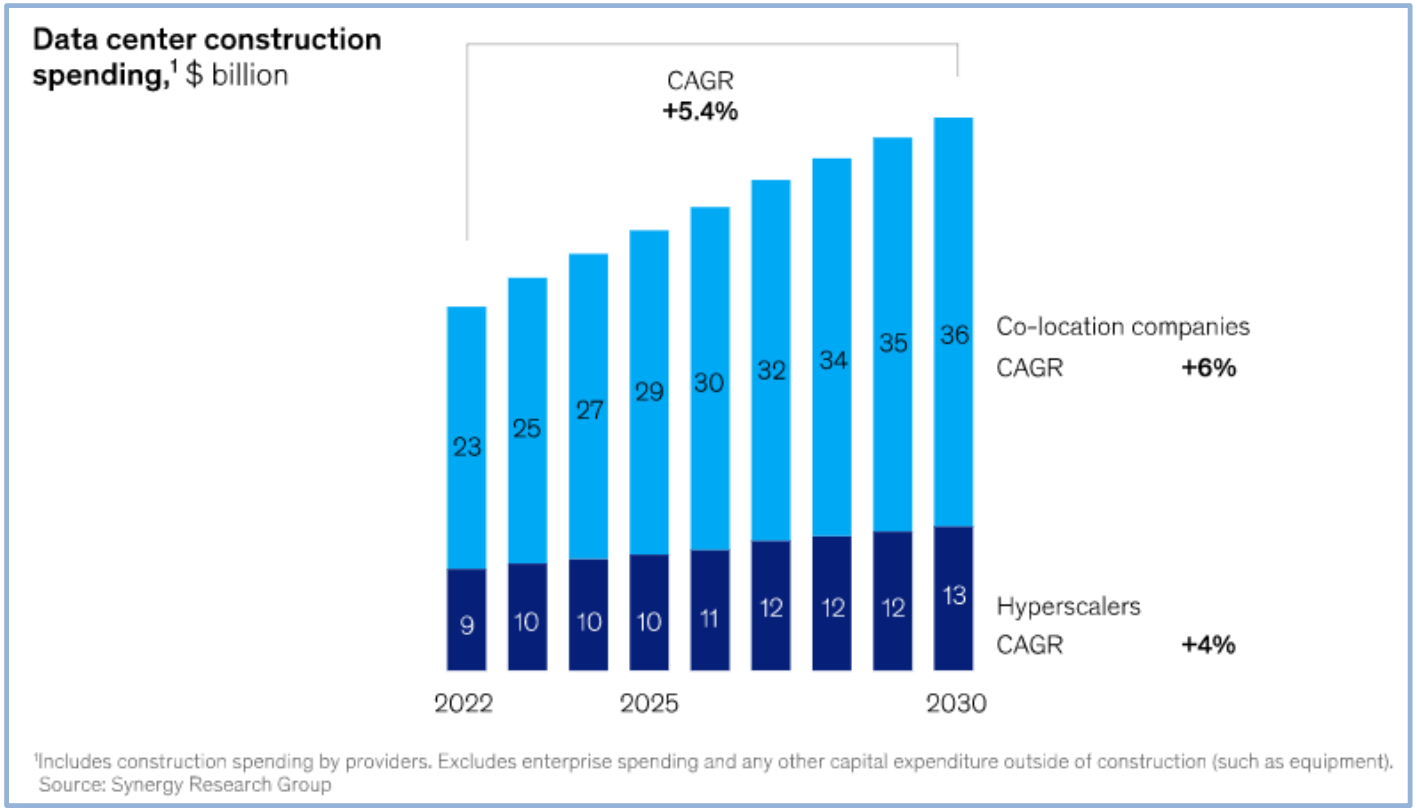
EDGE Datacenter



Datacenter types

DC TYPE	FEATURES	GOOD FOR
Edge	• Small scale, located near to user • Low latency • Customizable, compact, situated within entity premises	• IoT, AV, VR, AR, edge computing
Enterprise	• Owned and operated by user • Can be on-premises or off-site • Declining share of market	• Privacy and security, companies with unique network requirements
Colocation ('colos')	• Large facilities • Multiple customers lease space in one location • Flexible and scalable	• Companies without resources to own bespoke DC, companies wanting multiple hardware locations
Hyperscale	• Massive, scalable facilities, housing thousands or millions of servers • Owned and operated by user	• Large multi-national corporations and big tech, e.g. Amazon

A fast growing market



Source: McKinsey & Company

DATA CENTER TRENDS

Trend	**Sustainability**	**Flexibility**	**High density niche growing**	**Decentraliza**
Background	 ESG, reputation regulations	 Geopolitical turbulence- hybrid strategies	 Dedicated supercomputers HPC	 Self driving cars, smart grids, digital twin
Development	**Energy Saving solutions, Energy retrofits**	**Different solutions and technologies**	**Liquid cooling emerging**	**Datacenter in all locations; cooling is still necessary**

Data centre air conditioning

Air conditioning of data centres guarantees service continuity in these essential yet extremely energy-intensive infrastructures. The types of systems used differ according to local climatic conditions and the characteristics of the buildings.

- 50 years of innovations in cooling technology;
- multiple product platforms designed for energy savings;
- specific knowledge of data centre applications and collaboration with manufacturers in identifying the best solution.

It is estimated that this sector accounts for around 1.5% of world energy demand***. Sustainability and energy saving objectives can be achieved through continuous improvement of cooling solutions, which starts by adopting innovative high-efficiency technologies.

*** International Energy Agency (iea.org)

Plate air-to-air heat exchangers

Rotary air-to-air heat exchangers


Dampers


Monitoring systems


Programmable controllers


Steam humidifiers


Sensors and protection devices


Evaporative cooling units

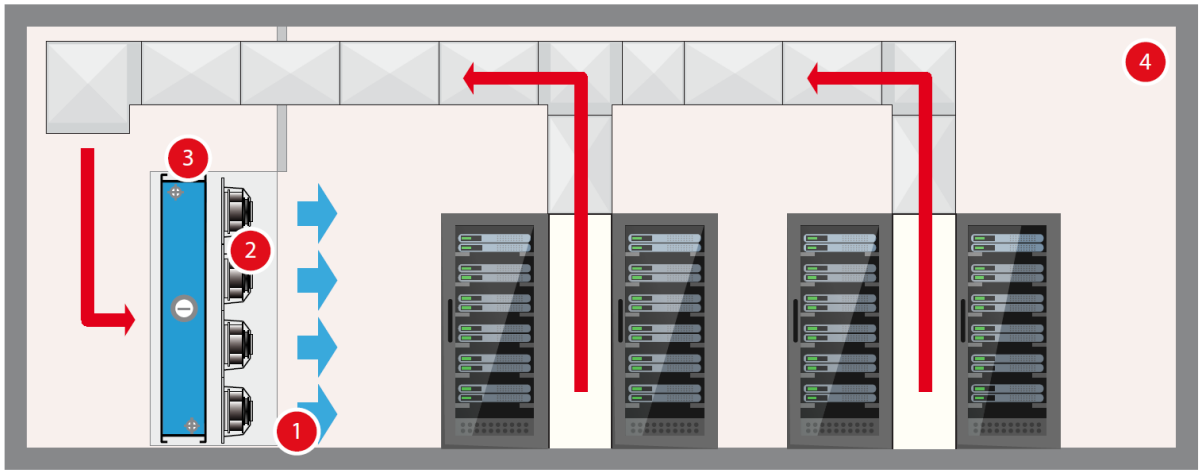

Adiabatic humidification systems


Electrical panels


Compressor inverters and electronic expansion valves

CAREL Value Proposition for Datacenter

1 Air recirculation with CRAC/CRAH and Cooling wa



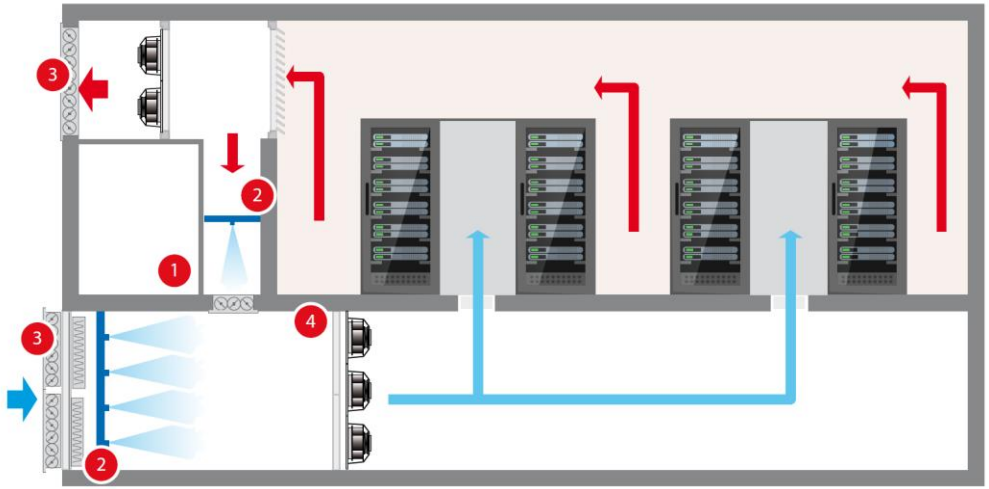
1 ⇨ Controller

2 ⇨ Sensors

3 ⇨ Dampers

4 ⇨ Adiabatic Hum.

2 Solutions for direct freecooling + DEC

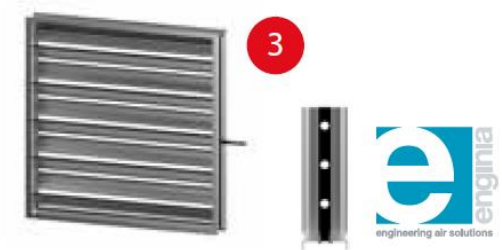


1⇨ Water treatment

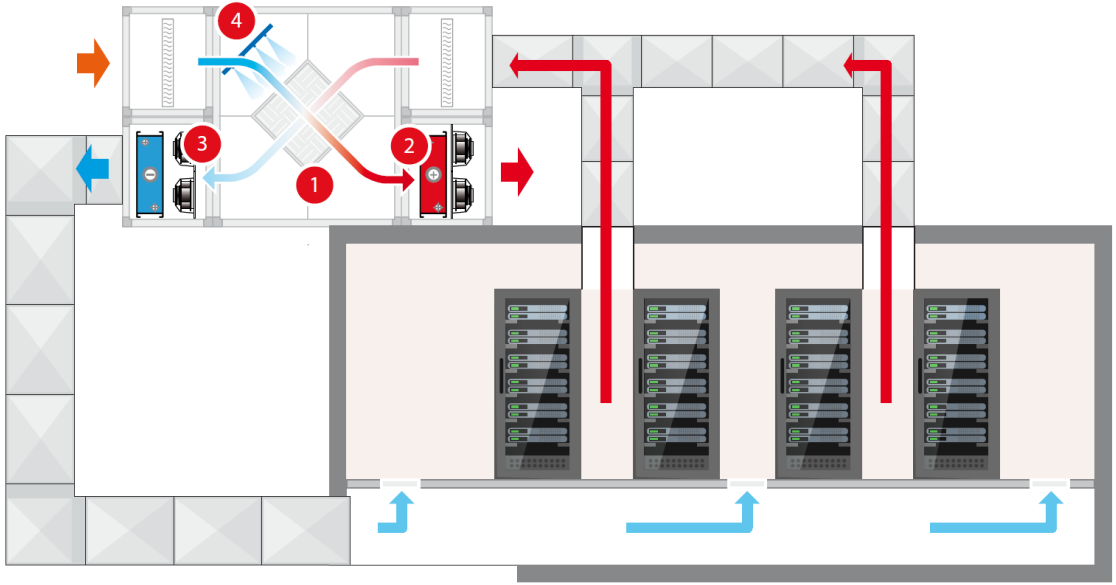
2⇨ Adiabiatic Hum.

3⇨ Dampers

4⇨ Controller



3 Solutions for indirect freecooling + IEC

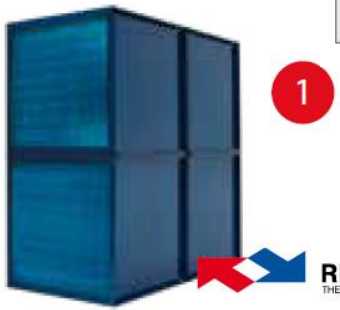


1⇨ Air to air Heat exchanger

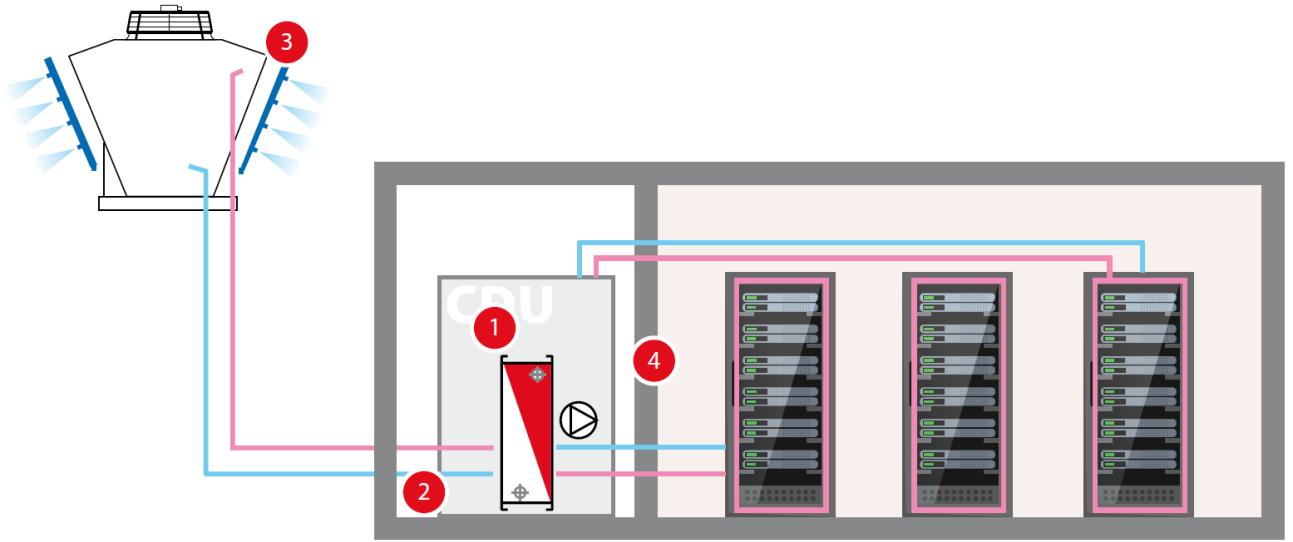
2⇨ High efficiency DX technologies

3⇨ Controller

4⇨ Atomizer for Evaporative Cooling



4 Solutions for liquid cooling and pumped ref. system



1 ⇨ Flooding sensor

2 ⇨ Controller

3 ⇨ Evaporative Cooler for outdoor Heat Rejection

4 ⇨ Intelligent Connection device

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