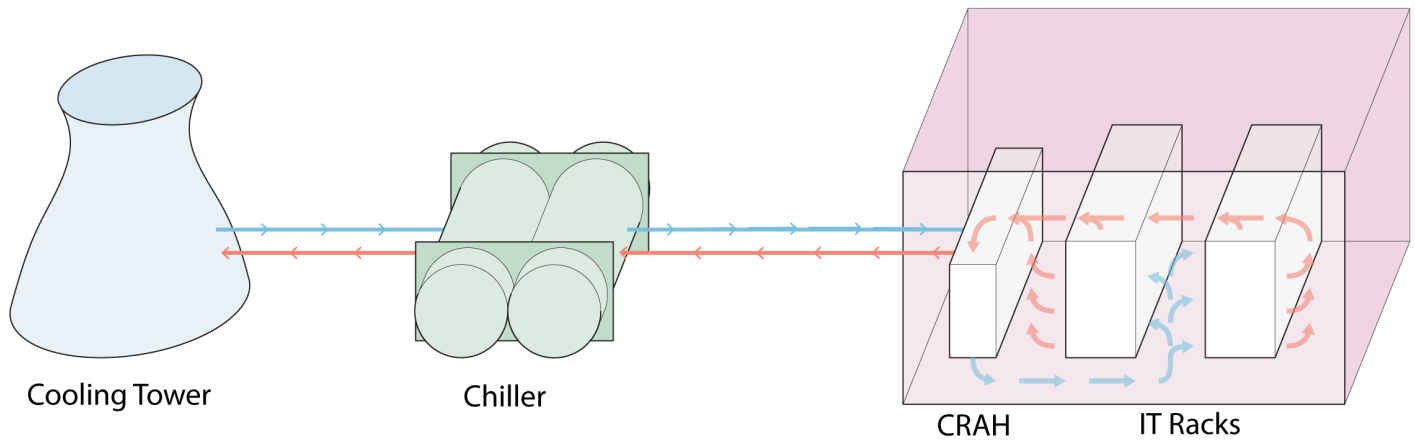


# Liquid Cooling



Liquid cooling is a data center cooling method that uses liquid coolants (often water) to absorb heat from computing equipment. This method can appear in a variety of ways.

One type of liquid cooling, illustrated above, is called [evaporative cooling](#), and uses [cooling towers](#) to draw hot air through water-saturated media, with the water's evaporation absorbing heat from the air. The cooling tower is used to cool the [chiller](#)'s condenser water, allowing the chiller to circulate colder water to the computer room, where it is either circulated directly through the IT racks or, in a hybridized system using [air cooling](#), supplied to the [CRAH](#). Another variant of liquid cooling is [immersion cooling](#), in which servers and IT equipment are directly submerged in a [dielectric fluid](#) coolant to remove heat.

In terms of liquid supply, liquid cooling can use either a [closed-loop](#) or an [open-loop](#) system. Closed-loop systems are more expensive to implement, but recirculate the coolant to reduce water use and prevent contamination. Open-loop systems are more cost-effective, but use water only once before disposing of are more water-intensive and involve a higher risk of environmental contamination.

Liquid cooling (excluding the immersion cooling variant) is used by about 16% of data centers. Compared to air cooling, liquid cooling is more energy-efficient and is equipped to handle larger, higher-density servers.

On average, liquid-cooled data centers (excluding immersion cooling) have a [power usage effectiveness](#) of [1.38](#), and a relatively inefficient [water usage effectiveness](#) of [1.90](#), not considering their [indirect water use](#).

Depending on their location, some data centers can take advantage of existing water features to reduce energy consumption. For example, in [Marseille, France](#), Interxion uses a form of liquid-

based [free cooling](#), sourcing water from a tunnel that carries flowing water at a natural, consistent temperature of 15C. Although the water still requires some filtration, the facilities bypass the need for extensive cooling processes, improving its [power usage effectiveness](#) to [1.11](#).

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Revision #7

Created 8 September 2025 22:12:31 by Caroline

Updated 17 September 2025 20:09:04 by Caroline