

Innovative cooling solutions reduce datacenter water consumption

As more people and businesses rely upon technology to stay connected, informed, and productive, digital needs around the globe are growing. That digital transformation is driving the growth of cloud services and the datacenters that deliver that technology.

Microsoft is committed to responsible use of resources to operate our datacenters, including water. As a company, Microsoft has committed to being water positive by 2030. Microsoft will reduce the water we use in our operations in every way we can. We will also replenish more water than we use into ecosystems around the world.

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Cooling datacenters

Microsoft datacenters house thousands of servers to deliver cloud services to our customers around the world. Those servers generate heat during normal operation, and the heat needs to be dissipated so servers don't overheat, which could cause downtime and loss of data.

There are several methods for cooling the heat generated by servers. The most efficient cooling method is to use outside air to cool the datacenter. Outside air can be used up to 85 degrees Fahrenheit, 29.4 degrees Celsius. Cooler, northern climates are well-suited for this cooling method, but it also can be used in warmer climates. For example, our datacenters in Sweden can use outside air nearly year-

round, and our datacenters in Arizona can use outside air for two-thirds of the year.

Utilizing outside air for cooling requires minimal energy use and no water use for operations. But when the temperature of outside air rises above the 85F/29.4C degree threshold, other cooling systems that use energy and water are needed.

One of the more efficient cooling methods is adiabatic cooling. In this method, air handler units (AHUs) push air over evaporative media to add humidity to the air and lower the air temperature. This method is the most efficient use of water for cooling when compared to cooling towers or indirect evaporative cooling. Adiabatic cooling uses minimal energy.

Datacenters can also be cooled by air-cooled chillers, where air handlers push air over refrigerant-filled coils to cool the air. This method can be used in any climate, regardless of temperature or humidity, and eliminates water usage. There is more energy consumption with this cooling method.

Water innovations

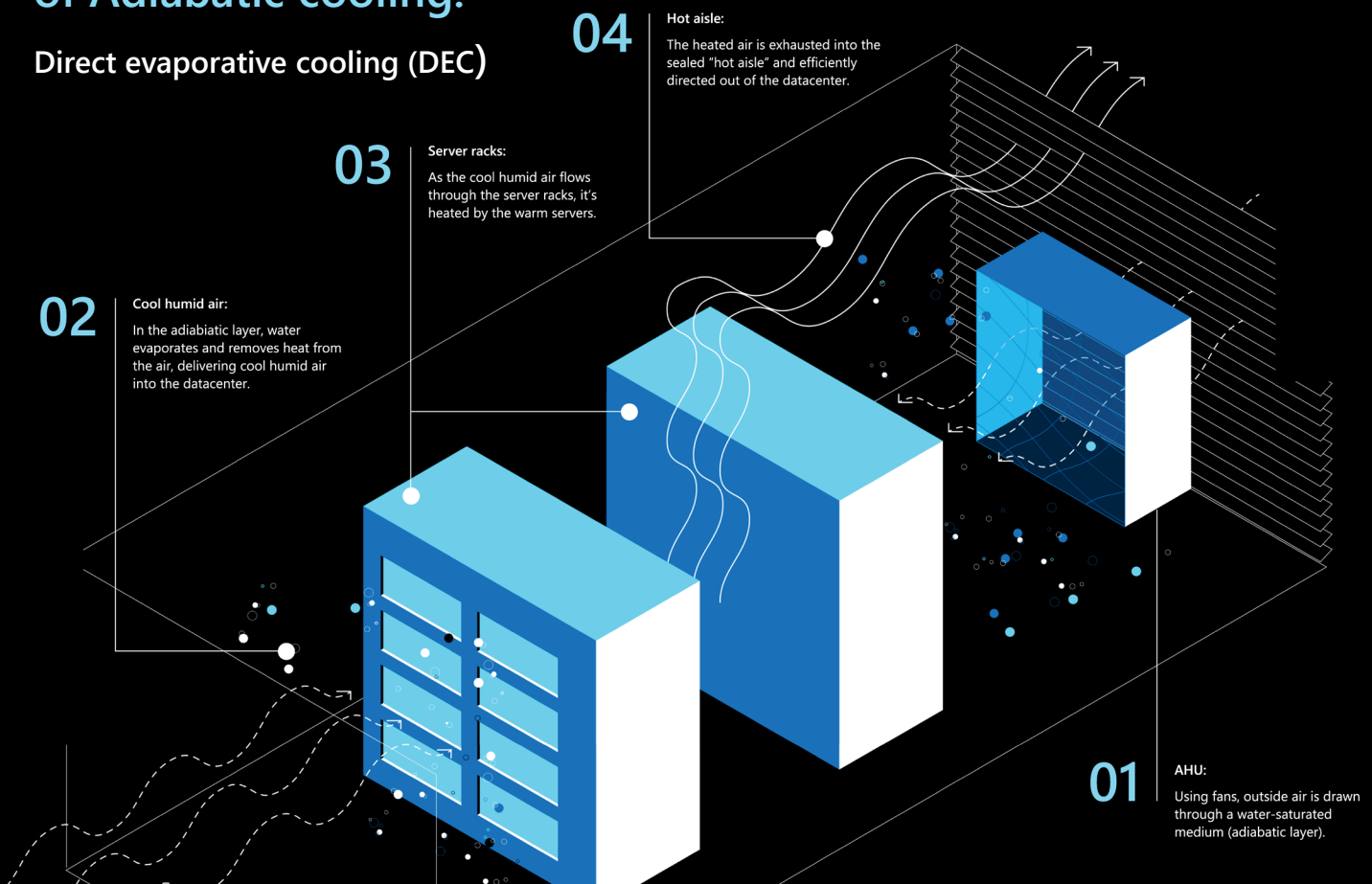
As we pursue our commitment to be water positive by 2030, we are investing in innovations to reduce and replenish our water use.

In Quincy, Washington, we helped the city build a water reuse utility. The facility processes and recycles cooling water for our data centers, significantly reducing our reliance on the municipal water supply.

At our datacenters in Gävle, Sweden we have built a system to capture rainwater. This water is used to provide humidity to air in the datacenter when humidity in the outside air drops below five percent. This system reduces our reliance on the municipal water supply.

A closer look at one type of Adiabatic cooling:

Direct evaporative cooling (DEC)



Learn more about our sustainability programs and climate goals across the areas of water, waste, carbon and ecosystems. [View the full infographic](#)