Microsoft

Responsible water use at our datacenters is a key part of our Datacenter Community Pledge and our corporate commitments

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 are making progress against our target to improve water use efficiency by 40% from a 2022 baseline across our global owned datacenter operations by 2030. We will also replenish more water than we use into ecosystems around the world.

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.

Maximizing cooling efficiency in existing and new datacenters

We design our datacenters to use as little water as possible. In many locations, datacenters can cool their systems using outside air for most of the year.

When we do use water for cooling, we work with local utilities to make sure that our water usage doesn't strain the community supply. That might mean investing in necessary infrastructure to support datacenter cooling, such as water pipes or pressure systems. Microsoft pays for these upgrades. We take responsibility for sourcing any water we use so our datacenters don't reduce the community's water supply or raise utility bills.

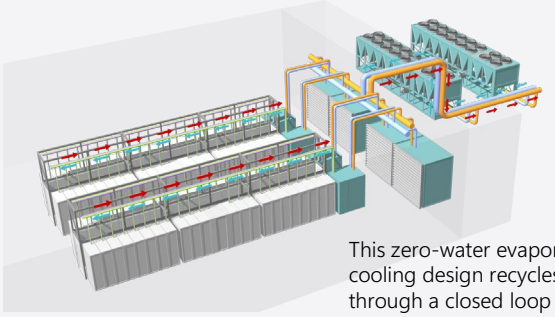
The datacenter cooling method is determined during the design phase and incorporates factors like climate, water availability, and what type of datacenter is needed. There are a couple types of datacenter cooling.

Air-cooled-only server cooling

- Outside air is utilized for cooling our datacenters that house air-cooled servers.
- Air is used either directly when outdoor air temperatures are below 85 degrees Fahrenheit (29.4 degrees Celsius) or with the assistance of evaporative media when outside air temperatures exceed this threshold.
- For example, our datacenters in Sweden can use only outside air year-round, while our datacenters in Arizona can use only outside air for approximately 40% of the year and utilize evaporative cooling for the remainder of the year.
- Outside-air-only cooling doesn't use any water.
- During evaporative cooling mode, air is pulled over wetted evaporative media to add humidity to the air and lower the air temperature.
- Utilizing outside air with evaporative cooling requires minimal energy use, as it doesn't require compressors for cooling.
- When local conditions such as water scarcity prevent us from using cooling system that require water, we use air-cooled chillers.

Liquid-to-chip type cooling

- Our newest datacenter designs are optimized to support high density GPU workloads and consume zero water for cooling.
- The design brings cooling directly to the source of heat generation—to the chip itself.
- For these type of datacenters, we use air-cooled chillers or water-cooled chillers with fin fan units.
- Heat from a chip is removed by transferring it to a liquid, which is then conveyed through the cooling system back to either water-cooled or air-cooled chillers.
- These cooling systems utilize a closed-loop water system, ensuring no additional water is required after the initial fill during startup.



This zero-water evaporated for cooling design recycles water through a closed loop system.

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 datacenters, significantly reducing our reliance on the municipal water supply.
- In 2023, we expanded our usage of alternative water sources, such as reclaimed and recycled water, in Texas, Washington, California, and Singapore, further reducing our dependence on freshwater supply.*
- We are harvesting rainwater to partially offset cooling and humidification needs at our Netherlands and Ireland datacenters, and to offset humidification at our Sweden datacenters.*
- Rainwater harvesting is also part of the design for new datacenters in Canada, England, Finland, Italy, South Africa, and Austria.*

*Microsoft 2024 Environmental Sustainability Report