Reducing Water in Data Centers

Amazon Web Services (AWS) has always focused on efficiency and continuous innovation in our data centers to improve operational excellence and reduce our impact on the environment.

In addition to our efforts on energy efficiency and our goal to achieve 100% renewable energy for our global infrastructure, AWS has multiple initiatives to improve our water use efficiency and reduce the use of potable (drinking) water for cooling data centers. AWS develops our water use strategy by evaluating climate patterns for each AWS Region, local water management and availability, and the opportunity to conserve drinking water sources. Taking a holistic approach, we assess both the water and energy usage of each potential cooling solution to select the most efficient method.

Evaporative Cooling

When possible, AWS incorporates direct evaporative technology for cooling our data centers, significantly reducing energy and water consumption. During cooler months, outside air is directly supplied to the data center without using any water. During the hottest months of the year, outside air is cooled through an evaporative process using water before being pushed into the server rooms, and we have optimized our cooling systems to use minimal water. AWS is constantly innovating the design of our cooling systems to further reduce water use, and we utilize real-time sensor data to adapt to changing weather conditions.

local drinking water sources. In Northern Virginia, AWS was the first data center operator to be approved to use recycled water with direct evaporative cooling technology. We partnered with Loudoun Water to demonstrate the benefits of recycled water for industrial cooling applications, and shared our operational best practices for utilizing recycled water in our data centers. In the AWS U.S. West (Oregon) Region, we have partnered with a local utility to use non-potable water for multiple data centers, and we are retrofitting AWS data centers in Northern California to use recycled water.

The process for utilizing recycled water begins when wastewater from residential and industrial customers is treated at a local facility and redistributed through its own piping infrastructure. Recycled water has to meet stringent health standards and safe surface discharge standards.

AWS is working with local utilities to expand distribution infrastructure and drive faster implementation and adoption of recycled water for data center cooling applications, in order to reduce our usage of potable water.

On-Site Water Treatment

AWS is implementing on-site modular water treatment systems in multiple regions. As water is cycled through evaporative cooling units, minerals build up as water evaporates, eventually reaching a level of concentration that requires replacement with fresh water. On-site water treatment allows us to remove scale-forming minerals and reuse water for more cycles. Increasing our “cycles of concentration” allows us to continue to reduce water intake for cooling our data centers.

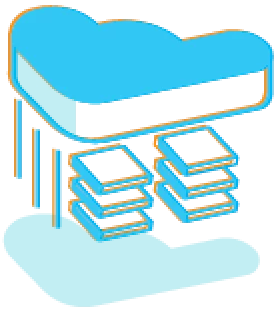
water efficiency metrics to determine and monitor optimal water use for each AWS Region, and we employ a data-driven approach to select the most effective water reduction technologies. Water metrics from each of our Regions help AWS evaluate technologies and understand the long-term impacts on our water usage, in order to increase efficiency as our infrastructure grows and we expand to new regions.

We are partnering with utilities to connect directly to utility water meters, and we are also installing our own meters to track real-time water usage to provide consistent data for our operations and sustainability teams. By analyzing this data, AWS can identify opportunities to reduce water usage and rapidly make operational changes, rather than waiting for bills or usage reports.

AWS will continue to implement these strategies and test new technologies in order to reduce our water consumption and conserve potable water sources. Saving water is good for the environment and also benefits our customers as we increase our operational efficiency.

TAP TO RESPOND

- Extremely Helpful
- Very Helpful
- Somewhat Helpful
- Slightly Helpful
- Not Helpful



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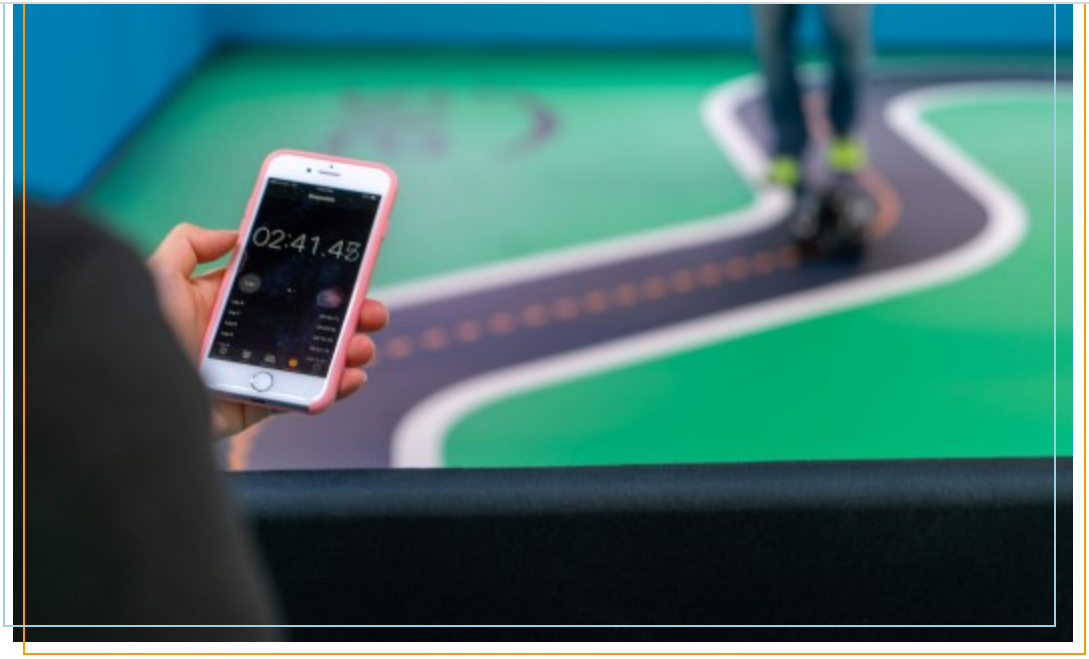

Machine learning for kids

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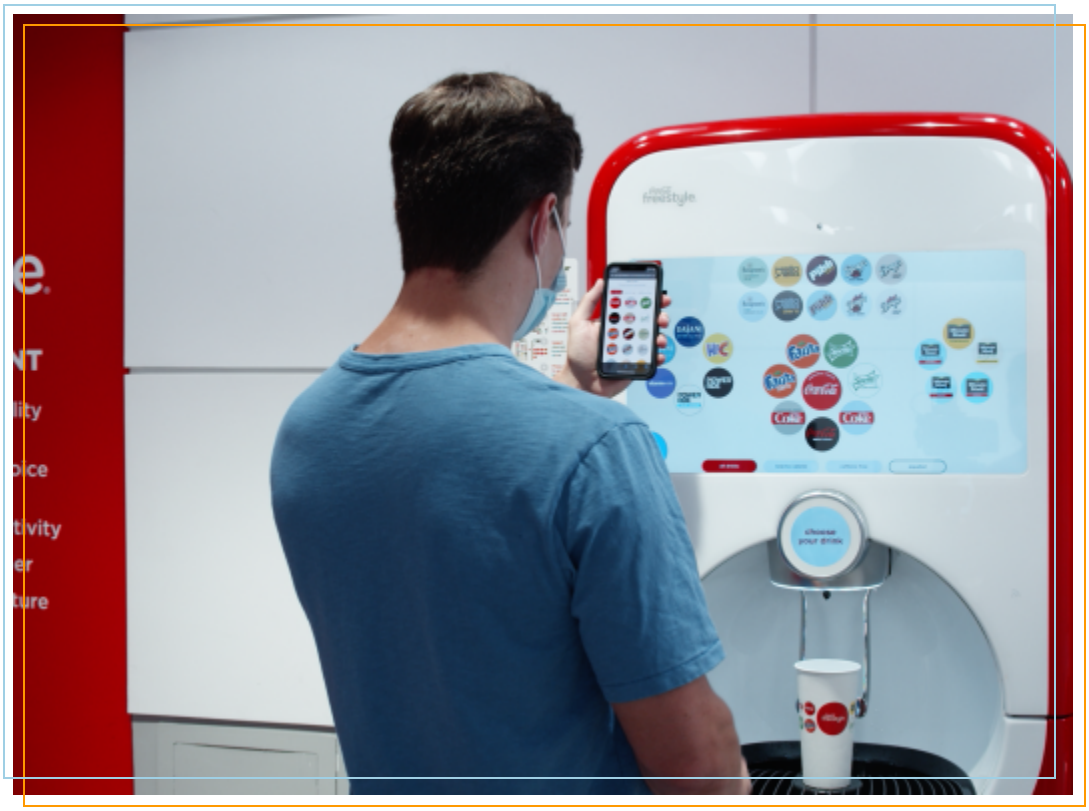

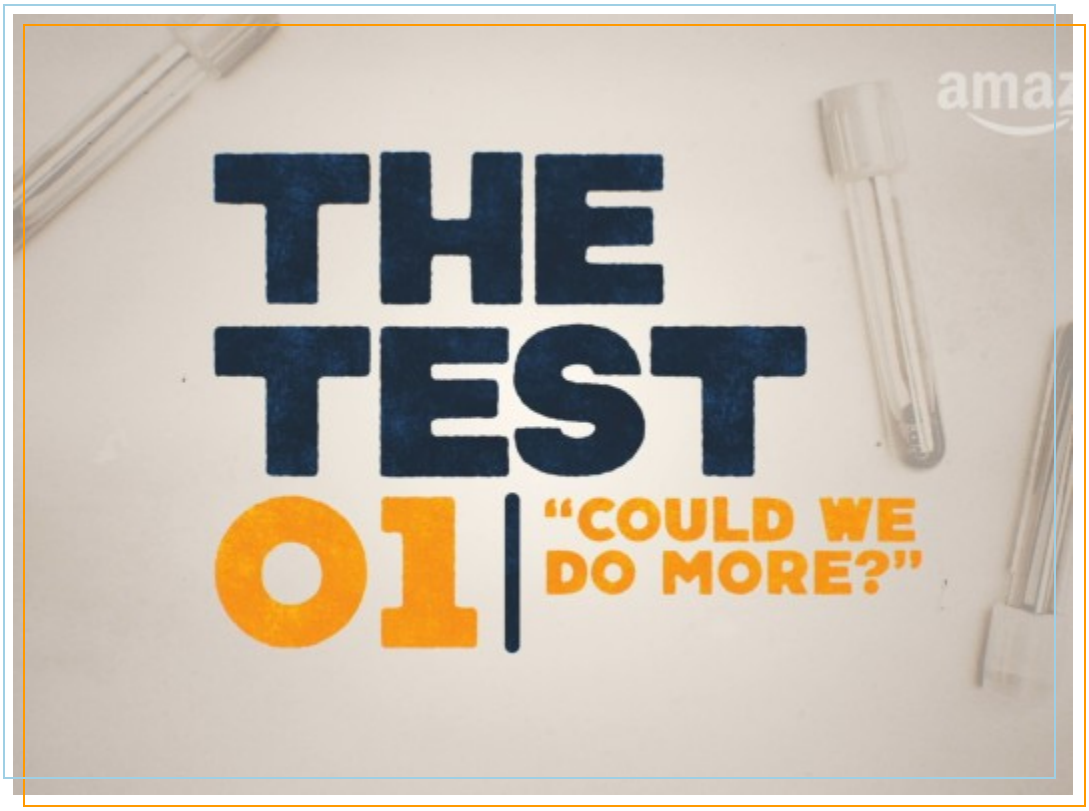

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All photos of people not wearing masks were taken prior to the COVID-19 pandemic.