



Quenching the insatiable thirst for data A sustainable approach to cooling the digital world

Highlights:

- Data centers require enormous amounts of water and energy to keep information flowing
- Novva Data Centers' sealed glycol loop absorbs heat from the servers, pushing that heat into the atmosphere without a single drop of water lost
- Novva trusts Phoenix Contact control equipment to ensure the cooling system runs reliably, efficiently, and sustainably

“Hopefully, what we’re doing here can inspire other data centers to cut out water use as well. There’s a better way, and we’re proving it works.”

– Jeff Gray, senior controls engineer and integrator at Novva

Customer profile: Novva Data Centers

Novva Data Centers is a privately held company with state-of-the-art colocation data centers in Utah, Colorado, Nevada, California, and Arizona. Novva’s turnkey data center solutions are hyper-scalable and can be easily customized to meet the growing needs of the data infrastructure market.



Figure 1: A single data center can use several hundred million gallons of water per year. That kind of water use is unaffordable and unsustainable, especially in desert regions.

Challenge: Data centers drive a hidden thirst

Today, more people have smartphones than indoor plumbing. With a swipe of a finger, you can access entertainment, games, social media, bank information, maps, emails, and more.

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This incredible amount of data is available almost instantly, but that is only a fraction of the amount of data consumed. Government, finance, retail, health care, transportation, infrastructure, manufacturing, and now AI all contribute to the dramatic increase in demand for access to data. But all of this data comes at a cost.

Behind each swipe, click, share, or download, there's a hidden thirst. Data centers – the unseen backbone of our digital world – require enormous amounts of water and energy to keep information flowing.

As of 2020, U.S. data centers consumed roughly 660 billion liters of water for cooling and power generation. Much of that water simply evaporates into the air, used up in the process of keeping servers and other computing resources cool. In a world where water is growing scarce, that approach is becoming unsustainable.

Depending on its size, a single data center could use several hundred million gallons of water per year just for cooling. In a desert region like Las Vegas, that kind of water use is unaffordable and unsustainable (Figure 1). But one company asked: What if a data center could run in a desert without consuming water?

Solution: A unique approach to cooling

Novva Data Centers set out to reimagine what a data center can be. Headquartered in the heart of Utah's desert, Novva set out to cool thousands of servers without wasting a drop of water.

“Novva is a colocation data center, basically an apartment complex for companies’ servers,” said Scot Kingdon, a controls engineer at Novva. “We provide the ‘furniture,’ so to speak: the power, the cooling, the space they need. Our clients bring in their computing equipment, and we keep it running safely and smoothly. Our server racks generate a lot of heat, so the cooling needs are very high. The cooling demand is there to ensure that the server racks maintain their temperatures, so they can keep providing their service to their customers.”



Figure 2: NOVVA uses a glycol mixture, rather than water, to keep its data centers cool.

Jeff Gray, senior controls engineer and integrator at Novva, explained, “Novva is pretty unique in how we cool. We moved away from the typical evaporative cooling systems – no more water-cooled chillers. Instead, we went to straight air-cooled chillers, which means we’re not wasting water. In our system, there’s no water lost at all. It’s a closed-loop design. We use a glycol mixture as the coolant, and it never evaporates. So we don’t consume water to keep our servers cool.”



Figure 3: After the sealed glycol loop absorbs heat from the servers, massive air-cooled condensers push that heat into the atmosphere – without a single drop of water lost.

Novva’s sealed glycol loop absorbs heat from the servers (Figure 2). Then massive air-cooled condensers push that heat into the atmosphere without a single drop of water lost (Figure 3). The closed-loop system operates more like a car’s radiator than an open evaporative tower. The impact is huge. By eliminating water cooling, Novva saves over 300 million gallons of water every year.

Novva has written programs to control the fan speeds to adjust the airflow across the coils. The data center can run its fans at a lower speed and amperage, making the process very efficient.

“A big problem traditional data centers run into is getting access to millions of gallons of water,” said Gray. “Here in the desert, you can’t assume you have that. Our air-cooled design means we don’t depend on local water at all, and that’s a game changer.”

Reliability through control

To make all these pieces work together, Novva partnered with Phoenix Contact. Kingdon stated, “We told them our requirements – the I/O counts, the communication protocols, everything – and they came back with the perfect control solution. The controllers, the software, all of it, fit our needs.”

Gray explained, “We run our entire cooling system on Phoenix Contact ILC 2050 BI controllers. That’s our main

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brain. It ties all our systems together and pulls in data from all kinds of devices. We have Modbus, BACnet – you name it – all communicating through one platform. Everything runs through that single brain, seamlessly” (Figure 4).

This isn’t just about sustainability; it’s also about reliability. By keeping servers cool without relying on municipal water, Novva can guarantee stable conditions even during droughts or water shortages. For the businesses that rely on Novva, and for those who rely on those businesses, that means a safer, more reliable digital experience.



Figure 4: The Phoenix Contact ILC 2050 BI controller is the brain behind NOVVA’s cooling system. It ties all of the systems together and pulls in data from all kinds of devices, using Modbus, BACnet, and other protocols.

Security matters

All the innovation inside means nothing if the servers aren’t safe. That’s why Novva’s data centers are built like fortresses. Security is a 24/7 mission, and Novva’s approach is as high-tech as it is vigilant.

“The security at our data centers is at a very high level,” said Gray. “There are cameras everywhere, audio sensors listening, and two-stage mantrap doors to get inside. You can’t just walk in. You go through one secure door at a time. Even vehicles have to stop at double security gates so no one can tailgate their way in.”

Protecting data isn’t just about keeping intruders out. It’s also about keeping the lights on. A data center is only as good as its uptime, so power is critical. Novva’s clients expect their data to be online all the time, so Novva has built redundancy into every watt of electricity that enters the campus.

“Everything here is built with backups on backups, what we call N+1 redundancy,” said Gray. “If we need one chiller, we install two. If one power feed fails, we have another ready to go. We’ve got utility power coming in, but should the grid ever drop out, huge UPS battery banks kick in instantly, and diesel generators fire up to keep us running. Our servers won’t even blink if the power goes down.”

These redundant systems mean Novva can promise 99.999% uptime. Even if a storm knocks out power in the city, the customers inside this data center won’t notice a flicker. For the rest of us, it means the online services we rely on – from banking to Netflix – stay up, even when disaster strikes.

Results: Proving there’s a better way

Keeping thousands of servers running 24/7 uses a lot of electricity, but Novva works to minimize its footprint. The facility’s design and automation ensure power isn’t wasted. Novva also utilizes outside, or ambient, air to cool data centers when outside temperatures are cool enough to do so. This helps keep Novva’s energy costs down and is part of the cooling solution. Cooling systems automatically dial down when loads are lighter, and lighting is intelligent. Every piece of equipment does its job with as little energy as possible.

As new technologies from smart homes to artificial intelligence demand more from data centers, the thirst for data continues to grow. By 2030, data center water and energy use are projected to double if industry practices don’t change. But Novva is living proof that those practices can change.

Kingdon concluded, “Novva encourages thinking outside the box and adapting to rapidly changing industry needs. We build many components in-house, including fan walls, chillers, and custom switchgear. It’s exciting to be part of something transformative.”

“We want our data centers to be as green as possible. We do everything we can to use power efficiently. And on the energy side, we make sure to buy renewable energy from wind, hydro, and solar instead of relying on coal,” Gray concluded. “Hopefully, what we’re doing here can inspire other data centers to cut out water use as well. There’s a better way, and we’re proving it works.”