

Drivers and Benefits of Modular & Micro-Modular Data Centers

Think modular / micro-modular data centers and you probably think about *edge computing*. But is the edge the only application that's driving the adoption of these solutions? The short answer is 'no', there are a lot more reasons why organizations are adopting modular and micro-modular data center solutions, however, the growing popularity and buzz around edge computing is playing an instrumental role in making these solutions growingly popular. This article will explore some of the key drivers and benefits of such solutions.

Let's first start by defining edge computing, the edge means many things to many people, but the way we look at it, it's '***the practice of processing data close to the data source and/or the end user***', rather than in a central, traditional data center. According to predictions cited by our friends at Dell, analysts estimate that [75% or more of enterprise data](#) will be processed outside traditional data centers by the year 2022. With edge computing, data can be efficiently processed even in remote locations. And for many businesses, having a micro modular data center represents the new frontier.

Micro/modular data centers are essentially what they sound like: small mobile, prefabricated data center containers that can be placed just about anywhere. Most of the offerings on the market typically include complete data center infrastructure including cooling, power, and backup infrastructure packaged in a self-contained unit such as an ISO shipping container or a custom rack enclosure. These modular data centers can range from single rack systems supporting a few kW of IT or larger systems supporting multiple racks and hundreds of kilowatts of IT load. And while mobile, modular data centers aren't the newest solution available, they've seen a huge uptick in mainstream adoption lately: over the last three years, they've experienced a [compound annual growth rate](#) of 42%. This begs the question:

What's driving the popularity of modular and micro-modular data centers?

Here's what we at GRC, are seeing in the market:

What's Driving The Popularity of Modular and Micro-Modular Data Centers?

Location Flexibility



01 Location Flexibility Get Closer to the Data Source

New age applications are pushing organizations to get closer to the data source and/or the end user.



02 Speed & Agility Quicker Deployment Time

Modular data centers allows for deployment in weeks instead of months.



03 Cost Efficiency Grow As You Go Solutions

Being pre-fabricated and often mass-produced helps them be more cost-effective than custom designed traditional data centers.



04 A Turnkey Solution Complete Infrastructure

Focus on core competencies without having to worry about infrastructure becoming a bottleneck or resource drain.

GRCOOLING.COM

New age applications are pushing organizations to get closer to the data source and/or the end user. Whether you're a high frequency trader trying to be close to the exchange, a military organization looking to get compute power in the battlefield, a manufacturing company processing IoT data on the factory floor, a streaming service looking to cut down latency, or supporting AI based self-driving cars, more and more organizations are looking for greater location flexibility, which is driving them towards modular solutions for the edge.

Speed & Agility Are More Critical Than Ever

Beyond defense applications where rapid deployment can become a huge strategic advantage, more and more commercial organizations are looking towards turnkey modular and micro modular solutions to help cut data center construction and deployment time. Traditional data center builds can take up to 18 months to build from planning to commissioning. Modular data centers allow deployment in weeks allowing businesses the agility to quickly respond to market needs while making capacity planning and forecasting easier.

Costs, Constraints, and Complexity Are Rising

Location, power, and cooling constraints are making traditional infrastructure growingly complex. As we add more systems to tackle each of these constraints, we end up increasing not just costs but also complexity and the potential points of failure. For example, air-side economization is a popular method to reduce air-conditioning needs but brings up other challenges such as stratification, humidity, and contaminants, which in turn mandate the need for additional systems to control the mixing, humidity, and filtration of incoming air. And while, not all modular and micro-modular solutions address complexity issues, being pre-fabricated and often mass-produced helps them be more cost-effective than custom designed

traditional data centers. In addition to being lower cost, micro/modular data centers also enable capital deferment by allowing you to 'grow as you go'. The lower cost basis makes modular data centers a growingly popular choice, not just for edge and greenfield builds, but also for augmenting the capacity of space constrained data centers, and for adding high density zones in legacy facilities.

Turnkey Solutions Make Life Easier

Apart from the strategic, technical, and financial benefits of modular and micro-modular data center solutions, they also make the whole process of deploying data center and compute capacity a lot easier. This helps businesses focus on their core competencies without having to worry about infrastructure becoming a bottleneck or resource drain.

What Gives GRC The 'Edge'?

There are numerous modular and micro-modular data center solutions on the market today, picking the one that's right for you can be a daunting task. Here are a few reasons why we at GRC believe that our patented immersion cooling technology, and over a decade of global deployment experience, help us better meet your needs:

What Gives GRC The 'Edge'?



01 Environmental Resilience Protects with ElectroSafe™

ElectroSafe™ coolant encapsulates servers protecting them from dust, moisture, vibrations, hot spots, and oxidation.



02 High Density Support Put REAL Compute on the Edge

GRC's modular data centers remove constraints of rack density, supporting 25 -100+kW per rack.



03 Efficient Operation Maximization of Available Power

<1.05 mPUE virtually anywhere on the planet and a 10-20% reduction in server power consumption with GRC's immersion cooling solutions.



04 Cost-Effective OPEX & CAPEX Savings

GRC's ultra-efficient immersion cooling technology eliminates costly air conditioning equipment, humidity and environmental controls, etc.



05 Easy Deployment Easy Operation Minimal Site Requirements

All you need is power, network, and a water source to get going. Plus, all GRC products come pre-integrated with a number of standard features to make your life easier.



06 Configurability and Flexibility GRC's ICEtank™ and HashTank™

A range of options and configurations to choose from; 2 to 8 racks, 25 to 100+kW per rack cooling capacity, redundancy options, cooling-tower/radiator/hybrid-cooler options, smart/basic PDUs, integrated/standalone UPS, backup generator, ATS, and more.

Unmatched Environmental Resilience Delivers Complete Location Flexibility

Imagine landing a chopper next to an air-cooled data center in the middle of a desert! Not the most comforting picture, but GRC's patented immersion cooling technology inherently protects servers immersed in the [ElectroSafe™ coolant](#). ElectroSafe™ encapsulates servers protecting them from dust, moisture, vibrations, hot spots, and oxidation, thereby offering unmatched environmental resilience that gives you the ability to drag and drop computing capacity, even in the harshest of environments.

High-Density Support That Allows You to Put REAL Compute on the Edge

Ever-evolving technology and new-age applications are among the leading drivers for edge computing, and as servers get more powerful to meet growing compute needs, they also get hotter. Unlike air-cooled data centers, GRC's modular data centers remove constraints of rack density, supporting 25 -100+kW per rack! This high density support allows you to put real computing power to support all your applications on the edge.

Ultra-efficient Operation Enables Maximization of Available Power

GRC's modular data centers offer unparalleled efficiency, delivering <1.05 mPUE virtually anywhere on the planet. In addition to the ultra-efficient cooling, GRC's immersion cooling also enables a 10-20% reduction in server power consumption through fan removal. Given that power is rarely cheap at the edge, this can result in considerable OPEX savings. Further, the lower peak power requirements allow for maximization of the available power envelope.

Simple = Cost-effective

In addition to OPEX savings offered by GRC's ultra-efficient immersion cooling technology, the technology also enables CAPEX savings by eliminating costly air conditioning equipment, humidity/environmental controls, etc. And through downsizing of power and backup infrastructure in proportion to the peak power reduction. The end result is a high-efficiency, high-performance modular data center that doesn't break the bank.

**Watch & Learn: A Closer Look at
Modular Immersion-Cooled Data Centers**

Easy to Deploy, Easy to Operate

GRC's turnkey modular data centers have minimal site requirements, all you need is power, network, and a water source (water-free radiator options are also possible). Further, all GRC products come pre-integrated with a number of standard features to make your life easier:

- [Foresight remote monitoring software](#) allowing remote /'lights out' operations.
- Complete electrical distribution and infrastructure
- Integrated server lifts and rack service rails for easy hardware maintenance
- Fire detection/suppression systems

Configurability and Flexibility

GRC's [ICEtank™](#) and [HashTank™](#) solutions also give customers a range of options and configurations to choose from; 2 to 8 racks, 25 to 100+kW per rack cooling capacity, redundancy options, cooling-tower/radiator/hybrid-cooler options, smart/basic PDUs, integrated/standalone UPS, backup generator, ATS, and more.

Overall, modular and micro-modular data centers address a number of technical and business challenges faced by data center operators across the globe, today. GRC's [ICEtank™](#) and [HashTank™](#) solutions further remove constraints of power, cooling, location, and costs over their air-cooled counterparts. With deployments in five countries, GRC's immersion enabled modular data centers are helping leading organizations, including the US Air Force, break through the limitations of traditional data centers.

To learn more about how the US Air Force tested and deployed GRC's ICEtanks, [download the case study from the Air Force Testing Authority](#), or send us an email at info@grcooling.com.