White Paper

# Modular Data Centers: An Ideal Solution for Digital Growth in the Middle East and Africa

Sponsored by: Vertiv

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## IDC OPINION

Digital transformation (DX) remains a global priority that signifies the strategic shift to digital-first businesses. Across all industries, organizations seek to create new business value through the effective use of technology across processes, products, services, and experiences. According to the IDC, worldwide spending on digital transformation is projected to grow to nearly $3.9 trillion by 2027, expanding at an annual growth rate (CAGR) of 16.1%.[1] This underscores the increasing demand for innovative solutions to sustain and enhance digital growth.

At the heart of this digital revolution lies an increased reliance on digital processes, data analytics, cloud services, the Internet of Things (IoT), and generative AI (GenAI). These technological advancements also come with challenges; they necessitate a resilient and scalable datacenter infrastructure that supports the rapidly increasing digital needs. As a result, datacenters are experiencing unprecedented growth, becoming pivotal hubs for producing, storing, and distributing digital assets within the digital economy.

In the Middle East and Africa (MEA), datacenter power capacity is expected to grow from 3,286MW in 2022 to 5,939MW in 2027, marking an 11.2% CAGR. This growth trajectory highlights the region's digital momentum and the critical need for adaptable and sustainable datacenter capacity.

Datacenter operators are struggling to meet the enterprise's capacity demands while growing sustainably. Modular datacenters help datacenter operators solve these competing priorities. Once a niche solution popularized by cloud service providers and telecommunications companies, modular datacenters have become the standard for new infrastructure builds and modernization efforts.

Modular datacenters stand out due to their speed, flexibility, and compatibility with multi-hybrid cloud environments. While the benefits of modular datacenters are globally recognized, they are particularly relevant in the MEA. In a region marked by rapid technological growth, challenging environmental conditions, and a growing emphasis on technical expertise, modular datacenters offer a tailored solution that addresses the unique needs of the MEA region.

[1] Worldwide Digital Transformation Spending Forecast to Continue Its Double-Digit Growth Trajectory According to IDC Spending Guide

## MODULAR DATACENTERS

### *What Are Modular Datacenters?*

Modular datacenters are dynamic and flexible structures designed for rapid deployment and efficient resource optimization. Distinct from conventional datacenters, modular datacenters rely on the concept of prefabricated components or "modules" (PFMs). These modules, encompassing computing, storage, networking equipment, and essential power and cooling systems, come with effortless assembly, disassembly, and reconfiguration. This adaptability is critical, as it allows for quick responses to evolving technological demands and business needs.

There are several types of modular datacenters. These can vary in size from large, manufactured units and shipping containers to smaller micro datacenters or integrated racks. Existing facilities or modules specialized for outdoor or remote locations can also house the designs.

### Modular Datacenter Types

**All-in-one datacenters,** or self-contained datacenters, are a comprehensive solution combining the various components necessary for datacenter operations (i.e., power, cooling, racks) into a single, self-contained, easily deployable unit. This integration simplifies infrastructure complexity, allowing for rapid deployment and straightforward maintenance and making them ideal for businesses seeking a robust yet flexible IT solution. A **micro datacenter** is a type of all-in-one datacenter that is compact and flexible, making it ideal for deployment at the edge of the network, network closets, or telecom sites.

**Prefabricated data halls** offer a modular and scalable solution for IT datacenter creation or expansion, providing an efficient alternative to traditional construction methods for housing IT equipment. These pre-assembled units allow for rapid deployment and easy integration with existing facilities, significantly reducing the time and costs associated with adding capacity.

**Prefabricated power and cooling modules** provide the power and cooling infrastructures for datacenters. They offer similar benefits to other modules, and they are applicable with traditional or modular datacenters.

Modular datacenters offer versatile deployment options to accommodate diverse operational needs. These units can be effectively integrated within existing structures using open frame skid mounts, or alternatively, they can be encapsulated within specially designed enclosures for outdoor applications. A key attribute of both deployment methods is their prefabricated nature, which significantly simplifies their construction, transportation, and installation. This feature ensures rapid scalability that aligns with fluctuating demand. Crucially, modular data centers provide a foundational element for datacenter expansion, offering adaptability and efficiency across various settings, from isolated areas to space-constrained urban locales.

### Benefits of Modular Datacenters

As businesses grapple with the escalating demands for digital services, the role of datacenters has become more critical than ever. The benefits address the complexities and challenges of contemporary infrastructure requirements. Each benefit contributes to making modular datacenters a technological option and a strategically and economically sound choice for organizations that need to modernize and expand their datacenter capacity.

## FIGURE 1

### Benefits of Modular Datacenters


Source: Modular Datacenters – Drivers, Forecast, and Buying Behaviors, IDC #US51305123

- **Speed:** Modular datacenters have faster deployment than traditional ones. This is because of their prefabricated design, and users can assemble them onsite in days or weeks rather than months or years, reducing overall project risk. This is a critical advantage for organizations that must quickly deploy new infrastructure to support new applications or initiatives.
- **Flexibility/scalability:** Modular datacenters are highly scalable and easily expandable to meet changing needs. PFMs are built from standardized components that are easy to add or remove, making them ideal for organizations with unpredictable IT needs.
- **Ruggedized:** Modular datacenters are rugged and able to withstand harsh environments. They are typically built from durable materials that endure extreme temperatures, dust, and moisture. These attributes make them ideal for deployments in remote locations or areas prone to natural disasters.
- **Lower costs:** Modular datacenters often use standardized PFMs that are quick and efficient to assemble. This prefabrication process reduces the costs of custom design and onsite construction. Building a modular datacenter is typically much quicker than a traditional datacenter, which can be a significant financial advantage, given the lower labor costs and quicker deployments.
- **Improved energy efficiency:** Modular datacenters are typically more energy-efficient than traditional datacenters, as they use less power and generate less heat. This can save organizations a significant amount of money on their energy bills.
- **Reduced environmental impact:** Modular datacenters have a smaller environmental impact than traditional datacenters because they use sustainable materials and less energy. Additionally, decommissioning and recycling them is a quick process.
- **New workloads:** High-performance computing systems that power new applications such as GenAI will force enterprises to redesign or deploy systems in recent locations due to their power and cooling demands.

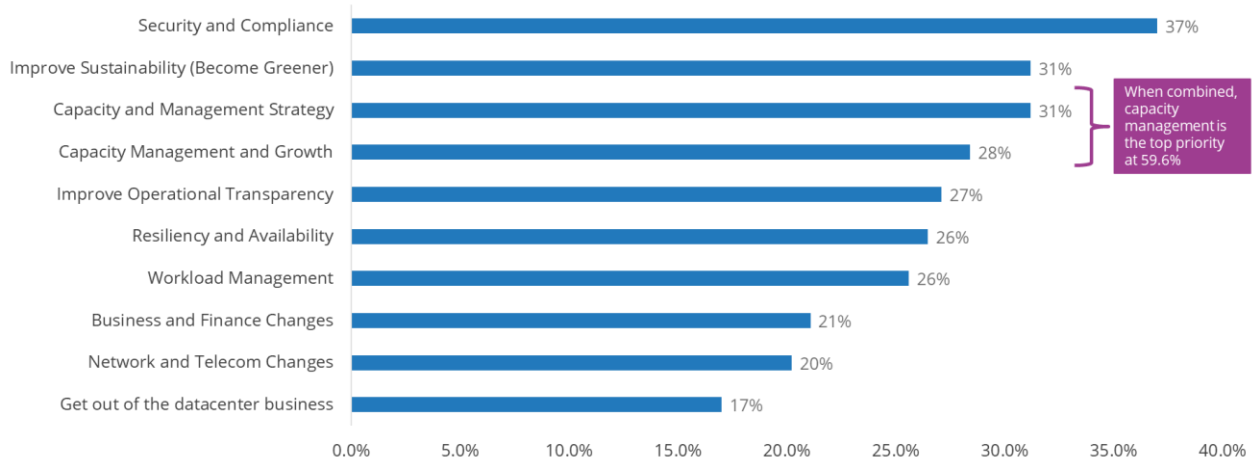
## Market Analysis

Current market conditions align well with the benefits of using modular datacenters because they help datacenter operators achieve their initiatives and resolve their most common problems. IDC's Data Center and Sustainability Survey from March 2023 asked datacenter operators, "*Thinking of your company's priorities regarding data centers, what are the top 3 initiatives over the next two years?*" "Capacity management" was the combined top initiative, and "improve sustainability" was also among the top 3 priorities. The benefits of modular datacenters directly address these priorities.

## FIGURE 2

### Datacenter Priorities

*Q. Thinking of your company's priorities regarding data centers, what are the top 3 initiatives over the next 2 years?*




n = 465

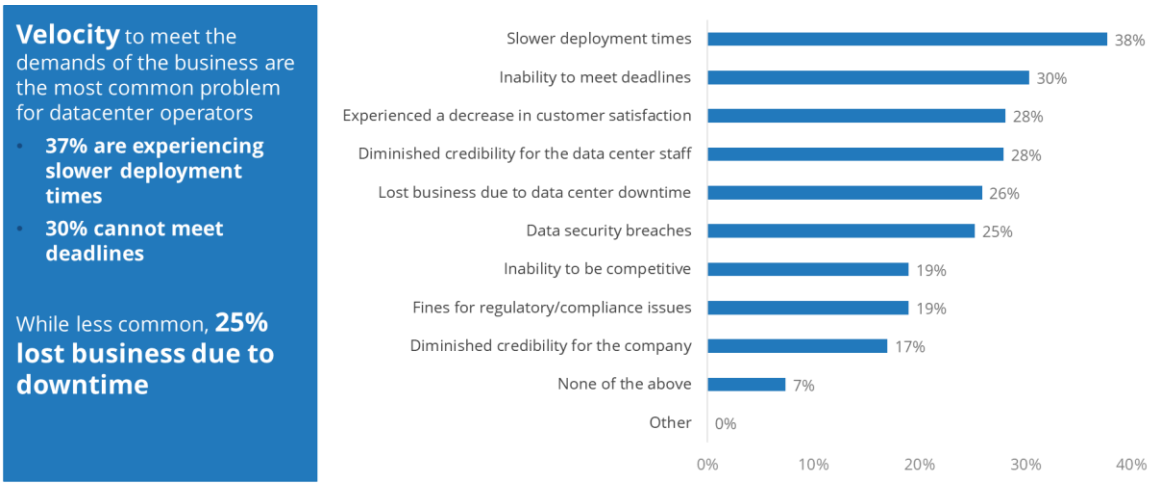
Source: Data center Operations and Management survey, IDC, January 2023

In that same survey, IDC asked datacenter operators about the problems they experienced in the last 12 months. The top 2 responses centered around the theme of velocity, slower deployment times, and inability to meet deadlines. Modular datacenters are well suited to address the most common problems of datacenter operators. IDC predicts that modular datacenters' growth will outpace traditional datacenters and expects the global market for new modular builds to reach $9.3 billion by 2027.

## FIGURE 3

### Problems in the Datacenter

*Seven percent of datacenter operations are running like well-oiled machines.*

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Source: Data center Operations and Management survey, IDC, January 2023

## Market Trends

To meet the growing DX demands, datacenter capacity in the MEA region is expected to grow from 3,286MW in 2022 to 5,939MW in 2027, marking an 11.2% CAGR. Organizations are expanding that capacity in three ways: expanding their footprint, creating net new capacity, and modernizing their footprint (retrofitting) with existing datacenters. IDC regularly communicates with datacenter operators about the drivers for both use cases, and common themes have emerged.

### *Why Expand?*

#### To Implement an Edge Strategy

Companies increasingly adopting an edge strategy need to enhance their operational efficiency and customer experience. By processing data closer to the source, edge computing significantly reduces latency and leads to faster, more reliable services. This approach benefits applications that require real-time data processing, such as IoT devices, autonomous vehicles, and AI-driven analytics. Additionally, as datacenter operators attempt to resolve their capacity problems, they ease the burden on central datacenters, reduce bandwidth costs, and support better compliance with data sovereignty regulations. As a result, companies can offer more agile, efficient, and personalized services.

#### To Increase Capacity for Higher Power Demand Workloads

Modern datacenters need to support data-intensive technologies, such as generative AI, machine learning, big data analytics, and advanced simulations – all of which require significant computational power. By expanding the infrastructure, companies can ensure they have the resources to manage these demanding tasks efficiently. This expansion enables the smooth operation of current high-power applications while preparing organizations for future technological advancements and the

corresponding increases in power and processing needs. As a strategic move, this is crucial for maintaining competitiveness and fostering innovation in an increasingly digital and data-driven business environment.

### *Why Modernize?*

#### To Increase Capacity for Higher Power Demand Workloads

Similarly, increasing capacity for high power demands is a frequently cited reason for modernizing datacenters. High power demand workloads require different designs to support high-density racks that can exceed 50kW and need liquid cooling for heat dissipation. Existing datacenters must undergo retrofitting to support these workloads, and additional power is often necessary.

#### To Help Attain Sustainability Goals

For several compelling reasons, datacenter operators are increasingly modernizing their facilities to support sustainable goals. There is a growing recognition of the environmental impact of datacenters, particularly their substantial energy consumption and carbon footprint. Modernizing datacenters with energy-efficient technologies significantly reduces this impact.

Second, there is a solid economic incentive: energy-efficient datacenters are more cost-effective in the long term because they reduce operational expenses. Additionally, sustainability aligns with corporate social responsibility objectives, enhancing brand reputation and meeting the expectations of environmentally conscious consumers and investors. This shift also prepares operators for stricter environmental regulations in the future.

#### To Rightsize Environments Due to the Migration of Workloads to Colocation or Public Cloud

Datacenter operators are modernizing their facilities to rightsize their environments in response to migrating workloads to colocation or public cloud services. The need for more flexible, scalable, and cost-effective infrastructure solutions is driving this shift. As more companies opt for cloud services or colocation, traditional datacenters often have underutilized space and resources. By modernizing, operators can optimize their datacenter footprints, adapting to the changing demands and ensuring that they allocate their resources efficiently. This involves reconfiguring physical space, upgrading power and cooling systems for better efficiency, and incorporating more advanced management systems for enhanced operational control.

## OPPORTUNITIES

In the MEA region, there is a noticeable surge in datacenter demand. This increase is attributed to several factors, including heightened internet penetration, a growing inclination toward cloud adoption, and the expansion of data-intensive industries, such as telecommunications and finance. Concurrently, many countries in this region are grappling with infrastructure challenges that hinder the construction of traditional datacenters. These challenges primarily revolve around limited access to essential resources such as land, power, and skilled labor. In this context, modular datacenters emerge as a viable solution. These prefabricated datacenters are quick to ship to the desired site, significantly reducing the need for extensive onsite construction.

Furthermore, the demand for sustainable datacenters in the MEA region is escalating. Modular datacenters are particularly appealing, as their designs often focus on energy efficiency and

sustainability. This design philosophy aligns well with the region's growing emphasis on sustainability and environmental consciousness. Additionally, governments across the MEA region are showing increasing support for developing the datacenter industry. Various initiatives manifest this support, including providing land, power, and tax incentives to datacenter operators. Governmental backing is pivotal in fostering a conducive environment for the region's growth and evolution of datacenters.

Vertiv is well-positioned to capitalize on the region's expanding demand for modular datacenters, with several key strengths bolstering this. Primarily, the company enjoys a strong brand reputation. Vertiv is recognized as a global leader in the datacenter industry, enhanced by its significant local presence in the MEA market with offices in over 20 countries. Vertiv's extensive local foothold implies that the company has an in-depth understanding of the regional market dynamics and enables swift responsiveness to customer needs for routine operations or emergencies.

Additionally, Vertiv boasts a broad product portfolio of modular datacenter solutions that can cater to diverse customer requirements. This breadth of offering is crucial in a market characterized by varied requirements and evolving needs. Furthermore, the company has a proven history of delivering successful modular datacenter projects within the region. This history of success lends substantial credibility to Vertiv, positioning it favorably and expanding its influence in this rapidly growing market segment.

## ABOUT VERTIV MEGAMOD

In February 2023, the company announced Vertiv MegaMod and Vertiv MegaMod Plus, prefabricated modular datacenter solutions for Europe, the Middle East, and Africa. The MegaMod PFM solution is designed for flexibility, offering modular units with power capacities ranging from 0.5 to 1MW and scalable deployment to support IT loads exceeding 2MW. The MegaMod Plus delivers up to 25% more rack and cooling capability than its standard counterpart.

Each unit is equipped and tested with Vertiv's power and thermal management systems, IT equipment racks, and sophisticated remote monitoring tools. MegaMod and MegaMod Plus offer a fully equipped datacenter out of the box, including external power rooms, cooling and thermal management systems, racks, monitoring technologies, and fire protection systems.

The solution value extends beyond the PFM. Vertiv offers a range of end-to-end services encompassing deployment, commissioning, ongoing maintenance, provision of spare parts, and continuous training and operational support. A key advantage Vertiv highlights is the significant reduction in deployment time and capital expense.

Vertiv claims that by opting for MegaMod or MegaMod Plus, companies can reduce their datacenter deployment time by up to 40% compared to traditional construction. This efficiency also comes with a decrease in initial capital expenditure, eliminating the need to construct dedicated white space and power rooms before the capacity is necessary.

## CASE STUDY — MEEZA

MEEZA is a leading provider of managed IT services and solutions in Qatar. Its mission is to become the top provider in the Middle East and North Africa region while offering fulfilling career opportunities in IT. MEEZA provides various IT services, including managed IT services, datacenter services, cloud services, and IT security services. It has five Tier 3 certified datacenters, called M-VAULTs, which offer

a guaranteed uptime of 99.98%. These datacenters comply with the most stringent international standards, allowing businesses to increase efficiency and reduce risks. MEEZA's Data Centre M-VAULT 2 is LEED Platinum certified, while M-VAULT 3 is LEED Gold certified, making them both state-of-the-art facilities.

## Problem

MEEZA needed to build capacity for two of its datacenters (M-VAULT 2 and M-VAULT 4) to align with Qatar's 2030 Digital Transformation goals. This ambitious plan necessitated a scalable increase in datacenter capacity over time. Simultaneously, hyperscalers expressed a keen interest in establishing their presence in the country before the World Cup 2022, setting an unalterable deadline for MEEZA's expansion plans. Recognizing these challenges, MEEZA identified the need for a modular datacenter to support rapid expansion. This solution needed to be hybrid to seamlessly integrate with the pre-existing infrastructure and effectively meet the increasing demands and tight timelines imposed by the national digital transformation initiative and immediate needs of the World Cup 2022.

## Why Vertiv

MEEZA understood that the solution had to be modular and easily scalable to meet the digital transformation goals set for Qatar 2030. However, it needed to gain experience stacking modular units and integrating them with the existing infrastructure. MEEZA opted for Vertiv as its partner and its modular solution offering due to its speed, scalability, and cost-effectiveness over traditional datacenters. In addition to Vertiv's leading modular solution, it has proven success in the region, experience with hybrid deployments (stick-build with modular), the ability to offer design services, and the ability to assist local contractors with education and integration. Vertiv's scale and MEEZA's previous experience also factored into the decision. Vertiv has been a trusted partner, and Vertiv's scale meant it could simplify supply problems and be accountable for delivery within the time requirements.

## Project Results

The project was successful and delivered within the unyielding time frame imposed by the World Cup 2022. The ultimate solution was a hybrid that integrated the new modules with the existing facility. The modular design that Vertiv proposed allowed the skids to be prepared in parallel with the module development, saving implementation and deployment times. George Hourani, Director of the Project Management Office at MEEZA, who was responsible for this project, said, "What was extremely attractive about Vertiv is their speed." Hourani also noted that Vertiv did not sacrifice quality in its delivery. Vertiv tested onsite in Croatia, where the unit was manufactured, and "The team was very good." Once onsite, it was noted that the team didn't encounter many issues in testing and commissioning.

Vertiv provided additional value beyond the design and implementation of the modular datacenter. Local contractors lacked experience with modular designs, and since they were also Vertiv partners, they were able to provide education and assistance. Also, due to the increased demands to support the World Cup, getting power from the utility was a considerable effort. Vertiv helped implement evaporative cooling to lower the overall power demand of the datacenter.

## CONCLUSION

The demand for robust, scalable, and sustainable datacenter solutions is growing as organizations become digital-first enterprises and invest in digital transformation. As organizations embed digitalization in their business offers and operations, additional datacenter capacity will be deployed differently. More capacity will be needed and created outside of traditional corporate datacenters, located near business end users and customers. Higher power densities will be necessary for generative AI.

Modular datacenters are not merely an alternative to traditional datacenter models; they are a forward-thinking solution that addresses the present and anticipates the future. While modular datacenters have appeal in all regions, they have a particular appeal in MEA, which has the additional burdens of limited access to essential resources such as land, power, and skilled labor, and datacenters are often exposed to harsh conditions. As such, the adoption and implementation of modular datacenters will play a critical role in shaping the digital future of the MEA region, quickly fostering growth, innovation, and resilience in an increasingly digital world.

## About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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