BENORI

Prioritizing Data Center Locations:

Strategies and Best Practices



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A data center is a physical location that stores computing machines and their related hardware equipment. It contains the computing infrastructure that IT systems require, such as servers, data storage drives, and network equipment. These have become a backbone of modern business operations, essential for storing, processing, and distributing vast data. The demand for data centers is escalating as the digital landscape evolves, driven by the increasing reliance on cloud computing, AI, and data analytics. This surge is not merely a trend but a fundamental shift in how businesses operate, underscoring the critical role these facilities play in enabling seamless access to applications and services across various sectors.

The strategic prioritization of data center locations is vital for organizations aiming to optimize their IT infrastructure. Key factors such as latency, regulatory compliance, cost efficiency, and environmental sustainability influence site selection. As companies navigate rapid technological advancements and heightened consumer expectations, understanding how to position data centers becomes crucial for maintaining a competitive edge and ensuring business continuity.

In response to the burgeoning demand for data centers, stakeholders across the value chain, including technology providers, hyperscalers, and real estate developers, are mobilizing resources to address potential capacity deficits. This competitive landscape drives innovation and evolution within the data center sector as organizations strive to meet the growing needs of a digital-first world while focusing on sustainable practices to minimize their environmental impact.



Data centers are becoming increasingly vital in the digital era, with leading players expanding their presence to address the capacity deficits

The demand for data centers is soaring as companies adapt to the growing need for cloud services and advanced technologies, driving significant investments in infrastructure to support scalable and secure digital operations. The rise of AI and GenAI is fueling an unprecedented demand for data centers, as businesses require robust infrastructure to support high-performance computing, massive data processing, and seamless deployment of advanced AI models.

Growing Significance of Data Center



Global data center demand is expected to reach **171–219 GW** by 2030, driven by the annual growth rate of **19–22%** from 2023 33% is the projected average annual growth rate for AI-ready data center demand from 2024 to 2030, with 70% of total demand dedicated to advanced AI workloads



GenAl is the fastest growing Al use case, likely to account for ~40% of total data center demand by 2030

Broadening Data Center Footprints

Leading players are heavily investing in new data center facilities, reflecting a strategic move to address rising data demands, improve operational efficiency, and support the expanding ecosystem of smart technologies.



Microsoft Azure operates over 200 data centers across 62 cloud regions and 120 availability zones. It will spend roughly USD 80 Bn on AI-enabled data centers by June 2025.



AWS has 32 cloud regions, 102 availability zones, and a data center facility of 33.5 mn sq. ft. It also plans to invest USD 11 Bn in Georgia, US, to expand data centers operations.



Google Cloud is expanding its global data center network, including a recent USD 1 Bn investment in a new data center in the UK.

EQUINIX

Equinix operates 248 data centers in 31 countries on five continents. It has also agreed to form a greater than USD 15 Bn JV to expand its hyperscale data centers in the US.

🔿 Meta

Meta, a key player in the data center market, operates 34 facilities, 20 operational and 14 upcoming, driving economic impact with 24,000 jobs and USD 1.8 Bn in labor income.



NTT Global Data Centers operates over 150 data centers in more than 20 countries and regions. It plans to invest USD 11 Bn during 2022–2027 to expand operations in key markets including India.

Al's resource-intensive nature is fueling the demand for advanced data centers

The growing significance of data centers in enabling digital transformation has driven a rapid evolution in their design and operations. Industry leaders are adopting innovative approaches that enhance scalability, efficiency, and environmental responsibility to meet the increasing demands of modern technologies.

Key Trends in Data Center Adoption

Al Boom Driving Data Center Growth

The AI surge drives data center demand, with server deliveries expected to increase to **1.5 million** by 2027, potentially consuming half of the current data center energy. As a result, service providers need to assess AI clients for long-term sustainability.

Building Hyper-Scale Data Center Campuses

Enterprises such as Amazon in Virginia (US) and Microsoft in Leeds (UK) are building hyperscale complexes to achieve one gigawatt of performance, supporting the rising cloud and AI workloads.

Adoption of Sustainable Practices

Data centers are adopting sustainability practices, **focusing on renewable energy, energy efficiency, and eco-friendly materials**. For instance, Meta's data center electricity use is matched with 100% renewable energy by adding renewables to the local grids.

Enhancing Energy Autonomy in Data Centers

Data centers are increasingly turning to **Small Modular Reactors (SMRs)** and advanced energy storage systems to boost energy resilience, manage power fluctuations, and enable operations in remote locations.

Additionally, vertical data centers are gaining traction with their multi-story designs that optimize space efficiency and provide higher server density than traditional models. These centers offer a scalable and energy-efficient solution by addressing urban space constraints and rising energy demands.

TRENDS

Choosing the right data center location ensures efficiency, performance, and compliance

Evolving trends such as AI integration, edge computing, and green initiatives necessitate strategic decision-making in data center locations to ensure optimal performance, cost efficiency, and sustainability. The right location minimizes latency, reduces operational costs, enhances security, and aligns with environmental and business goals. It can help in addressing current demands while ensuring scalability and adaptability.

Key Factors for Choosing Data Center Locations



Environmental Risk Factors

Climate and Natural Disasters: Reducing exposure to natural disasters can prevent operational disruptions and lower costs, improving efficiency and saving energy

Temperature:

Extreme temperatures directly influence cooling requirements, with colder climates offering cost-saving opportunities in cooling

Proximity to Water Resources: This is essential for cooling systems in some data centers, though water-scarce regions may require innovative cooling solutions



Infrastructure Factors

Power Availability and Cost: Access to stable, low-cost electricity, including renewable energy sources, ensures sustainability and operational efficiency

Telecommunications Connectivity:

Proximity to fiberoptic networks and major internet exchange points ensure low latency and high-speed data transmission

Transportation and Logistics: Accessibility to major roads, airports, and ports for equipment delivery and maintenance



Economic and Regulatory Factors

Real Estate Costs and Availability:

Affordable land costs and availability of suitable space are important for initial setup and future scalability, allowing for cost-effective construction and expansion

Labor Availability:

Skilled labor is available at competitive rates

Tax and Regulatory Environment:

Favorable tax policies and unambiguous regulations create a business-friendly climate, lowering costs and simplifying legal compliance for data center operations



Customer-Centric Factors

Proximity to Customers: Reduces latency for services, especially critical for cloud services and real-time applications

Market Demand and Growth:

High-growth regions with increasing demand for data services attract data center investments

Best practices are being adopted to address the complexities of modern data center development across different locations...

Leading players strategically select locations by evaluating key factors such as energy infrastructure, proximity to users, workforce availability, and suitable land, tailoring data center designs accordingly. This approach enables efficient operations and optimal service delivery while addressing the complexities of modern data center development. Companies ensure alignment with local and global standards by adopting practices such as embracing sustainable operational models, adhering to evolving regulatory frameworks, and fostering strategic collaborations.

Best Practices from Various Locations

Google

Seawater Cooling in Hamina, Finland

Google's Hamina data center in Finland utilizes seawater for cooling by repurposing old mill infrastructure. The cooling system circulates seawater through modules and returns it at a similar temperature, reducing the environmental impact.

Wind Power Strategy in Oklahoma, US

Google's Pryor data center in Oklahoma uses 140 MW of wind power from the Grand River Dam Authority, resulting in nearly 90% carbonfree energy. This practice aligns with environmental goals and energy cost optimization.

Rerouting Tasks for Grid Reliability in Taiwan

Google data center in Taiwan uses its carbonintelligent platform to reroute non-urgent tasks to other locations during peak summer hours, ensuring grid reliability while maintaining service performance. This approach balances operational efficiency with sustainability.

Microsoft

Underwater Data Center Innovation in Scotland

Microsoft's two-year Natick project in Scotland submerged 855 servers near the coast to explore the advantages of underwater data centers. The initiative showed fewer malfunctions than traditional land servers, minimizing corrosion and hardware failures while offering benefits such as rapid deployment, long-term connectivity, and enhanced efficiency and sustainability.

Using Renewable Energy and Adiabatic Cooling in Arizona, US

Microsoft's data center in Arizona partners with Longroad Energy for a 150MW solar plant and uses Renewable Energy Certificates (RECs) to offset energy use. The facility also incorporates adiabatic cooling, utilizing outside air for cooling purposes when temperatures are below 85°F, optimizing energy efficiency.

.....to drive efficiency and resilience in data center operations



Partnering with Local Bodies in Oregon, US

AWS has partnered with local organizations such as the Umatilla Electric Cooperative (UEC) to source renewable energy for its data center operations. This collaboration includes a sustainable water recycling initiative, where 95% of the cooling water is repurposed for agricultural use, demonstrating the benefit of working closely with local communities to support eco-friendly practices.

EQUINIX

Focus on Sustainability in Singapore

Equinix has adopted a comprehensive sustainability strategy to address the challenges posed by Singapore's land availability constraints and wind conditions for renewable power generation. The strategy focuses on low-carbon energy alternatives and innovation, with the purchase of renewable energy credits supporting clean energy generation. In collaboration with the National University of Singapore, Equinix is exploring energy-efficient, sustainable data center solutions to reduce its environmental impact.

Leading organizations worldwide are embracing best practices, while new emerging destinations are gaining prominence due to their strategic advantages and compliance requirements with the respective data protection laws.

New destinations are becoming key data center hubs, fueled by rising demand for digital infrastructure and strategic factors

Mature markets such as the US and Germany provide stability and steady demand while emerging markets exhibit rapid growth fueled by digital transformation and IT investments. Increasing cloud adoption, e-commerce expansion, and smart technologies drive data center demand. Additionally, regulatory compliance, data sovereignty, and the need for localized infrastructure further accelerate Data center development.

Spain is becoming Southern Europe's data hub, with its data center capacity expected to grow from 160 MW in 2023 to over 600 MW by 2026, driven by its strategic location, submarine cables, and major data centers in Madrid and Barcelona. India with 142 data centers and a growing digital workforce, offers major opportunities. The sector is set to grow with significant investments from Adani, Colt DCS, and Equinix. Data center capacity, at 977 MW in 2023, is expected to reach 3.29 GW by 2028, growing at a CAGR of ~11%. The Japan data center market, driven by remote work, is growing, with Tokyo and Osaka leading the way. With a 6.5% annual growth rate, the market is projected to reach USD 30 Bn by 2026.

The Brazil data center market is booming, with revenue expected to grow from USD 1.3 bn in 2023 to USD 1.9 bn by 2027. This growth is fueled by São Paulo and Rio de Janeiro's energy infrastructure, along with the strong market potential.

South Africa's data center capacity is nearly 250 MW, with Johannesburg accounting for 70% of the total power capacity. By 2028, the market is expected to attract USD 3.10 Bn in investments and reach a market value of USD 1.22 Bn. Malaysia is becoming a key data center hub in Asia, with USD 20.9 Bn invested in 12 projects since 2021. As of June 2024, its data center capacity stands at 640 MW, projected to exceed 2.4 GW by 2025, making up over 30% of Southeast Asia's market.

Data center locations should be prioritized based on impact and feasibility

As the establishment of data centers increases across various locations, it becomes essential to prioritize and evaluate the potential impact and feasibility before selecting a site. Early assessment of these factors allows organizations to ensure the success of their data center projects, optimize efficiency, and reduce long-term operational risks. Impact refers to the potential benefits a particular location can offer for the data centers' performance, growth, and alignment with business objectives. Feasibility focuses on the practicality and costs of setting up and maintaining the data centers at that location.

3D Framework: Prioritization Based on Feasibility and Impact





Defer

Locations with fewer business benefits and significant challenges

Examples: Regions from Sub-Saharan Africa, parts of the Middle East and Central Asia

Impact: These regions face ongoing political instability and underdeveloped infrastructure, limiting the ability to establish long-term sustainable data centers with reliable operations

Feasibility: Power supply issues and inadequate network connectivity increase the complexity and cost of development



Decide

Locations with potential but practical challenges or limited business benefits

Example: South Africa

Impact: High demand for data centers from large companies and enterprises, with power reliability challenges such as loadshedding in South Africa

Feasibility: Land limitations and energy challenges in regions such as South Africa may drive costs, but favorable tax incentives and renewable energy potential present viable expansion opportunities **Impact:** Handle significant global internet traffic with high demand from government and enterprises, offering central connectivity and low-latency access

Feasibility: Competitive energy prices, strong infrastructure, skilled workforces, ample land for expansion, renewable energy, and minimal natural disaster risk

Develop

Ideal locations with great business advantages and operational feasibility

Example: Northern Virginia, the US

Conclusion

The location of a data center is a critical success factor in meeting the growing demands driven by AI, cloud computing, and digital transformation. Selecting sites with stable, cost-effective energy, preferably renewable, ensures sustainability and operational efficiency. Proximity to robust fiber optic networks and internet hubs minimizes latency and supports high-speed connectivity, essential for real-time data processing.

Geographic and climate stability further reduces risks from natural disasters and optimizes energy efficiency through lower cooling costs. Strategic site selection maximizes value by mitigating risks and enhancing performance. While only a few locations meet all ideal criteria, adopting best practices helps organizations leverage local strengths to thrive in diverse environments.

For enterprises, incorporating location analysis in their data center strategies is essential. Organizations can future-proof their investments, ensure compliance with evolving data privacy regulations, and effectively address the demands of the digital era by evaluating economic incentives, regulatory landscapes, and workforce availability.



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