# CIO View

APAC CIO View

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Marketing material

# Evolving Data Center Landscape in Asia-Pacific


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- Data centers (DCs) have traditionally been established in developed markets, but emerging secondary markets are becoming increasingly appealing for hyperscalers and DC operators.
- Conventional DCs prioritized global connectivity, thriving in developed markets with solid internet infrastructure which are often regional economic centers. Yet, the rise of Artificial Intelligence (AI) computing has made access to affordable power and water a priority.
- However, DCs in primary markets would likely remain active as we foresee new facilities to be established near existing hubs to leverage the interconnectivity of the primary markets. Additionally, latency-sensitive tasks and those with lower value-add will likely remain in primary markets while AI training tasks would be done in secondary markets.
- Key beneficiaries of the DC boom include DC operators, power generation and utility companies and industrial firms that provide DC Power and Cooling solutions as well as the prefabrication and modular (PFM) sector that ensure rapid deployment.

The data center (DC) industry in APAC continues to demonstrate dynamic growth with no signs of a deceleration. Southeast Asia is at the forefront of this growth, receiving billions of investments from hyperscalers and colocation operators particular in Malaysia and Indonesia. In June 2024, Google Cloud announced a $2 billion investment to develop its first DC in Malaysia, followed by Oracle's commitment of over $6.5 billion in AI and cloud computing infrastructure in October 2024.

This marks a significant shift of DC development landscape, as DCs have historically been established in developed markets with strong internet infrastructure **(Table 1)**. Yet, these markets are becoming less attractive as AI workloads rise. In contrast to primary markets, the availability of affordable power and water makes secondary markets ideal candidates for DC development. The evolving DC landscape reflects changing DC requirements driven by AI computing, making these emerging markets increasingly appealing for hyperscalers and DC operators.

## Evolving landscape for DC Hubs

Before the generative AI boom, the proximity of DCs to demand and internet connectivity were crucial. Conventional DCs prioritized global connectivity over power supply, thriving in developed markets with solid internet infrastructure which are often also regional economic centers with massive demand from corporates. Power requirements were lower, and access to water was not a necessity since air cooling sufficed. However, the emergence of AI computing and the evolving business environment have seemed to make developing markets increasingly attractive for several reasons.

- **Access to Affordable Power**: The explosive energy consumption resulting from AI development has created a demand for large, affordable and stable power supplies. AI tasks, including training and inference, demand greater computing power, which is more effectively provided by graphics processing units (GPUs) rather than central processing units (CPUs). While CPUs are optimized for handling sequential tasks with low latency, GPUs are specialized for parallel processing, enabling faster model training, large dataset processing and the execution of complex algorithms.[1] However, this increase in computational power comes with higher energy consumption. AI DCs are estimated to consume up to five times more electricity

[1] HKCFA, July 2024.

than traditional DCs primarily due to the higher power requirements of GPUs. In fact, the latest generation of Nivida GPU chip can consume as much power as an entire cloud server.[2] Goldman Sachs forecasts global data center power demand will triple by 2030 compared to 2020.[3] Therefore, access to vast, affordable, and steady supply of power is essential. In many cases, hyperscalers and AI DC operators are willing to compromise other considerations for affordable and steady energy supply.

**Figure 1: Statistics on APAC DC Markets**

| Category | Market | Operating Capacity (OC) (MW) | Capacity Under Construction (UC) (MW) | Expected Capacity Growth (UC/OC) | Population (Mn) | Cost of Electricity (USD / MWh) | Number of Connecting Submarine Cable | Median Download Speed (MBPS) |
|---|---|---|---|---|---|---|---|---|
| Large Domestic Market | China | 3956 | 952 | 24.10% | 1419 | 78 | 20+ | 37.6 |
| | India | 1074 | 1147 | 106.80% | 1451 | 77 | 17 | 65.5 |
| International Primary Market | Japan | 1286 | 346 | 26.90% | 124 | 221 | 20+ | 139.5 |
| | Australia & New Zealand | 1168 | 365 | 31.30% | 32 | 247 | 15 | 101.0 |
| | Singapore | 973 | 45 | 4.60% | 6 | 254 | 20+ | 134.4 |
| | Hong Kong | 605 | 215 | 35.50% | 7 | 181 | 12 | 138.2 |
| | South Korea | 591 | 246 | 41.60% | 52 | 131 | 4 | 172.5 |
| | Taiwan | 257 | 49 | 19.10% | 23 | 92 | 15 | 136.6 |
| International Secondary Market | Indonesia | 222 | 147 | 66.20% | 283 | 95 | 20+ | 19.5 |
| | Malaysia | 189 | 224 | 118.50% | 36 | 54 | 20+ | 82.4 |
| | Thailand | 65 | 77 | 118.50% | 72 | 133 | 10 | 67.8 |
| | Philippines | 60 | 74 | 123.30% | 116 | 202 | 11 | 52.1 |
| | Vietnam | 45 | 15 | 33.30% | 101 | 76 | 6 | 45.9 |

Source: Data center capacity: Cushman & Wakefield, as of February 2024. Population: United Nation Population Division, as of December 31, 2023.Electricity Cost and Median Download Speed: World Population Review, as of March 2024. Submarine Cable: TeleGeography, as of December 12, 2024.

- **Access to Water**: Additional heat generated by greater computing needs necessitates the use of liquid cooling technologies, making the availability of abundant water crucial. One hyperscaler's water consumption is estimated at around 760 million liters per year, equivalent to 300 Olympic-sized swimming pools.[4] While DCs were traditionally located close to the demand to reduce latency, operators are now moving to secondary markets with ample and affordable water resources for cooling purposes.
- **Connectivity**: Enhanced network and fiber connectivity are essential for minimizing latency. AI applications such as real-time speech recognition, image processing, and generative AI models require low latency for real-time processing and task execution. Connectivity infrastructure like subsea cables connecting to other countries play a vital role in achieving this.

[2] Savills Research, May 2024.
[3] Goldman Sachs, April 2024.
[4] DGLT Infra, January 2024.

- **Sustainability**: Although DC development presents profitable investment opportunities, some markets are cautious about the risk of overdevelopment due to environment concerns and resources limitations. For example, Singapore imposed a moratorium on DCs construction in 2019 due to high carbon emission. Johor in Malaysia has rejected nearly 30% of DC construction applications in H2 2024 to conserve resources and regulate the industry to ensure maximum benefits for the local economy and community.[5]

On January 13, the U.S. issued a new policy consultation paper to restrict the export of advanced GPUs used in DCs, introducing uncertainties around Southeast Asian emergence as a DC powerhouse. The policy paper proposes a country and entity level export quota, exempting 19 key allies. While hyperscalers are generally exempted from the proposed quotas, local companies face a national limit of 50,000 GPUs. Entities meeting U.S. government security and human rights standards can purchase up to 320,000 advanced GPUs. As demand for computing power accelerates, we anticipate more AI DC with capacities of up to 100,000 GPUs. These export quotas could hinder the long-term development in emerging secondary markets, creating a more cloudy outlook. However, it is too early to assess the policy's impact, as it is currently in a 120-day consultation period before implementation and its execution is dependent upon Trump administration.

### Future Trends

The changing landscape has made emerging secondary markets increasingly attractive for AI data center (DC) development. However, DC development is likely to exhibit a strong clustering effect, with new facilities established near existing DC hubs to leverage the interconnectivity of primary markets. For instance, Batam in Indonesia and Malaysia are gaining popularity due to their proximity to Singapore. Kyushu is emerging as a new DC hub in Japan, complementing the Greater Tokyo and Osaka areas. Additionally, Perth and Queensland in Australia are developing as alternatives to Sydney for access to renewable energy.[6]

While these new markets thrive, established DC markets will likely remain active. Although higher-value AI training workloads may shift to data centers abroad due to their lower sensitivity to latency, lower-value services like cloud servers and tasks that require low latency, such as AI inference, will likely remain in primary markets because of their interconnectivity and proximity to demand. Consequently, both primary and secondary markets will coexist. However, current DCs in developed markets may face challenges in meeting the requirements for AI inference tasks, necessitating significant upgrades and creating new investment opportunities.

### Investment Opportunities from DC Upgrades in APAC

The demand for DCs with higher computing power presents an appealing investment opportunity. DC operators are direct beneficiaries. Power generation and utilities companies appear well positioned to benefit as substantial investments are needed to upgrade the power grid as DCs become increasingly energy intensive. Beyond these two obvious beneficiaries, further opportunities could exist upstream in the value chain, particularly among industrial firms that provide Power and Cooling solutions for data centers.

While the largest portion of DC costs is attributed to computing, networking and data storage, it is estimated that at least 40% of the total costs stem from power and cooling. Power management, encompassing power distribution, generators and uninterruptible power systems (UPS) account for the majority of this 40%. The surge in computing power and energy requirements necessitates more robust and efficient DC power solutions.

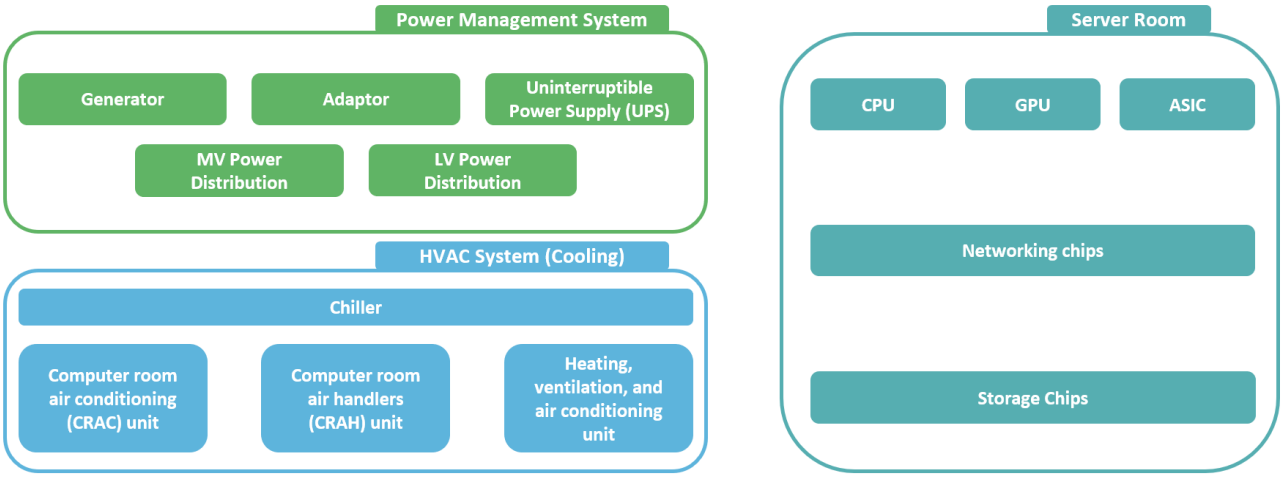
Efficient cooling is a crucial driver of a DC profitability, as a DC's capacity is largely determined by its ability to cool servers effectively. As heat generation increases due to greater computing demands, investments in liquid cooling technologies are rising. Within this sector, cold plate liquid cooling, which dissipates heat through plates positioned atop heat generating chips, is projected to grow from 5% to 26% of the DC thermal management market by 2026 as more high-performance compute (HPC) infrastructure expands.[7] In addition, immersion cooling that submerges servers in dielectric fluid has gained lots of tractions due to energy efficiency. Nonetheless, immersion cooling face challenges related to high maintenance cost from IT equipment failures, liquid leakage and evaporation.[8]

[5] The Straits Times, November 2024.
[6] CBRE, April 2024.
[7] The Register, May 2023.
[8] Haghshenas et al. Energy Informatics, June 2023.

Investment into immersion cooling technology that minimizes maintenance appear promising. There are also potential opportunities in waste-heat application, such as residential heating, since releasing excess heat into the environment can be detrimental.

Finally, the prefabrication and modular (PFM) sector also may also stand to benefit from the growing demand of DC. Hyperscalers are increasingly deploying PFM solutions that allow portions of the construction process to occur offsite, addressing challenges such as labor shortages and volatile commodity prices in specific markets. PFM effectively shortens construction timelines reduces costs and enhances safety, quality and sustainability through controlled manufacturing environments. Specific opportunities within the PFM sector include structural and architectural components, as well as mechanical, electrical and plumbing (MEP) equipment and modules.

**Figure 2: Simple Representation of a Data Center Physical Setup**




Source: Public Comps, as of February 4, 2024.

## Glossary

**Hyperscalers** are large cloud service providers, which can provide services such as computing and storage at enterprise scale.

**Generative artificial intelligence (AI)** describes algorithms that can be used to create new content, including audio, code, images, text, simulations, and videos.

**Latency** refers to the delay that happens between when a user takes an action on a network or web application and when it reaches its destination.

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