

Why China's Future Network Test Facility Can be a Game-Changer

China's newly opened Future Network Test Facility—a computing power pool that pulls together all of the country's top computing centers into a unified computing system—threatens to upend the Big Tech's AI data center model forever.

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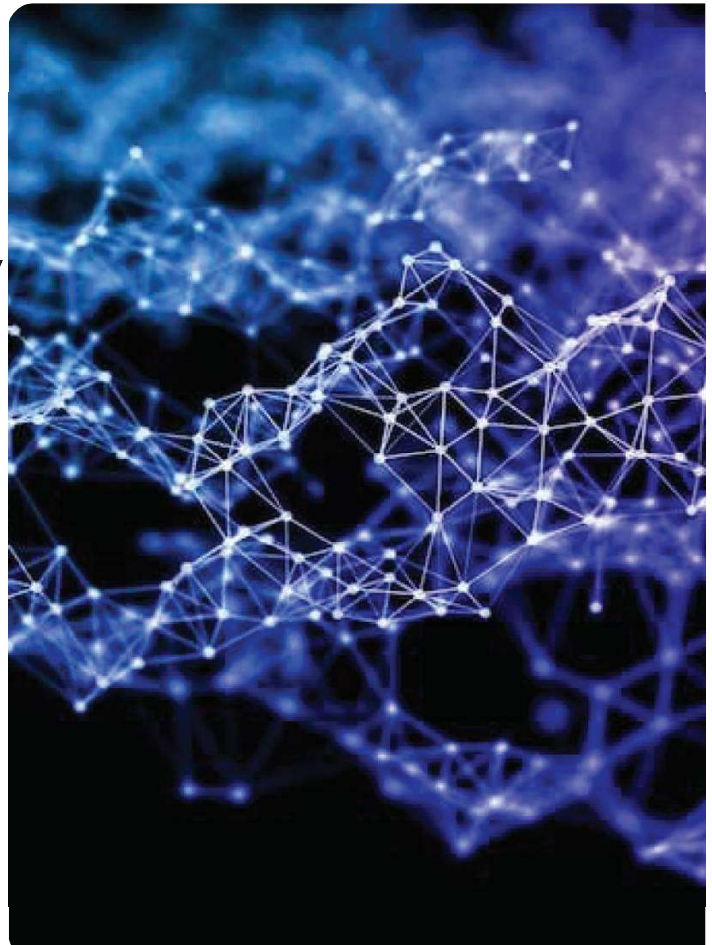


fter more than a decade of development and construction, China officially started operating its giant artificial intelligence (AI) infrastructure, the Future Network Test Facility (FNTF), on December 3, marking the country's first gigantic national science and technology infrastructure project. What is the project's significance and why does it matter in helping China to win the global AI race?

What is FNTF?

According to a December 10 report in the *South China Morning Post*, the FNTF is a 2,000 km-wide (1,243-mile) computing power pool pulling together China's top computing centers scattered across the country into a unified computing system, so that they could work together seamlessly, achieving an expected 98% of the efficiency of a standalone data center.

As summarized in the report, the FNTF launch marks a monumental milestone in China's AI quest by fast-tracking the development of the most powerful AI models and other cutting-edge technologies. This facility is also crucial for fast-tracking fundamental research and large-scale testing of innovations. It represents a strategic investment in AI capacities, paving the way for breakthroughs in sectors like telecommunications, autonomous driving, healthcare, and more.



A wake-up call for standalone AI centers

In a frantic race for the commanding heights of mass data processing capacities, United States companies have collectively invested over \$45 bn in standalone AI centers, estimated to exceed \$100 bn by mid-2020s. Examples include Google's massive AI research centers in Mountain View, California; Microsoft's OpenAI research labs in Redmond, Washington, and Cambridge, Massachusetts; Amazon Web Services (AWS)'s numerous AI centers across the US, notably in Seattle and Northern Virginia; and IBM's AI locations in Armonk, New York, and research labs in other states.

A typical medium-sized data center may consume between 1 to 5 megawatts of power, translating to approximately 8,760 to 43,800 MWh per year. Large data centers like AWS, Google, or Microsoft consume significantly more energy, often exceeding 10 megawatts. Some of the largest data centers can reach well over 100 MW in total capacity.

Due to their gargantuan energy appetites, data centers can only be located in carefully selected areas where the supply of electricity is reliable and abundant. What is more, the mad rush for gigantic standalone data centers





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with splurging power consumption incurs immense costs to the environment and Global Warming.

The mad rush for global commanding heights of AI processing power faced a nasty reality shock when



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Hangzhou-based AI upstart DeepSeek demonstrated convincingly that it could achieve similar performance results with up to 90% less processing power compared to

standard models, thereby massively lowering energy and operational costs. DeepSeek’s dramatically reduced processing requirements make its open-source model viable for deployment in various applications, including natural language processing and image recognition, where resource constraints may be a concern. By optimizing data center usage and minimizing its environmental footprint, innovations like DeepSeek are poised to lead to sustainable practices in AI development.

Now, by unifying and maximizing the capacities of separate data centers, China’s new FNTF facility represents a quantum leap in overall AI processing efficiency and sustainability.

Why FNTF will be the future of networking?

The following features make FNTF special:

Network Integration: The FNTF is designed to connect multiple data centers, improving overall computing capability by working in tandem rather than as isolated entities. This results in maximized efficiency, better resource allocation, and reduced latency.

Enhanced Computing Power: By close-knit interlinking of various data centers, the facility magnifies overall computing power, leading to advanced computation and big data processing that could exceed the capabilities of individual data centers working separately.

Data Sharing vs. Centralization: Instead of a single, giant data center, FNTF adopts an integrated network approach that allows for efficient data exchange across centers for centrally-coordinated data processing while utilizing decentralized resources.

Future of Networking: FNTF could contribute to new networking paradigms that leverage both centralized and decentralized computing, facilitating innovative applications in cloud computing, edge computing, and AI.

In sum, the FNTF maximizes connectivity among multiple data centers, focusing on integration, coordination and efficiency rather than simply linking them together.

FNTF facilitating DeepSeek’s advance

According to an earlier South China Morning Post report dated December 2, DeepSeek has unveiled its most powerful model variant, DeepSeek-V3.2-Special, claiming that it equals Google’s Gemini 3 Pro in reasoning capabilities, while performing on par with OpenAI’s GPT-5 launched in August the same year.

According to its technical report, DeepSeek has accomplished this despite having “fewer total training FLOPs” than its US rivals, due to export controls limiting Chinese access to advanced semiconductor chips; FLOPs or Floating-point Operations Per Second is a key metric for measuring a computer’s performance, especially supercomputers and GPUs, by counting how many complex math calculations (with decimal numbers) it can do

in one second, often expressed in GigaFLOPS (billions) or Tera-

FLOPS (trillions).

DeepSeek has open-sourced its V3.2 model on the developer platform Hugging Face, while V3.2-Special is accessible solely through an application announcement. The model variant is priced at \$0.28 per million input tokens and \$0.42 per million output tokens. For comparison, Gemini 3 Pro charges API users up to \$4 per million input tokens and \$18.00 per million output tokens. However, DeepSeek acknowledges that its model is “significantly inferior” to Gemini 3 Pro in token efficiency, indicating that V3.2 requires more tokens to process the same query. The start-up attributes this deficiency to its shortfall in computational power, which also affects the model’s “world knowledge” compared with Gemini 3 Pro.

DeepSeek said it intends to close these gaps by scaling up the computing power used for training models. The company’s latest model clearly indicates that computing power remains the Holy Grail that determines who leads the AI race, Patrick Zhang, ByteDance’s global head of technology policy and law, prophesied in his Geopolitechs newsletter. That’s why FNTF is a powerful and timely white knight for DeepSeek’s thirst for mega-computing power.

China has the world’s most abundant and cheapest energy for AI computing

AI depends on data centers, and data centers consume a tremendous amount of power. For decades, China has left no stone unturned to expand its national power grid capacities, especially for renewable energies. Apart from a positive impact on climate change, China’s abundant and cheap green energies have driven down its overall cost of energy supply.

These efforts have been underpinned by (a) completion of China’s ultra-high-voltage national grid to transmit abundant solar, wind and hydro powers from China’s Western regions to



the eastern industrial heartland and (b) China’s quantum leap to becoming the world’s green energy superpower par excellence, exemplified by its dominance in the global solar and wind power supply chains including electric vehicles (EVs).

According to a report in the *Wall Street Journal*, December 10 edition, China now has the biggest power grid the world has ever seen. Between 2010 and 2024, its power production increased by more than the rest of the world combined. Last year, China generated more than twice as much electricity as the US Morgan Stanley forecasts that China will spend some \$560 bn on grid projects in the five years through 2030, up 45% from the previous five years.

Some Chinese data centers are now paying less than half of what their American counterparts pay for electricity. Goldman Sachs predicts that by 2030, China will have about 400 gigawatts of spare capacity, about three times the world’s expected data-center power demand at that time.

China has the world’s largest reservoir of technological brainpower

A key driver of China’s AI advance is its leading position in a majority of new technologies that define the 4th and 5th Industrial Revolutions. According to a March 2023 research project by the

Australian Strategic Policy Institute (ASPI), based on citations of some 2.2 million peer-review STEM PhD papers, China is leading in 37 out of 44 cutting-edge technologies, including advanced materials and manufacturing, AI, computing and communications, energy and environment, quantum, biotechnology, gene technology and vaccines, sensing, timing and navigation, defense, space, robotics and transportation, often producing more than five times as much high-impact research as its closest competitor the US.

Out of 10 AI-related technologies, China is found leading in advanced radio frequency communications (including 5G and 6G), advanced optical communications, AI algorithms and hardware accelerators, distributed ledgers, artificial data analytics, machine learning (including neural networks and deep learning), and protective cybersecurity technologies, while the US maintains leadership in high performance computing, advanced integrated circuits design and fabrication, and natural language processing (including speech and text recognition and analysis).

The validity of these findings is reflected in China’s immense scientific manpower pool, according to George Town University’s Center for Security and Emerging Technology (CSET). Chinese universities are now producing more than 77,000 STEM PhDs per year

compared to approximately 40,000 in the US. Excluding international students, Chinese STEM PhD graduates outnumber their US counterparts more than three-to-one.

East Data West Computing Project (EDWCP)

China's national EDWCP aims at balancing regional disparities between eastern coastal regions (which are economically developed) and Western regions (which are less developed) in terms of digital infrastructure, resources for data processing and computational power.

The project envisions transferring data from highly populated and economically vibrant eastern cities (like Beijing and Shanghai) to the less populated and resource-rich Western regions (like Xinjiang and Sichuan), where abundant renewable energy sources are available. The initiative involves constructing data centers, enhancing broadband infrastructure, and improving interconnectivity between regions. It also seeks to develop cloud computing capacities in Western areas to handle increasing computational demands. Additionally, renewable energies in the West (e.g., hydropower from Sichuan) would power data centers sustainably.

The project is expected to promote economic growth in underdeveloped Western regions by creating tech-oriented jobs and attracting investments. As data centers expand, these regions would be increasingly urbanized with expanded infrastructure and services.

Emphasizing renewable energy for powering data centers aligns with China's goals for reducing carbon emissions and the nation's targets for peak carbon emissions by 2030 and carbon neutrality by 2060.

Streamlining data processing and storage helps optimize resource use across regions, leading to greater energy efficiency.

The establishment of data centers in Western regions could foster local tech industries and innovation ecosystems, driving advancements in AI, big data, and cloud computing, with collaboration between research institu-

tions and industries. Last but not least, strengthening data infrastructure within China reduces reliance on foreign technologies and services, enhancing national security and self-reliance in critical sectors.

As China expands its digital capacity, it is positioning itself as a leader in global data management and technologies. Nevertheless, massive financial investment is required to develop the necessary infrastructure, which poses a logistical and economic challenge. Additionally, ensuring that regions can adapt to new technologies and skills will require policy support across the board and execution at all levels, including comprehensive training.

In sum, EDWCP is China's strategic response to increasing data demands while addressing regional imbalances in economic development. Its successful implementation would have a profound impact on the nation's economy, energy sustainability, technological innovation, and geopolitical positioning in the Digital Age.

Potential advantage over other nations

The FNTF and EDWCP, as well as China's quantum jump in power grid infrastructure and green energies, not to mention its rapid advance in cutting-edge technologies which define the Fourth and Fifth Industrial Revolutions, all point to China's unique capabilities as a developmental One-Party state with mixed socialism and capitalism that can laser-focus all-of-government and all-of-society efforts to achieve strategic outcomes over decades.

By integrating extensive data resources and cutting-edge infrastructure, China is positioning itself to progress rapidly in AI research and applications. While the US maintains leading AI capabilities, particularly through private sector innovation, China's state-driven public-private concerted efforts in optimizing infrastructure and data utilization could lead to significant innovations, potentially leveling the playing field.

Outlook on China's growing clout in AI

China's growing influence in AI is a multifaceted challenge and opportunity for other nations. Its heavy investment in research and development, along with supportive government policies, has led to the nation's rapid advancements in AI technology. Countries like India can learn from China's approach by fostering collaboration and partnerships between government, academia, and industry to create a more robust innovation ecosystem. Building national AI infrastructures similar to the FNTF to maximize data management efficiency and productivity can optimize resources, catalyze research and development, and enhance overall AI development and capacity.

Societal issues

With advances in AI, questions regarding surveillance, data privacy, and other ethical implications of AI deployment would arise, necessitating public discussions on regulation and governance. The emergence of China as an AI powerhouse may heighten global competition, leading to geopolitical tensions, especially in military-civilian dual-use domains. Public demand for balancing technological advancement with environmental sustainability is likely to ensue, as energy and resource-intensive projects can have lasting impacts on ecosystems. Attracting and retaining skilled talent will be pivotal for both China and competing nations to maintain an edge in rapidly developing AI innovations.

Way forward

While China's advancements in AI present opportunities, they also pose challenges for other nations. As the world of data is getting increasingly interconnected, the focus should not only be on competition but also on collaborative frameworks that can lead to beneficial outcomes for the global community in AI and related technology development. ■

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