

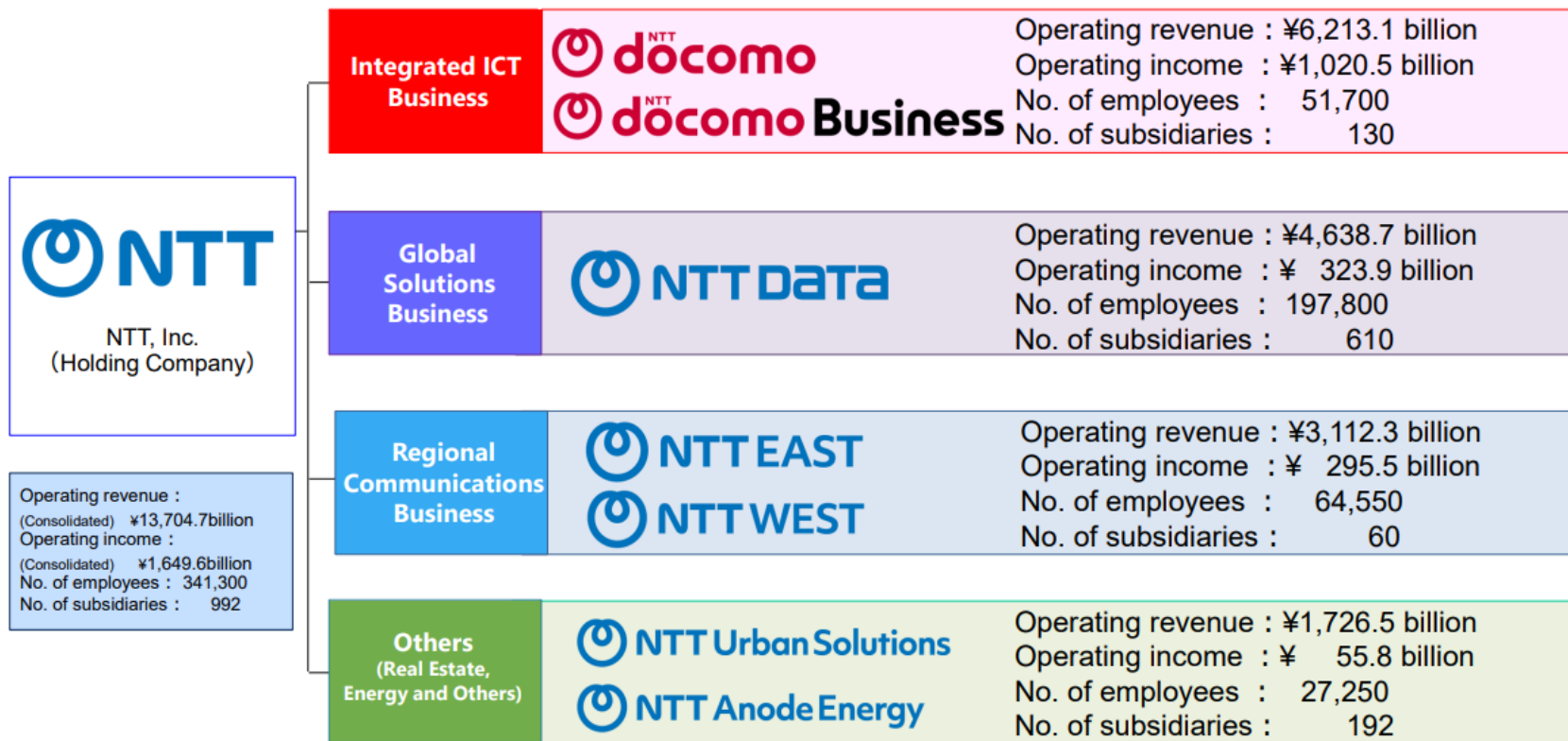


# Watt-Bit Collaboration and the IOWN Vision: Next-Generation ICT Architectures for AI

Director, Head of Standardization Office  
Research and Development Planning Department  
NTT, Inc.

**Hiroshi Yamamoto**

# About NTT Group



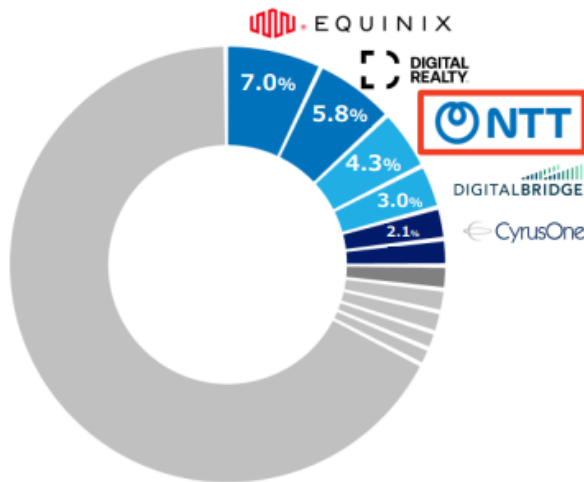
- Operating revenue and operating income for each segment are FY2024 figures including inter-segment transactions..
- The figures for both employees and subsidiaries are as of March 31, 2025.

# Our Business Example



## Global Data Center Colocation Revenue Share<sup>1</sup>

- 1 Equinix
- 2 Digital Realty
- 3 NTT GDC
- 4 Digital Bridge
- 5 CyrusOne
- 6 CenterSquare
- 7 QTS
- 8 American Tower
- 9 Stack Infrastructure
- 10 KDDI Telehouse
- 11 Others



NTT GDC is widely recognized as the third largest data center operator with a global footprint

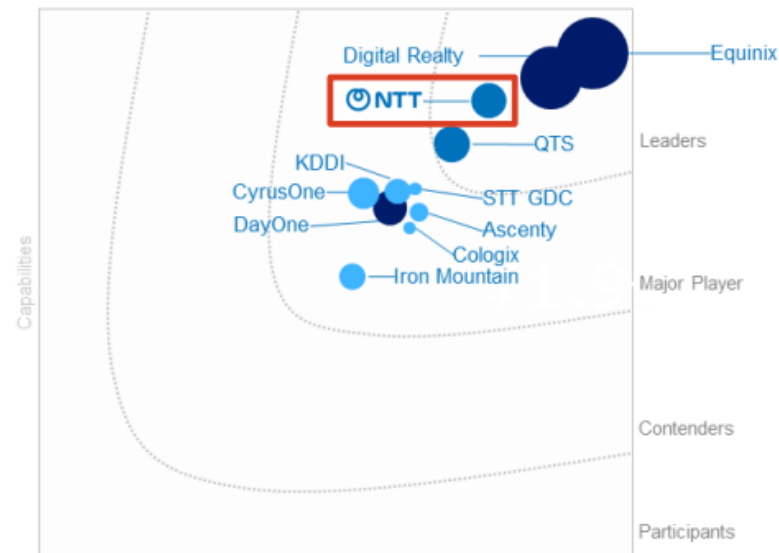
<sup>(1)</sup> NTT created the chart, excluding service providers in China, based on the Structure Research August 2025 Report.

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## Global IDC MarketScape Vendor Assessment<sup>2</sup>

IDC MarketScape Worldwide Datacenter Service, 2025



NTT is named as a “Leader” due to its broad service offering and global reach

<sup>2</sup> IDC MarketScape®: Worldwide Datacenter Services 2025 Vendor Assessment (August 2025, IDC #US52983725)

The IDC MarketScape visually ranks ICT vendors based on capabilities and strategy, using both qualitative and quantitative criteria. Capabilities reflect short-term execution; strategy reflects long-term alignment with customer needs. Icon size indicates market share.

# Enormous Development/Training Costs



## Estimated training cost of select AI models, 2016–24

Source: Epoch AI, 2024 | Chart: 2025 AI Index report

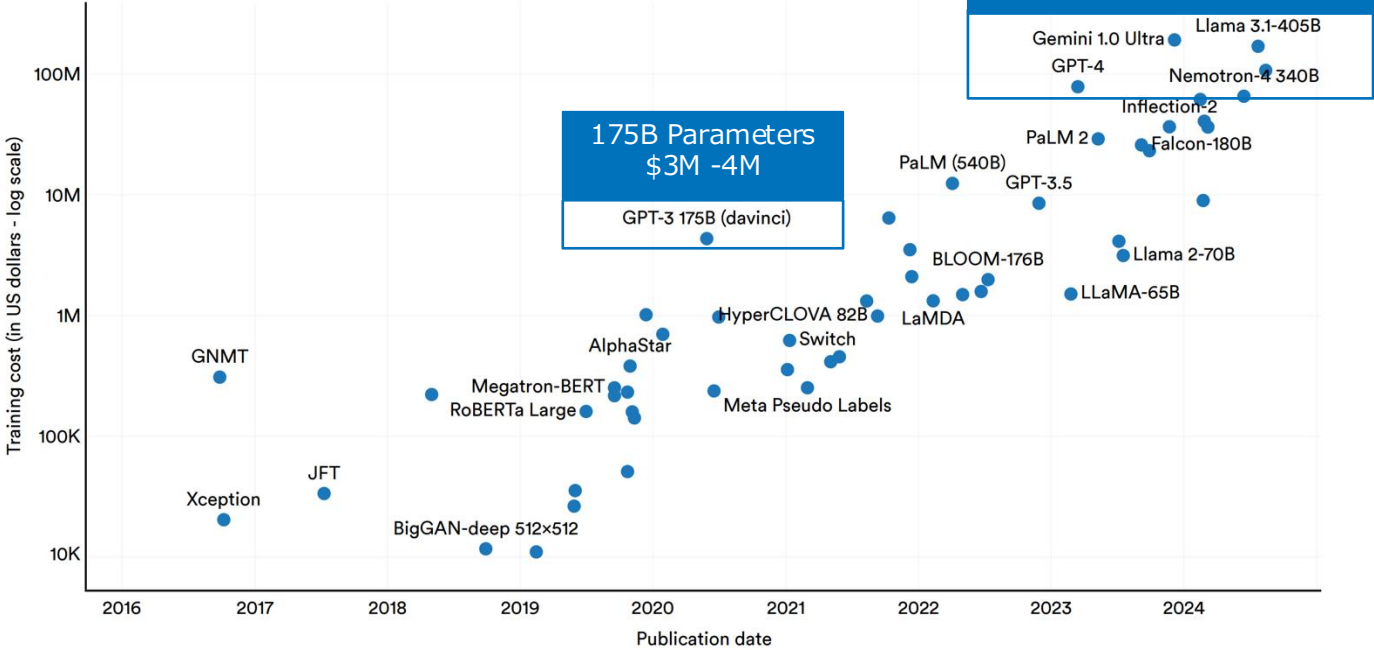


Figure 1.3.25

TO Develop GPT-4 class LLM

## Power Consumption

**Approx. 40,000MWh<sub>[1]</sub> / 1 training**



**Equivalent to  
40 Nuclear Power Plants**

(Approx. 1,000MWh / 1 Nuclear Plant)

[1] Stanford Univ. Artificial Intelligence Index Report 2024 Figure 1.3.22  
<https://gizmodo.com/chatgpt-ai-openai-carbon-emissions-stanford-report-1850288635>

## Current approach

“Power Games” using Large Amounts of Resources (such as GPUs)



## NTT's Approaches

Optimization of  
AI Execution Environment

**IOWN**

Optimization of  
AI Model

**tsuzumi**

# From Electronics to “Photonics”

Networking

Computing

**IOWN 1.0**

DC to DC

**IOWN 2.0**

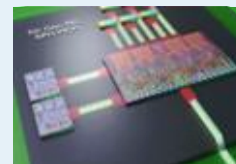
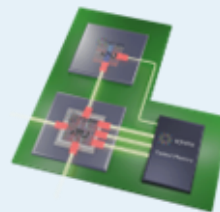
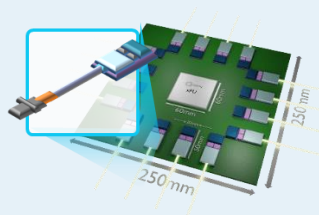
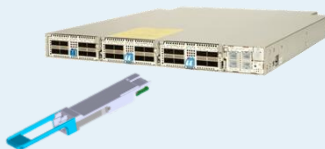
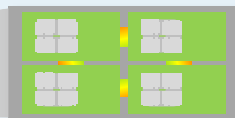
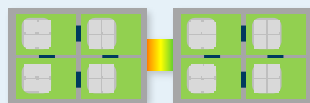
Board to Board

**IOWN 3.0**

Chip to Chip

**IOWN 4.0**

Inside Chip



# Further evolution of NTT's LLM

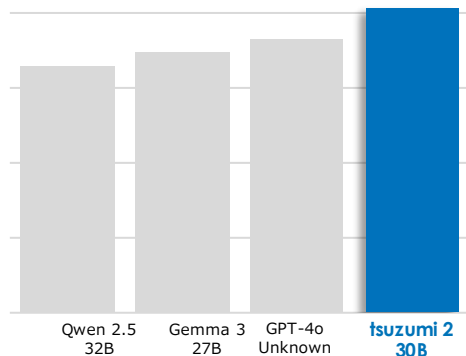
## tsuzumi 2



( Released in Oct. 2025 )

### ① World-class Japanese language performance

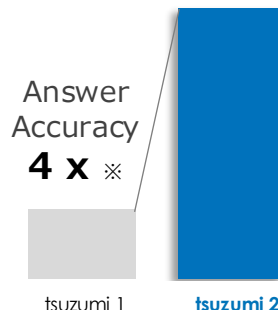
Japanese language performance superior to Gemma, Qwen, GPT-4o, etc.



※ The graph shows the evaluation results of the Japanese evaluation benchmark llm-jp-eval (excluding MR). tsuzumi 2 uses a version currently under development.

### ② High Customizability

Significant improvement in accuracy in business processing using RAG



※ Accuracy of inquiry responses using RAG based on NTT's internal financial processing information

### ③ High Security

Ideal for sovereign AI that handles confidential information

Developed from scratch by NTT

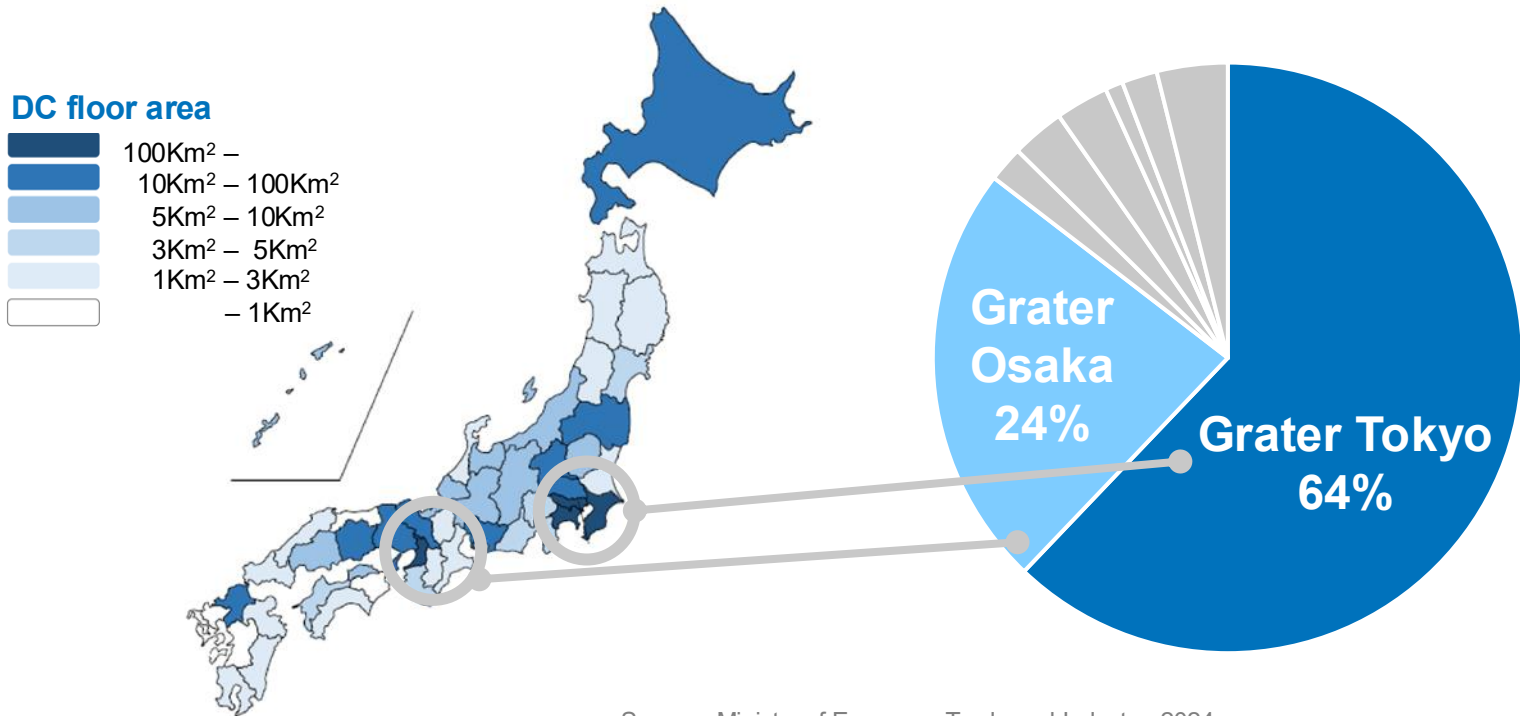
Training data is managed by NTT

Can be operated on-premises to support for highly confidential information



# Challenge: Securing land

- Japan's data centers are concentrated in the Tokyo and Osaka metropolitan areas (88% of all data center land in Japan)
- It will become more difficult to secure land for data centers in the future



# Challenge: Securing electricity

- In the Tokyo area, the development of the power grid has not kept up with the growth in DC demand, and waiting times for power supply can exceed 10 years

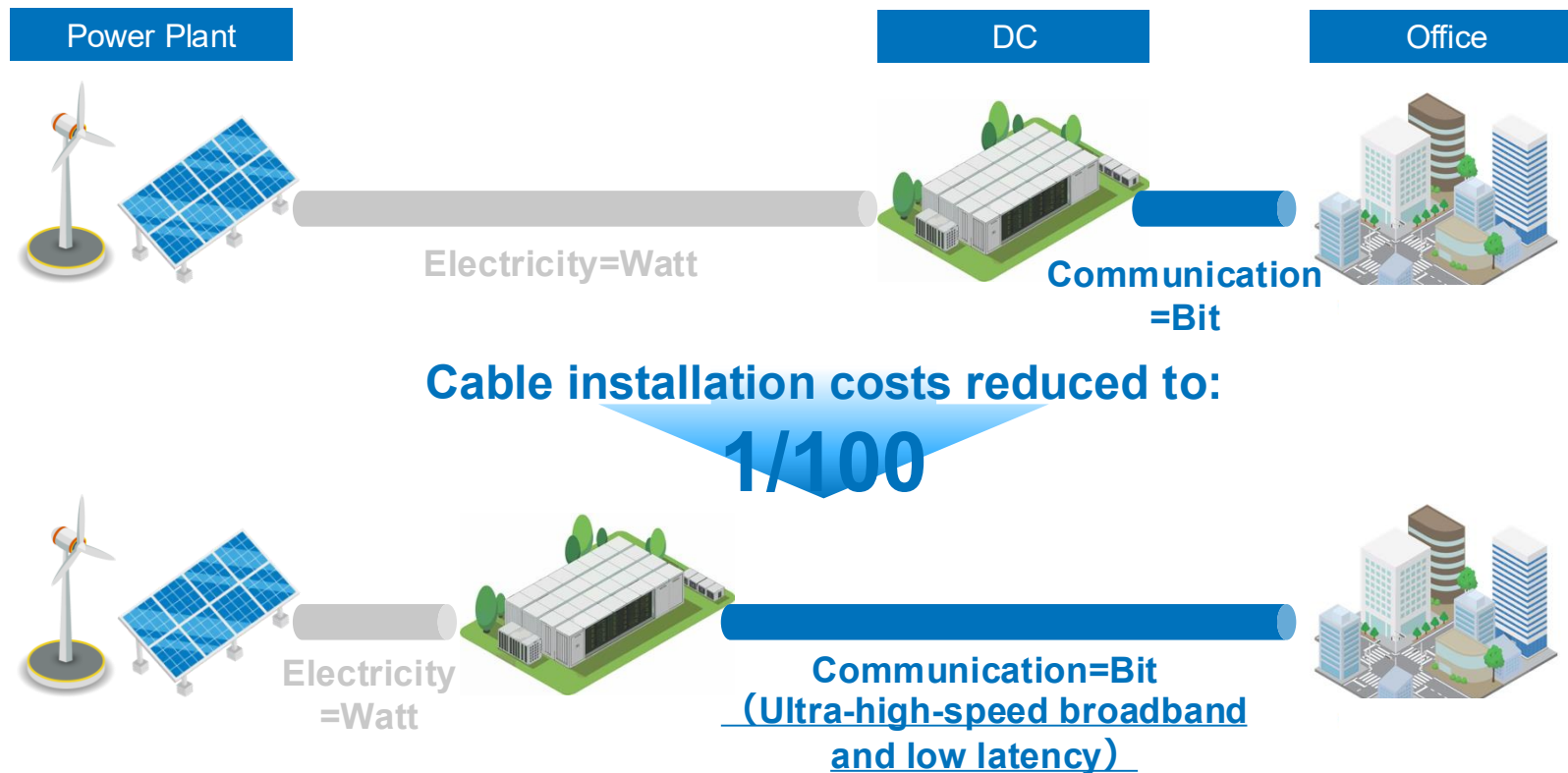
**Waiting time for power supply to new data centers near Tokyo:**

**Ca. 10 years**

Example:

Inzai City, Chiba Prefecture, near Tokyo (as of March 2025)  
40 customers waiting for power (total 2.5GW)

# Approach: Watt-Bit Collaboration



Ultra High Speed, Low Latency and Energy Efficient ICT Infrastructure will be Essential for AI era

→ **SG13 draft ITU-T Recommendation Y.L2E2net-frm**

Synergy Between Energy and ICT is Becoming Critical to Ensuring Future DC Capacity (Watt-Bit Collaboration)

→ **SG5 L.WBC\_FR** **New**

**"Framework for Industrial Advancement through Distributed Data Centre Workload Shifting for Watt-Bit Collaboration"**

