

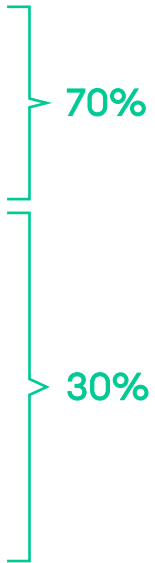
How much would a 1m XPU cluster cost to build and operate?

Capex for a 1m XPUs cluster: \$20bn

COGS: \$5bn p.a., split 70% depreciation/30% cash

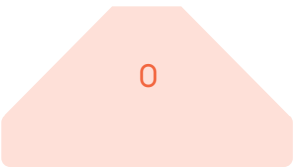
Capital Cost	US\$bn	Comments
XPUs	\$10bn	1m XPUs (50% GPUs, 50% ASICs). \$10k ASPs.
Other server	\$2.5bn	CPUs, DRAM, NAND. 20% of server capex.
Network	\$2.5bn	Switches, optics, cables. 15-20% of cluster capex.
Pwr/cooling	\$2.5bn	500W/XPU. \$10/W. Half for PDUs, UPS, HVAC, etc.
Building	\$2.5bn	500W/XPU. \$10/W. Half for building, generators, etc.
Total	\$20bn	

Annual Cost	US\$bn	Comments
Equipment depreciation	\$3.5bn	\$17.5bn over 5 years.
Building depreciation	\$0.2bn	\$2.5bn over 20y.
Electricity	\$0.8bn	6TWh (500W/XPU. 1.3 PUE). \$0.15/kWh.
Software	\$0.3bn	5-10% of TCO.
Maintenance	\$0.3bn	5-10% of TCO.
Total	\$5bn	



The \$100bn datacenter planned by OpenAI and Microsoft would correspond to a 5m XPU cluster, and cost \$25bn p.a. to operate.

Source: Corporate reports, Group 650, and NSR estimates and analysis.



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- After the rally: how to play the AI bull case, how to play the AI safe case, how to hedge against an AI winter. - (23 Feb 2024) - [Link](#)
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- Who can afford that many AI clusters? Part II - (28 September 2023) - [Link](#)
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- How to play the Cloud build-out? - (21 January 2022) - [Link](#)
- Hot Chips 2021: What's new in the realm of chip design? - (27 August 2021) - [Link](#)
- Intel Architecture Day: Is the Jim Keller magic hitting, and is Intel having its "ZEN" moment? - (23 August 2021) - [Link](#)
- Understanding Cloud compute growth dynamics... and why Intel is a screaming buy - (09 June 2020) - [Link](#)

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12 month historical recommendation changes are available on request

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