

Price of high-density server racks

Article Overview

High-density server racks range from \$500,000 for traditional setups to \$3.9 million or more for AI-focused high-density racks, with costs influenced by power, cooling, and installation requirements.

Cost Overview

Traditional server racks typically cost around \$500,000 per rack, while AI or high-performance computing (HPC) racks can reach \$3.9 million due to higher power densities, GPU integration, and advanced cooling needs . The sevenfold increase reflects the need for racks capable of supporting 100kW+ per rack, structural reinforcement, liquid cooling, and intelligent power distribution .

Factors Affecting Pricing

- o Power Density: High-density racks for AI or HPC workloads may require 40-900kW per rack, compared to 5-15kW for traditional racks . Higher power densities increase both CapEx and OpEx due to enhanced electrical infrastructure and cooling systems.
- o Cooling Requirements: Advanced cooling solutions, including liquid cooling or immersion cooling, are essential for racks exceeding 30kW, adding significant cost .
- o Installation and Rack & Stack Services: Standard rack installation costs range from \$500 to \$2,000 per rack, but high-density setups with complex cabling, PDUs, and UPS systems can increase labor and infrastructure costs .
- o Equipment Type: Blade servers, high-core-count CPUs (AMD EPYC, Intel Xeon), and multi-GPU configurations require specialized racks, further increasing costs .
- o Infrastructure Upgrades: Existing data centers may need electrical upgrades, raised floor reinforcement, and advanced DCIM tools to support dense configurations .
- o Geographic Location: Labor, taxes, and local regulations can affect installation costs, with metropolitan areas generally being more expensive .

Total Cost of Ownership (TCO)

High-density racks involve higher upfront costs, but they can reduce the number of racks needed, optimize space, and improve energy efficiency. Strategic planning is essential to balance ROI, operational complexity, and long-term scalability .

Summary

- o Traditional rack: ~\$500,000 per rack
- o AI/HPC high-density rack: ~\$3.9 million per rack
- o Installation: \$500-\$2,000 per rack (standard), higher for complex setups

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o Key cost drivers: Power density, cooling, equipment type, infrastructure upgrades, and location .

Organizations planning high-density deployments should evaluate rack specifications, projected workloads, and cooling/power requirements to ensure cost-effective and scalable infrastructure.

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Higher-density racks reduce total rack count for equivalent compute capacity. Fewer racks mean less floor space,

Racks for servers are essential components in any data center or IT environment, providing the necessary framework to organize

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This table shows how rack density, PUE, and location dramatically impact annual costs. An AI-capable 60 kW rack in

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