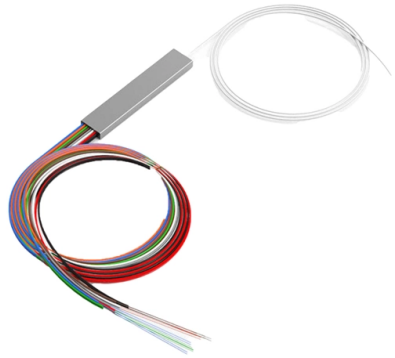
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The power distribution box is located in the middle of the data center



Overview

Master data center power distribution design with expert best practices, layouts, and redundancy strategies.

Key Takeaways

The power distribution box, often a PDU, is centrally located in a data center to efficiently distribute electricity to racks while maintaining redundancy and safety.Central Placement and Function

In modern data centers, the power distribution box—commonly a Power Distribution Unit (PDU)—is strategically placed near the center of the facility or within each rack row to optimize power delivery to servers, storage, and networking equipment . Central placement allows for:

• Efficient cable routing to multiple racks, reducing clutter and minimizing voltage drop.

• Balanced load distribution across circuits, which is critical for maintaining uptime and preventing overloads.

• Redundancy and reliability, as centrally located PDUs can be connected to multiple UPS systems or utility feeds to ensure continuous power even during failures . Power Flow Overview

Electricity in a data center typically follows this path:

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• Utility Power Input: Medium-voltage power enters the facility through main switchgear and transformers .

• Room-Level Distribution: Power is routed through UPS systems and facility distribution panels to maintain clean, uninterrupted electricity .

• Rack Power Feed: Dedicated cables carry power from the central distribution box to individual racks .

• Rack PDU Distribution: Inside each rack, the PDU distributes power to multiple outlets, supplying servers and other IT equipment .

• IT Equipment Power Supplies: Servers and storage devices draw power from the PDU outlets, completing the distribution chain .
Design Considerations
• Industrial Connectors: Many data centers use CEE or HEAVYCON connectors for high-current, reliable connections .

• Monitoring and Control: Advanced PDUs provide real-time monitoring, remote switching, and load balancing to optimize energy efficiency and prevent downtime .

• Safety: Grounding and protective earth connections are mandatory to prevent electrocution and protect equipment .
Summary

Placing the power distribution box centrally in a data center ensures efficient, reliable, and safe power delivery to all racks. It supports redundancy, simplifies maintenance, and allows for scalable growth as server density increases. Proper design and monitoring of PDUs are essential for maintaining continuous operation and protecting critical IT infrastructure .

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