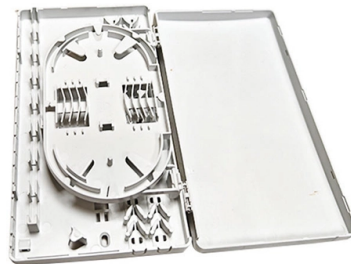


Construction Requirements for IDC Data Centers



AI Overview

IDC data center construction requirements are defined by tiered standards (T1-T4) that specify infrastructure redundancy, uptime, power, cooling, and operational design to ensure reliability, scalability, and sustainability.

Tier Classification and Uptime

IDC data centers follow a tiered classification system developed by the Uptime Institute, which evaluates infrastructure performance and expected uptime:

- Tier 1 (T1):** Basic infrastructure with no redundancy; availability of 99.67% (~28.8 hours downtime/year). Includes dedicated IT space, uninterruptible power supply (UPS), basic cooling, and engine generators for prolonged outages.
- Tier 2 (T2):** Redundant capacity components; availability of 99.75% (~22 hours downtime/year). Adds backup power and cooling systems to reduce downtime.
- Tier 3 (T3):** Concurrently maintainable infrastructure; availability of 99.982% (~1.6 hours downtime/year). Supports maintenance without affecting operations, with multiple power and cooling paths.
- Tier 4 (T4):** Fault-tolerant infrastructure; availability of 99.995% (~26 minutes downtime/year). Fully redundant and fault-tolerant systems, ensuring continuous operation even during component failures.

Core Design Criteria

IDC data center construction emphasizes redundancy, scalability, and flexibility:

- Redundancy:** Critical systems like power, cooling, and network must have backup paths to minimize downtime.
- Scalability:** Modular designs and virtualization allow the data center to grow with demand without major disruptions.
- Flexible Architectures:** Infrastructure should accommodate emerging technologies, such as AI workloads, and higher data volumes.
- Sustainability:** Energy-efficient designs, optimized airflow, and virtualization reduce power consumption and carbon footprint.

Infrastructure Components

Key infrastructure elements include:

- Servers and Storage:** Hardware for computing and...

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