

TIER CLASSIFICATION SYSTEM

The International Standard for Evaluating Data Center Infrastructure Performance

[Uptime Institute](#) (Institute) created the standard Tier Classification System as a means to effectively evaluate data center infrastructure in terms of a business' requirements for system availability. The Tier Classification System provides the data center industry with a consistent method to compare typically unique, customized facilities based on expected site infrastructure performance, or uptime. Furthermore, Tiers enables companies to align their data center infrastructure investment with business goals specific to growth and technology strategies.

This document summarizes the Institute's *Tier Standard: Topology*, which defines the requirements and benefits of four distinct Tier classifications for data center site infrastructure. Each Tier aligns with a specific function in the business world and sets the appropriate criteria for power, cooling, maintenance, and capability to withstand a fault.

The Tiers is progressive; each Tier incorporates the requirements of all the lower Tiers. Additionally, the Tiers has been demonstrated as a meaningful industry standard because Tiers allows a variety of solutions, allowing the flexibility to meet both the performance goals and comply with local statutes, codes, and regulations. In the Tier Certifications underway in over 25 countries, there has not been an impediment to meeting the Tier criteria.

Tier I and Tier II are tactical solutions, usually driven by first-cost and time-to-market more so than life-cycle cost and performance (uptime) requirements. Organizations selecting Tier I and Tier II solutions typically do not depend on real-time delivery of products or services for a significant part of their revenue stream. Generally, these organizations are contractually protected from damages stemming from lack of system availability.

Rigorous uptime requirements and long-term viability are usually the reason for selecting strategic solutions found in Tier III and Tier IV site infrastructure. Tier III and Tier IV site infrastructure solutions also have an effective life beyond the current IT requirement and are typically utilized by organizations that know the cost of a disruption—in terms of actual dollars—and the impact to market share and continued mission imperatives.

Tier I: Non-Redundant

Dedicated Data Center Infrastructure Beyond Office Setting

Tier I solutions meet the data center owner's or operator's desire for dedicated site infrastructure to support information technology (IT) systems. Tier I infrastructure provides an improved environment compared to an office setting and includes a dedicated space for IT systems; an uninterruptible power supply (UPS) to filter power spikes, sags, and momentary outages; dedicated cooling equipment that won't get shut down at the end of normal office hours; and an engine generator to protect IT functions from extended power outages.

Examples of industries that will benefit from a Tier I facility are real estate agencies, the hospitality industry, and business services such as lawyers, accountants, etc.

Tier II: Basic Redundant

Power and Cooling Systems Have Redundant Capacity Components

Tier II facility infrastructure solutions include redundant critical power and cooling components to provide an increased margin of safety against IT process disruptions that would result from site infrastructure equipment failures. The redundant components are typically power and cooling equipment such as extra UPS modules, chillers or pumps, and engine generators. This type of equipment can experience failures due to manufacturing defects, installation or operation errors, or, over time, worn-out equipment.

Examples of industries that select Tier II infrastructure include institutional and educational organizations because there is no meaningful tangible impact of disruption due to data center failure.

Tier III: Concurrently Maintainable

No Shutdowns for Equipment Replacement and Maintenance

Tier III site infrastructure adds the capability of Concurrent Maintenance to Tier II solutions. As a result, a redundant delivery path for power and cooling is added to the redundant critical components of Tier II so that each and every component needed to support the IT processing environment can be shut down and maintained without impact on the IT operation.

Organizations selecting Tier III infrastructure typically have high-availability requirements for ongoing business or have identified a significant cost of disruption due to a planned data center shutdown. Such organizations often support internal and external clients 24 x Forever, such as product service centers and help desks.

Tier IV: Fault Tolerant

Withstand a Single, Unplanned Event, e.g., Fire, Explosion, Leak

Tier IV site infrastructure builds on Tier III, adding the concept of Fault Tolerance to the site infrastructure topology. Fault Tolerance means that if/when individual equipment failures or distribution path interruptions occur the effects of the events are stopped short of the IT operations.

Organizations that have high-availability requirements for ongoing business (or mission imperatives), or that experience a profound impact of disruption due to any data center shutdown, select Tier IV site infrastructure. Tier IV is justified most often for organizations with an international market presence delivering 24 x Forever services in a highly competitive or regulated client-facing market space, such as electronic market transactions or financial settlement processes.

Uptime Institute Professional Services LLC, the management and engineering consulting arm of Uptime Institute, delivers third-party vendor-neutral consulting and Certifications to the Tier Classification System and Operational Sustainability. Uptime Institute Professional Services provides the most rigorous topology assessment in the industry and is the only group authorized and qualified to evaluate and award to Tiers. For more information, please contact Julian Kudritzki, Vice President, at 206.273.7993 or jkudritzki@uptimeinstitute.com.

References

Data Center Site Infrastructure Tier Standard: Topology (uptimeinstitute.com/resources)

Accredited Tier Designer Technical Paper Series (uptimeinstitute.com/resources)

Catalogue of Tier Myths & Misconceptions (professionalservices.uptimeinstitute.com/myths.htm)

Data Center Site Infrastructure Tier Standard: Operational Sustainability (coming soon)

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