

DATA CENTER TIERS: WHAT ARE THEY AND WHY ARE THEY IMPORTANT?



When dealing with Data Centers (DCs), it's helpful to understand what Data Center tiers are and how they affect IT organizations. Here's a brief overview of what a data center tier is, what data center tiers tell people about your data center, and why they're valuable to have.

(This article is part of our [Data Center Operations Guide](#). Use the right-hand menu to navigate.)

What is a Data Center tier?

Data center tiers are a standard methodology for ranking data centers in terms of their potential infrastructure performance (uptime). Data center tiers are ranked from 1 to 4 and higher ranked data centers have more potential uptime than lower ranked data centers.

Here are the four currently accepted data center tier rankings from the [Uptime Institute](#) and what each ranking represents in terms of uptime and availability.

<i>Tier 1 (Basic Capacity)</i>	Tier 1 data centers go beyond staging your servers in a spare office or large closet inside a larger facility. Tier 1 DCs need a dedicated space for all your IT systems (a server room which may or may not include a locked door); uninterruptable power supplies (UPSes) to condition incoming power and to prevent spikes from damaging your equipment; a controlled cooling control environment that runs 24x7x365; and a generator to keep your equipment running during an extended power outage.
<i>Tier 2 (Redundant Capacity)</i>	A tier 2 data center incorporates all the characteristics of a tier 1 DC. It also contains some partial redundancy in power and cooling components (the power and cooling systems are not totally redundant). A tier 2 DC exceeds tier 1 requirements, providing some additional insurance that power or cooling needs won't shut down processing.
<i>Tier 3 (Concurrently maintainable DC)</i>	A tier 3 DC incorporates all the characteristics of tier 1 and tier 2 data centers. A tier 3 data center also requires that any power and cooling equipment servicing the DC can be shut down for maintenance without affecting your IT processing. All IT equipment must have dual power supplies attached to different UPS units, such that a UPS unit can be taken off-line without crashing servers or cutting off network connectivity. Redundant cooling systems must also be in place so that if one cooling unit fails, the other one kicks in and continues to cool the room. Tier 3 DCs are not fault tolerant as they may share different components such as utility company feeds and external cooling system components that reside outside the data center.
<i>Tier 4 (Fault Tolerance)</i>	A tier 4 DC incorporates all the capabilities found in tier 1, 2, and 3 DCs. In addition, all tier 4 power and cooling components are 2N fully redundant, meaning that all IT components are serviced by two different utility power suppliers, two generators, two UPS systems, two power distribution units (PDUs), and two different cooling systems powered (again) by different utility power services. Each data and cooling path is independent of the other (fully redundant). If any single power or cooling infrastructure component fails in a tier 4 DC, processing will continue without issue. IT processing can only be affected if components from two different electrical or cooling paths fail.

Scoring data center tiers on uptime

Data center uptime is expressed as the percentage of time each year that your data center is available, with each higher data center tier having a higher uptime percentage.

Here are the standard uptime percentages along with the maximum downtime you can expect to see with DCs in each data center tier.

- Tier 1 DCs have a 99.671% uptime percentage per year. Maximum total yearly downtime = 1729.2 minutes or 28.817 hours each year
- Tier 2 DCs have a 99.741% uptime percentage per year. Maximum total yearly downtime = 1361.3 minutes or 22.688 hours
- Tier 3 DCs have a 99.982% uptime percentage per year. Maximum total yearly downtime = 94.6 minutes or 1.5768 hours
- Tier 4 DCs have a 99.995% uptime percentage per year. Maximum total yearly downtime = 26.3 minutes or 0.438 hours

minutes or 0.4 hours

Note that your mileage may vary (YMMV) when using any one of these DC tier models. Uptime percentages for tier 3 and tier 4 are more accurate and consistent because of their high degree of redundancy, while tier 1 and tier 2 DCs could experience longer processing outages depending on what causes their downtime.

What do you do with a data center tier ranking?

It's also important to understand your business needs for using a tier 1, 2, 3, or 4 data center provider. A tier 1 or 2 data center may work well for a smaller company that doesn't have full 24x7 requirements and can stand being down after-hours or on weekends for maintenance. In that case, it may not be worth it to put in the extra investment to run in a tier 3 or 4 environment.

However, if you're a large multi-national organization that does business around the clock and you have several critical applications that can never be down, you may want to opt for hosting your apps in a tier 3 or 4 data center or make your in-house data center tier 3 or 4 compliant.

DC tier rankings are also important in several different situations, including the following:

- When planning a data center move to an external provider or to a cloud provider, data center rankings help you understand the risks involved in using these providers
- When building or redesigning your own data center, to provide a blueprint for its setup and configuration that meets your needs
- When you're hosting a critical application for a customer, they will want to know what your data center ranking is, who certified your DC, and what certification standard was used
- In risk evaluation scenarios when you have to justify network availability to management

Who certifies a data center?

Data centers are generally rated and certified using either the Uptime Institutes' standard tier classification system or the [TIA/942 standard](#). Data centers are certified against these standards and issued a rating.

When hiring someone to certify your data center, make sure you know their reputation in the industry and which standard they are using.