Data Center Tier Classification Levels Explained (Tier 1, 2, 3, 4)

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What Are Data Center Tier Ratings?

The classification levels of data centers represent a certification of design. A tier is another way of saying "level of service."

The 4 tiers of data centers are:

- Tier 1 Data Center
- Tier 2 Data Center
- Tier 3 Data Center
- Tier 4 Data Center

The Uptime Institute does not tell anyone exactly how it defines tiers, though the most important metrics are made public. These metrics include redundant electrical path for power, uptime guarantee, cooling capacity, and concurrent maintainability, to name a few.

Background of Data Center Tiers & Levels

The Telecommunications Industry Association (TIA) created the first set of standards for data centers in 2005.

The Uptime Institute standard was formed separately from the TIA standard. The Institute also differed from the TIA because of its specialty in data centers whereas TIA standards could apply to many different aspects of the IT industry.

The Uptime Institute last revised its certification process most recently in July of 2015.

It was discovered that there were data centers without official rankings that were stating the Institute certified them. Much of the controversy happened between the Tier III and Tier IV rankings.

Design elements still make a difference but are not as heavily weighted. Any classification that was based solely on design is now no longer listed on the Uptime Institute website.

The percentages for each metric remain a secret of the Institute.

The Uptime Institute Chief Operating Officer addressed “Efficient IT” in a press release. The release stated that day-to-day operations for a data center now count towards rankings.

The Institute has also created an “Efficient IT Stamp of Approval” for data centers that produce efficient outcomes.

There are two levels of Efficient IT certification:

- **Approved Status** – Data centers that achieve this status are already in compliance with previous Uptime Institute standards. The stamp of approval continues for two years. After the certification expires, the center must be re-evaluated to receive another two-year accreditation.
- **Activated Status** – Activation means that the Institute has observed a data center moving towards higher efficiency. The Activated status is only good for a year. If a data center has not achieved efficiency excellence, it may still be awarded Activated state upon a new evaluation.

Data Center Tiers 1, 2, 3, 4 Explained

A **tier 1 data center** can be little more than a powered warehouse. They are not required to be very sophisticated. On the other end of the spectrum is a **tier 4 data center**. This tier gives its clients a guarantee of uptime and 2N (two times the amount required for operation) cooling and redundant power and infrastructure. These standards will protect most companies. Level IV clients usually never even hear if there are issues at the data center infrastructures due to these redundancies. These standards show just how reliable top-tier systems are.

Tier 2 colocation data centers are more robust than Tier I centers. Tier II does not have complicated performance hardware. For instance, level III and IV data centers require dual power inputs. Level II does not. Level II gives clients a customizable balance between cost management and performance.

A **tier 3 data cente**r can perform repairs without any notable service disruption. Another way to define a level III provider is that they offer an N+1 (the amount required for operation plus a backup) availability for clients. As with any technology product, unplanned maintenance may still cause a problem in a level III provider. In short, level III is even tolerant of some faults.

Tier 4 data centers are considered “fault tolerant.” Unplanned maintenance does not stop the flow of data to a data center Tier IV. Day-to-day operations continue regardless of any support taking place.

As you would expect, each tier has the characteristics of the levels below them. A Tier II provider, for example, will always be more reliable than a Tier I.

Availability According To Data Center Tiers

Availability levels include data from the hardware:

- **Tier 1** – 99.671% Guaranteed availability
- **Tier 2** – 99.741% Guaranteed availability
- **Tier 3** – 99.982% Guaranteed availability
- **Tier 4** – 99.995% Guaranteed availability

What is a Tier 4 Data Center?

To be defined as Tier 4, a data center must adhere to the following:

- **Zero single points of failure**. Tier IV providers have redundancies for every process and data protection stream. No single outage or error can shut down the system.
- **99.995 % uptime per annum**. This is the level with the highest guaranteed uptime. It must be maintained for a center to maintain Tier IV ranking.
- **2N+1 infrastructure (two times the amount required for operation plus a backup)**. 2N+1 is another way of saying "fully redundant."
- **No more than 26.3 minutes of downtime per annum** as a maximum figure. Providers must allow for some downtime for optimized mechanical operations; however, this annual downtime does not affect customer-facing operations.
- **96-hour power outage protection**. A level IV infrastructure must have at least 96 hours of independent power to qualify at this tier. This power must not be connected to any outside source and is entirely proprietary. Some centers may have more.

Tier IV is considered an enterprise-level service. Companies without international reach and consistently high web traffic do not usually require Tier IV facilities. Tier IV has approximately twice the site infrastructure of a Tier III location.

If you need to host mission-critical servers, this is the level to use. Tier IV data centers ensure the safety of your business regardless of any mechanical failures. You will have backup systems for cooling, power, data storage, and network links. Data Center Security is compartmentalized with biometric access controls. Full fault tolerance keeps any problems from ever slowing down your business. This is true even if you host less critical servers in other tier levels.

This tier also ensures optimized efficiency. Your servers are housed in the most physically advantageous locations. This drastically extends the life of your hardware. If the temperature and humidity are kept consistent, you gain a great deal of efficiency.

Even the backups and dual power sources are treated like primaries. You experience no downtime if you have to use one of these protections unexpectedly.

Of course, Tier IV colocation is also the most expensive choice. This is why this level is dominated by international brands with consistently high levels of traffic or processing demands.

What is a Tier 3 Data Center?

To be defined as Tier 3, a data center must adhere to the following:

- **N+1 (the amount required for operation plus a backup) fault tolerance**. A Tier III provider can undergo routine maintenance without a hiccup in operations. Unplanned maintenance and emergencies may cause problems that affect the system. Problems may potentially affect customer-facing operations.
- **72 hours of protection from power outages.** This provider must have at least three days of exclusive power. This power cannot connect to any outside source.
- **No more than 1.6 hours of downtime per annum.** This downtime is allowed for purposes of maintenance and overwhelming emergency issues.
- **99.982 % uptime.** This is the minimum amount of uptime that a level 3 provider can produce. The redundancies help to protect this number even if a system suffers unexpected issues.

Companies using Tier III providers are often growing companies or a business that is larger than the average SMB (Small to Medium Business). Most data center companies that are ranked by the Uptime Institute have a level III ranking.

Tier III gives you most of the features of a Tier IV infrastructure without some of the elite protections. For instance, you gain the advantage of dual power sources and redundant cooling. Your network streams are fully backed up. If your business does not need to compete on an international level against elite brands, this is a highly competitive tier.

Are you concerned with efficiency?

Level III should be the lowest that you go. Guaranteed uptime is slightly less than Tier IV, and the system is not entirely fault-tolerant. If you do not expect to be targeted by malicious hackers or competitors, you may not need to move any higher than level III.

Tier III is also less expensive than IV. You may choose this tier due to budget constraints with a plan to expand into a higher level later.

What is a Tier 2 Data Center?

To be defined as Tier 2, a data center must adhere to the following:

- **No more than 22 hours of downtime per annum.** There is a considerable jump between levels II and III regarding downtime. Redundancy is one of the primary reasons for this.
- **99.741 % uptime per annum**. This is a minimum amount of uptime that this provider can produce in a year.
- **Partial cooling and multiple power redundancies.** A Tier II provider does not enjoy redundancy in all areas of operation. The most critical aspects of its mechanical structure receive priority. These two aspects are power and cooling distribution. Redundancy in these areas is only partial. No part of the system is fault tolerant.

Tier II data centers are often targeted to SMB sized business clients. There are more guarantees of efficiency than a level II system. Tier II providers are also able to handle more clients.

Small business servers typically use this level. There is a massive decline in features from levels III to II. The utility is fundamentally different. If your business prioritizes redundant capacity components, then you may want to look at this level of infrastructure.

Companies with the web traffic that coincides with a small business are best suited for this tier. It is significantly less expensive than Tier III in most cases.

What is a Tier 1 Data Center?

To be defined as Data Center Tier 1, a data center must adhere to the following:

- **No more than 28.8 hours of downtime per annum.** These facilities are allowed the highest amount of downtime of any level.
- **Zero redundancy.** This level of a facility does not have redundancy on any part of its operations. Facilities do not have any redundancy guarantees within its power and cooling certification process.
- **99.671 % uptime per annum.** This is the lowest amount of uptime that a facility graded by the Uptime Institute can produce.

If you are a small business, then Tier I may be your ideal solution. You are presumably looking for a cost-effective solution. These centers do not have many of the features that larger centers have although they may include a generator or a backup cooling system.

The use of the Tier I infrastructure designed for startup companies with a need for a colocation data center. This is the most budget conscious option for a business. Your infrastructure consists of a single uplink, a single path for power, and non-redundant servers.

Be sure that your location managers are dedicated to physical security before committing to a Tier I facility. You may also want to check the temperature and

humidity of the building. A building that is appropriately maintained can avert many mechanical problems. This is especially true as facility age. If you plan on staying in this tier for an extended time, this is an essential check.

Data Center Classification Standards: Choosing the Right Tier

Data centers are not required to receive a **Tier Classification System** Ranking to do business.

Having a specific tier ranking does help legitimize its services, but it is not strictly required. Of the centers that have an official classification, the majority are considered enterprise level facilities.

When searching for a data center, make sure that any ranking you see comes directly from the Uptime Institute. Many companies use Uptime Institute ranking standards for their internal standardizations. However, this does not mean that the Institute has vetted them personally.

Definitions may even be “interpreted” in some cases, though this is likely a rarity. It is best to efficiently research when choosing a data center and validates all accredited certifications.

Earning an official ranking from the Uptime Institute is difficult. There is no guarantee that an investment in a center will warrant a specific classification. This is especially important to consider between the Tier III and Tier IV ranking. The investment in building out a Tier IV level facility is quite substantial. Tier III centers are often much cheaper to build and maintain.

That said, the clientele that requires a Tier IV facility will also have the budget to sustain residence. Just remember not to rely entirely on classification as the system ultimately is a pay-to-play certification.