

# Not all storage is the same. How to choose the right type for your data needs.

An expert overview of storage  
technologies and options.



White Paper by



## Storage isn't as simple as it sounds, but choosing the right solution can be.

Our world has become incredibly connected to the internet. One digital interaction occurs every 18 seconds, and by 2025 via 5G, the average person will create 4,900 digital data engagements every day.<sup>1</sup> That's a lot of data saved and consumed. And it's not just individuals. By 2025, 60% of the world's data will be produced by businesses.<sup>2</sup> Where will all this data go? How will it all get stored?

When saving photos and videos on your phone, you can run out of space quickly. You're forced to either delete items or upgrade to a new phone with a larger storage capacity. All of the data on the internet also has to be stored somewhere, though deleting it is usually out of the question. So, what do you do when you need to store large chunks of data on the internet? You have two main options — use cloud storage devices or use bare metal storage.

Determining the best option depends on the kind of data you want to keep, how much data you're storing, how often it needs to be accessed, and how you want it to be accessed.

**To start, let's take a brief look at the three major storage types and how they differ.**



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<sup>1</sup> <https://venturebeat.com/2019/12/12/how-5g-is-changing-mobile-data-traffic>. IDC Data Age, The Digitization of the World From Edge to Core

<sup>2</sup> <https://medium.com/ably-realtime/the-reality-of-megatrends-175-zb-of-data-by-2025-e3dc5b7ea30c>

## Three Types of Storage

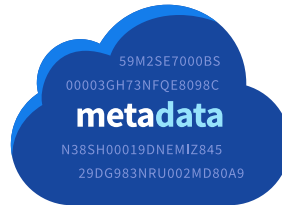
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### File Storage

File storage is the most common storage type — think personal computers, smartphones and tablets. File storage is hierarchical storage, often used in computer or bare metal server hard drives or on network-attached storage devices (NAS). The data is stored in the form of files or folders that can be accessed with given paths. The technology works exceptionally well for organized and structured data. It has great read and write performance and complete autonomy over data security. However, file storage can quickly get expensive, especially when scaling up with more drives or storage containers.

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### Object Storage

Object storage manages the data as objects in a flat, non-hierarchical structure. The objects are organized by the attributes of the files, known as the metadata, and are all stored together and labeled with unique identifiers. Object storage is often used with cloud storage solutions and is very fast, cost-efficient, highly scalable and has a simplified architecture. There are drawbacks, however, as object storage can't be used to run a traditional database, you can't alter individual pieces of data, and it's not easily mounted to an OS.

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### Block Storage

With block storage, data is stored as fixed-sized blocks. It is commonly deployed on Storage Area Networks (SANs) or other cloud storage devices. Each block in a block-level storage system can be controlled as an individual hard drive, and the blocks are managed by a server operating system. Block storage has low latency and can provide very high input-output (I/O) performance. It's also able to be used by programming languages to read and write files. This makes it ideal for large databases, high-performance applications and mission critical data that needs to be retrieved as fast as possible. On the downside, the storage is tied to one server at a time, it's very expensive, and it has a limited capacity to handle metadata.

## Now that we have a basic idea of the storage types, let's dive into the main storage devices.



### Bare Metal Storage Server

If you want to use a dedicated server for your storage device, you'll most likely be utilizing file-level storage. This is an excellent solution for data that needs to be retrieved often, requires fast speed and accessibility, and demands strong security. Databases work extremely well in this environment, and reading and writing data is second nature, as file-level storage is the most widely used today. On the downside, having any type of hot storage is expensive and scaling up a dedicated server is difficult and time-consuming.

### Public Cloud Storage

With public cloud storage, you're most often choosing between block or object storage types. By storing data this way, you're able to cut down on cost, be highly scalable, use APIs and programming languages to automate reading and writing of data, and off-load data from your production environments. This solution works great as a cold storage option but can get extremely expensive if you use it as a hot storage option with data that needs to be accessed frequently. Data-transfer costs from hosting providers will quickly add up and end up costing way more than a traditional bare-metal solution in the long run.





## Storage Use Cases

Depending on the type of data you store, the frequency in which you retrieve it, how quickly your data demands may change, your budget, and how you plan to store your data — your use case will differ. With so many things to consider, it's no wonder storage can be very complex and difficult to navigate. Following are some common use cases that simplify storage needs.

### Photos and Video

A typical small business or personal data use case for storage is photos and videos. These are often accessed on a frequent basis, require small to medium amounts of storage volume and, depending on the user, require minimal backups.

To correlate needs to infrastructure, you must calculate how often the data needs to be accessed. In this example, it would be too much for cold storage, so object storage on a public cloud wouldn't be the right fit. Block storage also seems unnecessary, as you would probably want to keep the read and writes simple. File storage would be the best fit, so let's dive further into the hosting solutions that work.

First, look at the space required. While videos can take up a lot of space, photos will not. So, you need to decide which of the two file types will be hosted most on your server. Individuals will likely

be hosting photos and short videos. This would be ideal for a Virtual Private Server (VPS) that can store this information at a low cost and creates snapshot backups or offline backups that won't break the bank. If you need to host a lot of videos or host many different individuals' photos, you'd want to consider a bare metal solution. It can be a bit more expensive but will come with vast amounts of storage, have better backup and RAID options, and can service a larger community needing to publicly access the material.

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## Storage Use Cases

### Big Data

Corporations that focus on big data need highly scalable solutions to store the data. Using object storage on public cloud is a great fit due to the fast write times and scaling ability. While accessing public cloud storage frequently can be pricey, you can lower this burden by creating different buckets for your storage. This will create some cold storage, warm storage and hot storage buckets, depending on how frequently you need to access the data. Processing big data requires a lot of resources, so this is where you'd want to implement a hybrid cloud strategy and connect your public cloud storage of big data to a private cloud solution or extremely powerful bare metal server.

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## Storage Use Cases

### Game Hosting

Video games have become a staple of the entertainment industry and show no signs of slowing down. From 2021 to 2027, it's estimated that the video game market will grow 12.9% a year.<sup>3</sup>

The evolution of multiplayer gaming on the internet started with TCP/IP direct computer connections, evolved into game companies hosting their own servers, and is morphing into individuals hosting private servers for friends, family or profit. While TCP/IP gaming is mostly dead, game companies hosting their games on servers are very much alive. The new frontier of individuals hosting games is expanding rapidly and coexists nicely with game companies privately hosting. Here's a look at both of these use cases to show which storage solution would be the better fit.

First, let's look at a video game company. A AAA publisher like Activision Blizzard would require an expansive infrastructure with numerous dedicated servers, a private cloud offering and a lot of backups and disaster recovery solutions to service their gigantic



player base. However, a smaller game company won't have the kind of resources to pay for such an investment. So, what type of storage infrastructure would work for a smaller game provider? The data will need to be retrieved constantly, and it will be written and read continuously for game progression, character progression, inventory adjustments, etc.

Bare metal servers would be ideal from a cost perspective of data retrieval and from the resource perspective of being able to handle the memory, compute and networking demands of game hosting. By creating a bare metal infrastructure and hosting several servers, you'd be able to meet the needs of the player base. Bare metal servers also have the advantage of setting up a RAID configuration in case there is any local failure of disks. Additionally, it would make sense to use public cloud object storage to hold game

progression data for all of the users in case of a disaster recovery event. As this data will only be written and not read on a frequent basis, it's very cost-effective to use this as a cold storage solution.

For the most part, individuals hosting games won't need to create a complex infrastructure and may only have smaller storage requirements to host their games. For instance, if you and a few friends want to play Minecraft and you don't expect many users on the device, you can easily do this with a VPS. Taking snapshots as manual backups as needed for save progression won't protect you in a disaster event, but it will protect you from any misconfigurations or hard drive mishaps. If you're an individual who wants to host for a larger crowd, it may make sense to upgrade to a bare metal server, utilizing RAID as your hard drive recovery and/or public cloud for backups.

<sup>3</sup> <https://www.grandviewresearch.com/industry-analysis/video-game-market>



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