Minecraft Server Optimization

Lag is a major concern for server owners. Lag can occur for a variety reasons, whether your server has more resources or your server is running on outdated hardware. Apex hosts are hardware-free. There are many ways to reduce lag on your server.

There are plugins available that can reduce lag. You can upgrade your server RAM, switch to a more optimized Minecraft jar, optimize your files, etc.

These options are enough to make you wonder what causes lag. There are several types of lag, including latency, TPS and FPS. In this guide, we will give a breakdown of the different types of lag and the best way to mitigate it on your Minecraft Server.

Types of lag

Server Lag (TPS)

Overall server performance is represented by its TPS (Ticks Per Second). TPS (Ticks Per Second) is a server's heartbeat. Your server beats at a fixed rate of 20 ticks per second, so one tick every 0.05 seconds.

On each tick, various aspects of the server advance a little bit; Mobs move, grass grows, animals spawn, almost everything that happens on the server relies on ticks. Normal gameplay will occur at 20 TPS if the server is performing at its maximum. But if your server's TPS starts to drop, you'll begin to notice lag while you play.

The server's hardware and what happens on it play a crucial role in determining the server's total server performance score (TPS). A server that is not managed properly can have the same effect as poor hardware.

When you are adding plugins or mods to your site, it is important to consider the long-term impact of your choices. Many server owners mistakenly believe that the server's number is the only factor that affects its performance. The number of players on the server can have an effect, but this is relatively small compared to the impact of redstone machines, mob farms, and mods/plugins. The primary cause of TPS drops is a result of what you have going on in your world at a given time.

Client Lag (FPS)

Low FPS can cause your game to behave slowly. If your frame rate is low enough, playing the game may feel like watching a slideshow. A low frame rate on your server doesn't necessarily mean that the server is slowing down, but that your computer is not keeping up with the game. If your PC is experiencing a low framerate, you may need to adjust your game settings or update your drivers.

It is important that you understand the difference between server lag and low FPS. Low FPS can sometimes appear simultaneously with server lag. While you may believe that the FPS is due the server's lag, it is often a separate problem with the device running the game.

There are many ways to increase FPS without having your hardware upgraded. You can adjust the video settings in Minecraft to reduce certain functions. To make sure your computer doesn't try to render clouds, you can go to the video settings. It is also a good practice to close any processes that are running in the background that you do not need. This allows your computer to use more resources for the game. This can be done quickly by closing any open Taskbar items.

Another option is switching to the high performing plan in your device's energy options. If you are on a Windows PC, you can do this by pressing the Windows Key + X to open a new context menu. To open your settings, choose "Power Options". Change the Power Mode setting to "Best Performance".

Connection Lag (Ping)

Your ping correlates with connection lag. Ping is the latency in the network between your game and your server. This measures the time it takes data to process and travel. It is possible for your connection to the server not to work if you have high ping. Having high ping is not something that's due to lag, but it causes lag. It may also crash the game because of the instability.

Low ping is the best because it provides smoother gameplay. Your ping will increase the farther away a server is to your physical location. It is best to move your server closer to you and the players to minimize this. Some factors that might affect ping include Internet connection speed, the quality of a user's Internet service provider, issues with the Minecraft servers network, and the configuration of firewalls.

Latency can fluctuate depending on network conditions, and the status of your server. You can "ping" a server to see how latency it will have. This tells you how long it takes the server to reply to a message. There are many ways to test your Ping, but we recommend using your Command Prompt. Open a terminal (or command prompt) and type "ping ServerIP". For example, "ping play.apexmc.co" Although the process can take up to a second, you should

be able to see the average ping once it is completed.

Creating a timings report

A timings report allows you to monitor how long it takes for your server to process an event. This allows you see where there may be lag issues, which can cause the server's TPS drops. To run a Timings Report, log on to your server. Run the command: /timings ON. After 30 minutes, type the command: /timings POST. This will provide you with a link, go ahead and click on it to open the report in your browser.

A timings report

The top section of the timings report will have a simple graph that shows your server's average TPS over time in five-minute intervals. The graph shows a brief overview of your server, along with the average TPS. These are a great way to see how your server is performing, but they don't tell you what's causing it. You will need to examine the data section below the graph to determine the root cause of the lag.

The lower section of a timings reports is a detailed breakdown of all ticks that occurred during the reporting period. It is also known as a 'treeview'. Each tree gives a broad overview of the type of tick that is occurring. The top tree on the list will often contain a summary of all the server's average ticks. To expand these trees and see more information about each layer, you can click on them. You will be able see which block or entity is ticking and how long it takes to tick once you have reached the end of the series.

A timings reports will defaultly sort information so that processes taking the longest time to complete appear first. These items are often what causes any lag on the server. The fastest way to find the source of your lag is to go through the top trees. Once you have identified the cause, you can either go back to your server to remove it or modify your settings to reduce its impact.

It can be intimidating to read a timings report. If you get stuck, or if it is unclear how you are reading it, there are some great resources to help clarify any confusion. Your best option would be to contact our support team. All of our tech support agents have knowledge about timing reports and can analyze them for your benefit. They can also walk you through the process of reading a report if you are stuck.

How to fix a laggy Minecraft server

Server lag can be prevented by optimizing your server. There are many tools you can use to

get the best performance from your server, and even push it past its normal performance limits.

Tick/Lag machines removed

Redstone is a great mechanic for creating almost any type of machine. However, too many machines can create problems. It will cause lag for all players and decrease your TPS. minecraft servers The solution for this is to limit the machines and install anti-redstone-lag plugins like this one. If you don't want to have automated farms or mob grinders, avoid complex redstone mechanics. You should include a way to shut down your farms and machines so that they don't consume your server's resources.

Pre-generating your world

Pregenerating the world is a crucial step in lag removal. This must be done before any other steps. The Chunky plugin is the best way to do it. To install the plugin, run the following commands. /chunky 5000 followed immediately by /chunky beginning.

This will pre-generate an area of 5,000 blocks around the world spawn. The server will lag heavily while the process is running, but once it is done your performance will improve dramatically. You can increase your radius as much or as little as you want, but we recommend keeping it below 20,000 blocks. Any larger and you could possibly create more lag than you would be preventing.

One option that is beneficial to reduce on any type of Minecraft server is the view distance from the server.properties file. Any number between 6-8 should help with optimizing the server without being detrimental to gameplay. To further improve server performance, it is recommended to change the view distance to 64 and the "Net Compression Threshold to 64".

If you are running Spigot or Vanilla, we strongly recommend switching to Paper. Paper has a large number of optimization and anti-cheat features to provide excellent performance.

Optimizing your config files

Some of the main files that you will want to modify to really optimize your server are Bukkit. yml, Paper.yml, and Spigot.yml. Below are the settings that you should change to get the best performance and minimize any impact on your gameplay.

To use these settings, stop your server from your control panel then click on the tabs below

to show the optimized settings for each file. These files are located in the FTP File Access tab on your control panel. You can open them in the online web editor by clicking on the "edit" button to the far right of the file. After you're done editing, click the green "Save" button and restart the server to apply the changes.

Bukkit.yml

Spigot.yml

Paper.yml

Not only is it possible to reduce or eliminate lag by changing the base server files, but there are other ways. There are many plugins out there that aim to reduce lag. Once you are familiar with which ones to use you will find that lag can be significantly reduced on your server after installing one or two plugins. Here is a list of the plugins we recommend most often to our users.

ClearLagg (1.14+), Limit Pillagers (1).14+), Village Optimiser 1.14.2+, MergedMobs 1.7+, Entity Tracker fixer (1.14+), Farm limiter (Premium 1.7+), Mob farm manager (Premium 1.7+), Spark 1.8+), StackMob (1.7+), Armor Stand Limiter 1.8+).

Although these plugins won't stop all lag from your server, they can help. If you do not know how to install plugins on your Minecraft server, We have an easy guide for you to follow.

It is important to make sure your server is lag-free and optimized. When players join a server, it is not expected that they will experience lag. Although you cannot control the lag clients experience, there are many things you can do to avoid server-side lag.

If you are running a Vanilla Minecraft server, you may think that it won't experience lag. It is the base version of the game after all. Unfortunately, the base game doesn't offer a lot of options for optimization and can be really laggy as a result. Newer updates such as 1.17+ have made the game a lot more resource-hungry. Switching to Paper or one of its forks like Purpur or Airplane will drastically improve your performance. Following this guide after switching to Paper will further improve performance, keep your players happy, and keep your server lag-free.