

How to Allocate More RAM for Minecraft for Maximum Performance

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Quick answer

Only Minecraft: Java Edition lets you manually allocate RAM - you can do this through your launcher's settings. Most players run fine on 4-6 GB, while heavy modpacks may need 8-10 GB. Bedrock Edition (mobile, console, and Windows "Bedrock" version) manages its own memory automatically and has no RAM setting at all. Giving Java Edition too much RAM can actually make performance worse, so more isn't always better.

Before changing anything, it helps to know which version of Minecraft you're playing, because the two versions handle memory in completely different ways. Minecraft: Bedrock Edition (the version on mobile, consoles, and the Microsoft Store on Windows) is built directly for your device. It grabs the memory it needs on its own, the same way most apps on your phone or console do. There's no menu or setting to give it more RAM, because the game itself decides how much it needs in real time. If Bedrock is lagging, the fix isn't a RAM setting, it's closing background apps, freeing up storage, or upgrading your device. Minecraft: Java Edition runs inside something called the Java Virtual Machine (JVM), which is a separate program that manages memory on Java's behalf. When you launch Java Edition, it reserves a fixed block of memory called a "heap" and uses only that block for the entire session. If the heap is too small, the game runs out of room and can crash. If the heap is too large, the cleanup process (called garbage collection) takes longer and can cause stuttering. This is why Java Edition, and only Java Edition, has a RAM allocation setting.

How to Check If RAM Is Actually Your Problem

Before bumping up your RAM allocation, it's worth confirming that memory is really the issue. Increasing RAM won't help if your lag is actually coming from your graphics card or processor. In Java Edition, press F3 to open the debug screen. On the right side, you'll see a memory readout that looks something like this: "2400MB / 4096MB (58%)".

What You See: Mem | What It Means: How much memory the game is actively using right now | Healthy Sign: Rises and falls between roughly 20-40%, then drops sharply (that drop is the cleanup happening)

What You See: Allocated | What It Means: The total RAM your launcher set aside for the game | Healthy Sign: Stays steady, this is your -Xmx setting

What You See: Allocation rate | What It Means: How fast the game is using up memory | Healthy Sign: Varies with movement and activity, spikes are normal

If your "Mem" number is regularly sitting near 90-100% and barely drops, your game is genuinely running out of memory, that's when increasing your RAM allocation will actually help. If it's cycling comfortably in the 20-40% range and you're still lagging, the problem is more likely your CPU, GPU, or internet connection, not RAM.

Why Giving Minecraft More RAM Isn't Always Better

It's a common assumption that setting RAM as high as possible will make Minecraft run smoother. In practice, it often does the opposite. Here's why: Java periodically pauses the game briefly to clean out memory that's no longer being used, things like old particle effects or arrows that already landed. This is called garbage collection. The bigger the memory pool you give it, the longer that cleanup takes when it finally happens, because there's simply more space to search through. Instead of frequent, tiny pauses, you get rarer but much longer freezes. There's also a knock-on effect on your whole PC. If you allocate too much RAM to Minecraft, your operating system may not have enough left over for everything else running in the background, forcing your PC to use your hard drive as overflow memory (called "paging"). Since even a fast SSD is far slower than actual RAM, this can turn a small stutter into a multi-second freeze. The takeaway: allocate enough RAM for what you're actually running, with a little headroom, not the maximum your PC can spare.

How Much RAM Should You Allocate?

The right amount depends on how many mods you're running and whether you're playing solo or hosting a server. As a rule of thumb, always leave at least 2-4 GB of RAM untouched for your operating system.

Setup: Vanilla / no mods | Recommended RAM: 3-5 GB | Notes: Comfortable for high render distance and resource packs

Setup: Light modpacks (e.g., Sodium, Lithium) | Recommended RAM: 5-7 GB | Notes: Good for performance-focused mods with few gameplay changes

Setup: Heavy modpacks (100+ mods) | Recommended RAM: 8-10 GB | Notes: Tech/magic packs, shaders, and high-res textures need this range

Setup: Small vanilla server (up to 10 players) | Recommended RAM: 3-4 GB | Notes: -

Setup: Large vanilla server (20-50 players) | Recommended RAM: 6-8 GB | Notes: -

Setup: Heavily modded server | Recommended RAM: 8-12+ GB | Notes: Varies a lot depending on the mods installed

Quick conversion tip: some launchers ask for memory in megabytes instead of gigabytes. 1 GB = 1024 MB, so 4 GB = 4096, and 8 GB = 8192.

How to Allocate RAM in Popular Launchers

Official Minecraft Launcher

1. Open the launcher and go to the Installations tab.
2. Hover over the version you play and click Edit.
3. Click More Options at the bottom.
4. In the JVM Arguments box, find the text '-Xmx2G'.
5. Change the number to your target amount, e.g., '-Xmx6G' for 6 GB.
6. Click Save.

CurseForge App

1. Click the gear icon in the bottom-left corner.
2. Go to Game Specific -> Minecraft to set the global memory slider.
3. For a specific modpack only, go to My Modpacks, click the three-dot menu on the pack, and select Profile Options.
4. Turn off Use System Memory Settings and adjust the slider for that pack.

Prism Launcher

1. Click Settings -> Java to set global minimum and maximum memory (in MiB).
2. For one instance only, right-click it, choose Edit Instance -> Settings.
3. Check Memory override and enter your custom values.

Modrinth App

1. Click the gear icon and open Default instance options to set the global memory slider.
2. To override it for one modpack, open the pack, go to Options, and enable Override Global Memory Settings.

ATLauncher

1. Click Settings -> Java/Minecraft to set the global "Maximum Memory/RAM."
2. For a single instance, open it from the Instances tab and use its own Java/Minecraft Settings.

Lunar Client & Badlion Client

Both of these PvP-focused clients keep it simple with a single memory slider in their settings. Lunar Client specifically recommends staying under 4 GB for competitive play, since a bigger heap tends to cause micro-stutters that can throw off your aim during fights. Lunar also offers a "Detect Recommended" button that picks a safe value automatically based on your PC's total RAM.

Setting Up RAM for a Java Edition Server

If you're running your own server, memory is set through a startup script rather than a GUI slider. The basic command looks like this:

```
java -Xms4096M -Xmx4096M -jar server.jar nogui
```

Keeping '-Xms' (starting memory) and '-Xmx' (maximum memory) the same value prevents the server from pausing to resize memory mid-game. The 'nogui' part just tells the server to skip its console window, saving a small amount of resources. For anything beyond a small survival server, most experienced admins use a set of extra startup flags known as Aikar's Flags. Without getting into the deep technical details, what these flags do is tell the server to clean up short-lived objects (like temporary particle effects or pathing data) faster and more efficiently, which cuts down on the random freezes that untuned servers experience. Here's a version set up for a server with 8 GB of RAM:

```
java -Xms8G -Xmx8G -XX:+UseG1GC -XX:+ParallelRefProcEnabled -XX:MaxGCPauseMillis=200  
-XX:+UnlockExperimentalVMOptions -XX:+DisableExplicitGC -XX:G1NewSizePercent=30  
-XX:G1MaxNewSizePercent=40 -XX:G1HeapRegionSize=8M -XX:G1ReservePercent=20 -XX:G1HeapWastePercent=5  
-XX:G1MixedGCCountTarget=4 -XX:InitiatingHeapOccupancyPercent=15 -XX:G1MixedGCHeapThresholdPercent=90  
-XX:SurvivorRatio=32 -XX:+PerfDisableSharedMem -XX:MaxTenuringThreshold=1 -jar server.jar nogui
```

Just swap the '8G' values for whatever amount of RAM you're actually allocating. For large servers running 16 GB or more, some admins switch to newer collectors like ZGC or Shenandoah, which are built to keep pause times extremely short even on huge amounts of memory, but for the vast majority of servers, Aikar's Flags with G1GC (the default collector, already used above) is more than enough.

RAM Requirements for Bedrock Dedicated Servers

Bedrock servers don't use JVM flags at all, since they're not built on Java. Instead, RAM needs scale directly with how many players are online and whether you're running add-ons.

Server Type: Vanilla, no add-ons | Players: 4 | Recommended RAM: 2 GB

Server Type: With Marketplace add-ons | Players: 4 | Recommended RAM: 3-4 GB

Server Type: Small community, vanilla | Players: 10-20 | Recommended RAM: 4-6 GB

Server Type: Large community, vanilla | Players: 50 | Recommended RAM: 6-8 GB

One important tip: never provision the bare minimum RAM for a Bedrock server. If it runs out of memory during a world save, it risks corrupting the world file. Always leave at least 40% headroom above your expected usage.

Other Things That Affect Performance Besides RAM

- Wrong GPU on laptops: Laptops with two graphics chips (an integrated one and a dedicated one) sometimes run Minecraft on the weaker integrated chip to save battery. No amount of RAM will fix this, you'll need to manually set Java to use your dedicated GPU in your system's graphics settings.
- Render and simulation distance: Lowering these in your settings (or in `server.properties` for servers) reduces how many chunks are loaded at once, which directly lowers memory pressure.
- Optimization mods: Mods like Sodium, Lithium, and FerriteCore improve performance and reduce memory use without changing how the game plays, and pair well with any RAM setting you choose.

Frequently Asked Questions

Can I allocate more RAM to Minecraft Bedrock Edition?

No. Bedrock Edition manages its own memory automatically and doesn't include a RAM allocation setting. This applies to the Windows, mobile, and console versions.

Is 16 GB of RAM overkill for Minecraft?

For most players, yes. Even heavy modpacks rarely need more than 10 GB. Allocating far more than you need can actually cause longer freezes during cleanup, so it's better to match your allocation to your actual mod list.

Why is Minecraft still lagging after I increased the RAM?

If your F3 memory readout wasn't near 90-100% before the change, RAM likely wasn't the bottleneck. Check your GPU usage, background apps, and internet connection instead.

What is Aikar's Flags?

It's a well-tested set of startup settings for Java servers that speeds up memory cleanup and reduces lag spikes, without needing any changes to the server itself. Getting Minecraft's performance right usually comes down to matching your RAM allocation to what you're actually running, not maxing it out. Start with the ranges above, check your F3 screen to confirm memory is the real bottleneck, and adjust from there.