

---

# **PaperDocs Documentation**

*Release 1.14.4*

**PaperMC Team**

**Dec 07, 2019**



# CONTENTS

<b>1</b>	<b>Introduction</b>	<b>3</b>
1.1	Running A Server . . . . .	3
1.1.1	Running A Server . . . . .	3
1.2	Contributing to Paper . . . . .	21
1.2.1	Contributing . . . . .	21
1.3	About Paper . . . . .	21
1.3.1	About the PaperMC Project . . . . .	21
1.3.2	The PaperMC Site . . . . .	27
<b>2</b>	<b>Useful Links</b>	<b>31</b>
<b>3</b>	<b>Acknowledgements</b>	<b>33</b>



**Warning:** This documentation is a work in progress. Some things are still missing. If you'd like to see it completed faster, you can contribute to the documentation [here](#).



## INTRODUCTION

Welcome to PaperDocs, the official documentation source for the [PaperMC](#) project.

Paper is a high performance fork of the Spigot Minecraft Server that aims to fix gameplay and mechanics inconsistencies as well as to improve performance.

Paper contains numerous features, bug fixes, exploit preventions and major performance improvements not found in Spigot.

Not sure what you're looking for? Try our [About the PaperMC Project](#) section, which contains a short [Introduction](#), our [Frequently Asked Questions](#) and an article about [The Structure of PaperMC](#).

Server owners should read our tips and instructions in [Running A Server](#) on how to install, run and maintain a Paper based server.

The PaperMC project has several main components. Learn more about the project structure [here](#).

### 1.1 Running A Server

Running a Paper server is easy. This section will cover common tasks such as configuring it, maintaining plugins, and general best practices.

#### 1.1.1 Running A Server

Running a Paper server is easy.

Click the links below for more information.

#### Contents

#### Getting Started

- [Requirements](#)
- [Migrating From Vanilla](#)
- [Migrating From CraftBukkit/Spigot](#)
- [Getting A Server Jar](#)
- [Running The Server](#)

- [Updating The Server](#)

## Requirements

Paper requires **Java 8** or newer to run. It should run fine on newer versions as well, such as Java 11, but certain plugins may have issues. Generally, LTS versions of Java are best supported, though you may have luck on newer versions.

## Migrating From Vanilla

Migrating from Vanilla is easy, but there are some differences, namely in world saves. Paper (and CraftBukkit and Spigot) separate out each dimension of a world (nether, the end, etc) into separate world folders.

Paper will handle this conversion for you automatically.

## Migrating From CraftBukkit/Spigot

Paper is a drop in replacement for both CraftBukkit and Spigot, you don't need to make any changes.

## Getting A Server Jar

Paper provides runnable server jars directly from our [website's downloads page](#).

Click on the build number to download a file.

## Running The Server

To run the server, simply start it up like any other Java application.

Open your terminal, navigate to the saved location, and then run `java -Xms2G -Xmx2G -jar paper-###.jar`

The amount of RAM can be set by changing the numbers in the `-Xms` and `-Xmx` arguments.

For more advanced Java tuning, see [Aikar's tuning page](#).

To configure your server, see the [Configuration](#) page.

## Updating The Server

To update the server, first stop it safely by executing the `stop` command and then replace the old paperclip jar with a new one. That's it.

## Configuration

This page details the various configuration settings exposed by Paper.

- [Global Settings](#)



- *World Settings*

If you want information on settings in spigot.yml and bukkit.yml you should see their respective documentation pages.

- [Bukkit Configuration \(bukkit.yml\)](#)
- [Spigot Configuration \(spigot.yml\)](#)

**Warning:** Configuration values change frequently at times. It is possible for the information here to be incomplete. If you cannot find what you're looking for or think something may be wrong, [Contact Us](#)

Last updated November 24th 2019 for MC 1.14.4, Paper build #230

## Global Settings

Global settings affect all worlds on the server as well as the core server functionality itself.

### verbose

- **default:** false
- **description:** Sets whether the server should dump all configuration values to the server log on startup.

### load-permissions-yml-before-plugins

- **default:** true
- **description:** Loads bukkit's permission.yml file before plugins, allowing them to check permissions immediately on enable.

### bungee-online-mode

- **default:** true
- **description:** Instructs the server how to handle player UUIDs and data when behind bungee. Set to match your proxy's online-mode setting.

### region-file-cache-size

- **default:** 256
- **description:** Sets the maximum size of the region file cache.

### incoming-packet-spam-threshold

- **default:** 300
- **description:** Sets the threshold at which the server will consider incoming packets as spam and ignore them.

### save-player-data

- **default:** true
- **description:** Sets whether the server should save player data, such as inventories, experience, and advancements.

### use-alternative-luck-formula

- **default:** false
- **description:** Use alternative luck formula by Aikar, allowing luck to be applied to items that have no quality defined. Makes major changes to fishing formulas.

### use-versioned-world

- **default:** false
- **description:** Sets whether the server should save your world in version-specific directories.
- **warning:** This setting is highly experimental! Don't use this in a production environment!

### suggest-player-names-when-null-tab-completions

- **default:** true
- **description:** Instructs the server to return a list of players when tab-completing if the plugin has no tab completions of its own.

### enable-player-collisions

- **default:** true
- **description:** Sets whether the server should allow players to collide with one another.
- **warning:** This setting can be broken by plugins interacting with the scoreboard, double check plugins when troubleshooting this value.

### save-empty-scoreboard-teams

- **default:** false
- **description:** Some scoreboard plugins leave hundreds of empty scoreboard teams around, dramatically slowing down login times. This sets whether the server should remove those empty teams automatically.

### velocity-support

- **enabled**
  - **default:** false
  - **description:** Set this to true if this server is behind a [Velocity](#) proxy.
- **online-mode**

- **default:** true
- **description:** Instructs the server how to handle player UUIDs and data when behind velocity. Set to match your proxy's online-mode setting.
- **secret**
  - **default:** '' (empty string)
  - **description:** The secret string that is shared by your Velocity proxy and this server. This needs to match your proxy's `forwarding-secret` setting.

## async-chunks

- **enabled**
  - **default:** true
  - **description:** Sets whether the server should load and save chunks asynchronously, improving performance.
- **load-threads**
  - **default:** -1
  - **description:** The number of threads the server should use for world saving and loading. This is set to (number of processors - 1) by default.

## watchdog

- **early-warning-every**
  - **default:** 5000
  - **description:** The interval in milliseconds between printed thread dumps while the server is hanging.
- **early-warning-delay**
  - **default:** 10000
  - **description:** The number of milliseconds before the watchdog thread starts printing thread dumps after the server starts hanging.

## spam-limiter

- **tab-spam-increment**
  - **default:** 1
  - **description:** The number that the internal tab spam counter increases by when a player presses tab in the chat window.
- **tab-spam-limit**
  - **default:** 500
  - **description:** The number that the internal tab spam counter can reach until the server kicks the player for spam.

## book-size

- **page-max**
  - **default:** 2560
  - **description:** The max number of bytes a single page in a book can contribute to the allowed byte total for a book.
- **total-multiplier**
  - **default:** 0.98
  - **description:** Each page has this multiple of bytes from the last page as it's contribution to the allowed byte total for a book (with the first page being having a multiplier of 1.0).

## messages

- **no-permission**
  - **default:** '&cI'm sorry, but you do not have permission to perform this command. Please contact the server administrators if you believe that this is in error.'
  - **description:** The message the server sends to requestors with insufficient permissions.
- **kick**
  - **authentication-servers-down**
    - \* **default:** '' (empty string)
    - \* **note:** The default value instructs the server to send the vanilla translateable kick message.
    - \* **description:** Message to kick a player with when they are disconnected because the Mojang authentication servers are down.
  - **connection-throttle**
    - \* **default:** Connection throttled! Please wait before reconnecting.
    - \* **description:** Message to use when kicking a player when their connection is throttled.
  - **flying-player**
    - \* **default:** Flying is not enabled on this server
    - \* **description:** Message to use when kicking a player for flying.
  - **flying-vehicle**
    - \* **default:** Flying is not enabled on this server
    - \* **description:** Message to use when kicking a player's vehicle for flying.

## timings

- **enabled**
  - **default:** true
  - **description:** Controls the global enable state of the Timings platform.
- **verbose**

- **default:** true
- **description:** Instructs Timings to provide more specific information in its reports. For example, specific entity types causing lag rather than just “entities”.
- **server-name-privacy**
  - **default:** false
  - **description:** Instructs Timings to hide server name information in reports.
- **hidden-config-entries**
  - **default:** { database, settings.bungeecord-addresses }
  - **description:** Configuration entries to hide in Timings reports.
- **history-interval**
  - **default:** 300
  - **description:** The interval in seconds between individual points in the Timings report.
- **history-length**
  - **default:** 3600
  - **description:** The total amount of data to keep for a single report.
  - **warning:** This value is validated server side, massive reports will be rejected by the report site.
- **server-name**
  - **default:** Unknown Server
  - **description:** Instructs timings on what to put in for the server name.

## World Settings

World settings are configured on a per-world basis. The child-node *default* is used for all worlds that do not have their own specific settings.

### per-player-mob-spawns

- **default:** false
- **description:** Determines whether the mob limit (in bukkit.yml) is counted per-player or for the entire server.

### disable-teleportation-suffocation-check

- **default:** false
- **description:** Disables the suffocation check the server performs before teleporting a player.
- **note:** While useful to keep your players out of walls, leaving this feature on may allow players to teleport through solid materials by logging out in specific locations.

### optimize-explosions

- **default:** false
- **description:** Instructs the server to cache entity lookups during an explosion, rather than recalculating throughout the process. This speeds up explosions significantly.

### portal-search-radius

- **default:** 128
- **description:** The maximum range the server will use to look for an existing nether portal. If it can't find one in that range, it will generate a new one.

### fixed-chunk-inhabited-time

- **default:** -1
- **description:** If 0 or greater, set the chunk inhabited time to a fixed number.
- **note:** The timer is increased when chunks are kept loaded because of player activity.

### use-vanilla-world-scoreboard-name-coloring

- **default:** false
- **description:** Instructs the server to use the vanilla scoreboard for player nickname coloring.
- **note:** Useful when playing on adventure maps made for the vanilla server and client.

### remove-corrupt-tile-entities

- **default:** false
- **description:** Instructs the server to automatically remove tile entities it detects as broken and cannot fix.

### enable-treasure-maps

- **default:** true
- **description:** Allows villagers to trade treasure maps.

### treasure-maps-return-already-discovered

- **default:** false
- **description:** Instructs the server to target the first treasure location found, rather than the first undiscovered one. Vanilla mechanics normally find the first undiscovered location, which may lead to structures that were not fully looted, and can also fail with a world border set. Enabling this will make the map simply find the closest target structure, regardless if it has been loaded or not already.

### experience-merge-max-value

- **default:** -1
- **description:** Instructs the server put a maximum value on experience orbs, preventing them all from merging down into 1 single orb.
- **note:** The default value instructs the server to use no max value, allowing them to merge down into a single orb. This is especially noticeable when defeating boss monsters.

### prevent-moving-into-unloaded-chunks

- **default:** false
- **description:** Sets whether the server will prevent players from moving into unloaded chunks or not.

### max-auto-save-chunks-per-tick

- **default:** 24
- **description:** The maximum number of chunks the auto-save system will save in a single tick.

### falling-block-height-nerf

- **default:** 0
- **note:** Values less than 1, will disable this feature.
- **description:** The height at which falling blocks will be removed from the server.

### tnt-entity-height-nerf

- **default:** 0
- **note:** Values less than 1, will disable this feature.
- **description:** The height at which Primed TNT entities will be removed from the server.

### filter-nbt-data-from-spawn-eggs-and-related

- **default:** true
- **description:** Instructs the server to remove certain NBT data from spawn-eggs, falling-blocks, and other often abused items in creative mode.
- **note:** Some adventure maps may require this be turned off to function correctly, but we do not recommend turning it off on a public server.

### max-entity-collisions

- **default:** 8
- **description:** Instructs the server to stop processing collisions after this value is reached.

### disable-creeper-lingering-effect

- **default:** false
- **description:** Disables creepers randomly leaving behind a lingering area effect cloud.

### duplicate-uuid-resolver

- **default:** saferegen
- **description:** Specifies the method the server uses to resolve entities with duplicate UUIDs. This can be one of the following values:
  - **saferegen:** Regenerate a UUID for the entity, or delete it if they are close.
  - **delete:** Delete the entity.
  - **silent:** Does nothing, not printing logs.
  - **warn:** Does nothing, printing logs.

### duplicate-uuid-saferegen-delete-range

- **default:** 32
- **description:** If multiple entities with duplicate UUIDs are within this many blocks, saferegen will delete all but 1 of them.

### disable-thunder

- **default:** false
- **description:** Disables thunderstorms.

### skeleton-horse-thunder-spawn-chance

- **default:** 0.01
- **description:** Sets the chance that a “Skeleton Trap” (4 skeleton horsemen) will spawn in a thunderstorm.

### disable-ice-and-snow

- **default:** false
- **description:** Disables ice and snow formation.

### count-all-mobs-for-spawning

- **default:** false
- **description:** Determines whether spawner mobs and other misc mobs are counted towards the global mob limit.



### keep-spawn-loaded-range

- **default:** 8
- **description:** The range in chunks around spawn to keep loaded.

### keep-spawn-loaded

- **default:** true
- **description:** Instructs the server to keep the spawn chunks loaded at all times.

### auto-save-interval

- **default:** -1
- **note:** Default value instructs the world to use Bukkit's default.
- **description:** Instructs this world to use a specific value for auto-save instead of bukkit's global value.

### armor-stands-do-collision-entity-lookups

- **default:** true
- **description:** Instructs armor stand entities to do entity collision checks.

### non-player-arrow-despawn-rate

- **default:** -1
- **note:** The default value instructs the server to use the same default arrow despawn rate from spigot.yml that is used for all arrows.
- **description:** The rate, in ticks, at which arrows shot from non-player entities are despawned.

### creative-arrow-despawn-rate

- **default:** -1
- **description:** The rate, in ticks, at which arrows shot from players in creative mode are despawned.

### water-over-lava-flow-speed

- **default:** 5
- **description:** Sets the speed at which water flows while over lava.

### grass-spread-tick-rate

- **default:** 1
- **description:** Sets the delay, in ticks, at which the server attempts to spread grass. Higher values will result in slower spread.

### bed-search-radius

- **default:** 1
- **description:** The distance the server checks for a safe place to respawn a player near their bed. Increasing this value gives players a better chance to respawn at their bed should it become obstructed.

### use-faster-eigencraft-redstone

- **default:** false
- **description:** Sets whether the server uses theosib's redstone algorithms, completely overhauling how redstone works. The new algorithms should be many times faster than current vanilla ones.
- **warning:** This may change how redstone works in very extreme edge-cases.

### fix-zero-tick-instant-grow-farms

- **default:** true
- **description:** Enable to fix zero-tick instant farms. See bug [MC-113809](#) for more info.

### nether-ceiling-void-damage

- **default:** false
- **description:** Instructs the server to do void damage when an entity is on top of the nether ceiling. Use to limit nether ceiling travel in a vanilla-lore friendly way.

### allow-non-player-entities-on-scoreboards

- **default:** false
- **description:** Instructs the server to treat non-player entities as if they are never on a scoreboard.
- **note:** Enabling this value may increase the amount of time the server spends calculating entity collisions.

### disable-explosion-knockback

- **default:** false
- **description:** Instructs the server to completely block any knockback that occurs as a result of an explosion.

### container-update-tick-rate

- **default:** 1
- **description:** The rate, in ticks, at which the server updates containers and inventories.

### parrots-are-unaffected-by-player-movement

- **default:** false
- **description:** Makes parrots “sticky” so they do not fall off a player’s shoulder when they move. Use crouch to shake them off.

### prevent-tnt-from-moving-in-water

- **default:** false
- **description:** Instructs the server to keep Primed TNT entities from moving in flowing water.

### armor-stands-tick

- **default:** true
- **description:** Disable to prevent armor stands from ticking. Can improve performance with many armor stands.

### spawner-nerfed-mobs-should-jump

- **default:** false
- **description:** Determines if spawner nerfed mobs should attempt to float (jump) in water.

### baby-zombie-movement-modifier

- **default:** 0.5
- **description:** Modifies the speed that baby zombies move at, where 0.5 is 50% faster than the mob base speed, and -0.4 would be 40% slower.

### allow-leashing-undead-horse

- **default:** false
- **description:** Instructs the server to allow players to leash undead horse types.

### all-chunks-are-slime-chunks

- **default:** false
- **description:** Instructs the server to treat all chunks like slime chunks, allowing them to spawn in any chunk.

- **note:** This may actually decrease your chances of running into a Slime as they now have a much larger potential spawn area.

### mob-spawner-tick-rate

- **default:** 1
- **description:** How often mob spawners should tick to calculate available spawn areas and spawn new entities into the world.

### game-mechanics

- **disable-pillager-patrols**
  - **default:** false
  - **description:** Disables Pillager patrols and associated AI.
- **scan-for-legacy-ender-dragon**
  - **default:** true
  - **description:** Determines whether the server searches for the ender dragon when loading older worlds.
- **disable-chest-cat-detection**
  - **default:** false
  - **description:** Allows you to open chests even if they have a cat sitting on top of them.
- **shield-blocking-delay**
  - **default:** 5
  - **description:** The number of ticks between a player activating their shield and it actually blocking damage.
- **disable-end-credits**
  - **default:** false
  - **description:** Instructs the server to never send the end game credits when leaving the end.
- **disable-player-crits**
  - **default:** false
  - **description:** Instructs the server to disable critical hits in PvP, instead treating them as normal hits.
- **disable-sprint-interruption-on-attack**
  - **default:** false
  - **description:** Determines if the server will interrupt a sprinting player if they are attacked.
- **disable-relative-projectile-velocity**
  - **default:** false
  - **description:** Instructs the server to ignore shooter velocity when calculating the velocity of a fired arrow.
- **disable-unloaded-chunk-enderpearl-exploit:**
  - **default:** true

- **description:** Prevent enderpearls from storing the thrower when in an unloaded chunk.

### max-growth-height

- **cactus**
  - **default:** 3
  - **description:** Maximum height cactus blocks will naturally grow to.
- **reeds**
  - **default:** 3
  - **description:** Maximum height reed blocks will naturally grow to.

### fishing-time-range

- **MinimumTicks**
  - **default:** 100
  - **description:** The minimum number of RNG ticks needed to catch a fish.
- **MaximumTicks**
  - **default:** 600
  - **description:** The maximum number of RNG ticks before catching a fish.

### despawn-ranges

- **soft**
  - **default:** 32
  - **description:** The number of blocks away from a player in which entities will be randomly selected to be despawned.
- **hard**
  - **default:** 128
  - **description:** The number of blocks away from a player in which entities will be forcibly despawned.

### lightning-strike-distance-limit

- **sound**
  - **default:** -1
  - **description:** The distance that players will hear lightning from.
- **impact-sound**
  - **default:** -1
  - **description:** The distance that players will hear a lightning impact from.
- **flash**

- **default:** -1
- **description:** The distance that players will see lightning flashes in the sky.

### frosted-ice

- **enabled**
  - **default:** true
  - **description:** Instructs the server to enable (and tick) frosted ice blocks.
- **delay**
  - **min**
    - \* **default:** 20
    - \* **description:** minimum RNG value to apply frosted-ice effects at.
  - **max**
    - \* **default:** 40
    - \* **description:** maximum RNG value to apply frosted-ice effects at.

### lootables

- **auto-replenish**
  - **default:** false
  - **description:** Instructs the server to automatically replenish lootable containers.
  - **note:** This feature is useful for long-term worlds in which players are not expected to constantly explore to generate new chunks.
- **restrict-player-reloot**
  - **default:** true
  - **description:** Prevents the same players from coming back and re-looting the same containers over and over.
- **reset-seed-on-fill**
  - **default:** true
  - **description:** Resets the loot seed each time the lootable is refilled. Effectively randomizing the new loot items on each refill.
- **max-refills**
  - **default:** -1
  - **description:** Sets the maximum number of times a lootable may be refilled.
  - **note:** The default value will allow a lootable to be refilled an infinite number of times.
- **refresh-min**
  - **default:** 12h
  - **description:** The minimum amount of time that must pass before a lootable will be eligible to be refilled.

- **note:** This field uses time-based values. 12s = 12 seconds, 3h = 3 hours, 4d = 4 days.

- **refresh-max**

- **default:** 2d
- **description:** The maximum amount of time that can pass before a lootable is refilled.
- **note:** This field uses time-based values. 12s = 12 seconds, 3h = 3 hours, 4d = 4 days.

## hopper

- **cooldown-when-full**

- **default:** true
- **description:** Instructs the server to apply a short cooldown when the hopper is full, instead of constantly trying to pull new items.

- **disable-move-event**

- **default:** false
- **description:** Completely disables the *InventoryMoveItemEvent* for hoppers. Dramatically improves hopper performance but will break protection plugins and any others that depend on this event.

## alt-item-despawn-rate

- **enabled**

- **default:** false
- **description:** Determines if items will have different despawn rates.

- **items**

- **default:** { COBBLESTONE: 300 } (a list of mappings)
- **description:** Determines how long each respective item despawns in ticks. You can use item names from *this enum* <<https://papermc.io/javadocs/paper/1.14/org/bukkit/Material.html>>.

## anti-xray

- **enabled**

- **default:** false
- **description:** Controls the on/off state for the Anti-Xray system.

- **engine-mode**

- **default:** 1
- **description:** Sets the Anti-Xray engine mode. Where 1 is to replace hidden blocks with stone and 2 is to replace all blocks with random block data.

- **chunk-edge-mode**

- **default:** 3

- **description:** Sets how the engine handles chunk edges. Where 1 is not to obfuscate the edges of chunks with unloaded neighbors, 2 is to not send the chunk until its neighbors are present (similar to a x-1 view distance), and 3 is to load the neighbor so it can properly obfuscate the current edge (similar to an x+1 view distance).
- **max-chunk-section-index**
  - **default:** 3
  - **description:** Controls to what Y value (height) the engine should operate to, expressed in chunk sections.
  - **note:** To determine the total height, use this formula:  $(\text{index} + 1) * 16$ . Therefore, the default value of 3 will result in the engine functioning up to Y: 64.
- **update-radius**
  - **default:** 2
  - **description:** Controls the distance in blocks from air or water that hidden-blocks are hidden by the anti-xray engine.
- **hidden-blocks**
  - **default:** { gold\_ore, iron\_ore, coal\_ore, lapis\_ore, mossy\_cobblestone, obsidian, chest, diamond\_ore, redstone\_ore, clay, emerald\_ore, ender\_chest }
  - **description:** List of blocks to be hidden in engine mode 1.
  - **note:** This list is using Mojang server names *not* bukkit names.
- **replacement-blocks:**
  - **default:** { stone, oak\_planks }
  - **description:** List of blocks that should be replaced by hidden-blocks in engine mode 2.
  - **note:** This list is using Mojang server names *not* bukkit names.

## generator-settings

- **flat-bedrock**
  - **default:** false
  - **description:** Instructs the server to generate bedrock as a single flat layer.

## squid-spawn-height

- **maximum**
  - **default:** 0.0
  - **description:** The maximum height at which squids will spawn.
  - **note:** The default value defers to Minecraft’s default setting, which as of 1.12 is the sea-level of the world (usually Y: 64).



## 1.2 Contributing to Paper

It's great to see new contributors to the project! Here are some documents which provide further information to get you started:

### 1.2.1 Contributing

This page has yet to be written.

It will contain information about contributing to the PaperMC project.

For now see our [main repository's contributing information](#).

## 1.3 About Paper

Paper is a fork of Spigot with certain goals in mind. The following links explain more about the purpose, rationale and structure of the PaperMC project.

### 1.3.1 About the PaperMC Project

This section provides basic information about the project, as well as covering asset information, frequently asked questions, and contact information.

#### Contents

#### Introduction

#### What is Paper?

Paper, and the PaperMC project behind it, exist to expand the platforms upon which it is built. Paper has a relatively small team, despite that, we have received a large amount of attention and a great showing of support from both server administrators and fellow developers.

As such, we focus on a few things:

- A performant server is paramount.
- Giving back to the community matters.
- Mojang's decisions and assumptions are not necessarily the best for everyone.

Paper is largely composed of two projects:

- **Paper-API**, An enhanced version of the Bukkit API.
- **Paper-Server**, usually just referred to as *Paper*, Paper-Server is an enhanced implementation of the server that goes hand-in-hand with our enhanced API.

There are also other, more technical, projects that support the above two projects. For more information on that see *The Structure of PaperMC*.

## Where can I download Paper?

A complete list of available builds can be obtained from our [site's download page](#).

## Frequently Asked Questions

- *General*
  - *What is Paper?*
  - *What do I need to run it?*
  - *Where do I get it?*
- *Server Administrators*
  - *What can I expect from switching to Paper?*
  - *Will players be able to tell?*
  - *Can I run Bukkit plugins on Paper?*
  - *Can I run Spigot plugins on Paper too?*
  - *Is there anywhere to get plugins for Paper?*
  - *Does Paper support Forge Mods?*
- *Developers*
  - *What can I do with Paper?*
  - *Does Paper make any breaking changes to the API?*

## General

### What is Paper?

Paper is a fork of the Spigot server implementation (which is itself a fork of CraftBukkit). Paper strives to bring improved performance, more features, and more APIs for developers to build awesome plugins with.

### What do I need to run it?

Paper requires the Java Runtime Environment to run. Specifically, it requires at least Java version 8. Once that is installed you're all good to go! If you don't already have a Java 8 Runtime, [it's easy to download and install](#).

See our docs on starting out: [Getting Started](#)

### Where do I get it?

Builds of Paper are already available on our [site's download page](#).

Alternatively, for more automated access, builds are available via a RESTful [Downloads API](#)

## Server Administrators

### What can I expect from switching to Paper?

When migrating your CraftBukkit or Spigot server to Paper, it is not uncommon to see a noticeable performance improvement.

---

**Note:** Though you may see an improvement, Paper is not a silver bullet. Ultimately, you are responsible for the performance of your server, good or bad, on any platform. Tailoring your server to best fit your players and gamemodes is ultimately the key to great performance.

---

Your plugins and worlds will not be changed and both should work just fine after the change.

### Will players be able to tell?

That depends. Your players may see a benefit to gameplay because of the performance improvement, assuming you see one. On a properly maintained server, your players may not even be able to tell the difference.

### Can I run Bukkit plugins on Paper?

Yep! You absolutely can. Paper takes care to maintain compatibility with Bukkit plugins made by the community.

### Can I run Spigot plugins on Paper too?

Yes you can! We don't like to break things most of the time. Sometimes there are plugin authors who do, but we can usually make things work.

### Is there anywhere to get plugins for Paper?

Many plugins that work with, and are made for, Paper are available on the [forum's resource section](#). Sometimes you'll also see them elsewhere, you just have to keep your eyes open.

### Does Paper support Forge Mods?

No, Paper does not support Forge mods of any kind. While there have been attempts to merge the Forge and Bukkit platforms in the past, it has never been a wonderful experience for developers or administrators.

If this is something you're after, we'd point you towards the [Sponge Project](#) instead.

## Developers

### What can I do with Paper?

Paper provides additional APIs ontop of Bukkit, exposing new vanilla elements and even some of its own for you to play with.

TODO: Link to developer docs here :D

### Does Paper make any breaking changes to the API?

Fortunately, Paper does not make breaking API changes so it can maintain plugin compatibility with upstream Spigot and CraftBukkit. At the same time, this means we are also sometimes limited with what we can do and how we can do it.

It's a double-edged sword.

### The Structure of PaperMC

Project	Description
Paper	Shared API & Server repository
Waterfall	A principles fork of the Bungeecord software suite
Travertine	An extended version of Waterfall with 1.7.10 support
PaperDocs	All documentation for the project
Paperclip	A wrapper around Paper-Server to make it easy to distribute and easy to use
PaperTestServer	A skeleton test server we use for testing plugin compatibility

### Paper

This is our main repository. Changes to Spigot-API and Spigot-Server are maintained as a (large) set of individual patch files in this repository. This repository contains only bash scripts and patch files. The bash scripts present in this repo will then take the patches to Spigot-API and to Spigot-Server and apply them.

From this process comes a proper, buildable, Paper-API and Paper-Server that we can then build as a standard maven project.

Paper-API is then compiled and sent to up to our maven server for developers to build their plugins against.

Paper-Server is compiled, then handed off to the Paperclip launcher tool. More on that in a second. From there, we distribute it to you!

### Paperclip

Paperclip is a binary patch distribution system for Paper-Server. We give it a normal, compiled, Paper-Server jar file. From there, Paperclip generates a binary patch of the difference between that Paper-Server jar and the vanilla Minecraft server. It then takes that binary patch and includes it in a separate jar file along with some information about the version of Minecraft it came from, stored as a JSON file, and some minimal code to launch it.

When an end-user runs Paperclip for the first time a few things happen.

1. Paperclip checks the JSON file it stores internally to see what version of Minecraft it was built against.
2. Paperclip downloads a vanilla minecraft jar for that particular version directly from Mojang.
3. Paperclip checks to see that the vanilla jar it just downloaded is the same as the one it was built against using a SHA-256 hash.
4. Paperclip applies the included binary patch of Paper changes to the vanilla jar.
5. Paperclip verifies that the final patched version of the server is the same as the one we originally built using a SHA-256 hash.
6. Paperclip does some java classloader magic and starts the server right then and there.

It only does this on the first run, after this first run, it will skip parts of that process as it deems necessary.

For example, when Paper pushes a new build of Paper for a specific Minecraft version, Paperclip will not re-download the vanilla jar, it'll simply re-patch it and start up.

If there is a Minecraft version change (like 1.9 to 1.10), only then will Paperclip re-download the vanilla Minecraft jar.

## Art Assets

This page provides the official PaperMC logomark and the terms under which you may use it.

**Attention:** The PaperMC logo is subject to its own separate licensing terms and does not inherit any from the projects it represents.

You may:

- Use the PaperMC logomark to represent the project in blogposts and other places in order to bring attention to the project.
- Use the PaperMC logomark to represent Paper-Server in downloads, server selectors, and similar places.
- Crop out extra transparent canvas space behind the PaperMC logomark so it fits better next to other content.

You may not:

- Alter any of the colors used in the PaperMC logomark.
- Change the dimensions of the PaperMC logomark.
- Create modified versions of the PaperMC logomark or derivative works of it.
- Add your own project images or branding to the PaperMC logomark.
- Claim the logomark as your own work or use it as a representation of your own projects.
- Sell the PaperMC logomark on its own or as part of other products without explicit permission.
- Alter the transparency of any of the elements in the PaperMC logomark

---

**Note:** The logomark is available in higher resolution and vector formats. If you need a higher resolution version please contact us.

---

## The official PaperMC logomark



## Contact Us

- *IRC*
- *Discord*
- *Twitter*

## IRC

The Paper project handles most of our communication via IRC.

You can join us on either of these two servers:

- [#paper on irc.spi.gt](#)
- [#paper on irc.esper.net](#)

## Discord

Our IRC presence is also bridged to a Discord server, you can use the following link to join it.

- <https://discord.gg/papermc>

## Twitter

We often tweet out version release notes, update notices, and other information via our Twitter page.

- [@PaperPowered](#)

You should not DM or @ this account for support. It is not checked as regularly as the above locations.

## 1.3.2 The PaperMC Site

The articles below document certain features of the site.

### Contents

#### Downloads API

After months of requests (years in the case of a few hosting providers), PaperMC has added a downloads API to standardize download links and finding specific versions of Paper for specific versions of Minecraft.

It is a simple RESTful JSON API. Like most APIs it uses versioned endpoints, the current version is `v1`, if any breaking changes are made it will be incremented to `v2` and announced, with the old version continuing to function for some time until further announcements are made.

Please note that although we have no plans to change the structure of the API in a breaking way, that it is still relatively new and we will likely be working through any problems or pain spots as they arise.

#### I just want to download the latest jar

To download the latest jar, simply connect to <https://papermc.io/api/v1/paper/1.14.4/latest/download>

If you're looking for Waterfall or Travertine, their name can be used in place of *paper* as either *waterfall* or *travertine*. Specific versions can also be used by replacing *1.14.4* with *1.12.2* or another version. For additional information about available endpoints, projects, and versions, please read further below.

### The new URLs give me weird filenames

*curl*, *wget*, and other command line tools make up their own file names based on the download URL. As the new URL uses standardized links for downloads, these tools come up with unfamiliar or “useless” names.

If you’re using *curl* you can use the `-JLO` flags to make it use the server’s suggested name rather than making up its own. Alternatively, you can use the `-o` flag by itself to specify your own name for the downloaded file (ex: `curl -o paperclip.jar http://someurl`). For more information, please see [curl’s own documentation](#).

If you’re using *wget* you can add the `--content-disposition` flag on newer versions to use the server’s suggested name rather than having *wget* make up its own name. You can also use the `-O` flag to specify your own name for the downloaded file. (ex: `wget http://someurl -O paperclip.jar`) For more information, please see [wget’s own documentation](#).

Other tools may or may not make up their own names for files, and they may or may not have options for following the server’s recommended name. You will have to consult those specific tools’ documentation to determine how that is handled. You can always simply rename the file immediately after download if your preferred tool does not support it for some reason.

### Endpoint Documentation

Requests made to the API should conform to the following pattern: `https://papermc.io/api/{API_VERSION}/{PROJECT_NAME}/{PROJECT_VERSION}/{BUILD_ID}/download`

You may optionally append the static path `/download` to automatically be given a specific file. Generally, hitting a parent of an item will enumerate it. Cases where this is not true are documented below.

Example getting a listing of available project versions for waterfall: `https://papermc.io/api/v1/waterfall`

```
{
  "project": "waterfall",
  "versions": [
    "1.13",
    "1.12",
    "1.11"
  ]
}
```

### API\_VERSION

v1 - The initial launch version of the API.

NOTE: The parent (`https://papermc.io/api`) does not currently enumerate the available API versions and will return a 501 Not Implemented if accessed directly.

### PROJECT\_NAME

- `paper` - The PaperMC server implementation
- `waterfall` - The Waterfall server proxy
- `travertine` - The Travertine proxy fork

NOTE: The parent (`https://papermc.io/api/v1`) does not currently enumerate the available project names and will return a 501 Not Implemented if accessed directly.



## PROJECT\_VERSION

This will vary from project to project above. By accessing the API using just the project name (ex: `https://papermc.io/api/v1/paper`), the API will return an array of supported versions.

```
{
  "project": "paper",
  "versions": [
    "1.14.4",
    "1.14.3",
    "1.14.2",
    "1.14.1",
    "1.14",
    "1.13.2",
    "1.13.1",
    "1.13-pre7",
    "1.13",
    "1.12.2",
    "1.12.1",
    "1.12",
    "1.11.2",
    "1.10.2",
    "1.9.4",
    "1.8.8"
  ]
}
```

These versions correspond to the version of Minecraft the software is targeting. For example, `https://papermc.io/api/v1/paper/1.14.4` will return all build IDs targeting the 1.13.2 version of Minecraft.

```
{
  "project": "paper",
  "version": "1.14.4",
  "builds": {
    "latest": "210",
    "all": [
      "210",
      "209",
      "",
      "140",
      "139",
      "138",
      "137",
      "136",
      "135"
    ]
  }
}
```

## BUILD\_ID

A specific build of the given project. These build versions correspond with the build IDs specified by the backend continuous integration tools. As of v1 of the API they will always be integers.

For example, `https://papermc.io/api/v1/paper/1.14.4/205` will return information about the build with the ID of 205.

```
{
  "project": "paper",
  "version": "1.14.4",
  "build": "205"
}
```

You can use the static keyword *latest* in place of a specific build in order to get the latest version for that specific release of minecraft. For example, <https://papermc.io/api/v1/paper/1.14.4/latest> will return info on the latest version of the Paper project for 1.14.4.

```
{
  "project": "paper",
  "version": "1.14.4",
  "build": "210"
}
```

## DOWNLOAD

Finally, if you want to download a version of something, you can simply append `/download` to the URL path in order to be served a file.

For example, to download the latest version of the Waterfall project for 1.14, you would access <https://papermc.io/api/v1/waterfall/1.14/latest/download>

Downloads served in this way will include `content-type`, `content-length`, and `content-disposition` headers for proper identification, progress, and naming of resources.

```
content-type: application/java-archive
content-length: 13358756
content-disposition: attachment; filename=waterfall-295.jar
```

## USEFUL LINKS

- [Main site](#)
- [Discord](#)
- [IRC](#)
- [Docs](#)
- [GitHub](#)
- [Forums](#)
- [Javadocs](#)
- [Issue Tracker](#)
- [Organization GitHub](#)



## ACKNOWLEDGEMENTS



YourKit, makers of the outstanding java profiler, support open source projects of all kinds with their fully featured Java and .NET application profilers. We thank them for granting Paper an OSS license so that we can make our software the best it can be.