Nexthosting

Study · Game servers

How much RAM do Minecraft modpacks really occupy?

A measurement series with 37 modpacks on the same test server

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Sample	35 of 37 modpacks evaluated
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1 Key results

0.77 GB

Persistently occupied memory (median)
Half of the 35 fully measured packs occupy less than 0.77 GB with 256 loaded chunks, the other half more. Measured after garbage collection and without players. This is not the server size you need: Java needs additional space, and so do players.

Evidence: daten.csv, Field world_mb

2.56 GB

Peak of the whole process (median)
The peak of the Java process had a median of 2.56 GB. It also includes memory for code, threads, buffers and heap not yet cleaned up. The value depends on the Java startup settings (1 to 8 GB heap) and is not a recommended RAM size.

Evidence: daten.csv, Field peak_anon_mb

1.78 GB

Highest persistently occupied memory
Creat : More Attachments and Optimization (88 mods) occupied the most memory among the fully measured packs.

Evidence: daten.csv, Field world_mb

0.30 GB

Lowest persistently occupied memory
RealisticCraft (33 mods) occupied the least memory.

Evidence: daten.csv, Field world_mb

0.65

Relationship between number of mods and memory
In this measurement, packs with more mods mostly occupied more memory, with some exceptions. For example, Creat : More Attachments and Optimization with 88 mods occupied 1.78 GB, Elysium Days with 297 mods only 0.86 GB. The value is the Spearman rank correlation across 35 packs (1 would be a perfect match). With so few packs it is uncertain. A relationship is not a cause.

Evidence: daten.csv, Field mods

2 Summary

> **Research question:** How much memory do widely used Minecraft modpacks actually occupy on a server, and how well does the number of mods predict this value?

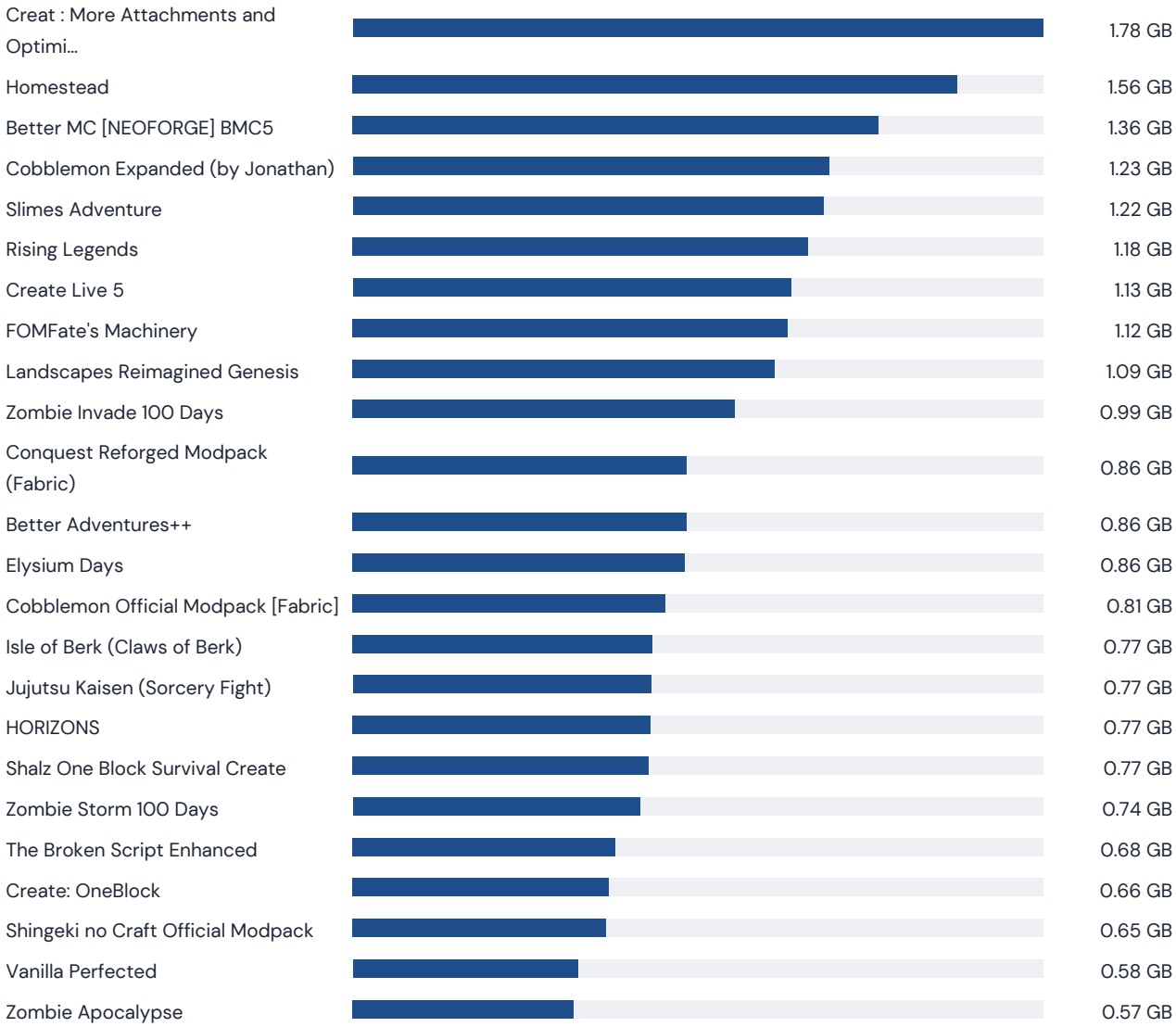
37 modpacks were selected. 35 of them are fully evaluated: each ran on its own on the same test server and was measured twice, after startup and with 256 loaded chunks. The other 2 packs: 1 could not be measured in our setup and 1 runs on a Minecraft version without /forceload, and its world value is only comparable to a limited extent. 7 of the evaluated packs ran only with a documented intervention, for example without client-only mods.

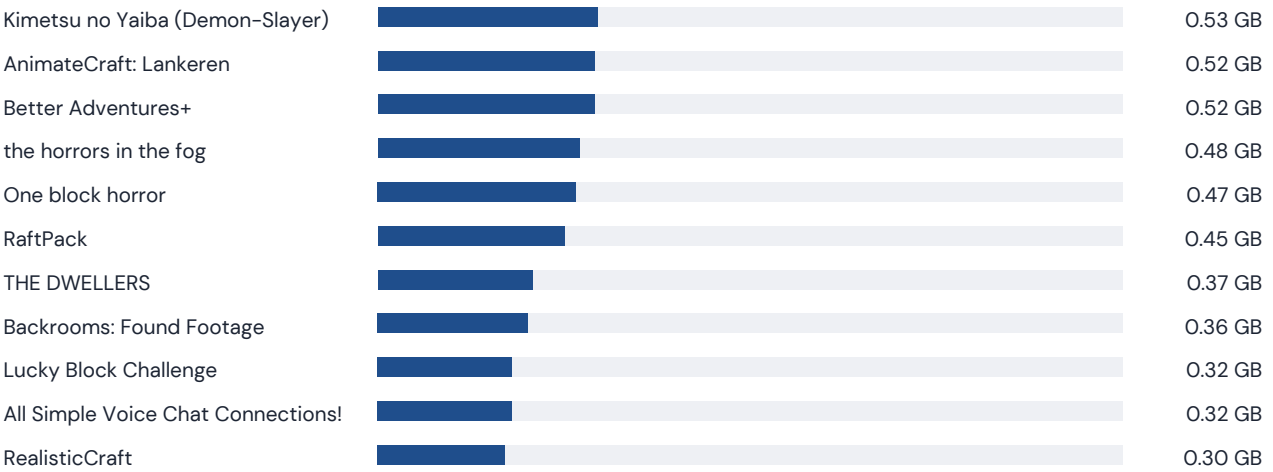
What we measured is the used memory, that is, the heap after two forced garbage collections plus Metaspace. This is the part a pack occupies persistently, and not a recommended RAM size. Player load is not included, so real servers need more.

3 Results

Used memory with loaded world

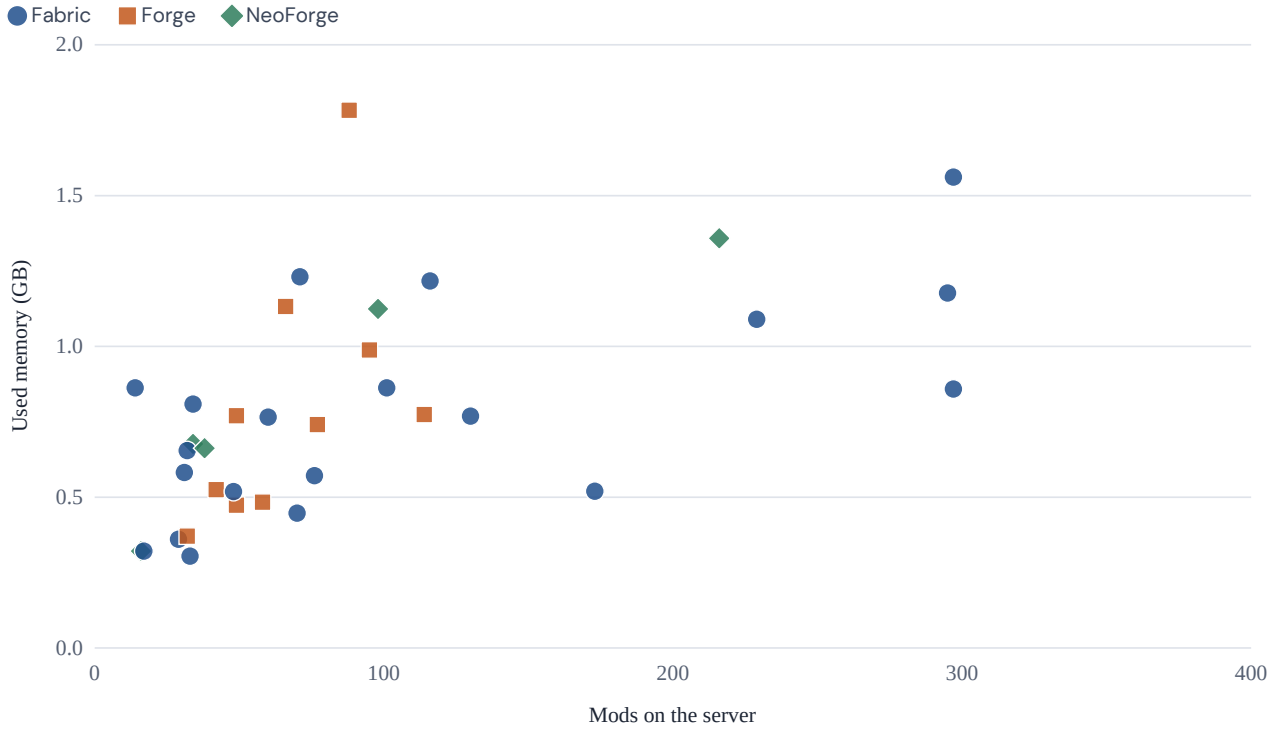
Heap after garbage collection plus Metaspace, per pack, without players.





Do packs with more mods occupy more memory?

Each point is one pack. The shape shows the mod loader.



All measured packs

“After start” and “With world” are used memory.

Pack	Mod loader	Minecraft	Mods	After start	With world	Startup time	World
Creat : More Attachments and Optimization	Forge	1.20.1	88	1.74 GB	1.78 GB	127 s	loaded
Homestead	Fabric	1.20.1	297	1.60 GB	1.56 GB	275 s	loaded, with intervention
Better MC [NEOFORGE] BMC5	NeoForge	1.21.1	216	1.26 GB	1.36 GB	85 s	loaded
Cobblemon Expanded (by Jonathan)	Fabric	1.21.1	71	1.04 GB	1.23 GB	63 s	loaded
Slimes Adventure	Fabric	1.21.1	116	0.85 GB	1.22 GB	73 s	loaded
Rising Legends	Fabric	1.20.1	295	1.17 GB	1.18 GB	154 s	loaded
Create Live 5	Forge	1.20.1	66	1.13 GB	1.13 GB	67 s	loaded
FOMFate's Machinery	NeoForge	1.21.1	98	0.98 GB	1.12 GB	57 s	loaded, with intervention
Landscapes Reimagined Genesis	Fabric	1.20.1	229	1.15 GB	1.09 GB	139 s	loaded
Zombie Invade 100 Days	Forge	1.20.1	95	0.98 GB	0.99 GB	100 s	loaded
Conquest Reforged Modpack (Fabric)	Fabric	1.20.1	14	0.98 GB	0.86 GB	85 s	loaded
Better Adventures++	Fabric	1.21.11	101	0.78 GB	0.86 GB	51 s	loaded
Elysium Days	Fabric	1.20.1	297	0.76 GB	0.86 GB	54 s	loaded
Cobblemon Official Modpack [Fabric]	Fabric	1.21.1	34	0.73 GB	0.81 GB	54 s	loaded
Isle of Berk (Claws of Berk)	Forge	1.18.2	114	0.63 GB	0.77 GB	64 s	loaded, with intervention
Jujutsu Kaisen (Sorcery Fight)	Forge	1.20.1	49	0.75 GB	0.77 GB	66 s	loaded
HORIZONS	Fabric	1.20.1	130	0.74 GB	0.77 GB	124 s	loaded, with intervention
Shalz One Block Survival Create	Fabric	1.20.1	60	0.75 GB	0.77 GB	57 s	loaded
Zombie Storm 100 Days	Forge	1.20.1	77	0.70 GB	0.74 GB	94 s	loaded, with intervention
The Broken Script Enhanced	NeoForge	1.21.1	34	0.51 GB	0.68 GB	36 s	loaded
Create: OneBlock	NeoForge	1.21.1	38	0.60 GB	0.66 GB	48 s	loaded
Shingeki no Craft Official Modpack	Fabric	1.21.11	32	0.52 GB	0.65 GB	36 s	loaded

Pack	Mod loader	Minecraft	Mods	After start	With world	Startup time	World
Vanilla Perfected	Fabric	26.3	31	0.32 GB	0.58 GB	33 s	loaded
Zombie Apocalypse	Fabric	1.20.1	76	0.40 GB	0.57 GB	42 s	loaded
Kimetsu no Yaiba (Demon-Slayer)	Forge	1.20.1	42	0.46 GB	0.53 GB	60 s	loaded
AnimateCraft: Lankeren	Fabric	1.20.1	173	0.50 GB	0.52 GB	79 s	loaded, with intervention
Better Adventures+	Fabric	26.3	48	0.46 GB	0.52 GB	33 s	loaded
the horrors in the fog	Forge	1.19.2	58	0.47 GB	0.48 GB	82 s	loaded, with intervention
One block horror	Forge	1.19.2	49	0.46 GB	0.47 GB	70 s	loaded
RaftPack	Fabric	1.20.1	70	0.36 GB	0.45 GB	36 s	loaded
THE DWELLERS	Forge	1.19.2	32	0.28 GB	0.37 GB	36 s	loaded
Backrooms: Found Footage	Fabric	1.20.1	29	0.23 GB	0.36 GB	27 s	loaded
Lucky Block Challenge	NeoForge	1.21.1	16	0.26 GB	0.32 GB	30 s	loaded
All Simple Voice Chat Connections!	Fabric	26.3	17	0.26 GB	0.32 GB	24 s	loaded
RealisticCraft	Fabric	1.19	33	0.26 GB	0.30 GB	48 s	loaded
Winter Zombies	Forge	1.12.2	32	0.28 GB	0.28 GB	30 s	via /forge generate

A dash under “With world” means: not measured. The value “via /forge generate” is only comparable to a limited extent. Neither goes into the key figures.

4 Method

1 **Install**

The pack is loaded in a fixed version, and every file is checked by SHA-512. Client-only mods are removed. Libraries that a server mod requires according to its mod file stay in. A bundled “Missing Mods Checker” and the mod “CIT Resewn” are removed because they abort the server start in our setup.

2 **Start**

The server starts in its own container without network and without players. After the “Done” message we wait 60 seconds.

3 **First measurement**
We force two garbage collections (jcmd GC.run) and read heap and Metaspace with jstat. This is the “after startup” value.

4 **Load the world**
With /forceload we load 256 chunks (16 × 16) around the origin. This is finished when all 256 are verifiably in the region files, after 5 minutes at the latest.

5 **Second measurement**
After a 30-second wait, two garbage collections again, then heap and Metaspace. This is the “with loaded world” value.

Measurement setup

Loaded chunks	256 (16 × 16)
World seed	20261121
Players	none
Processor	Intel Core i5-13500
CPU cores	4 efficiency cores, up to 3.5 GHz
Maximum heap	8 GB (start: 1 GB)
Memory limit of the container	10 GB
Garbage collection	G1, 2 × before each measurement
Java	8, 17, 21, 25, depending on the pack
View distance / simulation distance	10 / 8 chunks
Network during the measurement	none
Abort at startup	after 20 minutes
Unit	1 GB = 1,024 MB (calculated in binary)

5 Sample and period

Period	Nov 21, 2026
Population of the study	37 modpacks
Evaluated	35 modpacks
Not evaluated	2 modpacks: 1 could not be measured in our setup, 1 runs on a Minecraft version without /forceload, and its world value is only comparable to a limited extent. A start that fails in our setup says nothing about the quality of a pack.

Selection	The packs on our modpack pages, that is, widely used packs that can be set up on a server. Not a random selection.

6 Limits of what the study can show

No players. Players load new chunks, move objects and fill inventories. We did not measure this. Real servers need more than what is shown here.

Small, young world. We measured a freshly generated world with a fixed seed and 256 chunks. Built machines, farms and worlds played for a long time need more.

One run per pack. Each pack was measured once. Startup times also depend on the load on the measurement machine, where other servers were running alongside, and are only rough comparison values.

Fluctuating individual values. For 3 of 35 packs, the value with the loaded world was below the value after startup. We did not investigate the cause. Individual values should therefore be read with caution.

Fixed setup. All runs had 4 efficiency cores of an Intel Core i5-13500 (up to 3.5 GHz) and at most 8 GB heap. On faster cores, startup times may be shorter. With other Java settings, memory can look different.

Used memory is not total consumption. Java occupies additional memory for code, threads and buffers. The peak of the process is in the raw data, but it depends on the Java startup settings and is not suitable as a recommended RAM size.

Packs outside the key figures. Better MC [FORGE] - BMC4 (about 2.3 million downloads, rank 4 on the list) could not be measured. The required mods twilightforest, connectormod and flib are missing from the Modrinth package. Adding them would change the content of the pack. What was tried: the missing required library TemporalAPI 1.6.6 was added from Modrinth (Extra Compat requires 1.6.5 up to below 1.7.0). Winter Zombies runs on Minecraft 1.12.2, which does not know /forceload. The 256 target chunks were generated with /forge generate and counted afterwards, but do not stay permanently loaded. The world value is therefore only comparable to a limited extent. These packs are not included in the key figures.

Interventions on individual packs. the horrors in the fog: client mod Replay Mod removed (Modrinth: server_side=unsupported). Homestead: watchdog switched off (max-tick-time=-1), because otherwise the server is terminated while loading the 256 chunks. Zombie Storm 100 Days: client mod Just Enough Characters removed (loads client classes, crash on the server). Client mod Fog Overrides removed (loads client classes, crash on the server). Isle of Berk (Claws of Berk): client mod ToroHealth removed (Modrinth: server_side=unsupported). Client mod Fastquit removed (Modrinth: server_side=unsupported). Client mod Enhanced Block Entities removed (Modrinth:

server_side=unsupported). FOMFate's Machinery: client mod ReForgedPlay removed (brings the client graphics library lwjgl-tinyexr, which aborts the server start). HORIZONS: Distant Horizons 2.2.1 removed (according to the changelog, support for dedicated servers only exists from 2.3.0). AnimateCraft: Lankeren: library CompleteConfig 2.5.0 replaced by 2.5.2 (2.5.0 aborts on the server with NoSuchFieldError).

No random selection. We measured widely used packs from our range. The results do not apply to every modpack.

Fixed versions. New versions of a pack can differ. The measured version is in the raw data.

7 Data and verifiability

With the measurement script and the pack list, the measurement can be repeated on a Linux server with Docker. Packs are loaded in the same versions and checked by checksum. Different hardware, Java builds and the load on the machine can change startup times considerably and memory slightly.

File	Size	SHA-256
daten.csv Measured values per pack (CSV)	8.0 KB	d9682ed3555b7b7629a00d524916d8e4 82f973b41bdde8bc87b42d43adb9ff8f
daten.json Measured values per pack (JSON)	28.4 KB	956a72f2d8057d6884a72bc53ebd74d0 49ad12af6eb577212ab059dafd071e47
messung.py Measurement script	29.5 KB	a223ddde7fbf1cf2715a30cf31321833 5c12c347a57a5d4388ce05c82325ba97
packliste.json List of packs	9.2 KB	93319aedf7deb1e9cd49b220b306a401 42ff2feaa990645e0ce30e5cb248023f

Fields of the data files

Field	Unit	Meaning
slug		Identifier of the pack
name		Name of the pack
version		Measured version of the pack
minecraft		Minecraft version
loader		Mod loader
loader_version		Version of the mod loader
java		Java major version
mods	Anzahl	Mod files on the server after removing client-only mods
status		gemessen, beim_laden_beendet (started, was terminated while loading the world), nicht_gestartet (did not start in our setup), abgebrochen (measurement machine busy) or offen
ausgewertet		true = both measured values exist and all 256 target chunks were permanently loaded. Only these rows go into the key figures.
start_gemessen		true = there is a measured value after startup
eingriffe		Changes to exactly this pack so that it runs in our setup. Empty = none.
grund		Why a pack could not be measured
welt_ergebnis		loaded (all 256 chunks), loaded, with intervention, via /forge generate (generated and counted afterwards, not permanently loaded, only comparable to a limited extent), ended while loading or not finished.
start_s	s	Time from container start to the “Done” message
boot_heap_mb	MB	Heap after two forced garbage collections, after startup
boot_metaspace_mb	MB	Metaspace after startup
boot_mb	MB	boot_heap_mb plus boot_metaspace_mb
world_heap_mb	MB	Heap after two forced garbage collections, with loaded world
world_metaspace_mb	MB	Metaspace with loaded world

Field	Unit	Meaning
world_mb	MB	world_heap_mb plus world_metaspace_mb. This is the used memory, not a recommended RAM size. Empty = not measured.
peak_anon_mb	MB	Highest memory of the process during the run. Depends on the Java startup settings and is not a recommended RAM size.
chunks_s	s	Time until all 256 target chunks were in the region files or the time limit was reached
chunks_gezaehlt	Anzahl	Target chunks that are verifiably in the region files (target: 256)
chunks_stabil		true = all 256 target chunks are in the region files. false = not all target chunks loaded, so there is no world value.
forceload_bestaetigt		The server confirmed the loading of the chunks in the log. false does not automatically mean “not loaded”, some packs log only a raw language key.
weltdatei_mb	MB	Size of the region files of the world
bibliotheken_behalten	Anzahl	Files marked as client mods that had to stay because a server mod requires them
gemessen_am		Day of the measurement

8 Sources

[1] Modrinth: Modrinth API Documentation.
https://docs.modrinth.com/api/
Retrieved on Nov 21, 2026

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[4] Minecraft Wiki: Commands/forceload.
https://minecraft.wiki/w/Commands/forceload
Retrieved on Nov 21, 2026

[5] Pterodactyl: Yolks: Container-Abbilder für Java.
https://github.com/pterodactyl/yolks
Retrieved on Nov 21, 2026

9 Disclosure

Own interest

Nexthosting sells Minecraft and modpack servers itself and has an interest in this study being read and linked. The measurements were made on a Nexthosting server. The raw data and the measurement script are open, so the results can be checked independently of us.

Authorship

Erik Friedl, Nexthosting. The publisher is Nexthosting.

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10 How to cite this study

APA

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BibTeX

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  type       = {Study},
  year       = {2026},
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  url        = {https://nexthosting.net/en/studies/minecraft-modpack-ram},
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}
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11 Changes and corrections

Version	Date	Type	Change
1.0.0	Nov 21, 2026	Version	First complete version.