MCP SERVER | NO CODE | CLOUD HOSTED

# Beat Grid Sync Calculator MCP for AI Agents

## Align your video cuts to musical beats with millisecond precision.

Beat Grid Sync Calculator helps you align video cuts to music. It handles the math of BPM and millisecond timing so you don't have to. It calculates exact durations and speed factors for perfect rhythmic timing in your timeline.

A+ Quality Score 100/100

bpm | sync | video-editing | rhythm | automation | timeline

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vinkius.com/mcp/beat-grid-sync-calculator

SCAN TO VIEW

# The connectivity layer between AI and the world's software.

Vinkius sits between AI and every application. All communication passes through Vinkius Cloud via the Model Context Protocol (MCP) — with governance, observability, and security at every layer.

# Your AI Connections Run Through Vinkius Cloud

The world's largest managed MCP catalog

Vinkius is the connectivity layer where AI connects to the software your business already runs. We handle the hosting, the security, the credentials, the uptime — you get agents that actually do things.

We operate the world's largest managed MCP catalog. Major SaaS platforms, CRMs, databases, and cloud providers — running, monitored, production-ready. This MCP server is hosted and maintained by the Vinkius Cloud for AI Agents.

> *The agent doesn't manage credentials, doesn't manage uptime, doesn't manage security. Vinkius does.*
>
> — Architecture principle

## Four Pillars of the Vinkius Runtime

**01 — Security by design**

Credentials stay encrypted at rest via AES-256. The AI agent never touches raw keys — they're injected into a sandboxed V8 isolate at runtime. Actions are logged, and connections have an emergency kill switch.

**02 — Built on MCP Fusion**

This MCP server was built with **MCP Fusion**, the open-source framework (Apache 2.0) that powers the entire Vinkius catalog. Schema-as-firewall strips undeclared fields, compiled PII redaction runs at zero overhead, and cryptographic lockfiles produce git-diffable audit trails.

**03 — Deterministic observability**

Eight immutable metrics per endpoint: request volume, p95 latency, error rate, active connections, cost attribution. A live payload feed logs every tool call with mutation detection.

**04 — Autonomous operations**

Servers are deployed, monitored, and patched autonomously. New capabilities and security patches ship weekly. Zero-downtime deployments ensure continuous availability across all managed MCP servers.

| AES-256 | Ed25519 | 24h TTL | V8 Isolate |
| --- | --- | --- | --- |
| Encryption at rest | PKI vault signatures | Ephemeral session keys | Sandboxed execution |

## One Token. Instant Access.

Every MCP server on Vinkius is accessed through a **Connection Token**. Tokens are generated in the cloud dashboard and produce a unique MCP endpoint URL. Paste this URL into any MCP-compatible client — no SDK required.

A single token can serve **multiple AI clients simultaneously**, or you can issue separate tokens per client for granular access control. Each token tracks its own request count, last activity timestamp, and can be individually enabled or revoked.

MCP ENDPOINT

```
https://edge.vinkius.com/{token}/mcp
```

Claude · Cursor · VS Code · Windsurf · Grok · Gemini

## Security Is the Architecture

Security in Vinkius is not a feature — it's the foundation of the runtime. The gateway enforces multiple independent protection layers between AI agents and third-party APIs.

**01 — Ed25519 PKI Vault**

Every workspace has an Ed25519 Master Key. Session keys are generated ephemerally (24h TTL) and signed by the Master Key. Credentials never leave the vault boundary.

**02 — V8 Isolate Sandboxing**

Tool code runs inside isolated-vm V8 isolates with 64 MB memory caps and per-request timeouts. No filesystem access, no network access except through the SSRF-guarded fetch bridge.

**03 — SSRF Guard**

All outbound HTTP requests are DNS-resolved and validated before execution. Private IP ranges (10.x, 172.16-31.x, 192.168.x, AWS metadata 169.254.x) are blocked at the network layer.

**04 — DLP & PII Redaction**

A ResponseGuard pipeline intercepts every tool response. Configurable redaction patterns strip sensitive fields (emails, SSNs, card numbers) before data reaches the AI agent.

**05 — Cryptographic Audit Trail**

Every request is signed into a SHA-256 hash chain with Ed25519 signatures. Events form a tamper-proof, SIEM-exportable forensic record.

**06 — Honeytoken Trap System**

Phantom credentials are injected into isolated environments. If a honeytoken is used outside Vinkius infrastructure, the server is quarantined instantly.

# Emergency Kill Switch

EU AI Act Art. 14(1) Compliant

The kill switch is an **emergency halt** mechanism — not a simple toggle. When triggered, it executes three actions atomically:

**01 — Server deactivated**

The MCP server is immediately taken offline across the entire cluster.

**02 — All tokens revoked**

Every connection token is invalidated. Total lockout — reconnection blocked until new tokens are issued.

**03 — WebSocket connections killed**

Active connections terminated via Redis pubsub broadcast. Propagates to every runtime node in the cluster.

## Full Visibility. Zero Guesswork.

The Vinkius cloud dashboard includes a full MCP Governance suite — real-time analytics and security controls for production AI operations.

**Control Plane**

KPI dashboard with request volume, latency, success rate, token consumption, and AI-generated operational briefings.

**Agent Activity**

Which AI clients are connecting, how often, and what they're doing — real-time session tracking.

**FinOps**

Cost tracking per tool, payload compression savings, budget optimization signals, and consumption trends.

**Tool Health**

Slowest and most error-prone tools, with actionable root-cause insights and performance baselines.

**Firewall & DLP**

PII redaction activity, sensitive data protection counters, and security event timeline.

**Incident Log**

Error trends, failure rates, status-code breakdowns, and forensic audit trail access.

> Get started at **cloud.vinkius.com** — connect your AI agent in under 60 seconds.

# Beat Grid Sync Calculator MCP

3 tools available
Cloud-hosted on Vinkius

This MCP handles the math of syncing your video to a soundtrack. It's built for editors and motion designers who need to hit every beat perfectly without doing manual calculations. Instead of guessing where a cut should land, you can tell your agent the BPM and the length of your track, and it'll give you the exact millisecond timestamps for your timeline. It even figures out the speed factors you need to stretch or shrink a clip so the movement stays in time with the music. You'll find this MCP in the Vinkius catalog as a way to move from 'close enough' timing to frame-perfect sync. It takes the guesswork out of rhythmic editing by providing the precise data points needed for clean transitions. You no longer have to jump back and forth between your project file and a calculator. The AI does the heavy lifting of calculating the deltas and intervals, so you can just apply the numbers to your timeline. This ensures your edits feel intentional and professional, whether you're working on a high-energy music video or a subtle motion graphic loop. It turns a tedious manual process into a quick data request. It saves you from the frustration of tiny adjustments that don't quite land, letting you focus on the creative flow of your project instead of the technicalities of timecode. By automating the math, you can move faster through your timeline while maintaining a high standard of polish. It's about getting the technical details right so you can spend more time on the actual art of storytelling.

## Core Capabilities

**01 — Calculate beat duration**

Determine exactly how many milliseconds a single beat lasts based on the BPM.

**02 — Generate a full timeline of beat timestamps**

Get a complete list of beat markers over a specific duration for your project.

**03 — Determine exact clip adjustment values**

Find the precise millisecond delta needed to snap a clip to the nearest beat.

**04 — Find millisecond deltas for rhythmic alignment**

Get the exact timing differences required to align visual cuts with audio pulses.

**05 — Calculate speed factors for video stretching**

Identify the speed percentage needed to stretch or shrink a clip to fit a beat.

## One Click on Vinkius — From Prompt to Execution

Available at **vinkius.com/mcp/beat-grid-sync-calculator** — connect your AI agent in three steps.

01 Tell your agent the BPM and the start time of your audio track.

02 The MCP generates a full grid of beat timestamps for your desired duration.

03 You get the exact millisecond markers to use for your cuts and clip snaps.

The bottom line is you get the exact math for rhythmic cuts without having to open a calculator or guess your frame counts.

## Built For

This is for the video editor who spends too much time frame-stepping to find a beat, or the motion designer who needs to sync a loop to a specific BPM. It solves the frustration of 'almost' hitting a transition by providing the exact math for perfect timing.

**Video Editor**

Syncing high-energy cuts to a music video soundtrack without manual frame counting.

**Motion Designer**

Creating rhythmic animations that loop perfectly on the downbeat of a track.

**Content Creator**

Quickly aligning social media clips to trending audio for perfect transitions.

## What Changes When You Connect

01 Stop doing mental math for BPM. Use `get_beat_interval` to instantly get the millisecond duration of a single beat, which removes the need for manual calculations during your edit.

02 Achieve frame-perfect cuts. `calculate_clip_snap` ensures every transition hits the mark exactly, removing the 'almost there' feeling from your final export.

03 Build your timeline faster. `generate_sync_grid` gives you a full roadmap of beats at once, so you don't have to generate them one by one as you work.

04 Master complex video stretching. Get the exact speed factors needed to stretch or shrink a clip so it stays in time with the music without looking awkward.

05 Eliminate human error. Automated math ensures that your rhythmic alignment stays consistent across long projects, regardless of how complex the audio track gets.

## Real-World Applications

**Syncing a high-energy music video**

An editor wants to ensure every transition hits a beat on a 128 BPM track. They ask the agent to generate a grid for a 30-second clip, and it provides the exact timestamps to snap the cuts to.

**Creating a looping motion graphic**

A motion designer needs a loop to reset perfectly on a beat. They use the tool to find the exact speed factor and snap point to make the animation seamless.

**Rapid social media content batching**

A creator wants to sync five different clips to the same audio track. They ask the agent to calculate the snap points for all five to ensure consistent rhythmic timing.

**Aligning lyric video text**

A designer needs to know exactly when text should appear on screen. They generate a beat grid to get a list of timestamps for every word in the chorus.

## Patterns to Avoid

### Guessing the snap point

✗ AVOID

Manually dragging a clip and hoping it hits the beat visually.

✓ INSTEAD

Use `calculate_clip_snap` to get the exact millisecond delta for perfect alignment.

### Hardcoding beat intervals

✗ AVOID

Assuming every beat is 500ms for a 120 BPM track.

✓ INSTEAD

Use `get_beat_interval` to calculate the real duration based on the specific BPM of your track.

### Manual grid creation

✗ AVOID

Typing out a list of timestamps one by one in a spreadsheet.

✓ INSTEAD

Use `generate_sync_grid` to get the whole list in one go for your entire timeline.

## The Right Fit

Use this if you need to sync visuals to a specific BPM and want your agent to handle the math of millisecond deltas. It's the best choice for music videos, rhythmic motion graphics, and high-polish social content. Don't use it if you're doing basic linear editing where the rhythm doesn't matter. If you just need to trim a clip without any regard for a beat, a standard video editing tool is sufficient. This MCP is specifically for the precision work of rhythmic alignment.

# Beat Grid Sync Calculator for Precise Video Beat Alignment

You spend hours staring at a timeline, dragging clips back and forth by single frames to make them hit a beat. You're constantly checking the audio, doing mental math for the BPM, and hoping the transition doesn't feel off. It's tedious and often leads to 'almost' perfect timing that looks sloppy on rewatch.

This MCP handles the math for you. Tell your agent the BPM and the duration, and it hands you the exact timestamps. You stop guessing and start placing cuts with confidence, knowing they'll hit perfectly every time. You no longer have to jump back and forth between your project file and a calculator.

# Beat Grid Sync Calculator for Rhythmic Video Editing

For motion designers, getting a loop to hit perfectly on a beat is a chore. You have to calculate the speed factor of the clip, then adjust the start point, then cross-reference with the audio track. It's a lot of jumping between tools and mental notes.

You get the speed factors and the snap points in one go. The AI can generate the whole grid for you, so you can focus on the creative side of the motion while the MCP handles the technical synchronization. It's about getting the technical details right so you can spend more time on the actual art of storytelling.

# Beat Grid Sync Calculator, 3 Tools for Video Beat Alignment

Get exact beat timestamps, speed factors, and clip snap points for your timeline.

| # | TOOL | DESCRIPTION |
|---|---|---|
| 01 | `get_beat_interval` | Tells you the millisecond duration of a single beat based on the BPM. Use this to set your timing. |
| 02 | `calculate_clip_snap` | Gives you the specific adjustment needed to make a clip end on a beat. Use this for perfect rhythmic alignment. |
| 03 | `generate_sync_grid` | Creates a complete list of timestamps for a beat grid over a set duration. Use this to map your entire timeline. |

# See It in Action

Real prompts you can use once this MCP is connected to your AI agent through Vinkius Cloud.

**U** What's the beat duration for 128 BPM?

For a song at 128 BPM, one beat lasts exactly **468.75 milliseconds**.

Here is the breakdown:

- **BPM**: 128
- **Seconds per beat**: 0.78125
- **Milliseconds per beat**: 468.75

**U** Generate a beat grid for 30 seconds at 110 BPM.

Here is your beat grid for a 30-second duration at 110 BPM:

| BEAT | TIMESTAMP (MS) |
|---|---|
| 1 | 0.00 |
| 2 | 545.45 |
| 3 | 1090.91 |
| 4 | 1636.36 |
| ... | ... |
| 30 | 15909.09 |

U I have a clip ending at 1200ms. How do I snap it to the nearest beat at 115 BPM?

To snap your clip to the nearest beat at 115 BPM:

- **Beat Interval**: 521.74 ms
- **Current Position**: 1200 ms
- **Nearest Beat**: 1565.22 ms
- **Adjustment Needed**: +365.22 ms

Your clip needs to be stretched or moved by **365.22 ms** to hit the next beat perfectly.

# Frequently Asked Questions

01 **How does the Beat Grid Sync Calculator help with my video edits?**

It does all the math for your music sync. It calculates exact millisecond timestamps and speed factors based on your BPM, so you can snap your cuts to the beat instantly without manual frame counting.

02 **Can I use the Beat Grid Sync Calculator for music videos?**

Yes, it's perfect for music videos. It generates a full grid of beat timestamps, making it easy to ensure every transition and visual hit happens exactly when the music demands it.

03 **Does the Beat Grid Sync Calculator support variable BPM?**

It handles any BPM you provide. By giving your agent the BPM, the MCP calculates the correct intervals and snap points for that specific tempo across your entire timeline.

04 **Will the Beat Grid Sync Calculator help with motion graphics?**

Absolutely. It's great for motion designers who need to sync loops or animations to a beat. It can provide the exact speed factors needed to make your movement feel perfectly rhythmic.

05 **Is the Beat Grid Sync Calculator good for social media clips?**

It's a huge time saver for social media. You can quickly get the snap points for a 15-second clip so every transition hits the beat, making your content look much more professional.

06 **Do I need to be a math expert to use the Beat Grid Sync Calculator?**

Not at all. That's the point of this MCP. You just tell your agent the BPM, and it handles all the millisecond calculations and speed factors for you.

# Go Live in 60 Seconds

Get your connection token from **cloud.vinkius.com**, then paste the endpoint URL into any MCP-compatible client.

YOUR MCP ENDPOINT

```
https://edge.vinkius.com/[TOKEN]/mcp
```

| CLIENT | WHERE TO CONFIGURE |
|---|---|
| Claude AI | Profile → Customize → Connectors → "+" → Add custom connector → Paste endpoint |
| Cursor | Settings → Features → MCP Servers → "+ Add New MCP Server" → Type: SSE → Paste endpoint |
| VS Code | Ctrl/Cmd+Shift+P → "MCP: Add Server" → add `"beat-grid-sync-calculator": { "url": "…" }` |
| Windsurf | MCP Settings → `mcp_settings.json` → Add endpoint URL |
| ChatGPT | Settings → Tools & plugins → Add MCP server → Paste endpoint |
| Gemini | Extensions → Add MCP Server → Paste endpoint URL |

## ASK AN AI ABOUT THIS

Let your preferred AI explain this MCP server

- Ask ChatGPT
- Ask Claude
- Ask Perplexity
- Ask Gemini
- Ask Grok

READY TO CONNECT

# Beat Grid Sync Calculator is live on Vinkius Cloud.

Get your connection token, paste it into your AI agent, and start building. No SDK. No deployment. Just results.

**Start at cloud.vinkius.com →**

vinkius.com · support@vinkius.com

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