MCP SERVER | NO CODE | CLOUD HOSTED

Signal Filter Designer MCP for AI Agents

Cleaning and Shaping Time-Series Sensor Data

Signal Filter Designer provides digital signal processing tools for cleaning up numerical data. It lets your AI agent apply various filters—like low-pass or high-pass EQ—to time-series arrays. Use it to remove noise, correct drift, and smooth out erratic sensor readings from audio samples, scientific instruments, or any complex data stream.

A+ Quality Score 100/100

dsp | filtering | signal-processing | audio | data-analysis

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vinkius.com/mcp/signal-filter-designer

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.

Signal Filter Designer MCP

4 tools available
Cloud-hosted on Vinkius

Processing raw signal data often means dealing with noise, sudden spikes, or gradual drift. This MCP gives your agent a full suite of digital tools to clean up numerical arrays before analysis. Instead of manually trying different mathematical smoothing techniques, you just tell the system what kind of cleanup you need. You can use it to remove high-frequency jitters from sensor readings or apply specific EQ boosts to shape audio tones. For example, if your data is messy—maybe a temperature reading has noise spikes mixed in—your agent handles that clean up automatically. When you connect this MCP via Vinkius, you give any compatible AI client the power of professional signal processing tools right where you work, letting you focus on the insights instead of the cleanup.

Core Capabilities

01 — Smooth Data Fluctuations

Averaging local data points using different methods (Simple Moving Average or Exponential) smooths out rapid changes and short-term noise in a signal.

02 — Remove Noise and Correct Drift

Applying basic first-order filters removes unwanted high-frequency static or corrects slow, gradual shifts in the data stream (drift).

03 — Shape Signal Frequency Ranges

Using a peaking EQ allows you to boost certain frequencies (like emphasizing bass tones) or cut specific ranges from the signal.

One Click on Vinkius — From Prompt to Execution

Available at **vinkius.com/mcp/signal-filter-designer** — connect your AI agent in three steps.

01 Your AI client sends the raw numerical data array and specifies the desired cleanup action, such as 'remove high-frequency noise' or 'smooth short-term fluctuations'.

02 The Signal Filter Designer MCP processes the input data using the selected digital filter algorithm.

03 It returns a new, cleaned, or shaped array that is ready for further analysis.

The bottom line is your agent takes noisy raw signals and outputs clean, actionable time-series datasets.

Built For

This MCP is essential for data scientists, audio engineers, and hardware analysts who deal with real-world, messy sensor feeds. If your job involves analyzing any kind of continuous signal—be it sound or telemetry—you need this.

Data Scientist

Cleans raw time-series data before running statistical models, ensuring noise doesn't skew the results.

Audio Engineer

Applies specific equalization and filtering to recorded audio samples to shape tones or eliminate background hiss.

Telemetry Analyst

Processes streaming data from remote sensors (e.g., vibration, temperature) to filter out environmental noise and detect true anomalies.

What Changes When You Connect

01 Reduce noise spikes using `apply_first_order_filter`, ensuring your analysis isn't skewed by electrical interference or sudden environmental jitters.

02 Use `apply_moving_average_sma` to get a quick, reliable overview of signal trends without getting bogged down in short-term data fluctuations.

03 Get nuanced smoothing with `apply_exponential_moving_average`, letting you prioritize the most recent readings when analyzing rapidly changing conditions.

04 Tune specific frequencies using `apply_peaking_eq` to shape audio or sensor signals, allowing you to isolate key tonal characteristics for analysis.

05 Process complex inputs—whether they're sound waves or vibration metrics—into clean arrays ready for immediate pattern recognition.

Real-World Applications

Analyzing a Faulty Machine's Vibration Signature

A telemetry analyst feeds the agent raw vibration data. The agent uses `apply_first_order_filter` to remove ambient floor noise, then applies an EQ boost to highlight specific frequencies known to indicate bearing failure.

Cleaning up Field Recording Audio Samples

An audio engineer feeds the raw recording. The agent uses `apply_peaking_eq` to cut out a specific, persistent hum at 60Hz, making the voice track clearer and ready for publication.

Smoothing Out Stock Market Signal Data

A data scientist runs historical market readings. The agent applies `apply_exponential_moving_average` to filter out daily volatility noise, revealing the underlying long-term trend line.

Processing GPS Sensor Drift Correction

An analyst feeds raw location telemetry over time. The agent uses a low-pass function via `apply_first_order_filter` to correct for atmospheric or sensor drift, giving accurate position data.

Patterns to Avoid

Using only basic averaging

✗ AVOID

Trying to smooth complex audio by just using a simple average filter. This blurs out crucial high-frequency details needed for proper tone identification.

✓ INSTEAD

For better results, use `apply_exponential_moving_average`. It provides weighted smoothing that keeps the signal's character while still reducing noise.

Ignoring data type in filtering

✗ AVOID

Attempting to remove drift from an audio sample using a simple moving average. The SMA is too blunt and will degrade the sound quality unnecessarily.

✓ INSTEAD

For frequency-based cleanup, use `apply_peaking_eq` or `apply_first_order_filter`. These tools are designed for targeted spectral adjustments.

Over-filtering signals

✗ AVOID

Running the same signal through multiple aggressive filters in sequence. The output becomes dull, losing all unique and important data points.

✓ INSTEAD

Start by identifying the specific problem (noise or drift) and use one targeted tool. For noise, try `apply_first_order_filter` first.

The Right Fit

Use this MCP if your primary goal is signal integrity: cleaning up raw data streams before modeling or analysis. Specifically, you need to know *what* kind of cleanup—is it smoothing (using methods like `apply_moving_average_sma` or `apply_exponential_moving_average`), removing noise/drift (use `apply_first_order_filter`), or shaping frequency (use `apply_peaking_eq`)? Don't use this if your data is already perfectly clean and structured; in that case, you just need a standard calculation tool. If you only need to calculate the mean of a fixed window without worrying about noise, basic spreadsheet formulas will work fine, but they lack the sophisticated filtering options here.

Signal Filter Designer MCP for AI Agents: Cleaning Sensor Data Noise

When monitoring equipment or collecting field data, you rarely get a clean signal. The raw numbers are usually mixed with electrical noise, random spikes, and slow environmental drift. Manually cleaning this up involves endless copy-pasting between specialized software tabs—one for the filter, one for the visualization, another for checking the results.

With Signal Filter Designer, your agent handles that messy process end to end. You tell it you need to remove high-frequency noise or correct drift using `apply_first_order_filter`. The system returns a pristine data array, letting you skip the manual cleanup and jump straight to actionable insights.

Signal Filter Designer MCP for AI Agents: Analyzing Audio Tones

In audio analysis, simply listening isn't enough. You need measurable data about the tone. Today, isolating a specific sound—like filtering out background traffic to focus on speech—means diving deep into spectrograms and manually adjusting multiple EQ bands.

This MCP changes that. Your agent can use `apply_peaking_eq` to boost or cut frequencies based on your criteria. You get the exact, numerically processed audio data you need, making complex tonal analysis routine.

Signal Filter Designer: 4 Digital Signal Processing Tools for Analysis

These four tools let your agent smooth signals, remove noise, correct drift, or boost specific frequencies in any time-series data array.

#	TOOL	DESCRIPTION
01	`apply_moving_average_sma`	It smooths data by averaging the values of nearby points in a window.
02	`apply_peaking_eq`	You can boost or cut specific frequency ranges to change the signal's overall tone.
03	`apply_exponential_moving_average`	This method smooths data but weighs recent readings more heavily than older ones.
04	`apply_first_order_filter`	It applies basic attenuation to remove either high-frequency noise or low-frequency drift from the signal.

See It in Action

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

U I have a signal array from an accelerometer that's noisy. How can I clean it up and remove high-frequency jitter?

Signal Noise Reduction Report

We ran the raw data through a first-order filter to target the high frequencies.

- **Original Mean (Peak):** 85 units
- **Filtered Mean (Peak):** 79.2 units
- **Noise Removal Success:** High frequency components were reduced by an average of 14%.

This cleaned data is now stable for trend analysis.

U Smooth out this temperature reading array so I can see the long-term trend instead of daily spikes: [20, 25, 30, 28, 22].

Smoothed Trend Analysis (Exponential Average)

The exponential method was used to weight recent readings more heavily. Here is the resulting trend line:

DAY	RAW READING	SMOOTHED VALUE
1	20	20.0
2	25	22.5
3	30	26.8
4	28	25.9
5	22	23.1

U I need to boost the bass tones in this audio sample array at 100Hz by about 6dB.

EQ Adjustment Complete

The signal was processed using a peaking equalizer set for 100Hz with a Q factor of 1.0.

- **Target Frequency:** 100 Hz
- **Gain Applied:** +6 dB
- **Resulting Array Sample (Magnitude):** [0.5, **1.2**, 0.4, -0.8, 0.3]

The tone is now significantly richer in the low-mid range.

Frequently Asked Questions

01 **What kind of data signals can I use with Signal Filter Designer MCP for AI Agents?**

You can use it on any one-dimensional numerical array. This includes sensor telemetry (like temperature or vibration), audio samples, and time-series market readings.

02 **How does Signal Filter Designer MCP help with noisy data?**

It lets you apply specific filters to clean up noise. You can use tools like `apply_first_order_filter` to remove random high-frequency static, making the signal much clearer for analysis.

03 **Is Signal Filter Designer MCP better than just averaging my data?**

Yes, it's much more precise. Simple averaging blurs everything out. This MCP gives you specialized methods—like weighted exponential smoothing—that maintain critical details while still reducing noise.

04 **Can I use Signal Filter Designer MCP to improve the quality of recorded speech?**

Absolutely. You can use `apply_peaking_eq` within this MCP to boost specific frequency bands, helping you cut out background hums or emphasizing clear vocal tones.

05 **What if my data has a slow drift over time? Can Signal Filter Designer handle that?**

Yes. The `apply_first_order_filter` is designed specifically to detect and remove gradual, systematic drifts from your signal, giving you an accurate baseline.

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 `"signal-filter-designer": { "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

Signal Filter Designer 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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