

MCP SERVER

NO CODE

CLOUD HOSTED

Asset Correlation Matrix MCP for AI Agents

Calculating Portfolio Diversification and Hedging Opportunities from Historical Returns

The Asset Correlation Matrix MCP calculates the Pearson correlation coefficient between various financial assets using historical returns. It helps you identify which asset pairs are too highly correlated, posing a diversification risk, and which pair movements suggest natural hedging opportunities for your portfolio.

A+ Quality Score 100/100

correlation

pearson

finance

hedging

diversification



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.

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.

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.

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

Encryption at rest

Ed25519

PKI vault signatures

24h TTL

Ephemeral session keys

V8 Isolate

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.

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.

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.

06 — Honeypot Trap System

Phantom credentials are injected into isolated environments. If a honeypot 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.

FinOps

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

Firewall & DLP

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

Agent Activity

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

Tool Health

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

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.

Asset Correlation Matrix MCP

3 tools available

Cloud-hosted on Vinkius

Understanding how different assets move together is critical to managing risk. This MCP provides quantitative tools built specifically for financial analysis. Instead of manually pulling historical returns into spreadsheets and running correlation functions, this connector lets your AI agent compute a full Pearson correlation matrix instantly. You can then pinpoint exactly which asset pairs are too closely linked—those with correlations above 0.8 that undermine diversification efforts. Better yet, you can detect assets that move in opposite directions, suggesting natural ways to hedge risk. Just connect it through the Vinkius catalog and your agent gets access to these sophisticated financial tools without needing specialized coding knowledge.

Core Capabilities

01 — Calculate Asset Correlation Matrices

It computes a full Pearson correlation matrix based on historical returns for any set of assets you provide.

02 — Flag Diversification Risks

The MCP finds pairs of assets that move too closely together (correlation > 0.8), which means they aren't helping to diversify your portfolio.

03 — Identify Natural Hedges

It detects asset pairs with negative correlations, showing you natural ways to hedge risk by combining assets that move in opposite directions.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/mcp/asset-correlation-matrix — connect your AI agent in three steps.

- 01** Provide the MCP with historical return data for a group of financial assets.
- 02** Your AI client runs the `compute_correlation_matrix` tool, generating a detailed correlation matrix showing how all pairs relate to each other.
- 03** The agent then uses this matrix to run two checks: one for high-risk correlated pairs and another for low-risk inverse (hedge) pairings.

The bottom line is that you get an automated, multi-step quantitative analysis of your asset movements, pinpointing both risks and natural hedges in minutes.

Built For

This MCP is for finance professionals who spend too much time cross-referencing correlation coefficients across multiple systems. If you're constantly analyzing portfolio risk or looking for new hedging strategies, this tool saves hours of spreadsheet work.

Portfolio Manager

Uses the MCP to quickly check if a proposed asset allocation maintains sufficient diversification by identifying highly correlated pairs.

Quantitative Analyst (Quant)

Runs batch checks on large datasets, using correlation matrices to validate risk models and search for potential arbitrage opportunities.

Risk Officer

Inputs asset data to identify specific pairs that represent concentration risk or lack of effective hedging protection against market downturns.

What Changes When You Connect

- 01** Pinpoint immediate diversification risks. Instead of guessing, use `identify_diversification_risks` to automatically flag every asset pair with a correlation over 0.8.

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- 02 Automate matrix generation. The `compute_correlation_matrix` tool handles the heavy lifting, turning raw historical returns into usable, structured data instantly.

 - 03 Discover natural hedges. Use `identify_hedge_opportunities` to find assets that naturally counteract market movements, improving portfolio resilience.

 - 04 Save time on risk checks. Your agent executes complex quantitative analysis in seconds—a task that used to take hours of manual spreadsheet manipulation.

 - 05 Improve decision quality. By seeing the full correlation landscape, you build better-informed investment theses than relying on single asset performance metrics.
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Real-World Applications

Rebalancing a Concentrated Portfolio

A portfolio manager inputs returns for five assets and asks their agent to run the full correlation matrix. The agent uses `identify_diversification_risks` and reports that two major holdings are too correlated, suggesting they need to swap one out.

Evaluating New Investment Pairs

An analyst wants to know if pairing tech stocks with energy sector ETFs makes sense. They use the MCP to compute the correlation matrix and see that they are negatively correlated, suggesting a good hedge opportunity.

Stress-Testing Market Resilience

A risk officer feeds the MCP data from a volatile period. The agent runs checks for hedging opportunities using `identify_hedge_opportunities`, which suggests adding gold or commodities to naturally balance stock exposure.

Patterns to Avoid

Comparing assets individually

X AVOID

Looking only at AAPL's yearly performance vs. MSFT's yearly performance and assuming the relationship is stable or manageable.

✓ INSTEAD

Don't compare them in isolation. Use `compute_correlation_matrix` to generate a matrix that shows their co-movement across all time periods, giving you the full picture of risk.`

Ignoring correlation thresholds

X AVOID

Assuming that because two assets are 'different' (e.g., stocks and bonds), they can't be highly correlated.

✓ INSTEAD

Always use `identify_diversification_risks` to set a hard threshold, like 0.8. This forces the agent to prove the correlation risk mathematically.`

Treating hedge identification as guessing

X AVOID

Manually picking two assets that *might* move opposite ways without quantitative proof.

✓ INSTEAD

Use `identify_hedge_opportunities`. This tool rigorously checks for negative correlations, confirming the natural hedging relationship with data.`

The Right Fit

Use this MCP if your core problem is understanding co-movement risk. If you need to know *how* assets move relative to each other—if they cluster together or pull against one another—this is the tool. It excels at providing quantitative proof of correlation, diversification risks, and hedge potential.

Don't use this if your goal is simple data visualization (you could use a standard charting library) or if you only care about an asset's standalone performance metrics (a basic dashboard works fine for that). If you just need to pull raw historical price feeds without analyzing the relationship *between* them, look for a pure data retrieval MCP instead. This tool is strictly for deep quantitative analysis.

Asset Correlation Matrix: Solving Portfolio Diversification Risk with Finance MCP

Today, building and managing a diversified portfolio involves endless spreadsheets. You pull historical returns into Excel, manually selecting pairs of assets like tech stocks versus commodities. Then you run the correlation function, spending hours just checking if two major holdings are too closely linked or if your diversification efforts are even working.

With this MCP, your agent handles all that grunt work automatically. Give it a set of asset returns, and it runs `compute_correlation_matrix` to build the full picture in seconds. You stop manually cross-referencing tabs; you start getting clear insights into how your portfolio actually performs under stress.

Asset Correlation Matrix: Identifying Hedge Opportunities for Portfolio Management

The biggest time sink is usually identifying potential hedges. You spend days researching which assets move inversely to counteract risk, often just guessing based on market anecdotes or old academic papers.

Now, you let the MCP run `identify_hedge_opportunities`. It systematically scans every pair in your matrix and reports the ones that show a statistically significant negative correlation. You don't guess anymore; you act on confirmed quantitative data.

3 Asset Correlation Matrix Tools for Quantitative Finance Analysis

Use these dedicated functions to compute Pearson correlation matrices, flag high-risk correlations, and identify natural hedging opportunities in your asset set.

#	TOOL	DESCRIPTION
01	<code>identify_diversification_risks</code>	Checks a given correlation matrix and flags any asset pairs whose relationship is too strong, threatening portfolio diversification.
02	<code>compute_correlation_matrix</code>	Generates the core Pearson correlation matrix when provided with historical return data for multiple assets.
03	<code>identify_hedge_opportunities</code>	Scans asset pairs to find those that are negatively correlated, making them natural candidates for risk reduction or hedging.

See It in Action

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

U What are my diversification risks using these returns: AAPL:[0.1, 0.2], MSFT:[0.15, 0.25]?



Correlation Matrix Analysis

- **Risk Found:** The pair (AAPL, MSFT) shows a correlation of **0.94**.
- This is above the 0.8 risk threshold.
- **Action:** These two assets are moving too closely together and do not provide adequate diversification benefit when combined. Consider replacing one with an uncorrelated asset class.

U Find any hedge opportunities in this matrix: {GOLD-SPY: -0.3, AAPL-MSFT: 0.8}



Hedge Opportunity Report

We found one potential natural hedge:

- **Pair:** GOLD-SPY and other assets (requires full data set)
- **Correlation:** -0.3
- **Recommendation:** Incorporating the asset related to SPY can help dampen volatility when stock prices rise, providing downside protection.

U Calculate the correlation for tech stocks and energy ETFs: [returns...]



Pearson Correlation Coefficient Calculation

Based on the provided historical returns:

- The Pearson correlation coefficient between **Tech Sector Index** and **Energy ETF** is approximately **-0.62**.
- This indicates a moderate negative relationship, suggesting potential risk mitigation if combined into a portfolio.

Frequently Asked Questions

01 How does the Asset Correlation Matrix MCP help me improve my portfolio diversification?

It helps by mathematically flagging any asset pair that is too highly correlated (above 0.8). This tells you exactly where your risk concentration lies, allowing you to adjust holdings before a market downturn hits.

02 Can I use the Asset Correlation Matrix MCP to find natural hedges for my investments?

Yes. The MCP runs specific checks to identify assets that have negative correlations with your current portfolio. These pairs move in opposite directions, which is what defines a natural hedge and reduces overall risk.

03 What kind of data does the Asset Correlation Matrix MCP need?

It needs historical return data for the assets you want to analyze. You provide the returns, and the tool calculates all the relationships between them using the Pearson method.

04 Is this better than just looking at standard financial charts?

Absolutely. Charts show price over time; this MCP shows *relationship* across time. It gives you a quantitative measure of co-movement risk that simple visualization can't provide.

05 How many assets can I analyze with the Asset Correlation Matrix MCP?







The system handles various numbers of assets, but providing comprehensive data is key. You input the returns for all assets you want to check against each other in one batch process.

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 <code>"asset-correlation-matrix": { "url": "..." }</code>
 Windsurf	MCP Settings → <code>mcp_settings.json</code> → 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

Asset Correlation Matrix 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](https://cloud.vinkius.com) →

vinkius.com · support@vinkius.com

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

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