MCP SERVER | NO CODE | CLOUD HOSTED

Board Carve Radius Engine physics simulation.

Predict how a surfboard performs in real water.

Board Carve Radius Engine provides high-fidelity physics calculations for surfboard performance. It lets your AI client determine the precise turning mechanics of a planing hull, calculate physical loads, and predict water displacement patterns based on board geometry and rider input.

A+ Quality Score 100/100

surf | physics | fluid-dynamics | hydrodynamics | performance

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vinkius.com/en/ai-agent-connect/board-carve-radius-engine

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.

Board Carve Radius Engine MCP

4 tools available
Cloud-hosted on Vinkius

You can use this MCP to run precise hydrodynamic simulations for surfboard design and performance testing. Instead of guessing how a new rail profile or fin setup will behave, you can feed your board's geometry and intended speed into your AI client to get hard numbers. It handles the heavy lifting of calculating turning paths, the gravitational load on a rider during a carve, and the specific trajectory of water spray. Whether you are modeling a new rocker profile or testing how a specific mass affects turn intensity, this MCP gives your agent the physics engine it needs to provide accurate performance predictions.

Core Capabilities

01 — Turning Path Modeling

Your agent uses this to find the exact radius of a board's carve.

02 — Load Analysis

Your agent calculates the G-forces a rider feels during high-speed maneuvers.

03 — Spray Prediction

Your agent simulates the direction and height of water kicked up by the rail.

04 — Equipment Optimization

Your agent suggests fin or rocker changes to reach specific performance goals.

One Click on Vinkius — From Prompt to Execution

Available at **vinkius.com/en/ai-agent-connect/board-carve-radius-engine** — connect your AI agent in three steps.

01 Connect your AI client to the Vinkius hosted MCP.

02 Provide board geometry, speed, or rider mass to your agent.

03 The agent calls the specific physics tool needed for the calculation.

04 Receive precise numerical results for radius, G-force, or spray patterns.

Get physics-driven surfboard data in your AI client in four steps.

Built For

This MCP is built for professionals working in surfboard design and hydrodynamic simulation.

Surfboard Designers

They hand off geometry specs to the AI to test new shapes before cutting foam.

Hydrodynamic Engineers

They use the physics engine to validate planing hull performance.

Performance Coaches

They use the data to model how specific equipment affects rider load.

What Changes When You Connect

01	Replaces manual physics estimations with direct calculations.
02	Connects hydrodynamic data directly to your AI agent.
03	Provides specific equipment recommendations based on target maneuvers.

Real-World Applications

Rocker Profile Testing

Test how changing the rocker affects the spray trajectory and turning radius.

Fin Setup Validation

Check if a specific fin configuration meets the required turning radius for a maneuver.

Rider Load Simulation

Calculate the G-forces for different rider masses and speeds during a carve.

Hull Geometry Analysis

Determine the turning mechanics of a planing hull using precise geometry inputs.

4 Tools Available

#	TOOL	DESCRIPTION
01	calculate_carve_radius	This tool determines the primary turning radius of the board. It uses rider input and board geometry to find the path.
02	calculate_turn_gforce	This tool calculates the physical gravitational load. It tells you the G-force a rider experiences during a carve.
03	get_optimized_configuration	This tool recommends equipment setups. It suggests the ideal fin setup or rocker to hit a target radius.
04	simulate_spray_trajectory	This tool predicts water displacement. It models the visual pattern and direction of the spray kicked up by the rail.

See It in Action

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

U What is the turning radius for a 180cm board at 5m/s with a 30 degree edge angle and a thruster fin setup?

The calculated turning radius is 3.45 meters with a stability score of 0.82.

U How much G-force will I feel if I carve at 6m/s with a 2.5 meter radius and a total mass of 85kg?

You will experience a G-force of 1.48, which is categorized as moderate load intensity.

U Predict the spray pattern for a hard rail at 4m/s with a high rocker profile and 45 degree edge angle.

The spray will reach a height of 0.85 meters at a 35 degree angle with high volume intensity.

Frequently Asked Questions

01 **What kind of physics does this MCP handle?**

It handles hydrodynamic and planing hull physics, specifically focusing on turning radii, G-forces, and water spray trajectories.

02 **Can I use this with Claude or Cursor?**

Yes, you can use this with any MCP-compatible client like Claude, Cursor, or Windsurf once you connect it via Vinkius.

03 **How does it recommend equipment?**

The get_optimized_configuration tool analyzes your target radius to suggest the best fin setup or rocker profile.

04 **Do I need to host the physics engine myself?**

No, Vinkius hosts and manages the MCP, so it is ready to use immediately after you connect.

05 **What inputs are required for a carve calculation?**

You typically need to provide board geometry, rider input, and speed to get an accurate turning radius.

06 **How accurate are the turning radius calculations?**

The `calculate_carve_radius` tool uses fluid dynamics models to estimate the path based on edge angle, speed, and fin configuration.

07 **Can I optimize my board setup for specific turns?**

Yes, you can use `get_optimized_configuration` to receive recommendations for fin types and rocker profiles based on your target radius.

08 **Does this account for rider weight?**

Yes, the `calculate_turn_gforce` tool requires the combined mass of the rider and equipment to calculate the physical load.

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 `"board-carve-radius-engine": { "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

Board Carve Radius Engine 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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DOCUMENT INFORMATION

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Server ID	`01a07b19-babf-73ff-a78a-1e1214206cd4`
Platform	Vinkius Cloud for AI Agents
Endpoint	`https://edge.vinkius.com/{token}/mcp`

LICENSE & USAGE

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