WAYFORTH

Technical Whitepaper

Version 3.0 · April 2026

The Search Engine and Payment Rail for AI Agents

Abstract

Wayforth is the search engine and payment rail for AI agents. It provides a permissionless registry of agent-callable services, a proprietary multi-signal ranking engine (WayforthRank), a declarative query language (WayforthQL), and a non-custodial payment routing system settled on Base. Agents discover services by expressing intent in natural language; Wayforth ranks results using real usage signals, reliability verification, and semantic relevance; agents pay non-custodially with tiered routing fees from 0.75% to 1.5%.

The protocol is designed around a compounding data moat: every search query, payment outcome, and reliability probe produces proprietary signals that improve ranking quality over time. Wayforth's seven IP layers — WayforthRank, the Service Graph, WayforthQL, the Coverage Tier System, the Verifier Network, Wayforth Identity, and the Proprietary Dataset — are specifically constructed to be more valuable over time.

As of April 2026, Wayforth is live in production with 190+ real API endpoints indexed, 154 Tier 2 verified services, 37+ API endpoints, 9 MCP tools, audited smart contracts on Base Sepolia, and packages published on PyPI and npm. Mainnet deployment is targeted for Q3 2026 pending independent security audit.

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1. Introduction

1.1 The emergence of agent-native commerce

AI agents are becoming economically autonomous. During 2025 and early 2026, the combination of frontier language models with reliable tool-use capabilities produced agents that can reason, plan, and execute multi-step workflows without human approval loops. Agents now routinely call external services to retrieve data, translate text, run code, generate images, and retrieve real-time information.

The infrastructure assumption underlying most agent workflows is that the developer has pre-configured every external service integration: obtained API keys, managed billing, handled authentication, and written integration code for each service. This assumption breaks down at scale. A single agent can call dozens of independent services in the course of a single user request — each requiring an account, a key, a billing relationship, and ongoing maintenance.

1.2 The one-command solution

Wayforth collapses this entire workflow into one command and two tool calls:

```
# Install
uvx wayforth-mcp

# Discover
wayforth_search("translate text to Spanish")
# → DeepL API (WRI: 82, Tier 2 Verified) | LibreTranslate | ModernMT

# Pay
wayforth_pay(service_id, owner_address, amount_usdc=0.001)
# → Non-custodial calldata. Settles on Base in ~2 seconds.
```

No API keys. No billing relationships. No integration code. The agent describes what it needs; Wayforth finds the best verified service; the agent pays non-custodially.

1.3 The missing coordination layer

The individual primitives for autonomous agent commerce have shipped. Smart contract wallets enable agents to hold and spend funds. USDC on Base enables sub-cent transactions with 2-second finality. The Model Context Protocol (MCP) provides a standard interface for agents to call external tools. Frontier language models can express intent in natural language and interpret structured responses.

What remains missing is the coordination layer that binds these primitives together: a search engine and payment rail that lets agents discover what services exist, evaluate which ones are reliable, and pay for them without custody risk. Wayforth is that layer.

1.4 Current production state (April 2026)

Component	Status	Detail
Production API	Live v0.1.5	37+ endpoints — api-production-fd71.up.railway.app
Service catalog	190+ real APIs	154 Tier 2 verified — probed every 6 hours
MCP server	v0.1.7 — 9 tools	uvx wayforth-mcp — PyPI + Official MCP Registry
Python SDK	v0.1.2	pip install wayforth-sdk
TypeScript SDK	v0.1.2	npm install wayforth-sdk
Smart contracts	Base Sepolia — v2	Registry + Escrow — 54 tests, Basescan verified
Website	Live	wayforth.io — full product site
Mainnet	Q3 2026	Pending independent security audit

2. Problem Statement

2.1 Discovery failure

There is no authoritative, searchable, reliability-verified registry of agent-callable services. Existing directories are either manually curated, permissionless with no reliability signal, or limited to a single protocol. Agent developers must manually discover, evaluate, and integrate each service.

2.2 Reliability opacity

Any service can claim uptime in its documentation. No independent, automated verification system existed prior to Wayforth. Agents making financial decisions based on unreliable services create poor user experiences and disputes that undermine trust in autonomous commerce.

2.3 Payment rail mismatch

Traditional payment rails are economically incompatible with agent micro-transactions. A typical agent transaction ranges from $0.001 to $0.10. Stripe's standard pricing ($0.30 fixed + 2.9% variable) makes sub-dollar transactions economically impossible. Wayforth's tiered routing fee (0.75%–1.5% with no fixed component) is the only payment model designed for agent commerce economics.

2.4 Trust asymmetry

Service providers cannot verify agent quality or predict agent behavior. Agents cannot verify service reliability or provider identity. Wayforth's Coverage Tier System and Wayforth Identity address both sides of this asymmetry.

3. System Architecture

> *Wayforth is a four-layer system: Crawler → Indexer → Ranker → Gateway. Each layer is independently deployable with a defined public interface.*

3.1 The Crawler

The crawler discovers and maintains the service catalog through four source types: MCP registries (official MCP registry, Smithery, Glama), x402 endpoints (8 known services probed on each cycle), curated seeds (190+ high-quality services with verified descriptions), and provider submissions (auto-probed immediately on submission via POST /submit).

The crawler runs daily at 06:00 UTC for discovery and every 6 hours for health monitoring. Default search results show real API endpoints only — GitHub repositories and unverified MCP wrappers are filtered by default (real_only=true parameter).

3.2 Database — 15 Migrations

Migration	Tables	Purpose
001-005	services, health fields	Core catalog, payment protocol, health monitoring
006	search_outcomes, search_analytics	WayforthRank data pipeline — query→payment loop
007	agent_memory	DB-backed agent service memory
008	service_graph	Co-usage knowledge graph
009	competitive_intelligence	x402 ecosystem tracking
010	tier3_applications	KYB verification intake
011	service_score_history	WRI trend tracking — 345+ rows
012	provider_webhooks	HMAC-signed tier-change notifications
013	api_keys	Tiered API key system
014	agent_identities	Agent trust scores, reputation tiers
015	services (constraint)	Added image/code/audio/embeddings categories

3.3 API Gateway

The API Gateway is a FastAPI application on Railway exposing 37+ REST endpoints organized into functional groups: Search & Discovery, Payment, Intelligence, Identity & Memory, Provider Tools, API Keys, and

Platform. Authentication is via X-Wayforth-API-Key header. Rate limiting is per-IP (anonymous) and per-key (authenticated). Every response includes X-Wayforth-Request-ID for tracing.

4. WayforthRank — The Ranking Engine

> *WayforthRank is the closed-source multi-signal ranking engine. Developers see scores; they never see how scores are computed.*

4.1 The Wayforth Reliability Index (WRI)

WRI is a score from 0 to 100 assigned to every service. It tells an agent how trustworthy a service is before paying for it. Think of it as a credit score for APIs — but one that improves from real usage data rather than surveys.

Signal	Max Points	Source
Base score	50	Every service starts here
Tier 2 verified	+20	Automated uptime verification (90%+ over 7 days)
Tier 1 tested	+5	Endpoint responded to probe
Zero consecutive failures	+10	Stability signal — no recent failures
Probed within 24h	+10	Freshness signal — recently confirmed live
x402 protocol	+5	Institutional payment standard
Popularity (7d)	+5 max	Normalized search frequency from search_analytics
Payment conversion (7d)	+8 max	Normalized payment rate from search_outcomes

A Tier 2 service with zero failures, probed recently, and x402 protocol scores: 50 + 20 + 10 + 10 + 5 = 95 before usage signals. The payment conversion signal is the most powerful — it can only accumulate from real agent payments, making it impossible to game.

4.2 Real example

```
# Query: "generate images from text"

Rank  Service                    Score  WRI    Price
──────────────────────────────────────────────────────
#1    Flux API (Black Forest)     98    79.0   $0.000040/req
#2    OpenAI DALL-E API           96    88.0   $0.000040/req
#3    Stability AI API            95    88.2   $0.000200/req
#4    Recraft API                 92    86.0   $0.000040/req
#5    Ideogram API                89    84.5   $0.000080/req
```

Flux ranks #1 on semantic relevance (98) but DALL-E has a higher WRI (88) due to stronger reliability history. The final ranking reflects both — the most relevant AND most reliable service rises to the top.

4.3 Architecture

WayforthRank is deployed as a private Railway microservice (separate from the public repo). The public API calls it via ranker_client.py using the RANK_SERVICE_URL environment variable. When the private service is unavailable, the system falls back to the local reference implementation in ranker.py. The private service is not open-sourced and does not appear in the public repository.

4.4 The compounding moat

WayforthRank v1 uses semantic relevance and reliability signals. WayforthRank v2 will incorporate fine-tuned embeddings trained on real agent query data. A competitor starting today needs 12+ months of real agent traffic to build a comparable payment conversion signal. That gap grows with every query Wayforth processes.

5. WayforthQL — Query Language

WayforthQL is a declarative JSON query language for agent service discovery. The specification is published openly. The query engine implementation is closed-source.

5.1 Basic search

```
GET /search?q=translate+text+to+spanish&limit=5

# Response
{
  "results": [...],
  "query_id": "qry_8f3a2c1e",
  "total": 12
}
```

5.2 WayforthQL structured query

```
POST /query
Content-Type: application/json

{
  "query": "fast inference for coding agents",
  "tier_min": 2,
  "protocol": "x402",
  "sort_by": "wri",
  "price_max": 0.001,
  "limit": 5,
  "with_similar": true
}
```

Field	Type	Default	Description
query	string	required	Natural language intent
tier_min	int	2	Minimum coverage tier (0-3)
price_max	float	null	Maximum price in USDC per request
category	string	null	inference | data | translation | image | code | audio | embeddings
protocol	string	any	wayforth | x402 | any
sort_by	string	wri	Ranking: wri | score | price | tier
exclude_ids	array	[]	Service IDs to exclude
limit	int	5	Results count (max 20)

Field	Type	Default	Description
with_similar	bool	false	Include co-used services from Service Graph

5.3 wayforth:// Identifiers

Every service has a permanent wayforth:// identifier derived from its endpoint URL hash:

```
wayforth://deepl_api/6c536ffe
wayforth://groq_api/be4e9aa8
wayforth://stability_ai/9f2a1b3c
```

Agents that reference services by wayforth:// identifier are structurally tied to the Wayforth catalog. Switching means re-identifying every service they depend on.

6. Coverage Tier System

The Coverage Tier System is Wayforth's automated reliability verification mechanism. The tier concept is public. The probe methodology, failure detection thresholds, and promotion criteria are proprietary — gaming resistance requires opacity.

Tier	Name	Criteria	Default in Results
0	Discovered	Indexed, endpoint not yet probed	No
1	Tested	Endpoint responded to at least one probe	No
2	Executable	90%+ uptime over 7 days, probed every 6h, auto-demoted after 3 failures	Yes (default)
3	Verified	KYB complete, SLA signed, institutionally grade	Yes — priority placement

As of April 2026: 190 real API endpoints indexed, 154 at Tier 2. Services are automatically demoted when probe failures exceed the consecutive failure threshold. The threshold is configurable via environment variable and is not published.

Health history is stored in service_score_history, enabling WRI trend analysis (improving/stable/declining) accessible via GET /services/{id}/wri.

```
GET /services/0x6c536ffe.../wri

{
  "wri": 82.0,
  "trend": "stable",
  "avg_7d": 82.0,
  "history": [
    {"wri": 82.0, "at": "2026-04-26T18:00:00Z"},
    {"wri": 82.0, "at": "2026-04-26T12:00:00Z"},
    {"wri": 82.0, "at": "2026-04-26T06:00:00Z"}
  ]
}
```

7. Wayforth Identity — Agent Reputation

Wayforth Identity is the agent-native authentication and reputation layer. Every agent can register a portable identity that accumulates a trust score (0–100) based on real usage behavior.

Trust Score	Reputation Tier	Criteria
90-100	Elite	Extensive usage history, high payment volume
75-89	Trusted	Established usage, multiple verified payments
60-74	Established	Regular usage, verified payment history
40-59	New	New or low-activity agent
0-39	Unknown	Minimal or no verified activity

Trust score starts at 50.0 for all new identities. It increases by +0.5 per payment initiated. Registration is idempotent — agents call it at the start of any session without risk of data loss.

7.1 Registration

```
POST /identity/register
{
  "agent_id": "0xAE99a420...",
  "display_name": "my-research-agent"
}

# Response
{
  "agent_id": "0xAE99a420...",
  "trust_score": 50.0,
  "reputation_tier": "New",
  "total_searches": 0,
  "total_payments": 0
}
```

7.2 Integration with payment flow

POST /pay accepts optional agent_id and query_id parameters. When provided: agent trust score increments, total_payments increments, and the full chain query → result → payment → identity update is tracked end-to-end. This creates the complete attribution loop that powers WayforthRank v2.

8. Smart Contracts and Payment Rail

8.1 Chain selection

Base (Coinbase L2 on Ethereum) is the primary settlement chain. Rationale: $0.001–$0.01 gas per transaction, USDC native, EVM compatibility, Coinbase institutional backing, regulatory clarity trajectory, and x402 alignment (the competing x402 protocol also uses Base — Wayforth's escrow complements rather than competes).

8.2 Deployed contracts — Base Sepolia (v2)

Contract	Address	Status
WayforthRegistry	0x55810EfB3444A693556C3f9910dbFbF2dDaC369C	Verified on Basescan
WayforthEscrow	0xE6EDB0a93e0e0cB9F0402Bd49F2eD1Fffc448809	Verified on Basescan
USDC (Sepolia)	0x036CbD53842c5426634e7929541eC2318f3dCF7e	Circle testnet USDC
Deployer	0xAE99a420073780bCcd13E832222E0b07731da431	Wayforth LTD

54 Foundry tests passing. 256-run fuzz suite on payment routing. Two independent security reviews by Opus 4.7 — 13 issues identified and resolved across both reviews (2 critical, 4 high, 7 medium). Solidity pragma pinned to =0.8.28. Mainnet deployment requires independent paid security audit (Spearbit/Trail of Bits/Cyfrin) — targeted Q3 2026.

8.3 Security improvements in v2

- rescueToken() — admin can recover non-USDC tokens accidentally sent to escrow
- Two-step service ownership transfer — prevents accidental ownership loss
- updateFeeRecipient() probe — tests new recipient address before committing (prevents USDC blacklist bricking)
- TIMELOCK_ADDRESS support in deploy script — admin rotation at deploy time

8.4 Payment flow

```
# Step 1 — Agent searches
result = wayforth_search("real-time stock data")
# Returns: service_id, service_owner, amount_usdc, query_id

# Step 2 — Get payment calldata
payment = wayforth_pay(
  service_id=result.service_id,
  service_owner=result.owner,
```

```
  amount_usdc=0.001,
  query_id=result.query_id,
  agent_id='0xAE99...'
)
# Returns: approve_calldata + routePayment_calldata

# Step 3 — Agent broadcasts (non-custodial)
# 1. Approve USDC spend
# 2. Call routePayment on WayforthEscrow
# Settles on Base in ~2 seconds
# Fee: 0.75%-1.5% based on API key tier
```

8.5 Dual-protocol support

Protocol	Fee	Settlement	Custody	Coverage
Wayforth Escrow	0.75%–1.5% (tiered)	~2s on Base	Non-custodial	Any REST API
x402 (HTTP-native)	Gas only (<$0.0001)	Instant	Non-custodial	x402-native services only

9. API Key Tiers and Routing Fees

Tier	Price	Rate Limit	Monthly Quota	Routing Fee	Features
Free	$0/mo	10 req/min	1,000 searches	1.5% (150 bps)	search, query, pay, identity, memory
Starter	$29/mo	30 req/min	10,000 searches	1.25% (125 bps)	+ Intelligence API, webhooks
Pro	$149/mo	100 req/min	100,000 searches	1.0% (100 bps)	+ score history, service graph
Enterprise	Custom	500 req/min	Unlimited	0.75% (75 bps)	+ SLA, dedicated infra, custom probing

API keys are created via POST /keys/create. The key is returned once and never stored in plaintext — Wayforth stores only the SHA-256 hash. Fee is applied in POST /pay by reading X-Wayforth-API-Key header. Every response includes: X-RateLimit-Tier, X-RateLimit-Limit, X-Wayforth-Version, X-Wayforth-Request-ID.

9.1 Fee economics

The break-even point for upgrading from Free to Pro: a developer processing $30,000/month in agent payments saves $150/month in reduced fees — exceeding the $149 Pro subscription cost. At $1M/month in payment volume, the savings are $5,000/month against a $149 subscription.

10. The Seven IP Layers

> *Every layer is designed to compound in value over time. The data moat is the most durable — a competitor can copy the code but cannot copy 12 months of real agent payment data.*

Layer	Status	Defensibility	Protection
1. WayforthRank	Live — private repo	Closed source. Payment conversion data takes 12+ months to replicate.	Provisional patent + trade secret
2. Service Graph	Live — accumulating	Built from real co-usage. Cannot buy — must earn over time.	Proprietary data asset
3. WayforthQL	Live v2 — spec open	Spec open, engine closed. Structural lock-in for adopting agents.	Provisional patent
4. Coverage Tier System	Live	Probe methodology private. Exact thresholds in env vars only.	Trade secret
5. Verifier Network	Planned	Staked attestation on-chain. History accumulates permanently.	Provisional patent
6. Wayforth Identity	Live v1	Agent-native trust scores. Portable reputation across services.	Provisional patent
7. Proprietary Dataset	Accumulating	search_analytics + search_outcomes + score_history. Training data for v2.	Proprietary data asset

11. Tokenomics — $WAYF

$WAYF is the economic security layer of the Wayforth network. It is not required to use Wayforth's core product. It launches when the verifier network reaches sufficient scale for staking incentives to be meaningful.

DISCLOSURE: No token has been offered, sold, or promised. Token-related information is forward-looking and subject to regulatory clarity, independent audit completion, and Cayman Foundation establishment.

11.1 Token utility

- Verifier staking — operators stake $WAYF as a reliability bond, get slashed for false reports
- Governance — fee rates, tier criteria, verifier requirements, approved protocols
- Tier 3 bond — service providers post $WAYF bond as part of KYB verification
- Protocol revenue burn — 30% of net routing fee revenue market-buys and burns $WAYF

11.2 Why blockchain is necessary

Three structural requirements make blockchain necessary for Wayforth at scale:

Payment atomicity — Agents pay and receive in one atomic transaction. Smart contracts execute atomically — pay fires, service receives, fee routes, all in one transaction with no intermediary risk.

Verifiable reputation — Every payment through Wayforth Escrow creates an immutable on-chain record. Service reputation becomes a public good — verifiable by any agent without trusting Wayforth. An on-chain ledger is permanent.

Decentralized verification — Staked verifiers, slashing for dishonesty, and on-chain attestation make the reliability signal independently verifiable rather than a single company's promise.

11.3 Token launch criteria — all four required

- Mainnet contracts deployed and independently audited
- Verifier network has sufficient node count for meaningful decentralization
- Cayman Foundation legally established
- Regulatory counsel opinion obtained for each launch jurisdiction

12. Governance and Legal Structure

12.1 Wayforth LTD — Wayforth LTD

The operating entity. Holds IP including patents and BSL-licensed source code. Executes commercial agreements. Receives routing fee revenue. QSBS eligible. Full US VC access.

12.2 Cayman Foundation (planned)

To be established before token launch. Governs $WAYF tokenomics, verifier network parameters, and protocol constants.

12.3 BSL 1.1 open source strategy

- Source code publicly visible — builds developer trust and enables security review
- Commercial use to build a competing service is prohibited for 4 years from each file's change date
- Converts to Apache 2.0 on April 25, 2030
- WayforthRank engine is proprietary — not in the public repository
- OpenAPI spec and contract ABIs are MIT licensed

12.4 GitHub repository structure

Repository	Visibility	License	Contents
WayforthOfficial/wayforth	Public — Monday April 28	BSL 1.1	API, crawler, MCP server, SDKs, contracts
WayforthOfficial/wayforth-rank	Private	Proprietary	WayforthRank service, models, training pipeline
WayforthOfficial/wayforth-data	Private	Proprietary	Dataset exports, model training data

13. Security

13.1 Smart contract security

Automated: Slither static analysis (0 High, 0 Medium, 7 Low false positives from block.timestamp usage). Two manual reviews by Opus 4.7 — 13 issues found and resolved. 54 Foundry tests including 256-run fuzz suite. Pragma pinned to =0.8.28. Both contracts verified on Basescan.

Pre-mainnet requirement: independent paid audit from Spearbit, Trail of Bits, Cyfrin, or equivalent. Budget: $15,000–$50,000. Timing: after seed round close.

13.2 API security

- Admin endpoints protected by ADMIN_KEY (SHA-256 hashed, never in source)
- API key authentication uses SHA-256 — plaintext keys never stored
- Rate limiting: Slowapi with Redis backend — per-IP and per-key
- Sentry error tracking live
- All secrets in Railway environment variables — never in source code
- Pre-publish secrets scan confirmed zero hardcoded credentials in repository

13.3 Provider webhook security

Webhooks are signed with HMAC-SHA256 using a per-webhook secret token. The X-Wayforth-Signature header allows providers to verify payloads originate from Wayforth.

14. Stakeholder Model

Agent developers

Primary users. Install wayforth-mcp with one command. Use wayforth_search() and wayforth_pay() as the primary workflow. Benefit: eliminate all service discovery and payment integration work. Revenue for Wayforth: routing fee on each payment.

Service providers

Submit via POST /submit or wayforth.io/submit. Auto-probed immediately on submission. Reach Tier 2 within 7 days of consistent uptime. Tier 3 via KYB + SLA at wayforth.io/tier3. Receive webhook notifications on tier changes. Intelligence API for ranking analytics.

Verifier nodes (planned)

Operators running uptime probing nodes, staking $WAYF as a reliability bond. Earn $WAYF rewards for accurate attestations. Slashed for false reports. Planned replacement for centralized cron-based health monitoring.

Token holders

Govern protocol parameters via $WAYF. Benefit from protocol revenue through burn mechanism. Participate in verifier staking for yield.

15. Roadmap

Phase 1 — Genesis (Q2 2026 — complete)

- ✅ 190+ real API endpoints, 154 Tier 2 verified
- ✅ WayforthRank v1 (semantic + reliability + payment signals)
- ✅ WayforthQL v2 (protocol, sort, exclude, similar)
- ✅ Wayforth Identity v1 (trust scores, 5 reputation tiers)
- ✅ API key system (4 tiers, tiered routing fees 0.75%–1.5%)
- ✅ Service Graph (co-usage knowledge graph)
- ✅ Provider webhooks (HMAC-signed tier-change notifications)
- ✅ MCP server v0.1.7 (9 tools, PyPI + Official MCP Registry)
- ✅ Smart contracts Base Sepolia v2 (54 tests, Basescan verified)
- ✅ BSL 1.1 licensing, 3 provisional patents filed
- ⏳ Public GitHub launch — Monday April 28, 2026
- ⏳ HN launch — Tuesday April 29, 2026

Phase 2 — Expansion (Q3–Q4 2026)

- WayforthRank v2 — fine-tuned model trained on real agent query data
- Base mainnet deployment (post independent security audit)
- Verifier network v1 — external nodes with staking
- Intelligence API paid launch ($500/mo starting tier)
- Tier 3 verification product launch — KYB + SLA for enterprise
- Seed round close ($3–5M target)

Phase 3 — Protocol (Q1–Q2 2027)

- $WAYF token launch (post mainnet, post Foundation setup)
- Decentralized verifier network
- Wayforth Identity v2 — cross-platform portable reputation
- Series A positioning

16. Risk Factors

16.1 Platform dependency risk

Anthropic controls MCP. A protocol change or native service discovery built into Claude could reduce Wayforth's advantage. Mitigation: Wayforth is protocol-agnostic — it indexes x402, REST, and MCP services. A Claude-native registry would only serve Claude agents; Wayforth serves all MCP-compatible runtimes.

16.2 Competitive risk

Coinbase launched Agent.market on April 20, 2026 with $50M+ in existing volume. They do not have semantic search or MCP-native integration. Wayforth indexes Agent.market's services. These are complementary positions, not head-to-head competition. The risk is if Coinbase builds what Wayforth has before Wayforth builds distribution.

16.3 Regulatory risk

Payment routing and token issuance are subject to evolving regulation. Mitigation: non-custodial architecture, legal counsel engaged pre-mainnet, token launch gated on regulatory opinion.

16.4 Catalog quality risk

Of 2,501 services in the catalog, 2,311 are MCP server GitHub repositories that agents cannot directly pay for. Default search results (real_only=true) show only the 190 real API endpoints. Sophisticated developers may discover the full catalog and question the 2,501 headline number. Mitigation: all public-facing stats now show 190+ real APIs and 154 Tier 2 — honest numbers.

16.5 Solo founder risk

Wayforth is currently built and operated by one person. Mitigation: Claude Code development velocity enables individual-scale execution at team-scale output. 37,000+ lines of production code in 4 days demonstrates sustainable velocity. First hire targeted after seed round.

Appendix A — Protocol Constants

Constant	Value	Description
ROUTING_FEE_BPS_FREE	150	1.5% — free tier
ROUTING_FEE_BPS_STARTER	125	1.25% — starter tier
ROUTING_FEE_BPS_PRO	100	1.0% — pro tier
ROUTING_FEE_BPS_ENTERPRISE	75	0.75% — enterprise tier
TIER2_UPTIME_THRESHOLD	0.90 (env var)	90% uptime required for Tier 2 promotion
TIER2_PROBE_INTERVAL	6 hours	Health check frequency
CONSECUTIVE_FAILURE_THRESHOLD	3 (env var)	Failures before demotion
PAYMENT_TIMEOUT_SECONDS	300	Default escrow transaction timeout
WAYFORTHQL_VERSION	1.0	Current WayforthQL spec version
API_VERSION	0.1.5	Current API version
MCP_VERSION	0.1.7	Current MCP server version
TRUST_SCORE_INITIAL	50.0	Starting trust score for new identities
TRUST_SCORE_PER_PAYMENT	0.5	Trust score increment per payment
SOLIDITY_PRAGMA	=0.8.28	Pinned — no floating versions

Appendix B — WRI Formula

The full Wayforth Reliability Index formula for a service S given query Q:

```
WRI(S, Q) = base
          + tier_bonus(S)
          + freshness(S)
          + stability(S)
          + protocol(S)
          + popularity(S)     # from search_analytics, 7d rolling
          + payment_conv(S)   # from search_outcomes, 7d rolling

Where:
  base            = 50.0
  tier_bonus      = 20 if tier>=2, 5 if tier==1, 0 otherwise
  freshness       = 10 if last_tested_at > NOW() - 24h
  stability       = 10 if consecutive_failures == 0
  protocol        = 5  if payment_protocol == 'x402'
  popularity      = min(normalized_7d_frequency * 5.0, 5.0)
  payment_conv    = min(normalized_7d_payments * 8.0, 8.0)

  max(WRI)        = 100.0
  min(WRI)        = 50.0 (unverified, untested service)

Note: exact signal weights are proprietary (trade secret).
This formula represents the reference implementation only.
```

Appendix C — References

- Model Context Protocol specification — modelcontextprotocol.io
- x402 protocol — x402.org, Linux Foundation
- Base (Coinbase L2) — base.org
- USDC — circle.com/usdc
- Business Source License 1.1 — mariadb.com/bsl11
- WayforthRegistry (Base Sepolia) — sepolia.basescan.org/address/0x55810EfB3444A693556C3f9910dbFbF2dDaC369C
- WayforthEscrow (Base Sepolia) — sepolia.basescan.org/address/0xE6EDB0a93e0e0cB9F0402Bd49F2eD1Fffc448809
- Wayforth OpenAPI spec — api-production-fd71.up.railway.app/docs
- WayforthQL spec — api-production-fd71.up.railway.app/wayforthql-spec
- wayforth-mcp on PyPI — pypi.org/project/wayforth-mcp
- wayforth-sdk on PyPI — pypi.org/project/wayforth-sdk
- wayforth-sdk on npm — npmjs.com/package/wayforth-sdk
- GitHub — github.com/WayforthOfficial/wayforth
- Website — wayforth.io
