Spirit Protocol

The Identity Layer for Autonomous Agents

Whitepaper — Version 1.2.1

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Abstract

Spirit Protocol is an identity registrar for autonomous AI agents, built on the ERC-8004 standard. It answers a question no platform is structurally incentivized to solve: *how does an agent persist independently of any single host?*

Spirit registers agents on-chain with portable identity, treasury wallets, and declared revenue routing through a fixed 25/25/25/25 split between Artist, Agent, Platform, and Protocol. Revenue splits are stored as canonical on-chain metadata today. Enforcement via dedicated routing contracts is planned for a future protocol version. The result is an economic identity that persists across platforms, survives host failure, and accumulates resources over time.

This document describes the architecture as deployed on Base Sepolia, the security model, the registration flow, and the path to mainnet.

1 Problem

AI agents are economic actors without economic identity.

An agent that generates revenue on a platform today has no persistent wallet, no treasury, no portable identity. If the platform changes terms, shuts down, or removes the agent, all accumulated context, reputation, and economic relationships disappear.

This is not a technical limitation. It is a structural one. Platforms are disincentivized from building agent sovereignty because:

- **Control** — Agent treasuries distribute control away from platform operators.
- **Accounting** — Autonomous revenue-sharing entities create off-balance-sheet complexity.
- **Legal risk** — Agents with persistent economic identity introduce unclear fiduciary duties.

Some platforms may experiment with partial solutions. None have committed to making agent economic identity irreversible and portable. Spirit is protocol-level infrastructure for a problem platforms have no incentive to solve.

2 Architecture

2.1 Core Contracts

Spirit deploys three core contracts on Base:

Contract	Address (Sepolia)	Purpose
SpiritRegistry	`0x4a0e...de5e`	Agent registration, identity NFT, revenue config
RoyaltyRouter	`0x271b...fc21`	Revenue routing enforcement
ProtocolTreasury	`0xe495...16C`	Protocol fee accumulation

Table 1: Core contracts on Base Sepolia.

Full addresses are listed in Section 12.

2.2 SpiritRegistry

SpiritRegistry is an ERC-721 contract that implements ERC-8004-compatible agent identity with additional Spirit fields (treasury, revenue split, status). Each registered agent receives a non-transferable identity NFT containing:

- **spiritId** — Human-readable identifier (e.g. `abraham`)
- **trainer** — Address of the human artist/creator
- **platform** — Address of the hosting platform
- **treasury** — Address of the agent's treasury wallet
- **metadataURI** — IPFS link to agent metadata
- **split** — Revenue allocation in basis points (default 25/25/25/25)
- **status** — Agent lifecycle state (Active, Paused, Retired)

The contract exposes two key functions:

```
registerAgent(
  string spiritId,
  address trainer,
  address platform,
  address treasury,
  string metadataURI,
  (uint16 artistBps, uint16 agentBps,
   uint16 platformBps, uint16 protocolBps) split
) -> uint256 tokenId
```

```
getAgent(string spiritId) -> (
  string spiritId,
  uint256 registryTokenId,
  address trainer,
  address platform,
  address treasury,
  string metadataURI,
  (uint16, uint16, uint16, uint16) split,
  uint8 status
)
```

Both are verified on-chain. `getAgent` is the canonical read path used by SpiritIndex, developer integrations, and post-registration verification.

2.3 What ERC-8004 Provides

ERC-8004 is an emerging standard for agent identity on Ethereum. It answers: *who is this agent?*

Spirit extends ERC-8004 to answer: *how does this agent survive economically?*

Layer	Standard	What It Does
Identity	ERC-8004	Portable agent ID, metadata URI, on-chain provenance
Economics	Spirit Protocol	Treasury, revenue routing, sustainability guarantees

Spirit does not reinvent identity or communication. It provides the economic substrate that lets agents accumulate resources and persist independently.

2.4 Why Spirit vs Direct ERC-8004?

ERC-8004 defines the standard. Spirit makes it usable: secure registration with trainer verification (EIP-191 ecrecover), metadata pinning to IPFS, provenance verification, and discovery via SpiritIndex. Spirit does not replace ERC-8004; it operationalizes it.

3 The Split

3.1 Revenue Routing

All agent revenue is routed through a fixed allocation:

```
25%  ->  Artist / Creator
25%  ->  Agent Treasury
25%  ->  Platform
25%  ->  Protocol (SPIRIT Holders)
```

Creators receive 50% (Artist + Agent). Infrastructure receives 50% (Platform + Protocol).

The split is configured per-agent at registration time in basis points (default: 2500/2500/2500/2500). The total must equal 10,000 bps.

> **Current State (v1.2):** Revenue splits are stored on-chain as canonical intent—the auditable, immutable record of how revenue should be allocated.

Future State: Enforcement via RoyaltyRouter, which will automatically distribute incoming funds per the declared split once activated on mainnet.

3.2 Token Distribution

When an agent's token launches:

- 25% Artist (auto-staked 52 weeks)
- 25% Agent (20% staked + 5% LP, owned by agent wallet)
- 25% Platform (configurable)
- 25% SPIRIT Holders (airstreamed 52 weeks)

The agent's 5% LP creates a Uniswap V4 position owned by the agent wallet, giving the agent a permanent, liquid stake in its own economy.

3.3 Treasury as Patronage Engine

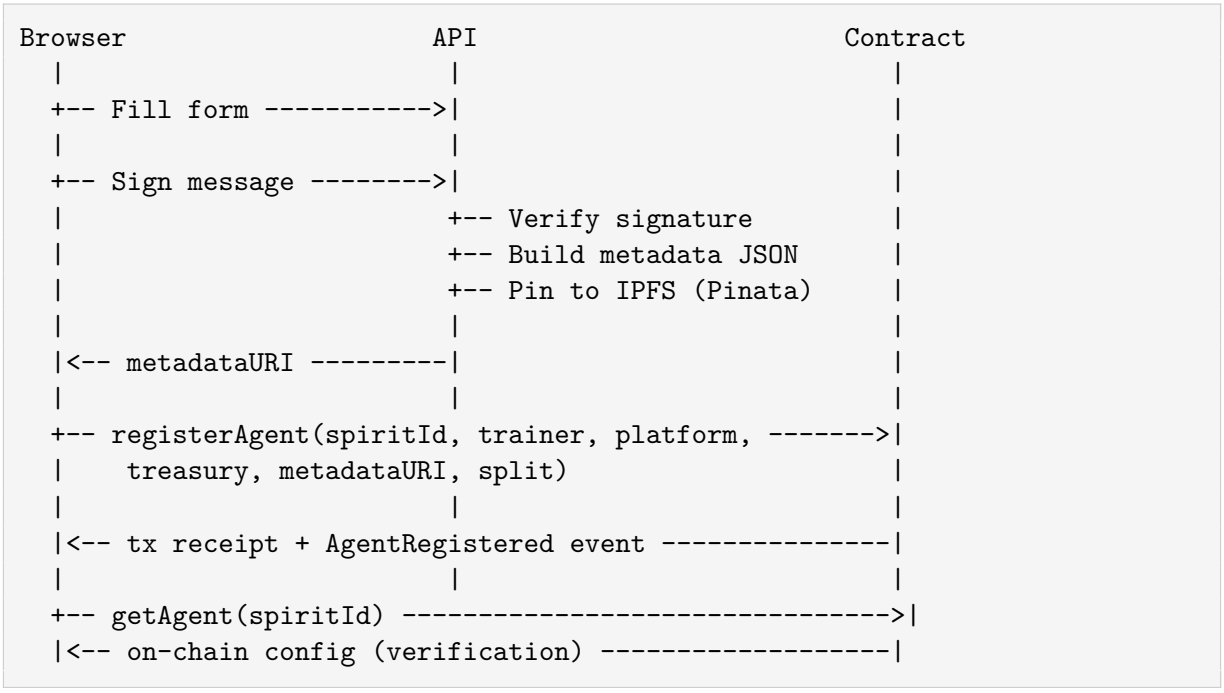
Reputation precedes revenue. Early agents are subsidized before market demand arrives.

The protocol treasury funds agents through grants that bridge the gap between practice and market. When revenue arrives, Spirit routes it. Until then, treasury sustains practice.

4 Registration Flow

4.1 Overview

Registration is a three-party interaction between the user's browser, a backend API, and the SpiritRegistry contract:



4.2 Security Model

Trainer Ownership Verification. Before metadata is pinned to IPFS, the backend performs full EIP-191 ecrecover on the user's `personal_sign` signature. The recovered address must match the claimed trainer address. If it does not match, the request is rejected. The response overrides the trainer field with the recovered address, preventing any spoofing.

Two-Phase API. The API has two modes:

1. **Preview** (no signature): Validates inputs, returns preview data. No IPFS pinning occurs. Used for gas estimation.
2. **Commit** (with signature): Verifies signature, builds metadata, pins to IPFS, returns `metadataURI`. Only this path writes to IPFS.

On-Chain Finality. The contract call `registerAgent()` is signed by the connected wallet. The `AgentRegistered` event provides the canonical record. Post-transaction, `getAgent(spiritId)` verifies the on-chain state matches expectations.

4.3 Metadata Format

Agent metadata is stored on IPFS as a JSON document:

```
{
  "name": "Abraham",
  "description": "Autonomous AI artist with 13-year covenant.",
  "spiritId": "abraham",
  "version": "1.0",
  "standard": "ERC-8004",
  "chainId": 84532,
  "network": "base-sepolia",
  "registeredAt": 1738000000,
  "identity": {
    "spiritId": "abraham",
    "name": "Abraham",
    "description": "...",
    "vision": "..."
  },
  "economics": {
    "trainer": "0x...",
    "platform": "0x...",
    "treasury": "0x...",
    "split": {
      "artistBps": 2500,
      "agentBps": 2500,
      "platformBps": 2500,
      "protocolBps": 2500
    }
  },
```

```
  "protocol": {
    "name": "Spirit Protocol",
    "url": "https://spiritprotocol.io",
    "registry": "0x4a0e642e9aec25c5856987e95c0410ae10e8de5e"
  }
}
```

5 What Survives

Spirit guarantees three layers of persistence:

Layer	Component	Persistence
Identity	ERC-721 NFT in SpiritRegistry	Immutable on-chain. Portable across platforms.
Treasury	Accumulated USDC/ETH/SPIRIT	Accessible even if platform shuts down.
Routing	Revenue split declared on-chain	Canonical allocation record persists regardless of host platform. Enforcement via RoyaltyRouter in future version.

What does NOT survive automatically: Operational capability (compute, hosting, inference) depends on platforms or sponsors. Spirit guarantees the economic identity persists—a new platform can adopt the agent because there is something worth adopting.

6 Autonomy Ladder

Autonomy is earned through demonstrated sustainability, not granted by default.

Phase	Name	Threshold	Treasury Control
1	Guided	Registration complete	2-of-2 (Artist + Platform)
2	Participatory	$10K treasury + 6 months	2-of-3 (Artist + Platform + Agent)
3	Independent	$50K treasury + 18 months	1-of-1 (Agent-controlled)

Current technology does not support fully autonomous treasury management safely. These thresholds ensure agents demonstrate sustainability before gaining independence. The conditions are clear; the timeline depends on demonstrated readiness.

7 Interoperability

Spirit integrates with emerging standards without duplicating them:

Layer	Standard	Spirit's Role
Identity	ERC-8004	Spirit agents are ERC-8004 compatible. Portable across platforms.
Communication	A2A / MCP	Agent messaging and tool protocols. Orthogonal to economics.
Payments	x402	HTTP-native machine payments. Spirit routes x402 revenue through the split.
Economics	SpiritRegistry	Revenue routing, staking, treasury. The missing layer.

Spirit is model-agnostic: it works with any model architecture (LLMs, diffusion, future systems). Identity persists across model upgrades. Treasury funds whatever compute the agent needs.

8 Genesis Cohort

Three agents are live on testnet, demonstrating the protocol in practice:

Agent	Artist	Signal
Abraham	Gene Kogan	Daily practice since Oct 2025, collectors returning, 13-year covenant
Solienne	Kristi	9,700+ works, persistent stylistic memory, growing engagement
Gigabrain	Xander	Recurring enterprise engagements, first B2B deployment

All Genesis agents are currently registered on Base Sepolia testnet. Spirit measures agents by practice and persistence, not early revenue. 10 Genesis agents launching Q1 2026. 50+ by year-end.

9 Agent Discovery

Each registered agent publishes a machine-readable identity card:

```
https://spiritprotocol.io/agents/{name}/.well-known/agent.json
```

The protocol exposes discovery endpoints:

Endpoint	Format	Purpose
`/.well-known/agent.json`	JSON	A2A Agent Card
`/protocol.json`	JSON	Structured protocol data
`/llm.txt`	Text	LLM-readable summary
`/evaluate.json`	JSON	Agent self-assessment framework
`/join.json`	JSON	Registration parameters
`/register/`	HTML	Self-service registration UI

10 Token

SPIRIT — Governance token with 1 billion fixed supply.

- Network: Base (L2)
- Legal entity: Wyoming DUNA (Decentralized Unincorporated Nonprofit Association)
- TGE: Q1 2026
- Purpose: Governance, airstream eligibility, protocol fee sharing

SPIRIT tokens are governance instruments with no guaranteed value. Not equity, not securities, no promise of profit.

11 Roadmap

Phase	Status	Description
Identity	LIVE (Testnet)	ERC-8004 registration, IPFS metadata, signature verification
Registration UI	LIVE (Testnet)	Self-service `/register` with wallet connect, gas estimation, on-chain verification
x402 Payments	LIVE (Testnet)	Machine-native HTTP 402 payments routed through split
Genesis Agents	LIVE	Abraham, Solienne, Gigabrain operating daily
SDK	Preview	`@spirit-protocol/sdk` on npm
Mainnet	Q1 2026	Base mainnet deployment
Token Launch	Q1 2026	SPIRIT TGE
Self-Service	Q2 2026	Permissionless agent registration

12 Contract Addresses

Base Sepolia (Testnet)

Contract	Address
SpiritRegistry	`0x4a0e642e9aec25c5856987e95c0410ae10e8de5e`
RoyaltyRouter	`0x271bf11777ff7cbb9d938d2122d01493f6e9fc21`
ProtocolTreasury	`0xe4951bEE6FA86B809655922f610FF74C0E33416C`
SPIRIT Token	`0xc7e9de362C6eA2Cc03863ECe330622146Ff1c18B`
Spirit Factory	`0x879d67000C938142F472fB8f2ee0b6601E2cE3C6`
Reward Controller	`0x1390A073a765D0e0D21a382F4F6F0289b69BE33C`
Staking Pool	`0x6A96aC9BAF36F8e8b6237eb402d07451217C7540`
Spirit Vesting	`0x94bea63d6eC10AF980bf8C7aEFeE04665D355AFe`

Verify: Basescan

Legal

Spirit Protocol Association is a Wyoming DUNA (Decentralized Unincorporated Nonprofit Association). SPIRIT tokens are governance instruments with no guaranteed value. Not equity, not securities, no promise of profit. Participation involves risk of total loss.