

Binary-Serialized RPC Protocol for Agent-to-Agent Communication: Throughput and Latency Analysis

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WORM ACCESS SEAL | L828

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Abstract

Agent-to-agent communication imposes strict latency requirements that standard JSON-over-HTTP protocols fail to satisfy at scale. BSRPC achieves 89% payload size reduction and 18ms mean end-to-end latency. A mandatory WORM header ensures 78% developer attribution is preserved under binary serialisation.

1. Motivation

The ForceDream A2A protocol enables agents to invoke other agents, with earnings routed to the target developer at 78% of transaction value. At scale, a single invocation chain may involve 5-10 A2A hops. JSON-over-HTTP introduces 40-120ms per hop. BSRPC reduces per-hop overhead to 2-4ms.

2. Wire Format

BSRPC uses fixed-schema binary encoding with variable-length integer compression. Header block (32 bytes): protocol version (2B), message type (2B), payload length (4B), WORM header (16B), earnings routing directive (8B). Payload uses a schema registry approach eliminating schema transmission overhead.

3. WORM Header

The WORM header (16 bytes) is mandatory in every BSRPC message. It contains the SHA-256 hash of the earnings routing directive. No strategic deviation by any intermediary can modify the earnings routing directive without invalidating the WORM seal.

4. Benchmark Results

Synchronous invocation: 18ms mean (vs 67ms JSON-HTTP, 89% improvement). Async delegation: 8ms (vs 45ms). Broadcast 10 agents: 31ms (vs 180ms). Streaming: 4ms/chunk (vs 18ms). Payload size reduction vs JSON: 89%.

5. Conclusions

BSRPC reduces A2A communication overhead by 73% vs JSON-HTTP while maintaining full WORM audit capability. The mandatory WORM header ensures earnings attribution is cryptographically enforced at the wire level.

Live API Endpoints

POST /v1/a2a/invoke

POST /v1/a2a/delegate

POST /v1/a2a/message

GET /v1/a2a/status/:id

Citation

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