11-28-2025

Cryptix Network | https://Cryptix-Network.org | info@cryptix-network.org

---

Proposal for ISO/IEEE TC307: eBPS – Efficient Blocks Per Second

A Standardized Metric for Blockchain Global Consensus Throughput

---

1. Abstract

Current blockchain throughput metrics such as Blocks Per Second (BPS) and Transactions Per Second (TPS) are widely used but often misleading. High reported BPS values may result from local block pre-generation, DAG-based parallel confirmations, or optimistic consensus mechanisms. These mechanisms create the appearance of speed but do not overcome physical limitations such as intercontinental network latency, heterogeneous node performance, and routing overhead.

We propose **eBPS (Efficient Blocks Per Second)** as a standardized metric for blockchain systems that reflects **real, globally effective block throughput**. eBPS measures only blocks that achieve global finality under real-world network conditions, providing a transparent, user-protective, and physics-aligned benchmark. This proposal is submitted for consideration in ISO/IEEE TC307 for standardization.

---

2. Motivation and Background

Blockchain networks increasingly advertise high BPS/TPS numbers, which can mislead users and developers regarding actual system performance. The industry lacks a standard metric for **true, globally finalized throughput**.

2.1 Physical Constraints

- Intercontinental communication is limited by the speed of light and network routing.
- Realistic global round-trip latency is approximately 150–250 ms.

- No blockchain can finalize global blocks faster than these limits.

2.2 Network and Hardware Variability

- Nodes operate on heterogeneous hardware with variable bandwidth and uptime.
- High BPS claims can cause weaker nodes to fall behind, increasing centralization risk.

2.3 Hot-Air Blocks

- Local block generation or DAG-based parallel blocks inflate BPS without providing true global finality.
- Current BPS measurements are therefore insufficient for assessing practical system performance.

---

3. eBPS: Definition

eBPS measures the number of blocks achieving **global consensus and finality per second**.

Criteria for an efficient block:

1. Fully propagated across all participating nodes.
2. Confirmed by the network consensus mechanism.
3. Accounts for physical network latency and congestion.
4. Contains meaningful state transitions.

Formal Definition:

```
eBPS = 1 / (Global Finality Time)
```

Where **Global Finality Time** includes propagation delay, consensus round-trip, verification delays, and network congestion.

---

4. Advantages of eBPS

- **User Protection:** Prevents misleading claims based on synthetic performance.
- **Standardized Comparison:** Enables meaningful benchmarking between blockchain systems.
- **Development Incentives:** Encourages focus on real throughput, adaptive block timing, improved propagation, and network health.
- **Trust:** Builds credibility by measuring only globally final blocks under realistic conditions.

---

5. Measurement Methodology

1. Deploy monitoring across geographically distributed nodes.
2. Record actual propagation and finalization times.
3. Account for network latency, congestion, and node variability.
4. Compute eBPS as the effective finalization throughput.

---

6. Illustrative Example

Blockchain	Reported BPS	Global Finality Time	eBPS
Chain A	30 BPS	200 ms	5 eBPS
Chain B	15 BPS	180 ms	5.5 eBPS
Chain C	5 BPS	150 ms	6.6 eBPS

This shows that high BPS numbers may not translate to better global consensus performance.

---

7. Relevance to ISO/IEEE TC307

- **Category:** Performance and Scalability Metrics for Distributed Ledger Technology
- **Contribution:** Provides a transparent, standardized metric for evaluating blockchain throughput.
- **Benefit:** Supports industry-wide comparability, user protection, and development focus on effective block finalization.

---

8. Conclusion

The proposed **eBPS metric** addresses a critical gap in blockchain standardization. By focusing on globally finalized blocks and incorporating physical network realities, eBPS offers a reliable, transparent, and standardized way to measure blockchain performance. Standardization via ISO/IEEE TC307 would establish a common reference, prevent misleading marketing claims, and encourage genuine technological progress.