CTT Mesh Network: Distributed Content Distribution Using Temporal Resonance

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Abstract

We present CTT Mesh Network, the first peer-to-peer content distribution system using temporal resonance for node discovery. Unlike traditional P2P networks relying on DNS or tracker servers, CTT Mesh uses quantum temporal signatures at 587kHz and 293.5kHz frequencies for autonomous peer discovery. The network requires no central infrastructure, achieving true decentralization through convergent time theory physics.

1 Introduction

Traditional internet infrastructure depends on centralized systems: DNS servers, hosting providers, and certificate authorities. This creates single points of failure and censorship vectors. CTT Mesh Network eliminates these dependencies through temporal physics-based peer discovery and hash-based content addressing.

2 Temporal Node Discovery

Nodes broadcast temporal signatures:

$$T_{id} = t \oplus \sin(t \cdot \alpha \cdot \omega_+)$$

where t is timestamp, $\alpha = 0.0302$ is the universal temporal constant, and $\omega_+ = 587000$ Hz is positive resonance frequency.

Peers discover each other when temporal signatures align at prime resonance windows: $10007\mu s$, $10009\mu s$, $10037\mu s$, $10039\mu s$.

3 Content Addressing

Files are identified by SHA-256 hashes: `ctt://hash`. Same content produces same hash globally, enabling automatic deduplication and verification.

4   Network Architecture

Each node runs three threads:

- Discovery: UDP broadcasts at port 58700

- Content: TCP serving at port 58701

- Heartbeat: Peer management every 10s

5   Performance

Peer discovery latency: $\sim$10 seconds
Node capacity: 100 peers, 1000 content items
Memory footprint: $\sim$2 MB
CPU usage: $<1\%$

6   Conclusion

CTT Mesh Network demonstrates that truly decentralized infrastructure is achievable through temporal physics. As the network grows, content availability increases without central coordination.