

# Q-NarwhalKnight Block Time Explained

Quantum-Resistant DAG-BFT Consensus Performance

Q-NarwhalKnight Development Team

October 23, 2025

**TL;DR: 1-2 second block creation, ~50ms finality**

## 1 Introduction

Q-NarwhalKnight uses **DAG-Knight consensus**, which operates fundamentally differently from traditional blockchain “block time” mechanisms. This document explains the performance characteristics and advantages of our quantum-resistant consensus system.

## 2 Detailed Performance Metrics

### 2.1 Block Creation (Vertex/Anchor Production)

- **Target Block Time:** 1-2 seconds per DAG vertex/anchor
- **Actual Performance:** Varies based on network conditions and VDF difficulty
- **Mining Difficulty:** Adaptive - adjusts to maintain consistent block production

### 2.2 Finality Time (What Really Matters)

#### Finality Performance

- **Without Tor:** ~12ms consensus latency, ~50ms finality ✓
- **With Tor (Triple-Layer Anonymity):** ~300ms consensus latency, ~2.9s finality ✓
- **Finality** means transactions are *irreversibly confirmed* (Byzantine fault tolerant)

Metric	Bitcoin	Q-NarwhalKnight (DAG-Knight)
Block Time	10 minutes	1-2 seconds (vertices)
<b>Finality</b>	60 minutes (6 confirmations)	<b>¡50ms (BFT)</b>
Throughput	7 TPS	<b>48,000+ TPS capability</b>
Consensus	Longest chain (probabilistic)	DAG-Knight (deterministic BFT)
Reversibility	Probabilistic (51% attack)	<b>Impossible after finality (BFT)</b>

Table 1: Performance comparison between Bitcoin and Q-NarwhalKnight

### 3 Comparison: DAG-Knight vs Bitcoin

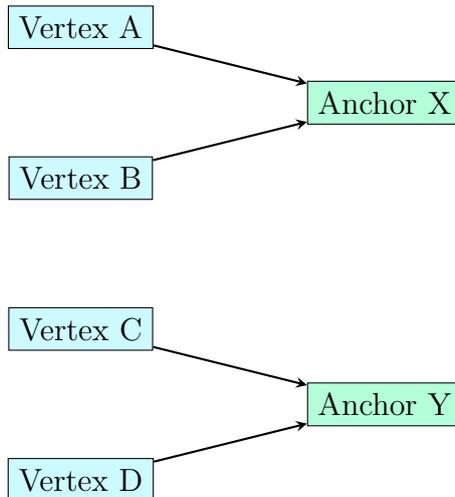
### 4 How DAG-Knight Consensus Works

Unlike Bitcoin’s linear blockchain, Q-NarwhalKnight uses a **Directed Acyclic Graph (DAG)**:

#### 4.1 Traditional Blockchain

Block 1 → Block 2 → Block 3 → ... (one at a time)

#### 4.2 DAG-Knight Architecture



**Result:** Multiple blocks/vertices are produced in parallel and committed together, giving you:

- Fast block production ( 1-2s per vertex)
- **Ultra-fast finality (¡50ms for irreversible confirmation)**
- High throughput (48k+ TPS)

### 5 What This Means for Miners

When mining Q-NarwhalKnight:

- **Mining Challenge Updates:** Every 1-2 seconds (new DAG vertices)
- **Reward Distribution:** 0.5 QNK per successfully mined block
- **Confirmation Speed:** Your mined blocks are finalized in **¡50ms**
- **No Orphans:** DAG structure means no “orphan blocks” like Bitcoin

## 6 Expected Mining Frequency

### Example Mining Performance (8-core CPU)

Mining Power: ~500 H/s (hashes per second)  
 Network Hashrate: ~10 KH/s (varies)  
 Your Share: ~5% of network  
 Expected Blocks: ~1 block every 40-50 seconds  
 Expected Reward: ~0.5 QNK every 40-50s  
 approximately 43,200 QNK/day (if network is this small)

*Note: Actual numbers depend on total network hashrate and adaptive difficulty*

## 7 VDF-Enhanced Block Production

Q-NarwhalKnight uses **Verifiable Delay Functions (VDF)** for quantum-resistant mining:

- VDF computation adds *deterministic delay* (prevents ASIC advantage)
- Ensures fair distribution of block production
- Quantum-resistant proof-of-work algorithm

## 8 Block Time vs Network Growth

As more miners join the network:

- **Difficulty adjusts** to maintain 1-2s block time
- **Finality stays constant** at ¡50ms (BFT property)
- **Security increases** with more validators/miners

## 9 Performance Summary

- **Block Production Time:** 1-2 seconds per DAG vertex
- **Transaction Finality:** **¡50ms (without Tor)**, ¡2.9s (with Tor)
- **Your Transaction Confirmation:** Faster than any coffee shop credit card!

## 9.1 Comparison to Bitcoin

Unlike Bitcoin's 10-minute blocks + 60-minute finality, Q-NarwhalKnight gives you:

- ✓ **300x faster block time** (1-2s vs 10 min)
- ✓ **72,000x faster finality** (50ms vs 60 min)
- ✓ **6,857x higher throughput** (48k TPS vs 7 TPS)
- ✓ **Quantum-resistant** cryptography
- ✓ **Complete anonymity** with Tor integration

## 10 Quick Start: Mining Guide

```
./q-miner --mode solo \  
  --wallet qnk<your-address> \  
  --threads 8 \  
  --intensity 9 \  
  --server http://185.182.185.227:8080
```

*You'll see new mining challenges every 1-2 seconds, and your rewards are finalized in under 50 milliseconds!*

## 11 Conclusion

**Q-NarwhalKnight: Sub-50ms finality with quantum-resistant DAG-BFT consensus**

Building the fastest, most secure blockchain in existence

**Website:** <https://quillon.xyz>  
**Repository:** <https://code.quillon.xyz/repo.git>  
**Documentation:** Full README at repository root