Quantum AI

Revolutionizing AI with Quantum Computing

Vision

Quantum AI democratizes artificial intelligence by leveraging quantum computing and blockchain technology to create a decentralized network for AI development and deployment.

- **Quantum-Powered Speed**: 100-1000x faster than classical computing for specific AI tasks
- **Enhanced Security**: Post-quantum cryptography with zero-knowledge proofs
- **Decentralized Infrastructure**: Global network of quantum computing resources

Executive Summary

Technical Architecture

Quantum Computing Foundation

Quantum AI leverages quantum computing principles to accelerate AI computations:

$$|\psi\rangle = \sum_{i=0}^{2^n-1} \alpha_i |i\rangle, \quad \sum_{i=0}^{2^n-1} |\alpha_i|^2 = 1$$

Quantum states enable exponential parallelism through superposition, allowing us to process multiple AI model parameters simultaneously.

Technical Architecture

Quantum Neural Networks

Our proprietary Quantum Neural Network architecture:

$$U(\theta) = \prod_{l=1}^{L} \prod_{j=1}^{n} R_j^l(\theta_j^l) \prod_{(i,j)\in E} CR_{ij}$$

Where:

- $R_j^l(\theta_j^l)$ represents single-qubit rotations
- CR_{ij} represents controlled operations between qubits
- θ represents the trainable parameters

Quantum Advantage for AI

Classical Complexity

$$O(2^n)$$

- Exponential scaling with problem size
- Limited by hardware constraints
- High energy consumption

Quantum Complexity

$$O(n^2)$$

- Polynomial scaling with problem size
- Quantum parallelism
- Significant energy efficiency

Technical Architecture

Blockchain Integration

Quantum-Resistant Block Structure

```
Block {
  header: {
    prevHash: Hash,
    merkleRoot: Hash,
    timestamp: Timestamp
  },
  transactions: Transaction[],
  quantumProof: LatticeSignature
}
```

Utilizes post-quantum cryptographic algorithms (CRYSTALS-Dilithium) to ensure security against quantum attacks.

Core Registry Contract

```
// Key mappings for quantum resources
mapping(address ⇒ Computer) public computers;
mapping(uint256 ⇒ AIModel) public models;

// Token and stake management

IERC20 public qaiToken;

uint256 public requiredStake;


// Events for network activity

event ComputerRegistered(address provider);

event ModelRegistered(uint256 modelId);
```

Consensus Mechanism

Quantum-Enhanced Proof of Stake (QPoS)

$$P(i) = \frac{s_i \cdot q_i}{\sum_{j \in V} s_j \cdot q_j}$$

Where:

- $P(i)$ is the probability of validator i being selected
- s_i is the stake of validator i
- q_i is the quantum computing power contributed by validator i
- V is the set of all validators

Quantum AI Models

Q-Transformer Architecture

Quantum Attention Mechanism

$$\text{Attention}(Q, K, V) = \text{softmax}\left(\frac{QK^T}{\sqrt{d_k}} \otimes U_{\text{quantum}}\right)V$$

Where U_{quantum} is a unitary quantum operation that enhances the attention mechanism through quantum entanglement.

Q-Recommender System

Quantum Matrix Factorization

$$\min_{P,Q} \sum_{(u,i)\in\kappa} (r_{ui} - p_u^T q_i)^2 + \lambda(||p_u||^2 + ||q_i||^2)$$

Enhanced with quantum amplitude estimation to achieve quadratic speedup in optimization.

Quantum AI Models

Tokenomics

$QAI Token Utility

Governance

- Protocol parameter voting
- Model approval process
- Network upgrades

Incentives

- Quantum computing providers
- AI model developers
- Validators and node operators

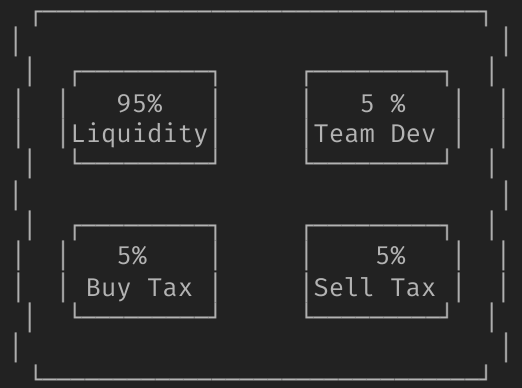
Access

- Computing resource allocation
- Model usage rights
- Premium features

Value Capture

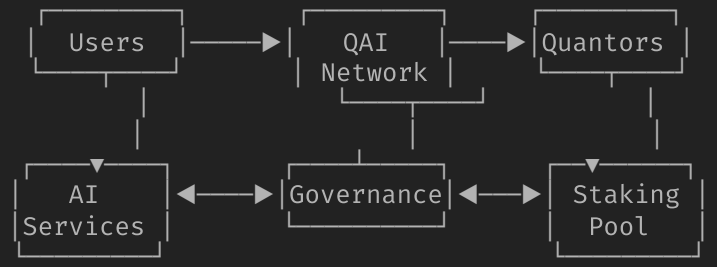
- 5% buy/sell tax
- 95% liquidity pool
- Total supply: 100M tokens

Tokenomics



Tokenomics

Token Utility Flow

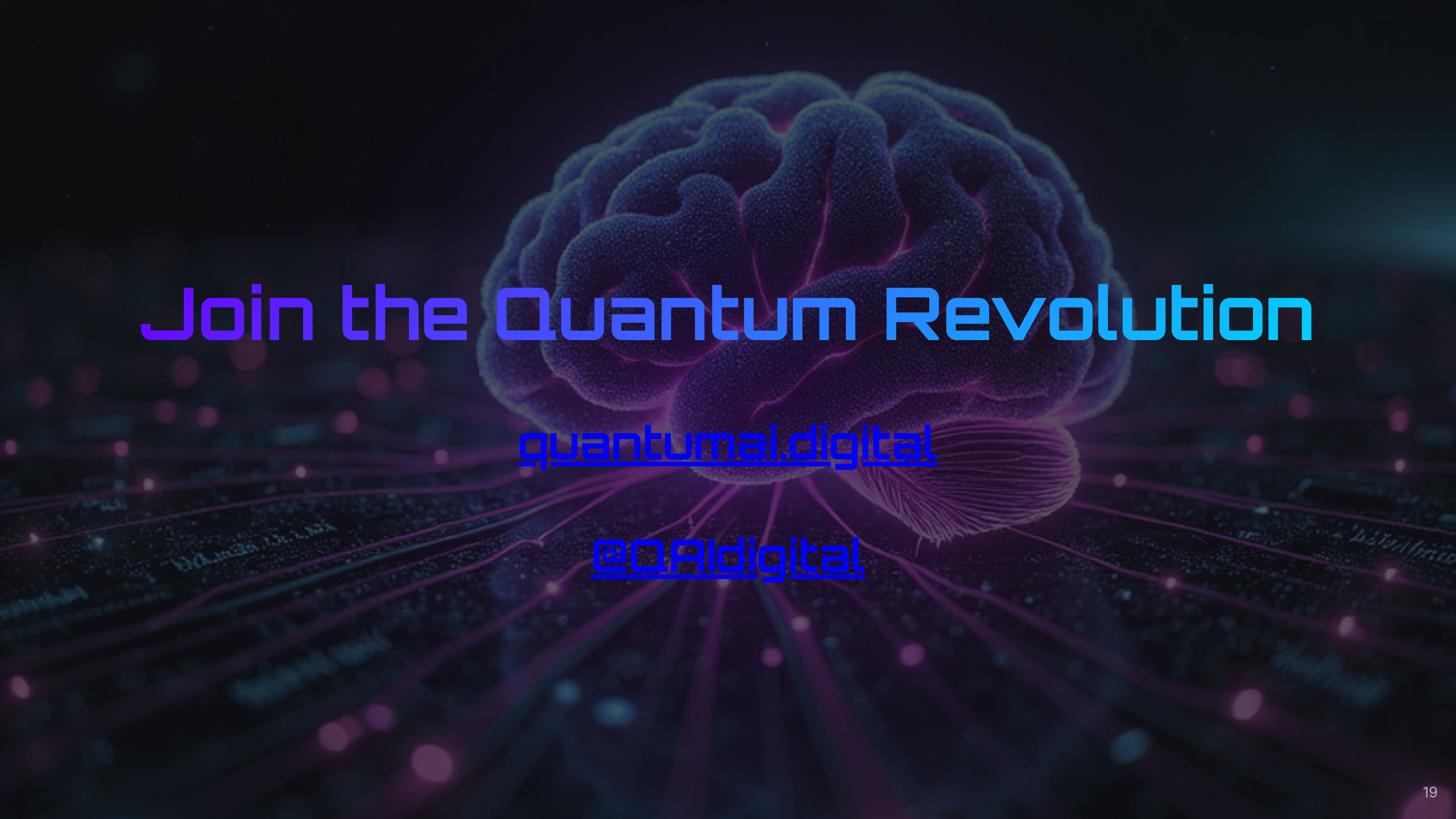


Tokenomics

Roadmap

Development Timeline

Phase	Timeline	Milestones
Alpha	Q2 2025	- Testnet launch - Initial quantum models - Developer SDK
Beta	Q4 2025	- Mainnet launch - Quantum validator network - First dApps
V1.0	Q2 2026	- Full quantum integration - Cross-chain compatibility - Enterprise solutions
V2.0	Q4 2026	- Quantum AI marketplace - Advanced QNN models - Governance DAO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