

# Flow: Scaling Blockchain for Games and NFTs

RYAN  
LIVINGHOUSE

# What is Flow?

---



DEVELOPED BY DAPPER  
LABS



LAUNCHED IN 2020

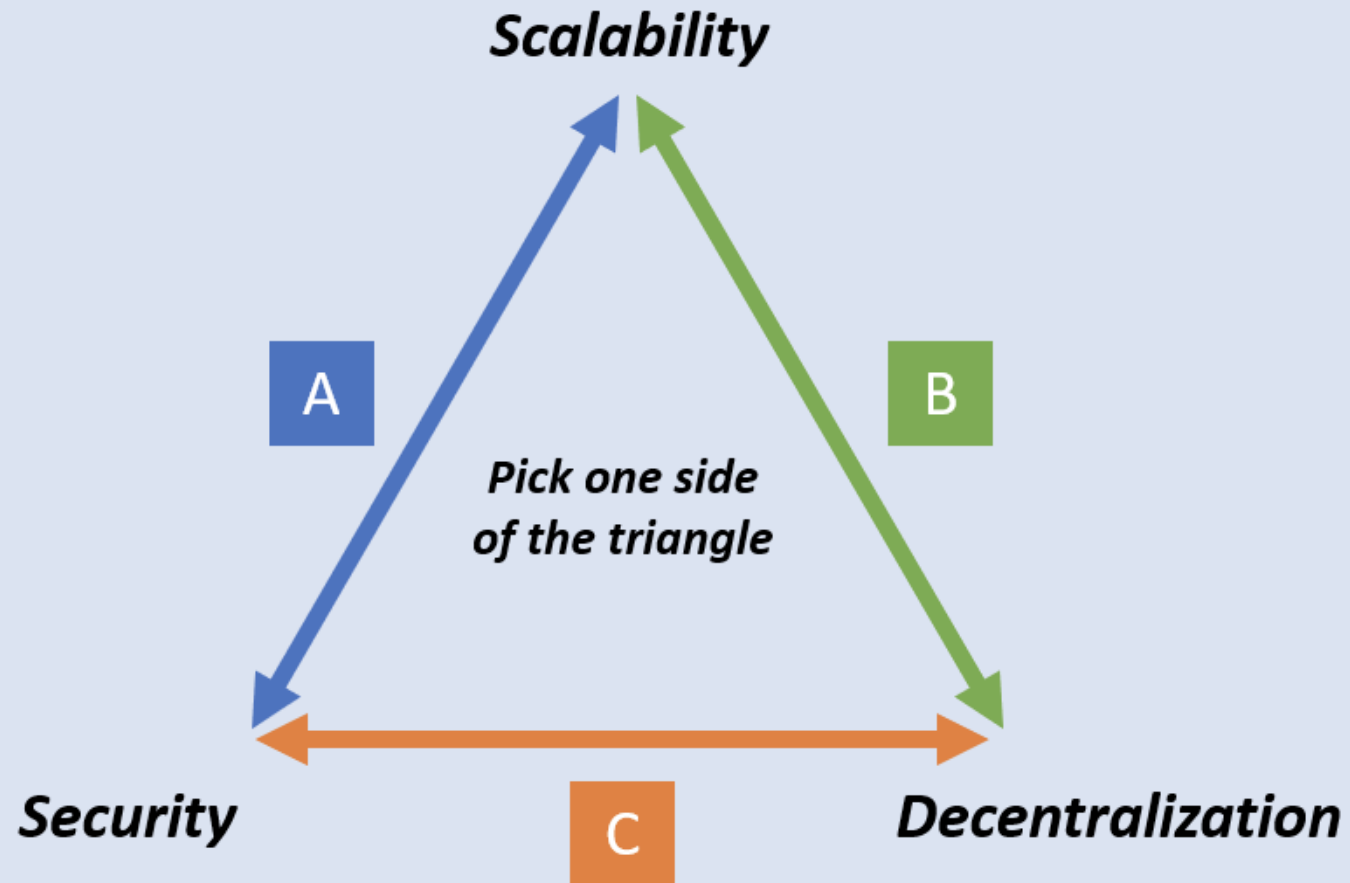


DESIGNED FOR  
MAINSTREAM ADOPTION



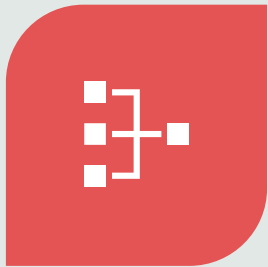
MISSION: ENABLE A NEW  
GENERATION OF GAMES,  
APPS, AND DIGITAL  
ASSETS.

# The Scalability Trilemma



# Flow's Unique Approach

---



MULTI-NODE  
ARCHITECTURE  
(PIPELINING)



DEVELOPER FIRST  
DESIGN



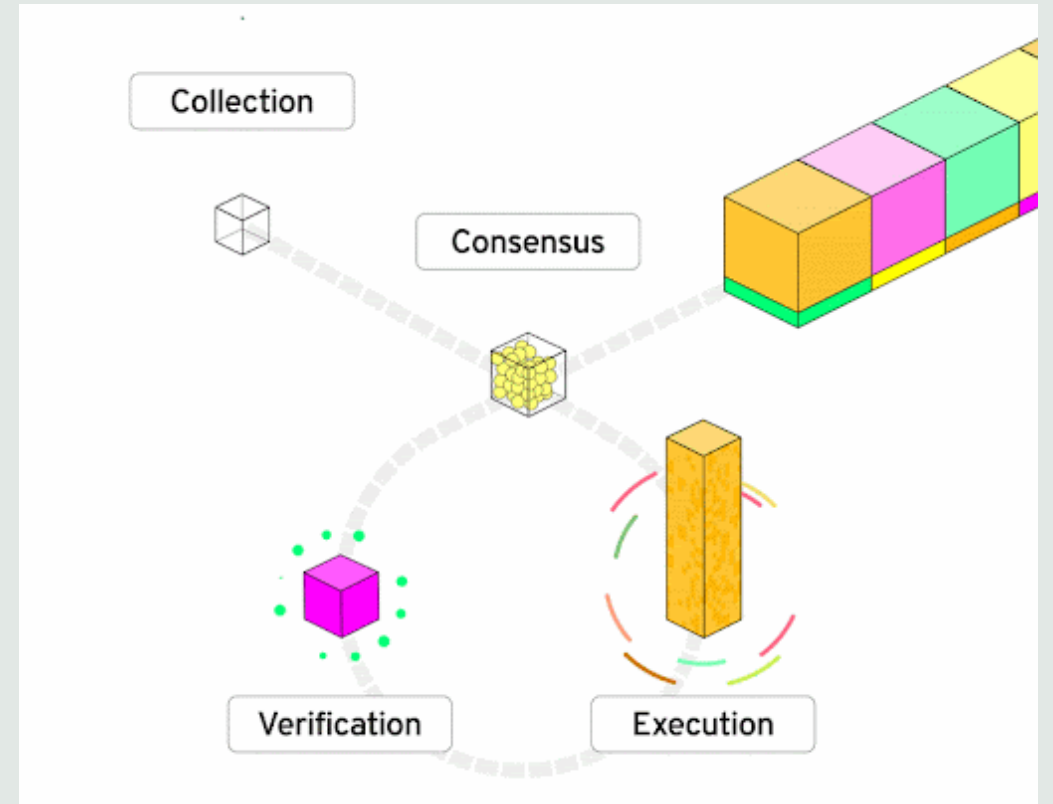
CONSUMER  
FRIENDLY  
EXPERIENCES



ENVIRONMENTALLY  
FRIENDLY

# Pipelining with Specialized Nodes

- Collector nodes
- Consensus Nodes
- Execution Nodes
- Verification Nodes



# Flow's Consensus Mechanism

- ♦ Proof of Stake model
- ♦ Utilizes the HotStuff BFT algorithm
- ♦ Ensures security and fast transaction finality



# Understanding HotStuff

- ♦ Modern Byzantine Fault Tolerant (BFT) algorithm
- ♦ Designed for decentralized networks
- ♦ Balances security and performance



# Benefits of HotStuff in Flow



Fast finality



Efficiency



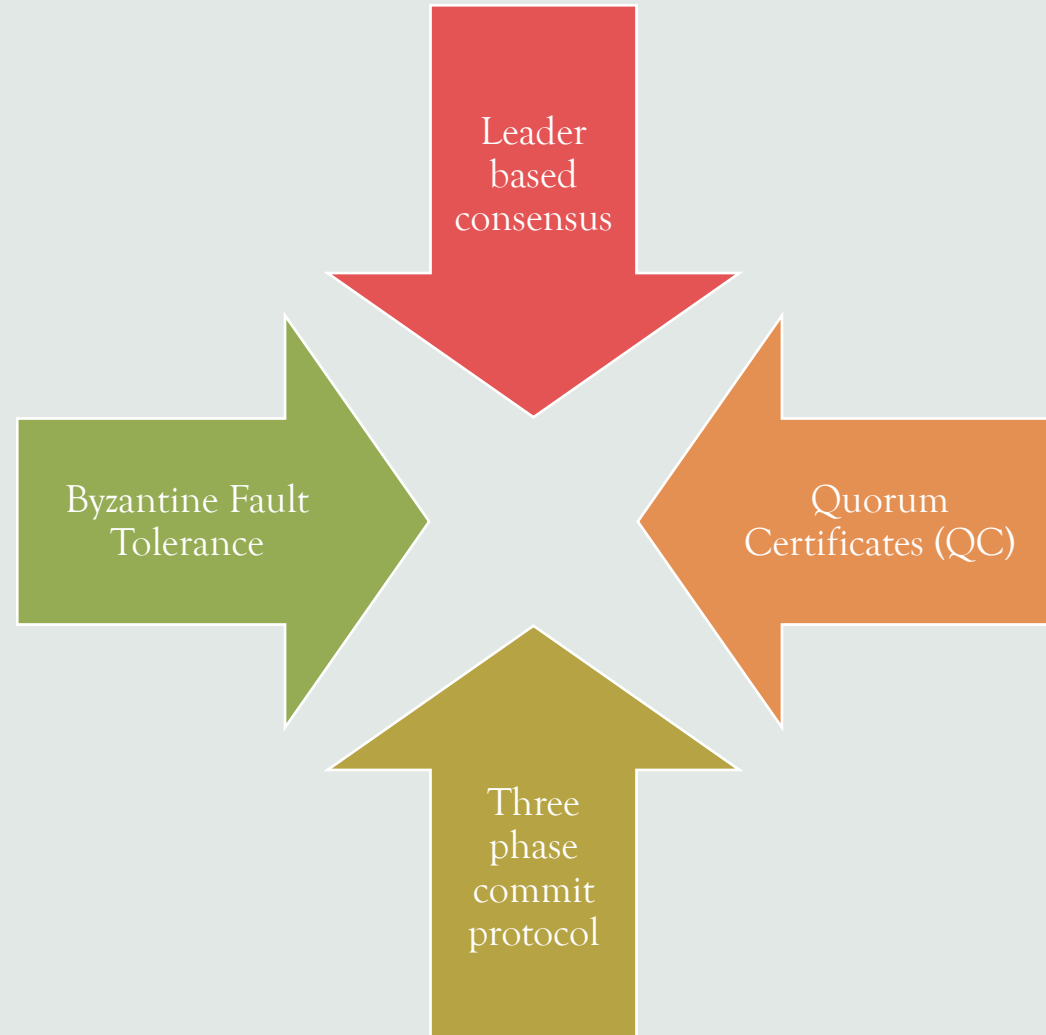
Scalability



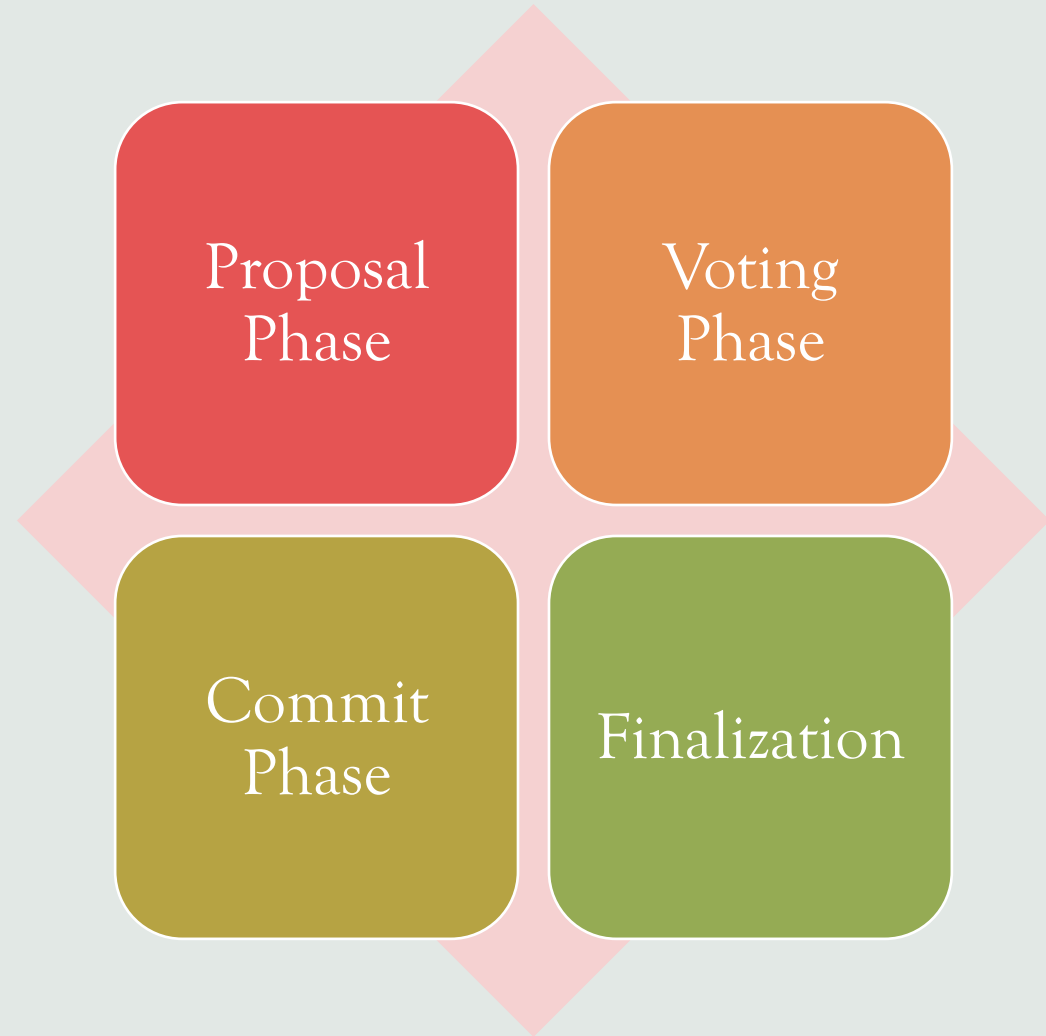
1,800 transactions per second (TPS)



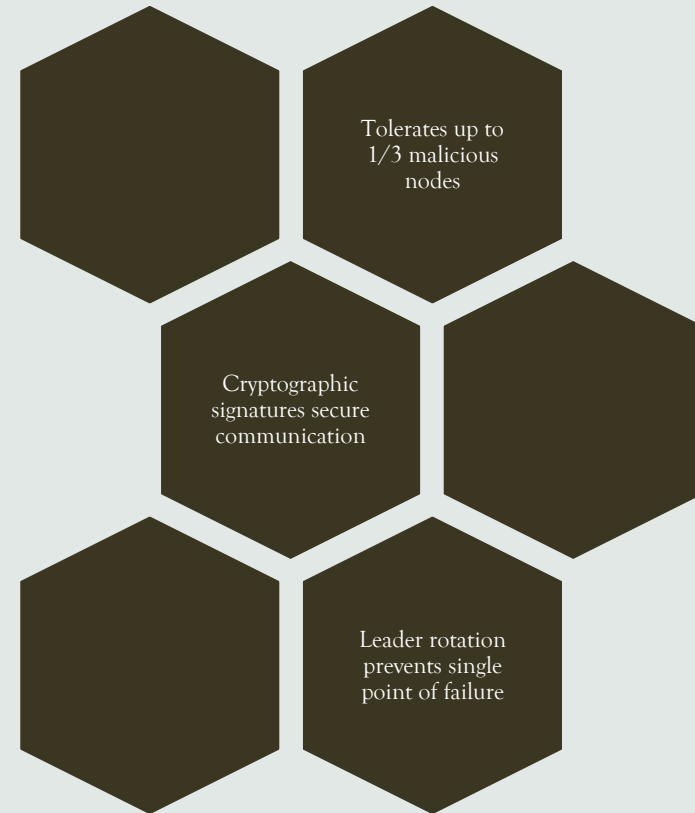
# Core Principles of HotStuff



# Basic Steps



# Security



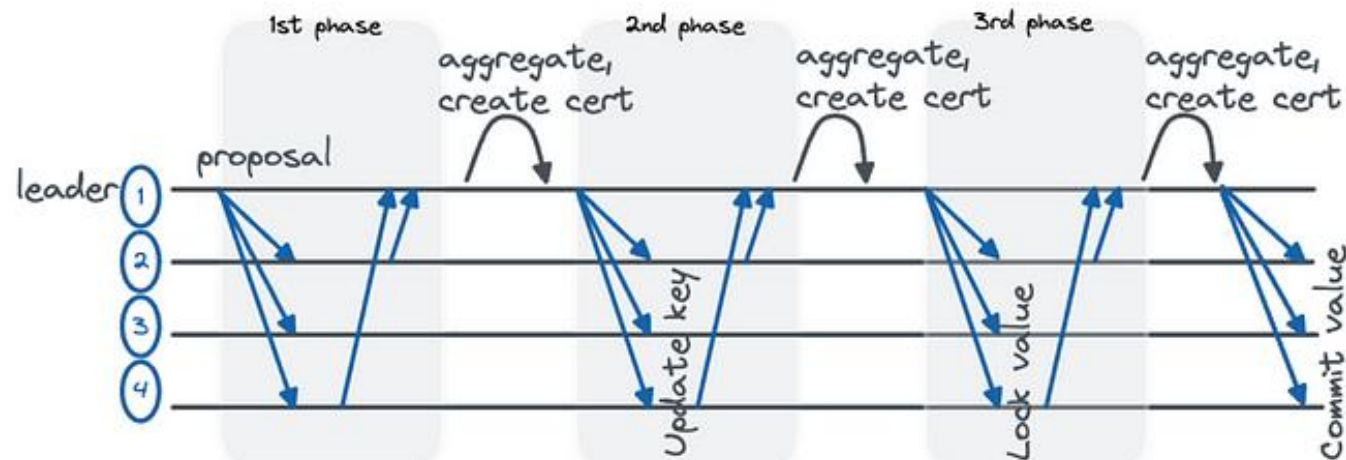
# HotStuff and Integration with Flow

---

Used by consensus  
nodes

Separates  
transaction  
ordering from  
execution

Supports fast and  
deterministic  
finality



Leader proposes block

Validators voting

Certification created

Block is formed

# “Developer First” Design

---

Cadence  
programming  
language

Upgradable  
smart contracts

Open-source  
tooling and  
libraries

Emphasis on  
resource oriented  
programming

# Flow in Action

ONE OF THE WORLDS FIRST  
BLOCKCHAIN GAMES



NBA NFT STORE



## Growing Network and Partnerships

Partnerships with major  
brands and developers

Active community  
engagement

Developer programs and  
support



# Sustainable Blockchain Solution

1

Lower energy  
consumption  
compared to proof  
of work blockchains

2

Efficient resources  
utilization

3

Environmentally  
friendly consensus  
mechanism

# What's Next for Flow?

Ongoing scalability improvements

Enhancing developer tools and resources

Expanding ecosystem partnerships

Focus on mainstream adoption

# Conclusion: Flow to Power the Future of Digital Experiences

---



OPTIMIZED FOR  
GAMES AND NFTS



INNOVATIVE MULTI  
NODE  
ARCHITECTURE



DEVELOPER  
FRIENDLY AND  
SCALABLE



READY FOR  
MAINSTREAM  
ADOPTION



# Questions and Discussion

## Works Cited

- “Core Protocol Vision.” *Flow Technical Vision*, 14 Sept. 2023, [flow.com/core-protocol-vision](https://flow.com/core-protocol-vision).
- “Core Protocol.” *Flow Governance*, [flow.com/core-protocol](https://flow.com/core-protocol). Accessed 19 Nov. 2024.
- “Data Availability Vision.” *Flow Technical Vision*, 14 Sept. 2023, [flow.com/data-availability-vision](https://flow.com/data-availability-vision).
- Hentschel, Alexander. *Flow: Separating Consensus and Compute*, 12 Sept. 2019, [arxiv.org/pdf/1909.05832.pdf](https://arxiv.org/pdf/1909.05832.pdf).
- Hentschel, Alexander. *Flow: Separating Consensus and Compute*, 18 Feb. 2020, [arxiv.org/pdf/2002.07403.pdf](https://arxiv.org/pdf/2002.07403.pdf).
- Hentschel, Alexander. *Flow: Separating Consensus and Compute*, 2019, [arxiv.org/pdf/1909.05821.pdf](https://arxiv.org/pdf/1909.05821.pdf).
- Hentschel, Alexander. “Core Protocol Vision.” *Flow Technical Vision*, 2023, [flow.com/core-protocol-vision#parallel-execution](https://flow.com/core-protocol-vision#parallel-execution).
- “Inside Flow: The Multi-Node Architecture That Scales to Millions.” *RSS*, 16 Sept. 2021, [flow.com/post/flow-blockchain-multi-node-architecture-advantages](https://flow.com/post/flow-blockchain-multi-node-architecture-advantages).
- Lutz, Sander. “Dapper Labs Reaches \$4 Million Settlement in NBA Top Shot Nft Lawsuit.” *Decrypt*, Decrypt, 5 June 2024, [decrypt.co/233621/dapper-labs-reaches-4-million-settlement-nba-top-shot-nft-lawsuit](https://decrypt.co/233621/dapper-labs-reaches-4-million-settlement-nba-top-shot-nft-lawsuit).
- Lutz, Sander. “NBA Top Shot Lawsuit May Be Bad for Dapper-Could It Be Good for Nfts?” *Decrypt*, Decrypt, 24 Feb. 2023, [decrypt.co/122148/nba-top-shot-lawsuit-dapper-good-for-nfts](https://decrypt.co/122148/nba-top-shot-lawsuit-dapper-good-for-nfts).
- Umucu, Av. Elif Hilal. “Understanding Hotstuff and Byzantine Fault Tolerance 🤖.” *Medium*, Medium, 29 May 2023, [medium.com/@Elifhilalumucu/understanding-hotstuff-and-byzantine-fault-tolerance-393ca878173f](https://medium.com/@Elifhilalumucu/understanding-hotstuff-and-byzantine-fault-tolerance-393ca878173f).