

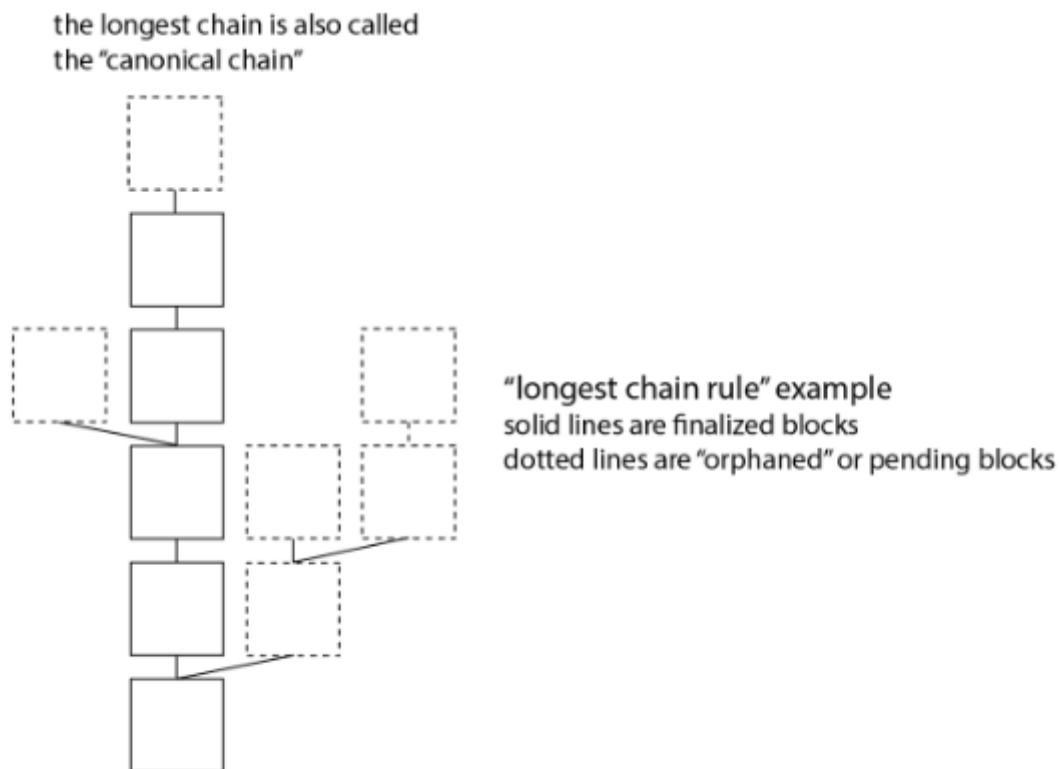
EVM Compatible chains overview

Consensus Mechanism review

1. Nakamoto consensus

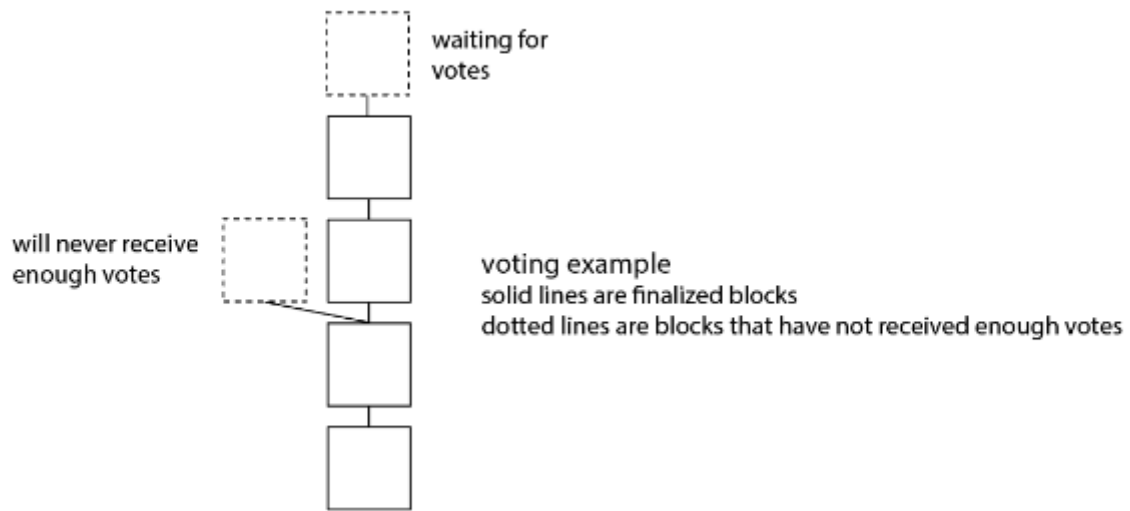
The 'longest chain' rule

From consensus preliminaries (<https://medium.com/thundercore/consensus-series-preliminaries-a3bab33ae09>)



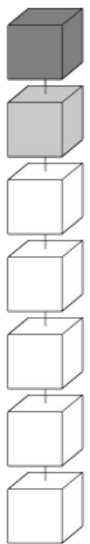
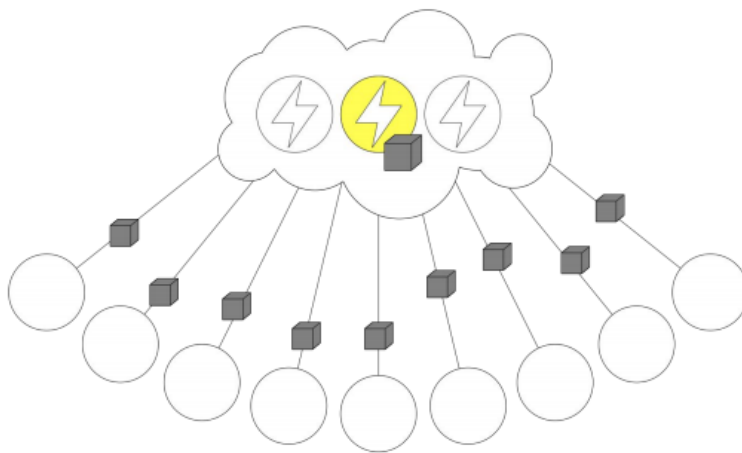
2. Classical consensus

Here a voting mechanism is used to come to consensus

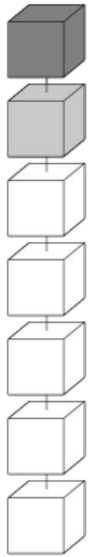
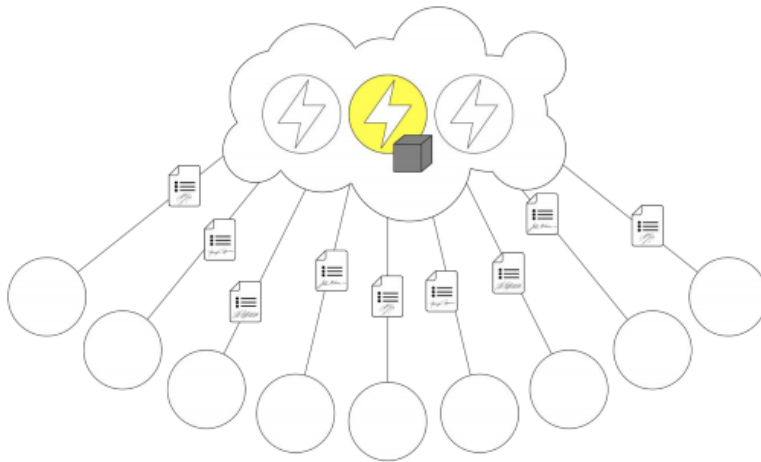


Thundercore

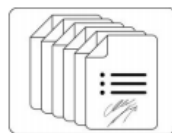
PaLa Consensus



The **primary proposer** rapidly creates new blocks and sends it over a high speed network connection to all voters



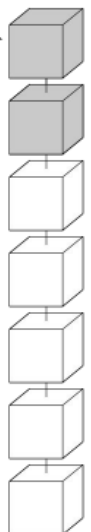
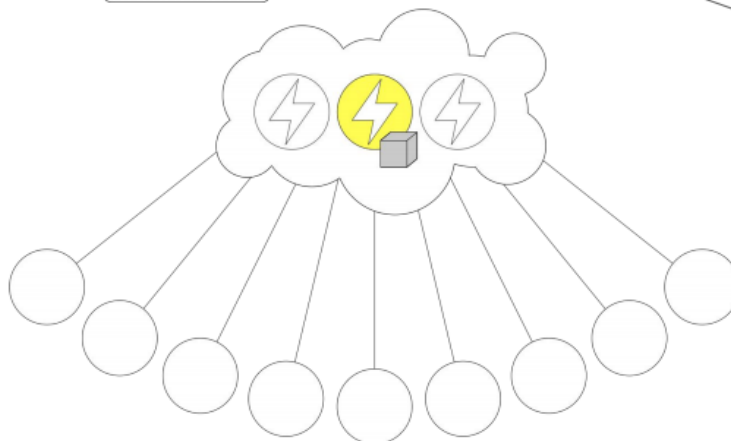
The voters respond with **votes**



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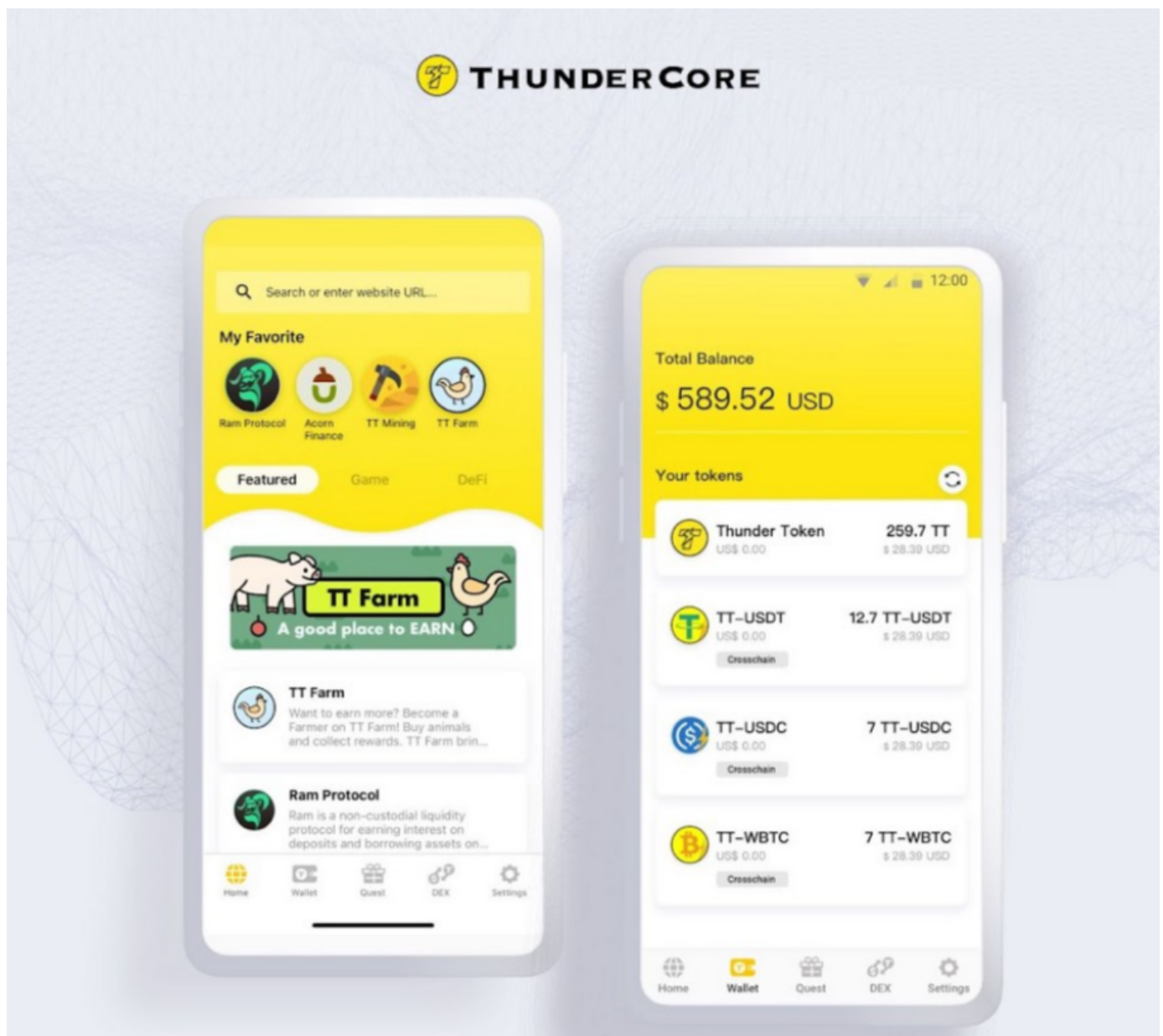


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upon receiving votes from 2/3 of voters, the block is **notarized**

Thundercore Hub



Binance Smart Chain





















Binance Smart Chain relies on a system of 21 validators with Proof of Staked Authority (PoSA) consensus that can support short block time and lower fees. The most bonded validator candidates of staking will become validators and produce blocks.

Binance Chain is responsible for holding the staking function to determine validators of BSC through independent election, and the election workflow are performed via staking procedure.

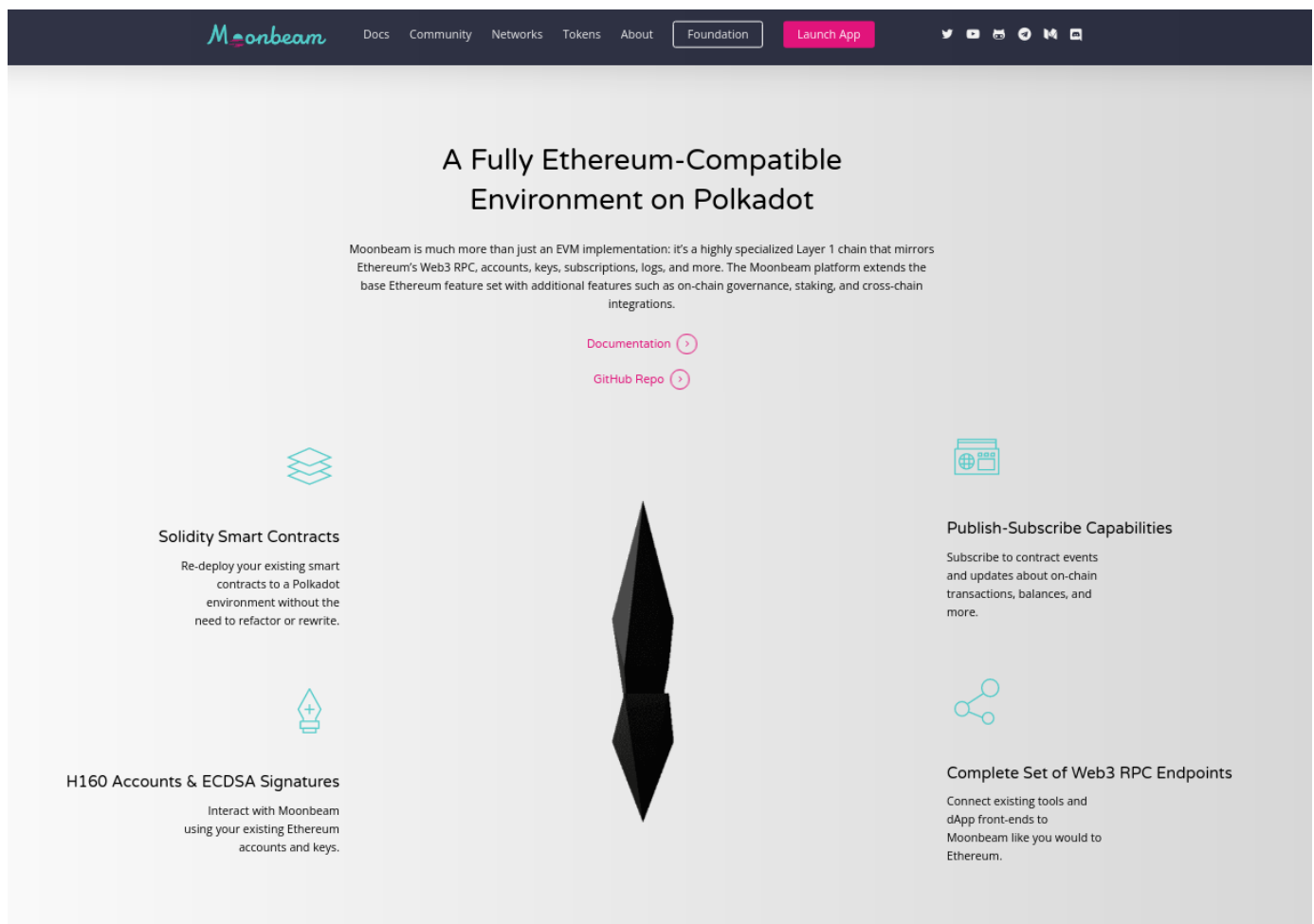
Comparison Between BC and BSC

	Binance Chain	Binance Smart Chain
Consensus	DPoS	PoS
No. of Validators	11	up to 21
Mean Block Time	<1s	~5s
Programmability	BEPs	Support EVM-compatible smart contracts
Cross Chain	BEP3 introduces <i>Hash Timer Locked Contract functions</i> and further mechanism to handle inter-blockchain tokens peg.	BSC comes with efficient native dual chain communication ; Optimized for scaling high-performance dApps that require fast and smooth user experience.

Ecosystem

		CATEGORY	BALANCE	USERS	VOLUME	ACTIVITY
1	 PancakeSwap BSC	DeFi	\$1.85B	335.32k -16.86%	\$258.32M	
2	 Bomb Crypto BSC	Games	\$8.29M	36.51k -18.01%	\$4.55M	
3	 SecondLive BSC	Games	\$38.52k	31.66k +5.40%	\$6.61k	
4	 DRIP BSC	DeFi	\$7.16M	22.09k +11.73%	\$7.39M	
5	 X World Games BSC	Games	\$6.6M	20.44k +34.06%	\$72.47k	
6	 MOBOX: NFT Farmer BSC	Games	\$70.53M	8.28k -10.92%	\$365.26k	
7	 Squid NFT World BSC	Games	\$253.96k	8.17k +9.71%	\$234.54k	
8	 ZOO - Crypto World BSC	Games	\$1.09M	8.11k -2.34%	\$95.89k	
9	 Cryptowolf Finance BSC	Games	\$3.28k	7.81k -8.56%	\$29.21k	
10	 Biswap BSC	DeFi	\$404.35M	7.13k -14.60%	\$168.35M	

Moonbeam



The Moonbeam production MainNet is a parachain on Polkadot and has been since December 17th 2021.

In advance of deploying to the Polkadot MainNet, Moonbeam launched Moonriver as a parachain on the Kusama network. The parachain functionality is live on Kusama.

Differences Between Moonbeam and Ethereum

See DOCS (<https://docs.moonbeam.network/learn/features/eth-compatibility/>)

First, Moonbeam uses a Proof of Stake-based consensus mechanism, which means that Proof of Work concepts, such as difficulty, uncles, hashrate, etc., generally don't have meaning within Moonbeam. For APIs that return values related to Ethereum's Proof of Work, we return default values. Existing Ethereum contracts that rely on Proof of Work internals (e.g., mining pool contracts) will almost certainly not work as expected on Moonbeam.

Another significant difference between Moonbeam and Ethereum is that Moonbeam includes an extensive set of on-chain governance features based on Substrate functionality. These onchain governance modules include functionality to power upgrades to the blockchain itself based on token weighted voting.

Ecosystem

From State Of The Dapps (<https://www.stateofthedapps.com/platforms/moonriver>)

Moonriver Stats

Total DApps	32
Users (24h)	1.73k
Transactions (24hr)	6.89k
Volume (24hr)	USD \$1,631,059
# of contracts	75

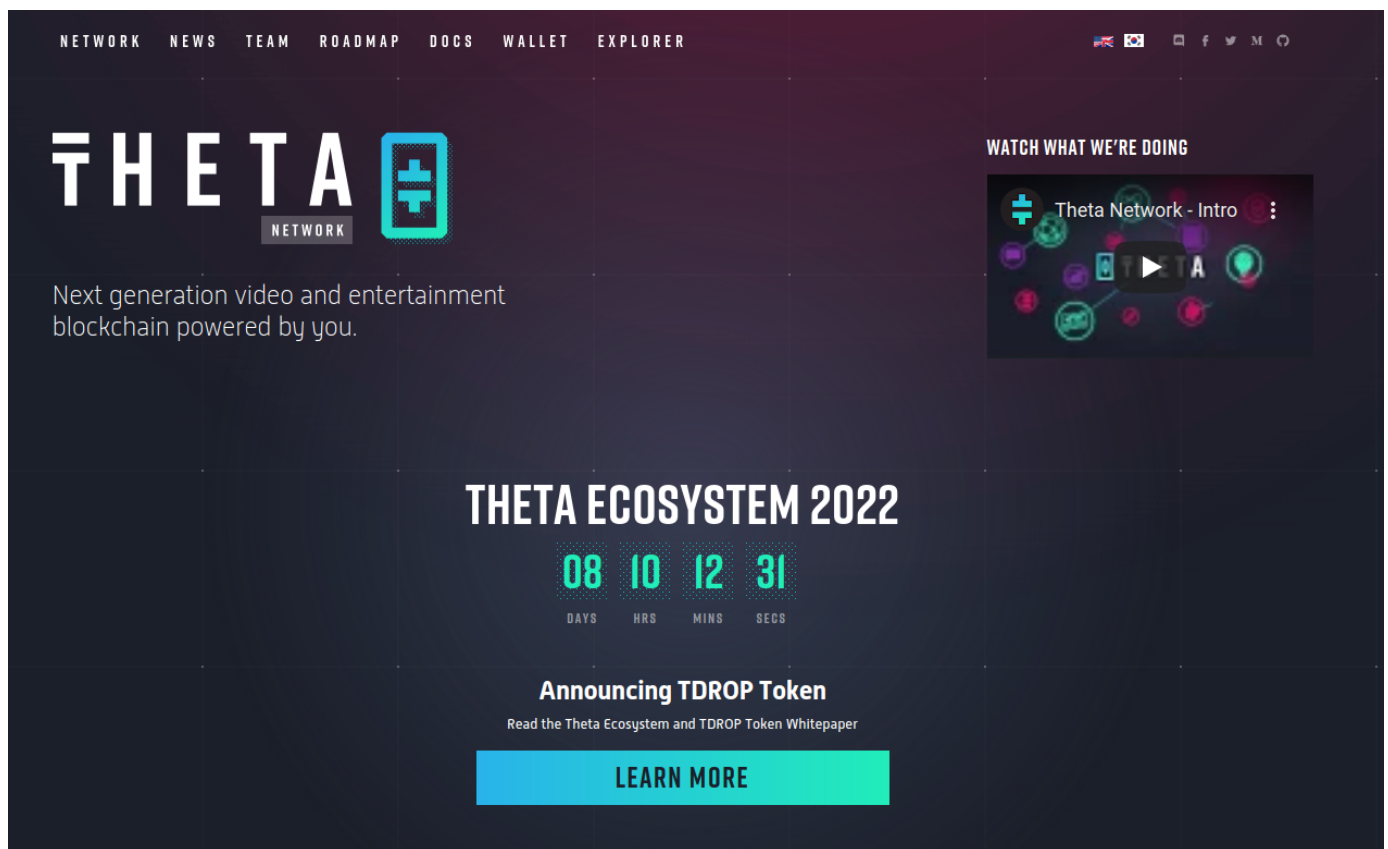
[View more stats](#)

DApps per Category

Nft	<u>12</u>
Defi	<u>7</u>
Yield-farming	<u>3</u>
Development	<u>2</u>
Exchanges	<u>2</u>
Wallet	<u>1</u>
Tools	<u>1</u>
Games	<u>1</u>
Social	<u>1</u>
Marketplaces	<u>1</u>
Finance	<u>1</u>

Theta

Designed for video delivery



Consensus

Scalable BFT (<https://ieeexplore.ieee.org/abstract/document/8751327>)

Uses “aggregated signature gossip protocol which can significantly reduce the messaging complexity and thus allows a large number of nodes to reach consensus quickly.”

Gnosis chain (formerly xDai)

Consensus

1. Sybil protection : POSDAO

Validators are selected based on the amount of STAKE they place into the protocol along with an on-chain RNG.

2. Authority Round (AuRa)

In this model, selected validators (selected through the POSDAO process) take turns signing blocks. A signed block is broadcast to all validators, and if the majority agree it is valid, it is added to the chain. A new block is added every 5 seconds, regardless of whether any transactions occurred during that time

Ecosystem

xDai Stats

Total DApps	21
Users (24h)	19
Transactions (24hr)	159
Volume (24hr)	USD \$62,994
# of contracts	58

[View more stats](#)

DApps per Category

Nft	<u>5</u>
Wallet	<u>4</u>
Marketplaces	<u>3</u>
Finance	<u>3</u>
Property	<u>2</u>
Defi	<u>2</u>
Games	<u>1</u>
Social	<u>1</u>

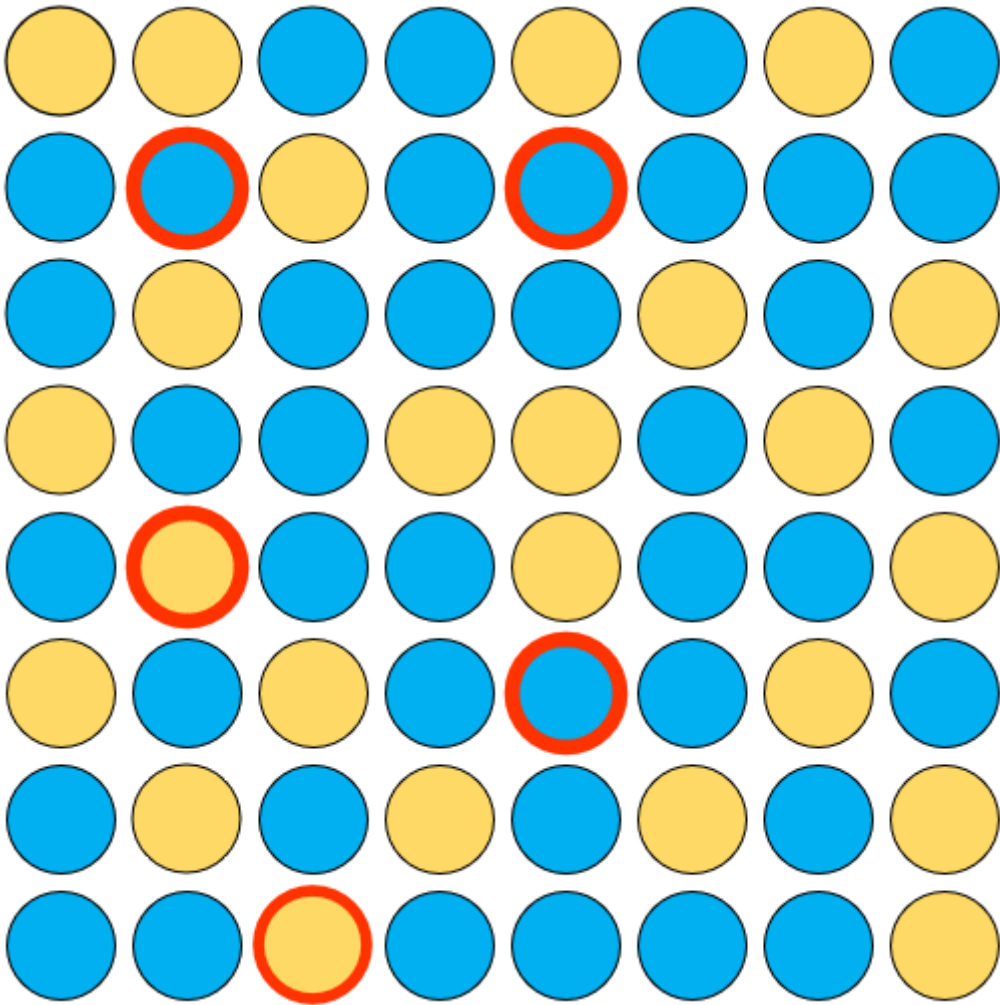
Avalanche

Consensus

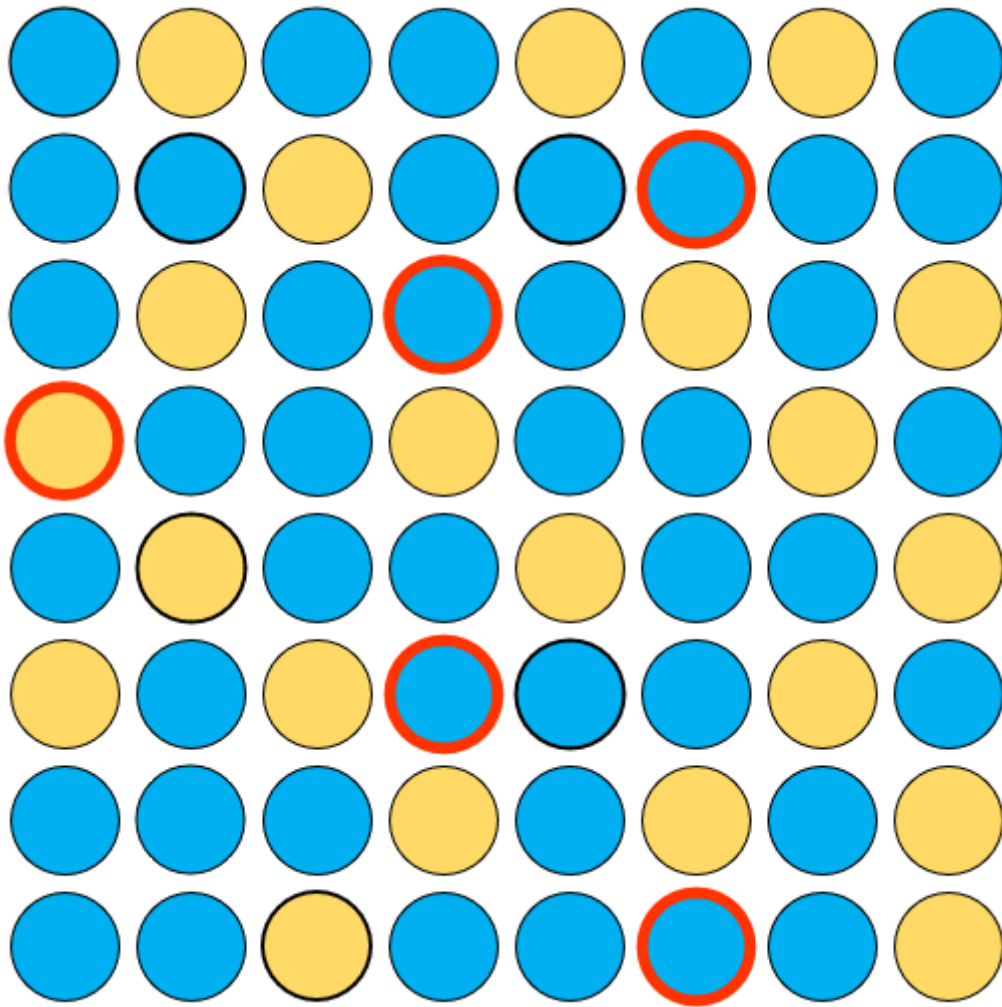
Preference for a decision outcome is manufactured by polling nodes for the transactions which are deemed to be valid until consecutive consensus is reached, preference is updated on the fly based on responses from other nodes.

Looking at the node on the top left

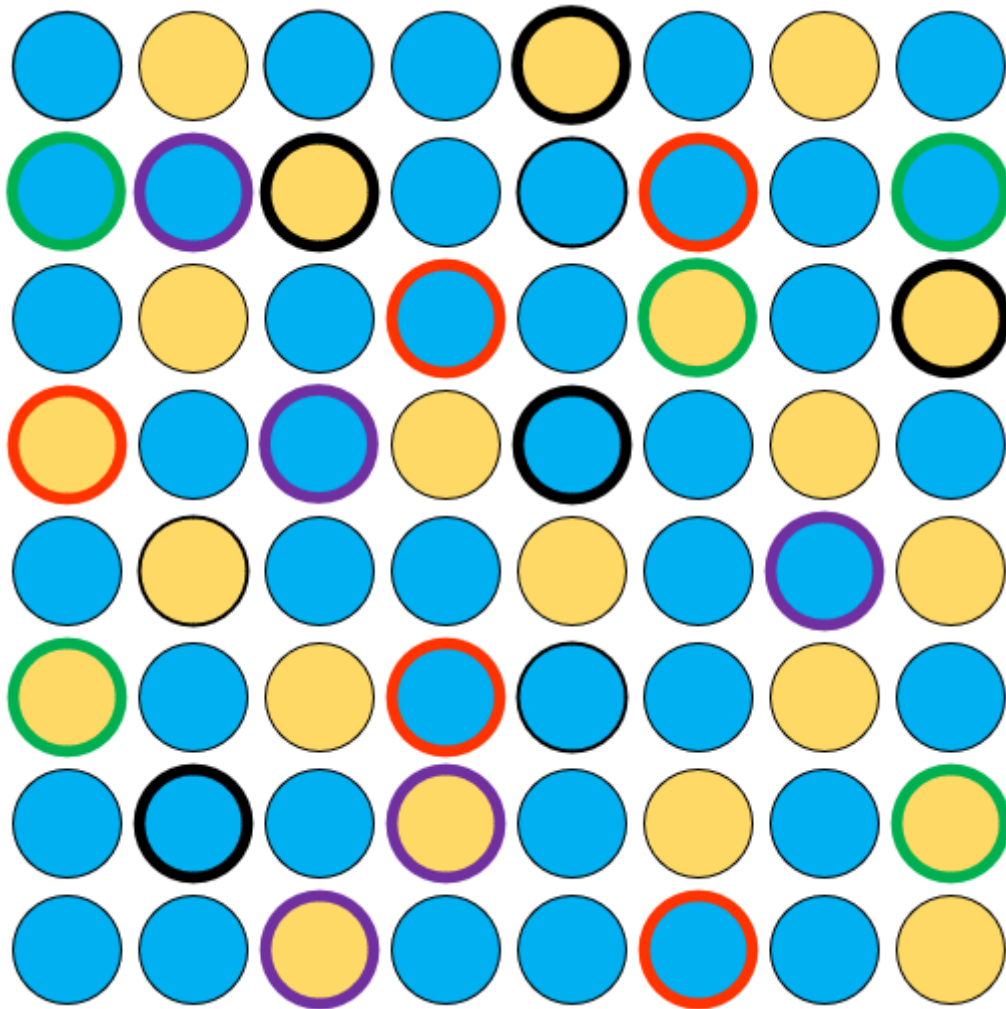
We sample other nodes and get a majority of blue



Therefore we change our value to blue and continue sampling



Other nodes are also doing the same process

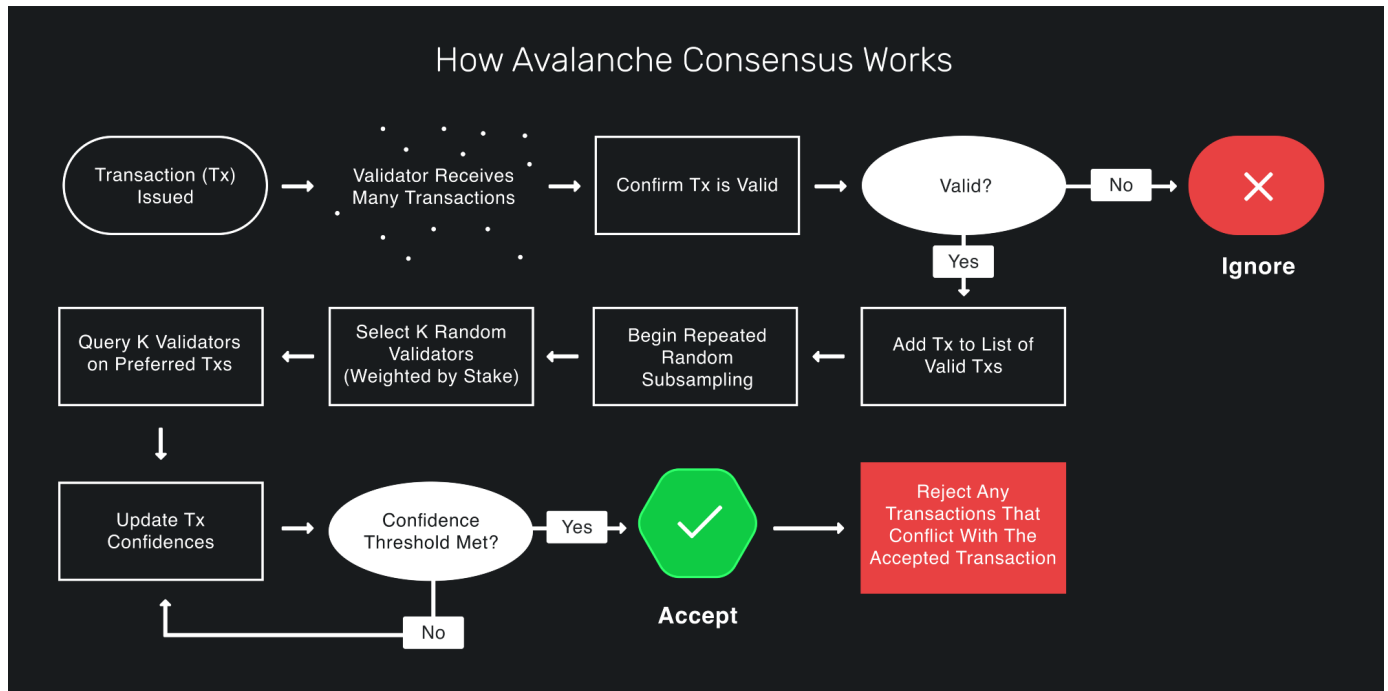


Avalanche has no upper bound on number of participants in the network and transactions finalise in less than a second without waiting for confirmations.

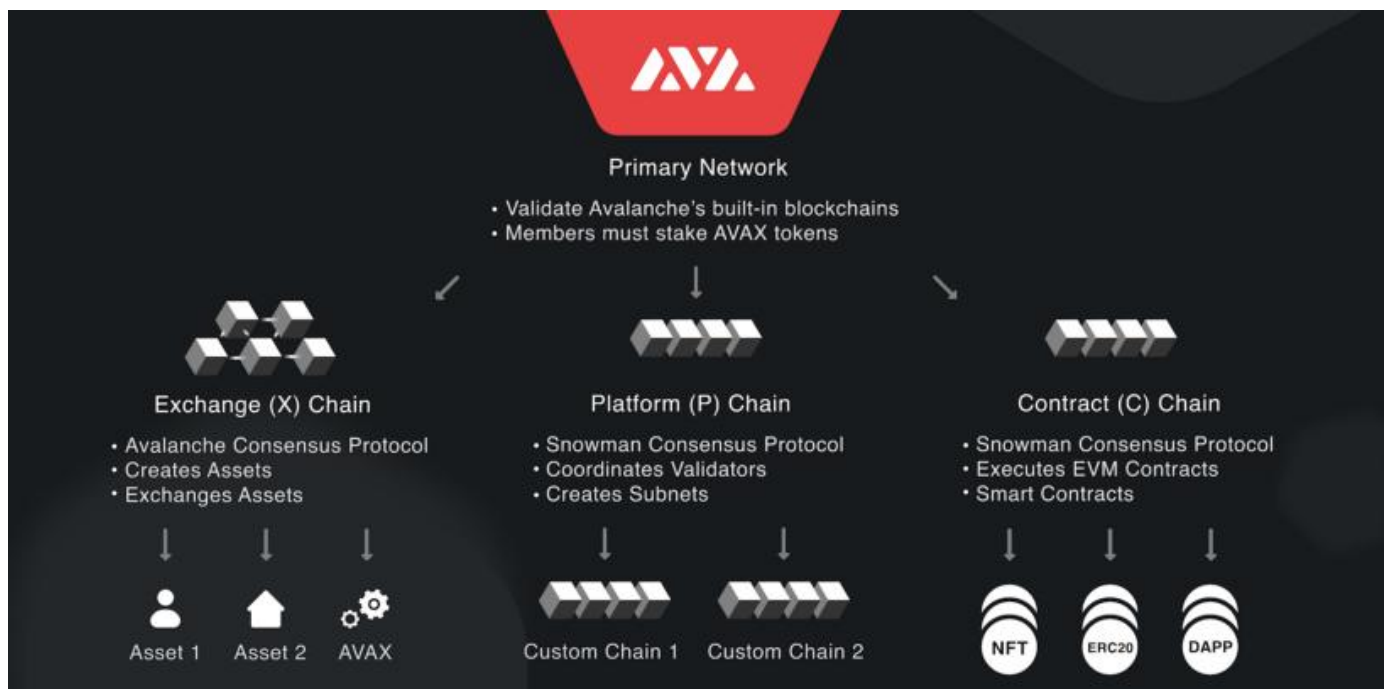
Avalanche consensus in detail

- A validator is presented with a set of transactions that have been issued and asked to decide which transactions to “Accept.”
- The node client presents the virtual machines (“VMs”) with their transactions, and the VMs will provide information to help the client determine which transactions are acceptable.
- The validator selects a subset of these transactions that do not conflict, marks them as preferred, and attempts to accept them over the network.
- Any nodes that query this validator receives its latest preferred choice for this decision.
- This validator selects K nodes from the entire validator list (probability of selection is weighted by stake amount) to query for their preferred decision.
- Each queried validator responds with their preferred decisions, the validator’s votes are updated accordingly, and confidence is built.
- Meanwhile, other nodes are also selecting random validators from the validator set to be queried for their preferred response and updating their answers accordingly.

- This continues for at least M rounds or until a sufficient confidence threshold is reached, whatever comes last, with K validators selected randomly each round (without replacement).
- Once a confidence threshold is reached, the decision on the transaction is locked in as final.
- If “Accepted”, the transaction is sent to the VM to be handled; if “Rejected”, the transaction is removed from consensus.



Network



The X-Chain is based on Avalanche. It is a decentralized platform for the creation and exchange of digital assets.

The C-Chain is based on Snowman. It allows the creation of smart contracts via its API.

The P-Chain is based on Snowman. It coordinates validators, oversees existing subnets, and creates new subnets.

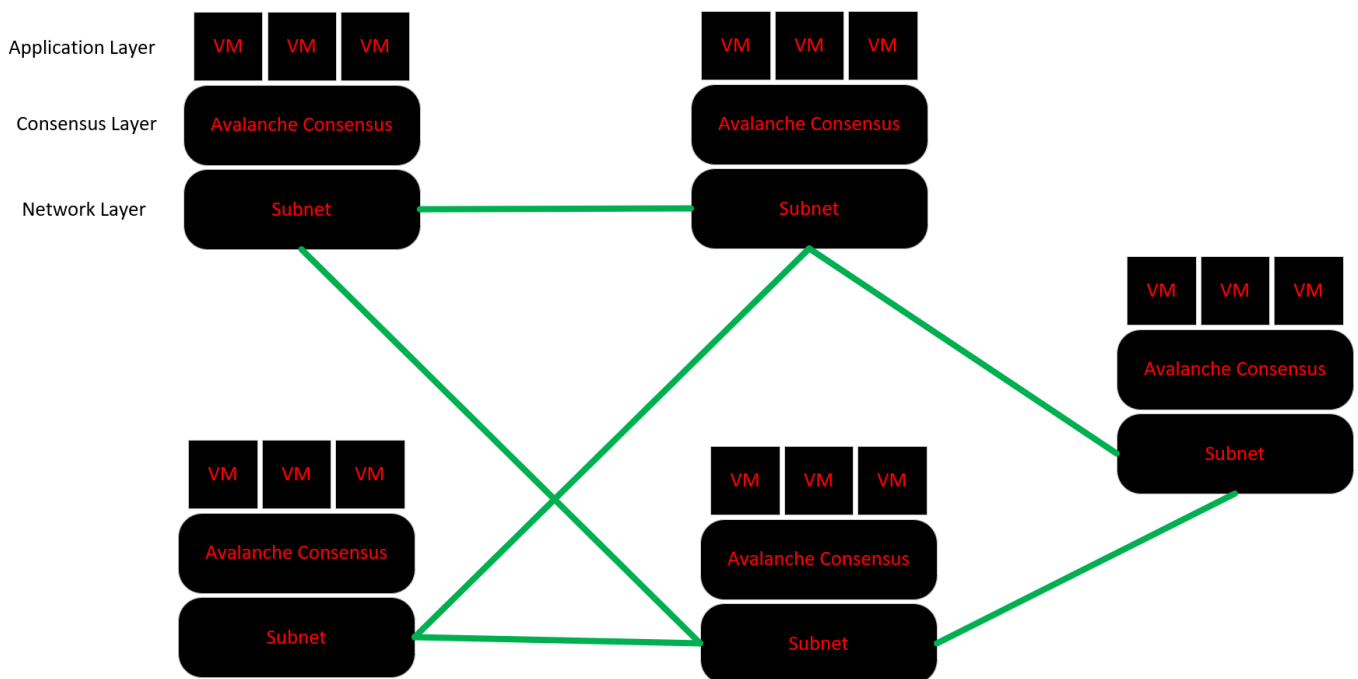
For Snowman the 'DAG' is linear allowing ordering

Subnets

Avalanche allows anyone to create their own tailor-made application specific blockchains, supporting multiple custom virtual machines such as EVM and WASM.

Avalanche is a platform of platforms ultimately consisting of thousands of subnets to form a heterogeneous interoperable network of many blockchains

A Subnet manages its own membership and it may require that its constituent validators have certain properties.



Coreth (from core Ethereum) is the Virtual Machine (VM) that defines the Contract Chain (C-Chain). This chain implements the Ethereum Virtual Machine and supports Solidity smart contracts as well as most other Ethereum client functionality.

Differences Between Avalanche C-Chain and Ethereum

1. Atomic Transactions

As a network composed of multiple blockchains, Avalanche uses atomic transactions to move assets between chains. Coreth modifies the Ethereum block format by adding an ExtraData field, which contains the atomic transactions.

2. Avalanche Native Tokens (ANTs)

The C-Chain supports Avalanche Native Tokens, which are created on the X-Chain using precompiled contracts. These precompiled contracts `nativeAssetCall` and `nativeAssetBalance` support the same interface for ANTs as `CALL` and `BALANCE` do for AVAX with the added parameter of `assetID` to specify the asset.

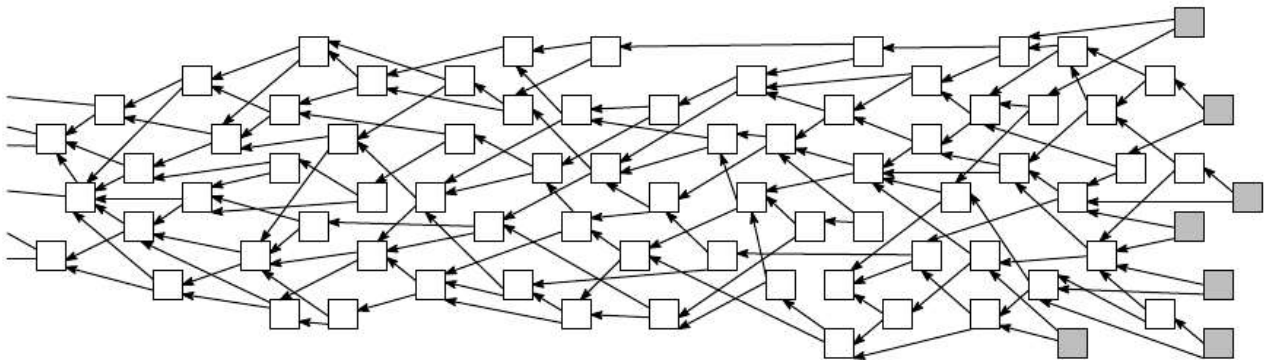
3. Block Timing

Blocks are produced asynchronously in Snowman Consensus, so the timing assumptions that apply to Ethereum do not apply to Coreth. To support block production in an async environment, a block is permitted to have the same timestamp as its parent. Since there is no general assumption that a block will be produced every 10 seconds, smart contracts built on Avalanche should use the block timestamp instead of the block number for their timing assumptions.

A block with a timestamp more than 10 seconds in the future will not be considered valid. However, a block with a timestamp more than 10 seconds in the past will still be considered valid as long as its timestamp is greater than or equal to the timestamp of its parent block.

Transactions

Transactions are assembled as a DAG rather than in blocks



Ecosystem

AaveA Protocol for Earning Interest
and Borrowing Assets**\$20M in AVAX Rewards****BENQI**An Algorithmic Liquidity Market
Protocol on Avalanche**\$3M in
AVAX Rewards** **Curve**

A Stablecoin Liquidity Pool

\$7M in AVAX Rewards **Sushi**

Be a DeFi Chef with Sushi

**\$15M in
Combined Incentives
(Coming Soon)** **Pangolin**

Scale Your DeFi Trading

**\$2M in AVAX
Rewards** **STAKE DAO**A Multi-service Cross-chain
DeFi Platform**\$3M in AVAX
Rewards** **AVALAUNCH**Interoperable Token Pools
& Auctions **Trader Joe**One-Stop Decentralized Trading
on Avalanche**\$20M in AVAX
and JOE Rewards** **kyber
network**Delivering a Sustainable
Liquidity Infrastructure for DeFi**\$5.8M in AVAX
and KNC Rewards** **paraswap**

Solving Liquidity For DeFi

**Find the best DEX
prices for DeFi traders****YAK**Earn From the \$100k in
Developer Incentives**Autocompound on
Avalanche**

Other Chains

Klaytn, Oasis, Celo, Near, Loom, EOS ...