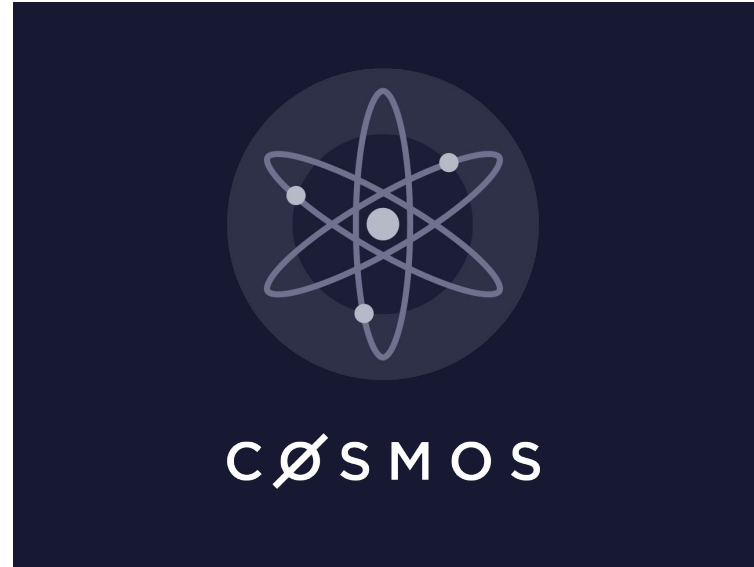


# Fission Munch & Learn: Cosmos



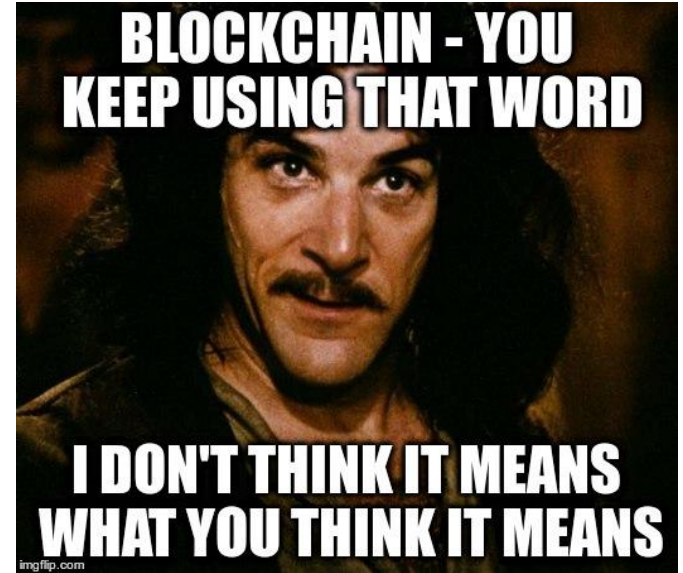
# What is Cosmos?

- A decentralized network of interconnected blockchains
- Each blockchain runs a Byzantine Fault Tolerant (BFT) consensus algorithm like Tendermint
- Blockchains built with the Cosmos SDK can be lightweight and focused around a single application
- Blockchains talk to each other and blockchains outside of Cosmos to accomplish broader goals



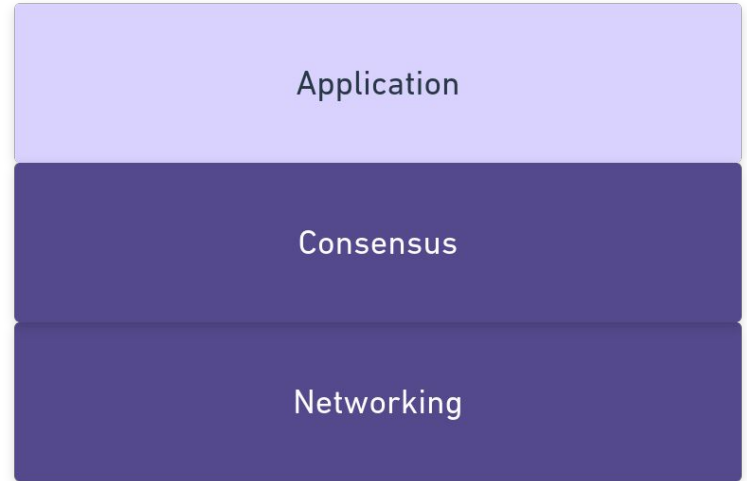
# What is a Blockchain?

- A digital ledger maintained by a set of validators
- The ledger is correct even if some of the validators are malicious
- No central authority
- The goal is to replicate the ledger so that each honest validator sees the same ledger
- The ledger is a chain of blocks
- Transactions get added to new blocks on the chain



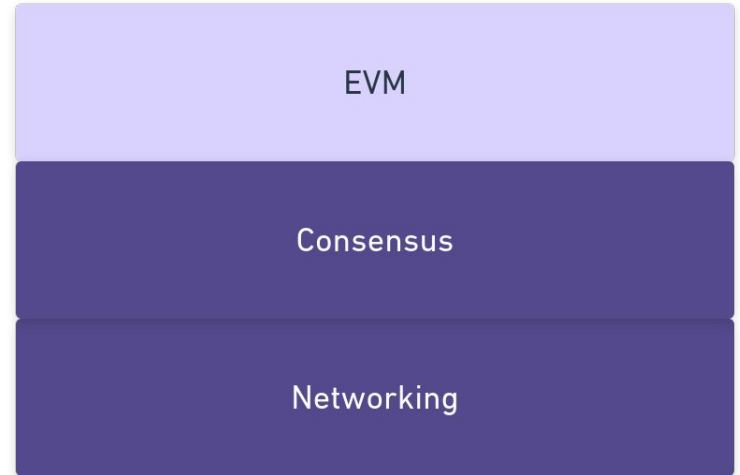
# What is the architecture of a blockchain?

- **Application.** Update state by processing transactions.
- **Consensus.** Run consensus to get nodes to agree on state.
- **Network.** Propagate transactions and consensus-related messages.



# So what about Ethereum?

- **Application.** Ethereum Virtual Machine. Runs smart contracts to process transactions, run dApps, and more.
- **Consensus.** Currently uses Proof of Work (PoW) to reach consensus, moving to Proof of Stake (PoS).
- **Network.** Peer to Peer (P2P) communication between nodes.

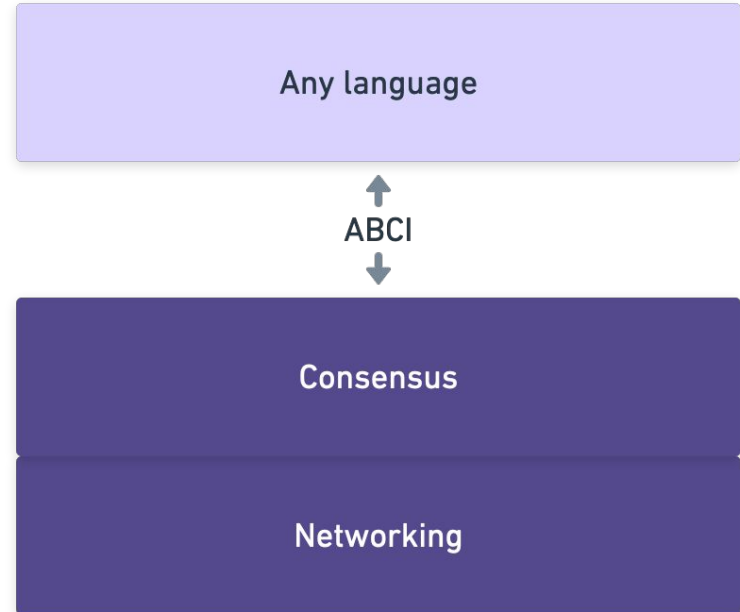


# What are the limitations of the EVM?

- **Scalability.** Ethereum dApps compete for 15 transactions per second on a single blockchain.
- **Usability.** EVM needs to be general purpose, but it must make some choices that are not be ideal for every dApp. Limited set of programming languages that target the EVM.
- **Sovereignty.** dApps are dependent on decisions Ethereum makes, they aren't fully in control of their destiny.

# What is Tendermint?

- Tendermint is a generic BFT consensus engine
- **Application.** Any language can target the Application Blockchain Interface (ABCI).
- **Consensus.** Tendermint BFT engine for PoS or Proof of Authority (PoA).
- **Network.** Tendermint BFT engine provides P2P networking.



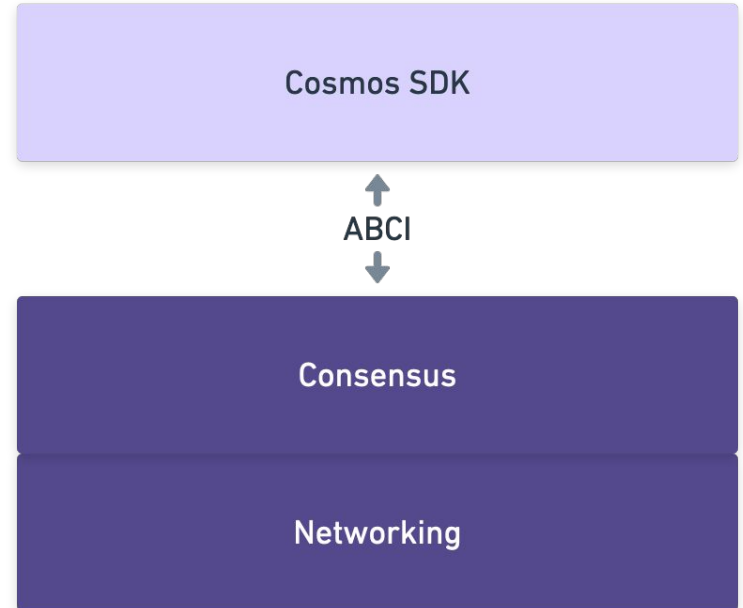
# Why is this a good thing?

- **Performance.** Tendermint BFT block times can be around one second with thousands of transactions per second.
- **Instant Finality.** Forks are never created when we have enough honest validators. Users can be sure their transactions are finalized right away.
- **Usability.** Applications only need to use the parts of the ABCI that matter to them, which can make them more efficient and secure. Any program language can target the ABCI.
- **Sovereignty.** Applications are fully in control because they have their own blockchain.



# What about the Cosmos SDK?

- The Cosmos SDK is an ecosystem of modules for building application blockchains
- **Application.** Applications made from prebuilt or custom Cosmos SDK modules.
- **Consensus.** Tendermint BFT engine for PoS or Proof of Authority (PoA).
- **Network.** Tendermint BFT engine provides P2P networking.



# An Internet of Blockchains?

- Now we can all have application blockchains, so how do they talk?
- Blockchains communicate using the Inter-Blockchain Communication protocol (IBC)
- Chains can transfer value (tokens) or data between each other
- Tokens are bonded on one chain, proof of bonding is sent to a second chain, tokens are created on the second chain
- Hubs and zone blockchains form a star network topology to limit the number of connections



# What is Ethermint?

- Started as a research project to build the EVM on top of Tendermint in 2016
- Later ported to the Cosmos SDK
- Interoperable with Ethereum and blockchains in the Cosmos ecosystem
- Bridges are used to interoperate with Ethereum
- Uses fast finality to decide when Ethereum is “final enough” that it isn’t likely to fork

# Are Evmos and Ethermint the same thing?

- Messaging has not been entirely clear, but it seems they are separate projects
- Evmos is a blockchain built with Ethermint
- Ethermint and Evmos maintained by Tharsis and they are interested in collaborating with other chains to improve Ethermint in the future
- Evmos expands the scope of Ethermint by adding an interoperable smart contract platform

*“[We want to]... create a platform in which we support interoperability and interchain composability so that other smart contract platforms can interact with smart contracts deployed on Evmos.”*

– Federico Kunze Küllmer,  
Evmos co-founder