Avalanche: Building a Novel dApp Protocol for the Internet of Finance

Ava Labs is building the Avalanche protocol which expects to deliver the highest performance, most secure, and most energy efficient general-purpose cryptocurrency for highly decentralized applications, novel financial primitives, and new interoperable blockchains. Using its innovative Avalanche consensus mechanism, the protocol hopes to create a new digital crypto-native economy for frictionless real-world and digital asset exchange, composable financial application primitives and derivatives, Web 3.0 privacy-focused data and social applications, and more. Avalanche expects to scale these use cases for global userbases.

- **The Avalanche core team consists of seasoned professionals and distributed systems researchers.** As the CEO and Founder of Ava Labs, Dr. Emin Gün Sirer is a former professor of computer science and networking systems at Cornell University. He developed Bitcoin-NG, a bitcoin scaling solution, and Bitcoin Covenants, a security solution. To develop the Avalanche protocol, he successfully built a team with experience in institutional finance, private markets, and technology (Slide 3).

- **Avalanche aims to build on earlier breakthroughs to develop a fully internet-native economy.** Early cryptocurrencies offered global, decentralized, non-sovereign, digital money. The second wave of crypto platforms built on the core technology and enabled the creation of ecosystems of programmable dApps. These dApps included DeFi products, NFT collectibles, and other yield-generating apps and use cases. However, these platforms haven’t proven themselves to be designed for every use case. Now, a third wave of cryptonetworks are aiming to support a wider range of dApps on cheaper and faster blockchains. By offering a dApp platform with low fees, high scalability, and network interoperability, Avalanche believes it will enable the creation of a fully digital economy on a global scale (Slide 6).

- **Avalanche is organically growing a comprehensive DeFi & Web 3.0 ecosystem.** Third-party developers are rapidly deploying new DeFi products on the Avalanche (Contracts) C-Chain. These decentralized applications span decentralized exchange, liquidity mining, lending, synthetic assets, and more (Slide 7). Avalanche’s unique, multi-chain framework enables core functions to interoperate seamlessly, without causing performance degradation as we see in networks that pile all activity into one chain. This is leading to rapid, precipitous growth of assets, applications, and custom implementations on subnets tailored to enterprises and institutions (Slide 9).

- **Network metrics are competitive with top protocols in terms of scalability, security & speed.** In order to host a wide range of decentralized applications and build a robust digital economy, the blockchain base-layer must offer decentralization, security, and scalability with low transaction fees. Avalanche’s mainnet already offers a transaction settlement layer with characteristics that are highly competitive with the leading staking networks and proof-of-work cryptocurrencies across these metrics (Slide 11). Additionally, AVAX’s proof-of-stake consensus incentivizes token lockups with high staying rewards (Slide 13).

- **Partnerships may help bootstrap network adoption and growth.** The Avalanche protocol is a young network that initially launched its mainnet in September 2020, yet it already boasts an impressive ecosystem of partners, integrations, and third-party applications. Beyond DeFi and Web 3.0, the Avalanche Foundation and Ava Labs are building out tooling and infrastructure to support a wide range of crypto products and use cases. Integrations with the leading crypto exchanges, wallets, stablecoins, and asset tokenization projects could fast track adoption and incentivize users to engage with the Avalanche network (Slide 14).

- **What could go wrong?** Avalanche fails to execute on its roadmap, competing layer-one protocols or second-layer solutions iterate faster and deliver scalable cryptonetworks, Avalanche fails to attract significant developer mindshare and adoption.

Bottom line: Although the network is young in its growth and development, Avalanche implements an interesting consensus mechanism that may successfully deliver a scalable and interoperable cryptocurrency to enable a global and fully digital economy of decentralized financial applications and Web 3.0 personal data sovereignty.
Ava Labs is the New York-based technology company developing the Avalanche consensus protocol and network. Avalanche is an open-source platform for launching highly decentralized applications, new financial primitives, and new interoperable blockchains.

The project was founded in 2018 by Emin Gün Sirer, Maofan Yin, and Kevin Sekniqi who were all researchers at Cornell University. Sirer is renowned for his contributions to peer-to-peer systems, operating systems, and computer networking.

Project Objectives
- Democratize financial markets and bridge all blockchain platforms together into one interoperable ecosystem
- Create the highest performance, most secure, and most energy efficient decentralized protocol
- Next generation blockchain platform enabling anyone to digitize, create, and exchange assets

Value Proposition
- Developers who build on Avalanche can easily create powerful, reliable, and secure applications and custom blockchain networks with complex rule sets or build on existing private or public subnets
- Avalanche gives developers complete control on both the network and application layers—enabling them to build anything they can imagine

Financing History
- The firm is well capitalized having raised $6 million in a Series A financing round and $54 million over two token sales
- Ava Labs has backing from leading investment firms including a16z, Bitmain, Dragonfly Capital Partners, Galaxy Digital, Initialized Capital & NGC Ventures

Summary
- Ava Labs is the New York-based technology company developing the Avalanche consensus protocol and network.
- Avalanche is an open-source platform for launching highly decentralized applications, new financial primitives, and new interoperable blockchains.
- The project was founded in 2018 by Emin Gün Sirer, Maofan Yin, and Kevin Sekniqi who were all researchers at Cornell University. Sirer is renowned for his contributions to peer-to-peer systems, operating systems, and computer networking.
# Founding Team Spun Out Of Cornell And IC3, Tech & Finance Expertise

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Previous Experience</th>
</tr>
</thead>
</table>
| Dr. Emin Gün Sirer    | **CEO and Founder**                        | - Associate Professor (on leave) from Cornell University  
- Creator of first PoW based currency Karma, Bitcoin-NG, Bitcoin Covenants  
- Author of seminal Bitcoin Selfish Mining Paper  
- In 2003, published the first cryptocurrency that uses distributed mint based on PoW |
| John Wu               | **President**                              | - Former CEO of the Digital Assets Group at SharesPost  
- Founder of $500 million hedge fund, Sureview Capital  
- Former portfolio manager at Kingdom Capital and analyst at Tiger Management  
- Received MBA from Harvard Business School and BS from Cornell University |
| Kevin Sekniqi         | **COO and Co-Founder**                     | - Cornell PhD Candidate 2021 (currently on leave)  
- Former researcher and software engineer at Microsoft  
- Former researcher and software engineer at NASA Jet Propulsion Laboratory  
- Cornell PhD Candidate 2021  
- First author of Hotstuff Consensus Protocol Paper, used by Facebook Libra Blockchain  
- Former research assistant at Vmware, SpeechLab of Shanghai Jiao Tong University, and the Institute for Infocomm Research |
| Ted Yin               | **Chief Protocol Architect and Co-Founder**|                                                                                                                                                      |
Avalanche Consensus was initially outlined in a whitepaper by a pseudonymous group called Team Rocket in 2018, an idea Sirer and his colleagues were also pursuing. With those proofs, Sirer, Sekniqi, and Yin began Ava Labs to develop a novel layer-one blockchain based on the proposed breakthroughs.

Since its founding, Ava Labs raised $60 million and launched three testnets and the public mainnet of the protocol.

Figure: Ava Labs Historic Milestones

**May 2018:** Cornell University professor and blockchain researcher Emin Gün Sirer launches Ava Labs in stealth to build a new cryptonetwork that offers high throughput, fast confirmation times, and decentralization for a wide range of dApps.

**June 2020:** Ava Labs closed a $12 million private sale of its AVAX token led by Galaxy Digital, Initialized Capital, NGC Ventures and Dragonfly Capital.

**August 2020:** Everest public testnet was launched, which was a fully-featured version of the network before mainnet. It added NFT support, more advanced smart contract utility, and network fees.

**May 2019:** Ava Labs comes out of stealth and launches private testnet of the Avalanche protocol that was first proposed in 2018.

**May 2020:** Denali incentivized public testnet was launched, distributing two million tokens to contributors.

**July 2020:** Ava Labs raised $42 million during a 4.5 hour public sale of its AVAX token. The proceeds of the raise are used to continue growth and development of the network.

**September 2020:** Ava Labs launches the mainnet for its Avalanche protocol to support a wide range of projects including stablecoins, lending, and swaps.
Cryptonetworks Are Platforms For The Next Era Of The Web
Web 3.0 promises to give users back control of their data & privacy

- The internet continues to evolve. Web 1.0 PC networks connected us online and gave access to information and e-commerce payment gateways. Web 2.0 mobile-first social networks connected us to online communities while algorithms used our data to optimize user experience. Web 3.0 cryptonetworks consist of trustless protocols giving users back control of their data and privacy with DeFi applications natively embedded.

Figure: Evolution of the Web
Avalanche Aims To Develop A Fully Internet-Native Economy

Avalanche may solve technical issues to support full range of dApps

- Early cryptocurrencies offered global, decentralized, non-sovereign, digital money. The second wave of crypto platforms built on the core technology and enabled the creation of ecosystems of programmable dApps. These dApps included DeFi products, NFT collectibles, and other yield-generating apps and use cases. However, these platforms proved to be slow and expensive, ushering in the third wave of cryptonetworks supporting a wider range of dApps.

Figure: Cryptonetwork Progression & Attributes

Wave 1
- Global
- Decentralized
- Digital Money

Wave 2
- Open & Permission-less
- Programmable dApps
- Layer-2 DeFi Protocols

Wave 3
- Low Fees & High Scalability
- Protocol Interoperability
- Fully Digital Economy

Source: FSInsight
Third-party developers are rapidly deploying new DeFi products on the Avalanche (Contracts) C-Chain. These decentralized applications span decentralized exchange, liquidity mining, lending, synthetic assets, and more.

Since its launch February 9th, Pangolin Exchange had $855M+ in total trading volume and $250M+ total liquidity. As tooling and DeFi primitives continue to be built, we expect more developers will flock to the Avalanche platform.

Figure: DeFi & Web3 Ecosystem Projects

Source: FSInsight, Ava Labs, Pangolin Exchange
Avalanche Consensus Is Competitive With Leading Protocols
AVAX token accrues value as usage of the network increases

- AVAX is the native token of the network and is expected to accrue value as it secures the network, pays for transaction fees, and provides the basic unit of account between the multiple blockchains deployed on the network.
- Avalanche consensus does not require proof-of-work, it is energy efficient and green. It is expected to offer a strong probabilistic safety guarantee in the presence of adversarial actors without sacrificing throughput and scalability.

Figure: AVAX Token & Avalanche Consensus Overview

<table>
<thead>
<tr>
<th>AVAX Token Overview</th>
<th>Avalanche Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
<td>Validator Receives Many Tx's</td>
</tr>
<tr>
<td>Native Platform</td>
<td>Confirm Tx is Valid</td>
</tr>
<tr>
<td>Primary Purpose</td>
<td>Valid?</td>
</tr>
<tr>
<td>Price</td>
<td>No</td>
</tr>
<tr>
<td>$28.13</td>
<td>Ignore</td>
</tr>
<tr>
<td>52 Wk Range (High/Low)</td>
<td>Query K Validators on Preferred Tx's</td>
</tr>
<tr>
<td>$59.94 / $2.79</td>
<td>Select K Random Validators (Weighted by Stake)</td>
</tr>
<tr>
<td>Market Cap ($M)</td>
<td>Begin Repeated Random Subsampling</td>
</tr>
<tr>
<td>$3.6B</td>
<td>Add Tx to List of Valid Tx's</td>
</tr>
<tr>
<td>24H Volume</td>
<td>Update Tx Confidences</td>
</tr>
<tr>
<td>$210.9M</td>
<td>Confidence Threshold Met?</td>
</tr>
<tr>
<td>Circulating Supply</td>
<td>Yes</td>
</tr>
<tr>
<td>128.0M</td>
<td>Reject Any Tx's That Conflict With Accepted Tx</td>
</tr>
<tr>
<td>Initial Supply (Locked &amp; Unlocked) / Fully Diluted Supply</td>
<td>No</td>
</tr>
<tr>
<td>360M / 720M</td>
<td>Accept</td>
</tr>
<tr>
<td>Supply Staked (SM) / % Initial Supply Staked</td>
<td>Yes</td>
</tr>
<tr>
<td>$297.4M / 82.6%</td>
<td>Consensus: Classical vs Nakamoto vs Avalanche</td>
</tr>
<tr>
<td>Supported Exchanges</td>
<td>Classical</td>
</tr>
<tr>
<td>OKCOIN</td>
<td>-</td>
</tr>
<tr>
<td>Binance</td>
<td>-</td>
</tr>
<tr>
<td>BITFINEX</td>
<td>✓</td>
</tr>
<tr>
<td>Huobi</td>
<td>✓</td>
</tr>
<tr>
<td>FTX</td>
<td>-</td>
</tr>
<tr>
<td>Node / Staking Services</td>
<td>OKCOIN</td>
</tr>
<tr>
<td>ALLNODES</td>
<td>✓</td>
</tr>
</tbody>
</table>

Consensus: Classical vs Nakamoto vs Avalanche

- Classical: Scalable, Highly Decentralized, Low Latency, High Throughput, Lightweight, Green, Sustainable
- Nakamoto: Scalable, Highly Decentralized
- Avalanche: Scalable, Highly Decentralized, Low Latency, High Throughput, Lightweight, Green, Sustainable

Source: FSInsight, Ava Labs, Coinbase
Avalanche Architecture Enables Platform To Scale With Usage

Subnets can be launched to optimize for specific use cases

- Avalanche features three built-in blockchains (subnets) which are all validated and secured by the Primary Network. A subnet is a dynamic set of validators working together to achieve consensus on the state of a set of blockchains.
- Subnets are highly customizable blockchains, allowing for the creation of networks with unique properties and predefined rules such as type of virtual machine, governance, membership parameters, and regulatory compliance.

Figure: Avalanche Network Architecture Diagram

**Primary Avalanche Network**

The Primary Network is a special subnet, and the members of all custom subnets must be a member of the Primary Network by staking at least 2,000 AVAX. The Primary Network validates the three built-in blockchains.

**Exchange Chain (X)**

The X-Chain is the default asset chain on Avalanche and enables the creation of new assets, exchanging between assets, and cross-subnet transfers.

**Platform Chain (P)**

The P-Chain is the metadata chain on Avalanche and coordinates validators, keeps track of active subnets, and allows for the creation of new subnets.

**Contracts Chain (C)**

The Contract Chain is the default smart contract chain on Avalanche and enables the creation of any Ethereum-compatible smart contracts.

X-Chain use cases can also occur on C-Chain

Source: FSInsight, Ava Labs
Ethereum Bottleneck Is Pricing Out Users & Transactions
New protocols may enable products requiring cheaper transactions

- As users dive into new DeFi products, transaction fees on the Ethereum blockchain have skyrocketed. High transaction fees can limit certain use cases and price out smaller users/transactions from the network.
- Ethereum has shown it is useful and has established significant network effects. However, new layer-one protocols focused on scalability and low fees could grow complementary ecosystems and enable novel use cases.

Figure: Ethereum Network 7-day Rolling Average Transaction Fee and Median Transfer Value
Date: 3/1/2020 – 3/21/2021

Source: FSInsight, CoinMetrics
AVAX Is Competitive In Terms of Scalability, Security & Speed

Avalanche Consensus aims to deliver performance without tradeoffs

- In order to host a wide range of decentralized applications and build a robust digital economy, the blockchain base-layer must offer decentralization, security, and scalability with low transaction fees.
- Avalanche’s mainnet already offers a transaction settlement layer with characteristics that are highly competitive with the leading staking networks and proof-of-work cryptocurrencies across these metrics.

**Figure: Comparative Key Network Metrics**

<table>
<thead>
<tr>
<th></th>
<th>Scalability (TPS)</th>
<th># of Validators</th>
<th>Finality (Settlement Sec)</th>
<th>Transaction Fees ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avalanche</td>
<td>4,500</td>
<td>890</td>
<td>2</td>
<td>$0.04</td>
</tr>
<tr>
<td>Bitcoin</td>
<td>1,500</td>
<td>14</td>
<td>3600</td>
<td>$11.07</td>
</tr>
<tr>
<td>Ethereum</td>
<td>1,000</td>
<td>56</td>
<td>120</td>
<td>$8.70</td>
</tr>
<tr>
<td>Algorand</td>
<td>1,000</td>
<td>100</td>
<td>22</td>
<td>$0.001</td>
</tr>
<tr>
<td>Cosmos</td>
<td>1,000</td>
<td>125</td>
<td>7</td>
<td>$0.0040</td>
</tr>
<tr>
<td>Polkadot</td>
<td>1,500</td>
<td>40</td>
<td>60</td>
<td>$0.00003</td>
</tr>
<tr>
<td>Ripple</td>
<td>1,000</td>
<td>40</td>
<td>5</td>
<td>$0.001</td>
</tr>
<tr>
<td>Stellar</td>
<td>0</td>
<td>40</td>
<td>0</td>
<td>$0.004</td>
</tr>
</tbody>
</table>

Source: FSInsight, Avascan, StakingRewards
Approximately 50% of the token distribution is allocated as staking rewards and the remaining 50% is split between public and private sale investors, the Avalanche Foundation, the Ava Labs team, grant program, and token airdrop.

AVAX has a burn and mint model in which user transaction fees are burned and newly minted tokens are rewarded to validators. In the long run, token burns may cause the network to be deflationary as tokens are removed from circulating supply.

Figure: AVAX Issuance Schedule and Initial Token Distribution

AVAX Token Supply Issuance Schedule
Supply cap of 720M with initial mainnet supply of 360M at launch

AVAX Token Distribution
Allocations to various stakeholders
AVAX Incentivizes Token Lockup With High Staking Rewards
Staking reduces circulating supply & allows the network to function

- Validators play a crucial role in processing transactions and securing the network. They must stake at least 2,000 AVAX to participate and receive token rewards based on proof-of-uptime and proof-of-correctness.
- AVAX also has governance properties and network nodes can vote on certain protocol parameters by staking. These may include specific protocol developments and the inflation/reward rate within pre-established boundaries.

Figure: Competing Layer 1 Staking Rewards and % of Supply Staked
Date: 3/31/2021

Total AVAX Staked / Value Staked ($USD)
297,369,844 / $8.37B

Staking Rewards (annualized) 10.62%

Staking Ratio (% of Supply) 78.02%

Total Active Validators / Delegators 890 / 6,302

Source: FSInsight, Avascan, Ava Explorer, StakingRewards

Top Layer 1 Staking Rewards

<table>
<thead>
<tr>
<th></th>
<th>Reward - LHS %</th>
<th>Total Staked (% of Circulating Supply) - RHS %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tron</td>
<td>3.21</td>
<td>13.04</td>
</tr>
<tr>
<td>Tezos</td>
<td>27.94</td>
<td>78.02</td>
</tr>
<tr>
<td>Cardano</td>
<td>7.18</td>
<td>7.83</td>
</tr>
<tr>
<td>ETH 2.0</td>
<td>3.09</td>
<td>78.15</td>
</tr>
<tr>
<td>Cosmos</td>
<td>8.93</td>
<td>8.93</td>
</tr>
<tr>
<td>Polkadot</td>
<td>65.17</td>
<td>13.04</td>
</tr>
<tr>
<td>Avalanche</td>
<td>10.62</td>
<td>10.62</td>
</tr>
</tbody>
</table>

Source: FSInsight, Avascan, Ava Explorer, StakingRewards
Beyond DeFi and Web 3.0, the Avalanche Foundation and Ava Labs are building out tooling and infrastructure to support a wide range of crypto products and use cases.

Integrations with the leading crypto exchanges, wallets, stablecoins, and asset tokenization projects could fast track adoption and incentivize users to engage with the Avalanche network.

Figure: Avalanche Ecosystem Partnerships & Projects

<table>
<thead>
<tr>
<th>DeFi</th>
<th>Exchanges</th>
<th>Wallets</th>
</tr>
</thead>
<tbody>
<tr>
<td>hummingbot</td>
<td>Binance, FTX</td>
<td>Ledger, Metamask</td>
</tr>
<tr>
<td>Arrow DFMs</td>
<td>OKCoin, OKEx</td>
<td>AVALANCHE WALLET</td>
</tr>
<tr>
<td>Reef, UNION</td>
<td>Bitfinex</td>
<td>COIN98 WALLET</td>
</tr>
<tr>
<td></td>
<td>Huobi, Voyager</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NFT / Gaming / DEX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyient Games</td>
<td>BiLira</td>
<td>Republic, aleph.im</td>
</tr>
<tr>
<td>Sushiswap</td>
<td>Dexter</td>
<td>SECURITIZE, bloq</td>
</tr>
<tr>
<td>Yeti Swap</td>
<td>e-Money</td>
<td>Magic, Ankr</td>
</tr>
<tr>
<td>Yeti Swap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pangolin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complus Network</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jelly Swap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>trusttoken</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: FSInsight, Ava Labs
Avalanche-X Grant Program Bootstraps Ecosystem Growth
Inviting developers to build critical infrastructure and products

- The grant program is designed to kickstart growth and provide resources for developers and other participants to grow the Avalanche ecosystem. 7% of the total token supply (~50 million AVAX) will be allocated to the Community & Developer Endowment, of which the Avalanche-X program is part.
- To date, the program has funded critical infrastructure and applications including block explorers, payment and trading products, an educational platform, and node and wallet infrastructure, amongst other tooling.

Figure: Avalanche-X Grant Program

<table>
<thead>
<tr>
<th>Eligibility</th>
<th>Project Requirements</th>
<th>Grant Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ava Labs will consider all applications, whether the applicant is new to the space or a seasoned developer, as long as they want to help grow the Avalanche ecosystem.</td>
<td>All projects must contribute to the growth of Avalanche, as a fully open-source and decentralized ecosystem.</td>
<td>The grant amount depends on the complexity and scope of the project. The maximum limit is $250,000 unless otherwise stated for specific grants.</td>
</tr>
</tbody>
</table>

Cohort 1
May 19, 2020
- Applications
  - Blockchain Academy Chile
  - NoTex
- Financial Products
  - Protocoh
  - JellySwap
- Tooling / Infra
  - AVADO
  - Figment
  - KURTOSIS

Cohort 2
October 6, 2020
- User Services
  - ablock
  - Magic
- Block Explorers
  - VSCOUT
  - AVASCAN
- Tooling / Infra
  - TESSERACT
  - HALBORN

Source: FSInsight, Ava Labs
# Appendix - Comparison of network stats, category descriptions and sources

<table>
<thead>
<tr>
<th></th>
<th>Scalability (TPS)</th>
<th># of Validators (Consensus Nodes)</th>
<th>Security (Settlement Sec)</th>
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<td>1,500</td>
<td>40</td>
<td>4</td>
<td>$0.001</td>
</tr>
<tr>
<td>Stellar Lumens</td>
<td>1,000</td>
<td>40</td>
<td>5</td>
<td>$0.004</td>
</tr>
</tbody>
</table>

### Description

**Scalability**
Throughput (transactions per second) capacity of the network

**Consensus Nodes**
Number of nodes/miner entities primary affecting technical network consensus (issuing ledger changes) in the last 24 hours

**Finality**
Number of seconds before a transaction is expected to be considered secure against double spend attempts based on historical precedent of reversed transactions

**Transaction Fees**
Average transaction fee on the network

Source: FSInsight, Ava Labs, Avascan, Ethernodes, Bitnodes, Subscan, Ripple, TheBlock

Sources:
- [https://avascan.info/staking/validators](https://avascan.info/staking/validators)
- [https://polkadot.subscan.io/validator](https://polkadot.subscan.io/validator)
- [https://www.etherchain.org/charts/topMiners](https://www.etherchain.org/charts/topMiners)
- [https://www.blockchain.com/charts/pools](https://www.blockchain.com/charts/pools)
- [https://stellarbeat.io/](https://stellarbeat.io/)
- [https://polkadot.subscan.io/tools/charts](https://polkadot.subscan.io/tools/charts)
- [https://ethgasstation.info/](https://ethgasstation.info/)
- [https://bitinfocharts.com/comparison/bitcoin-transactionfees.html](https://bitinfocharts.com/comparison/bitcoin-transactionfees.html)
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