Grow the Pie: Protocol Development Is Here to Stay

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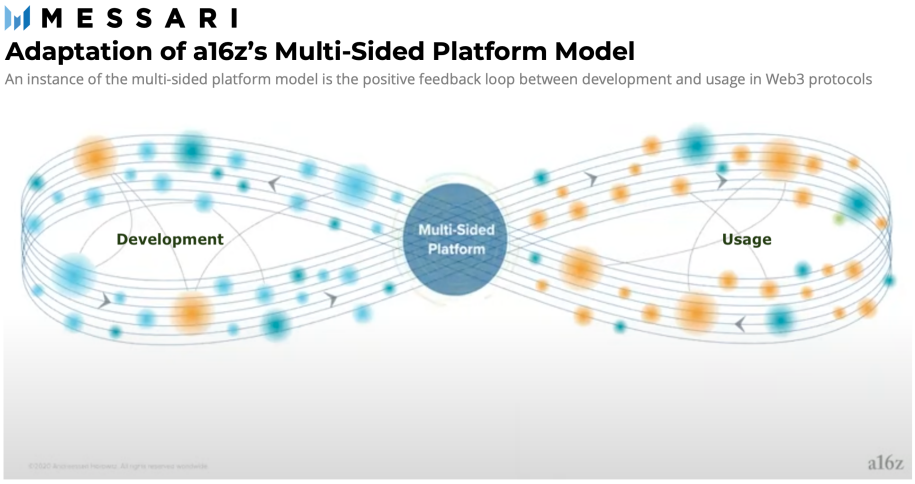
How do technology platforms capture and increase their value over the long-term? According to a16z, the core template for value capture in Web3 protocols is the alignment of incentives between developers and users. This often translates into a positive feedback loop between code development and application usage: On one hand, sustained code development fosters the creation of widely-used applications; on the other hand, wide application usage incentivizes further development of new protocol functionalities.



Source: a16z, Messari

Note: for simplicity, we illustrate one specific example of the positive feedback loop. Several such feedback loops occur between protocol ecosystem participants: developers, validators, capital providers, and users.

This positive feedback loop differs from the ad-based value capture model in Web2 platforms monetized by Amazon, Youtube, or Uber. While value in Web2 platforms is usually generated by content creators, only a chunk of ad revenues flows back to content creators. To be able to maintain and increase value over time, Web2 platforms usually incentivize content creators to continue to generate valuable content over the long-term.

In contrast, incentive alignment in Web3 is more straightforward, in part thanks to the more transparent nature of open-source software development. The mechanics of this incentive alignment are as follows: Applications are developed by open-source communities on top of Web3 protocols. As these applications get adopted by users, more capital flows back into the protocols. Thus, value is captured at the protocol layer. This often translates into superior protocol functionalities that support new applications. As these new applications get adopted by more users, developers are incentivized to further build on top of "composable" Web3 protocols. As Layer 1 protocols are increasingly gaining adoption, sustained code development is paramount to create a lock-in effect that "grows the pie" over time.

Yet, when analyzing Web3 protocol success in the long-term, few analysts systematically assess code development activity. In fact, most analysis focuses on on-chain metrics for usage (e.g. number of wallets, number of applications, flow of funds, trading volume, public sentiment, or media awareness). While most on-chain analysts agree on the importance of code development for Web3 protocol success in the long-term, the topic is still largely considered abstract.

Missing Piece: Development Metrics in Action

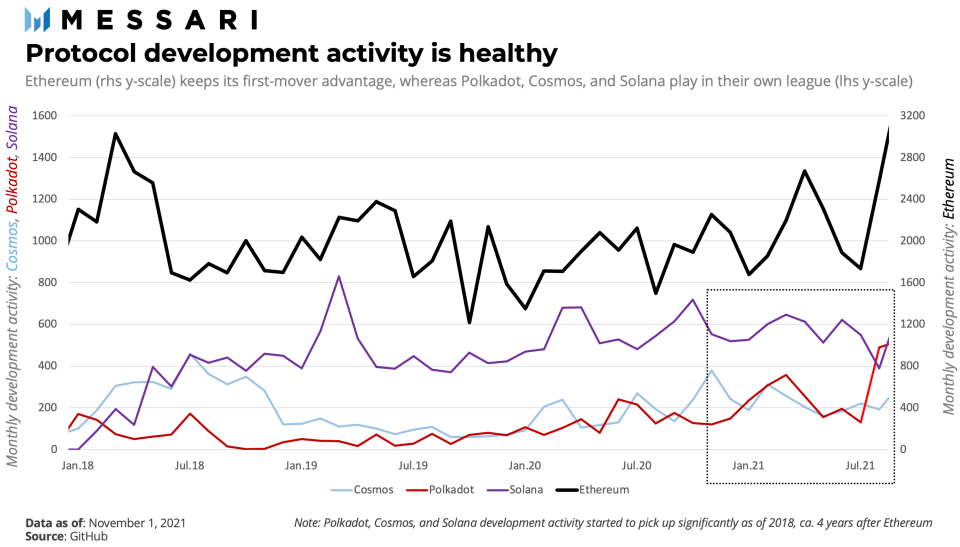
To help address this gap, Santiment and CoinGecko offer custom developer activity metrics. These metrics attempt to capture code development progress in GitHub repos in isolation, on an individual-project basis. A recent report from Galaxy Digital concluded, in terms of code development, alternative Layer 1s are closing in on Ethereum's heels. While acknowledging difficulties in quantifying development activity, the report provides a static comparison of the number of bookmarks for core GitHub repositories as a proxy of where talent is currently focused. Another recent report from The Block provides a framework for comparing Layer 1 protocols. The report acknowledges the importance of developer activity in understanding growth prospects. As a proxy for developer community size, the report uses social media followings from a static snapshot of Github and Discord data. However, what both reports are missing is an aggregated, longitudinal understanding of sustained code development trends in context. To address this shortcoming, let's analyze GitHub open-source code development in terms of:

- Development activity: Aggregates the number of code contributions in GitHub
- Developer community: Aggregates the number of developers who authored at least one code contribution

Below we put these metrics to work as part of a comparative study of four of the most established Web3 protocols ordered by their age: Ethereum, Cosmos, Polkadot, and Solana. One may apply the same methodology to any other Web3 protocols that gain traction.

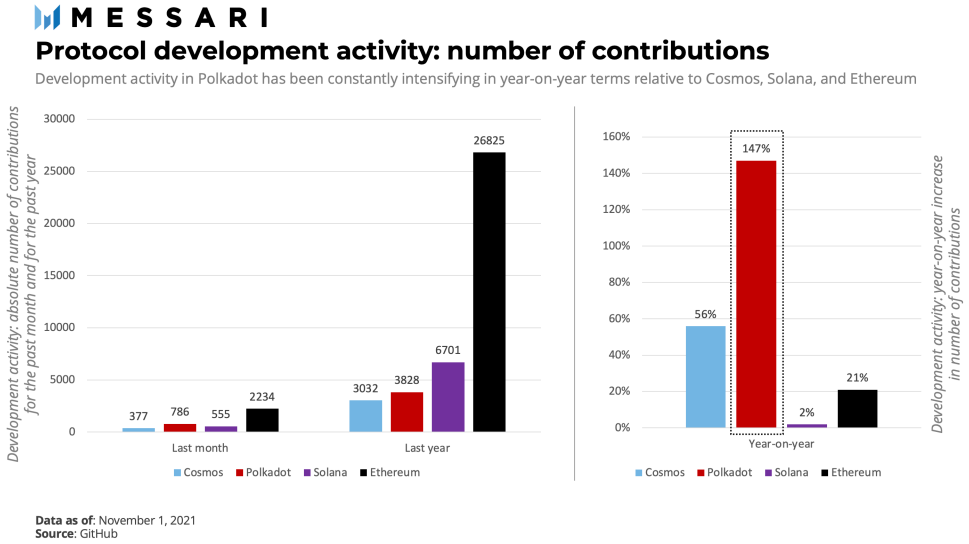
Protocol Development Activity

Overall development activity is healthy and the trend is positive across all four protocols. Ethereum managed to keep its first-mover advantage since 2014, whereas Cosmos, Polkadot, and Solana development started to pick up significantly past 2018.



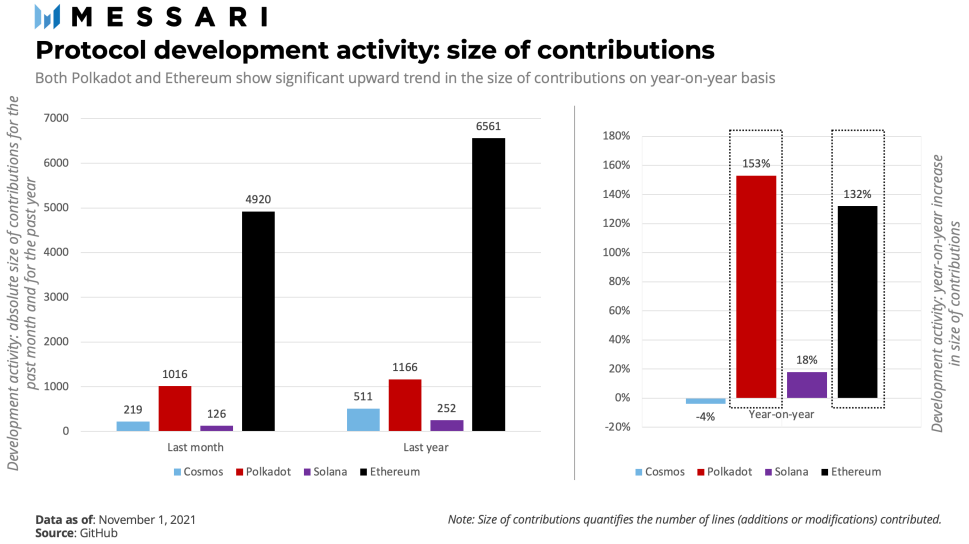
While Solana has a high number of monthly code contributions (ca. 500) over the past three years, Polkadot is trending higher in 2021. To put that in perspective, Polkadot has been surpassing Cosmos ever since Q1 2021 and is on par with Solana since Q3 2021. This uptake in Polkadot protocol development activity appears to happen around the timeframe of the releases that precede the first Parachain slot auction in November 2021. At the same time, Cosmos appears to maintain its long-term, steady pace of development.

This trend is consistent when comparing year-on-year contributions below. In this sense, development activity in Polkadot has picked up significantly this year compared to Cosmos, Solana, and Ethereum.



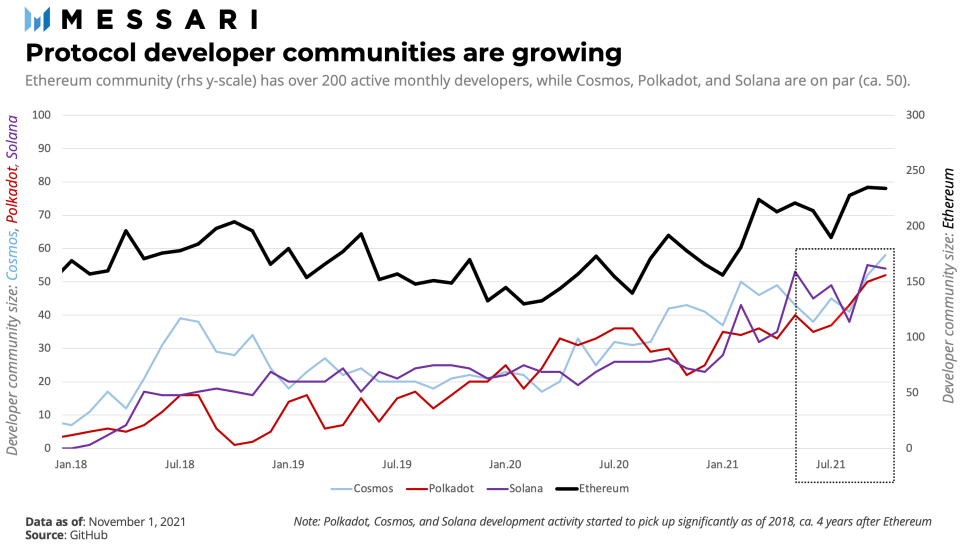
Next, let's look into the size of contributions, measured as the lines of code (additions or modifications) contributed. While taking into account variances across programming languages, larger contributions tend to correspond to more substantial changes in the code. Thus, the size of code contributions can be a suitable proxy for substantial code develop-

ments. In this sense, Ethereum clearly distinguishes itself as beneficiary of larger contributions compared to Cosmos, Polkadot, and Solana. It should be noted, however, both Polkadot and Ethereum show significant upward trend on a year-on-year basis. This is consistent with the above finding on the number of code contributions.



Protocol Developer Community

Active developer communities continue to rise for each of the four protocols: Ethereum has reached close to 250 active monthly developers, whereas Cosmos, Polkadot, and Solana are relatively on par with one another at ca. 50 active monthly developers. Interestingly enough, Polkadot, Cosmos, and Solana have all managed to attract an increasing number of monthly active developers recently. This is in line with the capital and talent migration currently happening from Web2 towards Web3 development.



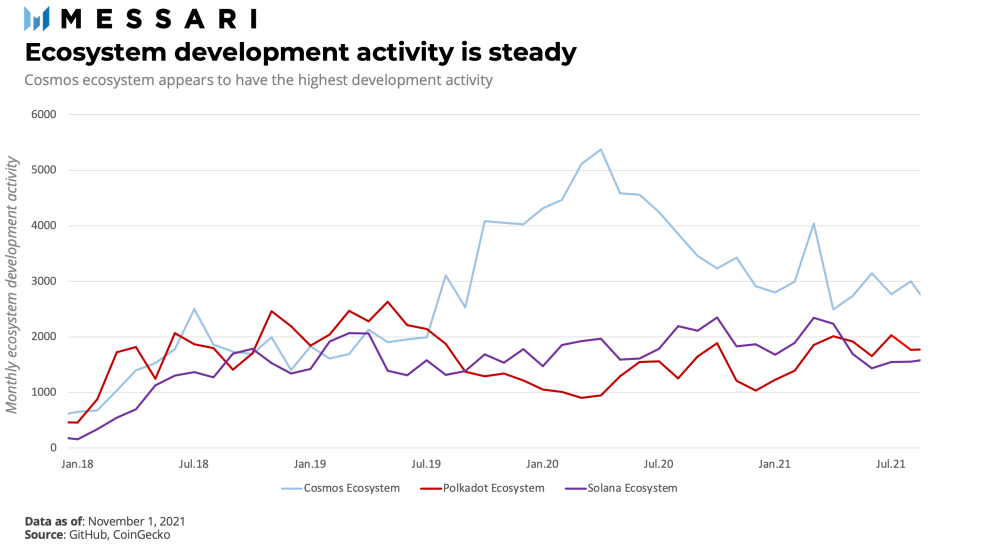
This upward trend in development community size is great news for the blockchain space: developers are here to stay and push further effort into sustained protocol developments.

Ecosystem View

That being said, protocols themselves produce value only as long as they have thriving ecosystems of applications that are useful and used. These application ecosystems are developed by open-source communities on top of the protocols themselves. In an attempt to quantify the development activity at application ecosystem level, we: (1) selected all projects among top 300 by market-cap in CoinGecko corresponding to each protocol ecosystem (Cosmos, Polkadot, and Solana), and (2) removed cross-chain projects. This resulted in: Cosmos ecosystem - 15 projects among top 300; Polkadot ecosystem - 9 projects among top 300; Solana ecosystem - 13 projects among top 300, as per November 1, 2021. Note that Ethereum is excluded from this comparison. The reason is that counting all new projects currently in development on Ethereum is impractical at this point due to the very fast growth and sheer size of the Ethereum ecosystem.

Ecosystem Development Activity

While all three ecosystems have steady development activity, the Cosmos ecosystem stands out. The graph below shows that platforms and applications built on top of each of the three protocols attract significant development effort. This development is sustained over time.



Zooming in, when comparing year-on-year contributions, development activity in the Polkadot ecosystem has been intensifying on a year-on-year basis, especially relative to Cosmos and Solana ecosystems. Again, this intensification in Polkadot ecosystem activity precedes the first Parachain slot auction in November 2021.

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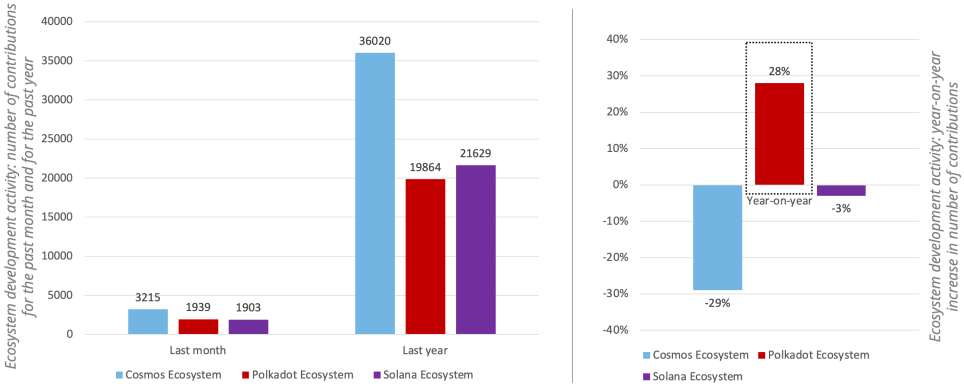
Ecosystem development activity: number of contributions

Development activity in Polkadot ecosystem has been constantly intensifying in year-on-year terms relative to Cosmos and Solana



Data as of: November 1, 2021
Source: GitHub, CoinGecko

In terms of size of contributions (measured as additions or modifications contributed to the code) on a year-over-year basis, Polkadot ecosystem (+32%) distinguishes itself on the upside relative to Solana (+9%) and Cosmos (+5%) ecosystems. This finding is consistent withthe above trend in the number of contributions.

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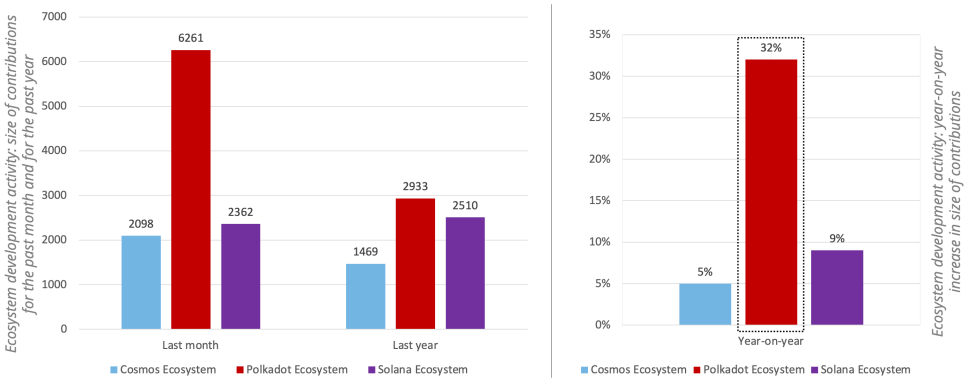
Ecosystem development activity: size of contributions

Polkadot ecosystem shows significant upward trend in the size of contributions on year-on-year basis



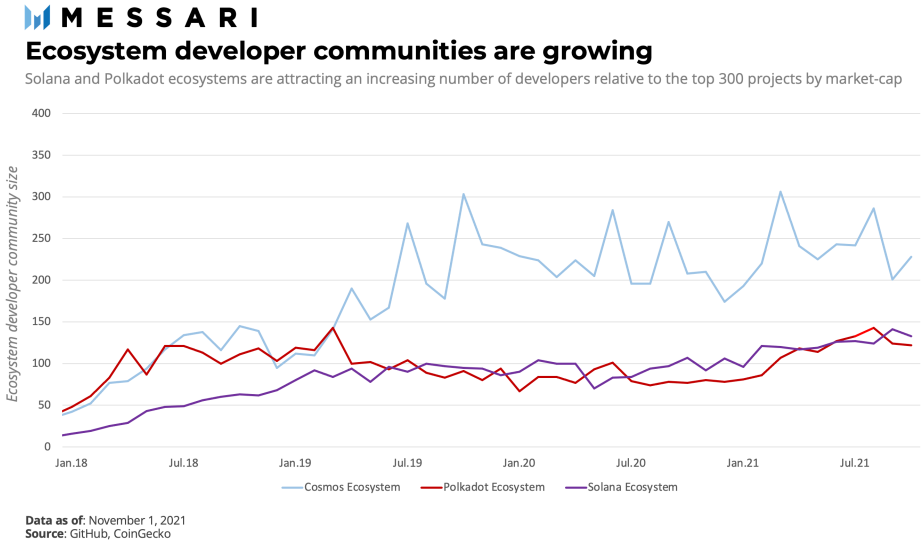
Data as of: November 1, 2021
Source: GitHub, CoinGecko

Note: Size of contributions quantifies the number of lines (additions or modifications) contributed.

Ecosystem Developer Community

In terms of growth in ecosystem developer communities, all three ecosystems appear to be attracting an increasing number of developers, with particular growth in the Solana and Polkadot ecosystems. Though many factors may be at play, one potential explanation for this uptake is that application development on the Solana and Polkadot blockchains is done in Rust – the most loved coding language among developers. Rust is a largely familiar coding language to the general developer community. This may make it easier for developers to build

more applications, thus potentially contributing to the year-on-year uptake in both Polkadot and Solana ecosystem developments.



Conclusion

Sustained code development is paramount for Web3 protocols to maintain value in the long-term. Beyond the hype around Web3 protocols, code development is healthy across all major protocols and their ecosystems.

From a *protocol* perspective, both Polkadot and Ethereum show significant upward trends in amount and size of contributions. At the same time, developer communities show healthy growth across all major protocols, with Ethereum clearly distinguishing itself as the largest and most active developer community. For the time being, Ethereum keeps its first-mover advantage relative to all other major protocols.

From an *application ecosystem* perspective, Polkadot ecosystem development activity has been intensifying recently, in line with the Parachain auctions; at the same time, the uptake in the developer community of Solana and Polkadot ecosystems might be due to the relative ease of building applications on both blockchains.

In a nutshell, developers are here to stay and "grow the pie" through sustained Web3 protocol developments. This is great news for application ecosystems building on top of major Web3 protocols.