

Developer Report

January - June 2019

The Developer Report is built on proprietary data from Electric Capital

Electric Capital is a digital asset management firm. We invest in programmable money and blockchain applications based on innovative technology, market adoption, and real use cases. We compile code, do security audits, run nodes to programmatically inspect the blockchain, have market intelligence based on proprietary software, and more.

electriccapital.com

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Contributor
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Twitter: @puntium

Why analyze developer activity?

1. Crypto networks are **new open platforms** on which a new generation of applications will be built.
2. A clear, early signal for an emerging platform is **engagement from developers**. Developers build the applications that deliver value to end users and customers, and set off a virtuous cycle attracting more developers.
3. The base layers of the crypto stack are uniquely **open source**, allowing us to analyze and understand developer engagement in an unprecedented way.
4. Electric Capital tracks developer adoption as a leading indicator of where **future value will be created and captured**.

Electric Capital indexed 27,000+ code repositories

...analyzed 22M commits to find original code authors

...across 3,400+ crypto ecosystems.

The Developer Reports compile findings from our ongoing research.

Help map the crypto ecosystem

We've opened our ecosystem map on GitHub so that anyone can contribute:

1. Submit a pull request in <https://github.com/electric-capital/crypto-ecosystems>
2. or email info@electriccapital.com

We will use this data for our reports going forward.

For more details on our methodology, consult our appendix.

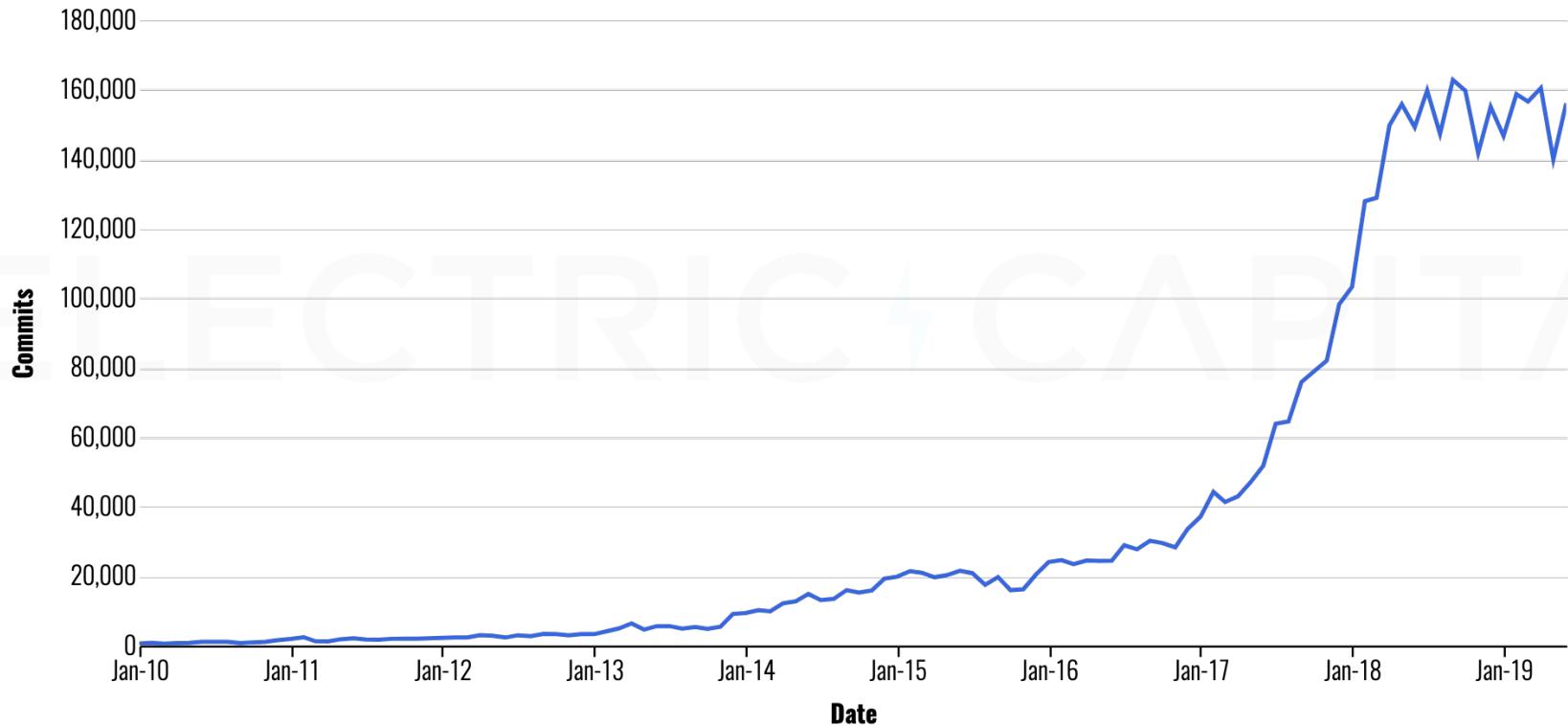
Executive Summary

1. Despite market downturns in 2018, **Full Time developers increased 13%** year-over-year in June 2019 and are **consolidating around high network value projects**.
2. **Code commit volume is consistent** but total monthly active developers are **down 10% Y/Y**.
3. **80% of developer loss** came from One Time per month and Part Time developers.
4. The biggest developer drop-off came from projects **outside of the Top 100** by network value.
5. **Smart Contracts, Infrastructure, and DeFi** ecosystems continue to gain Full Time developers.
6. Overall crypto ecosystems are approaching the size of well known open source projects such as Apache, but still has **plenty of space to grow**.

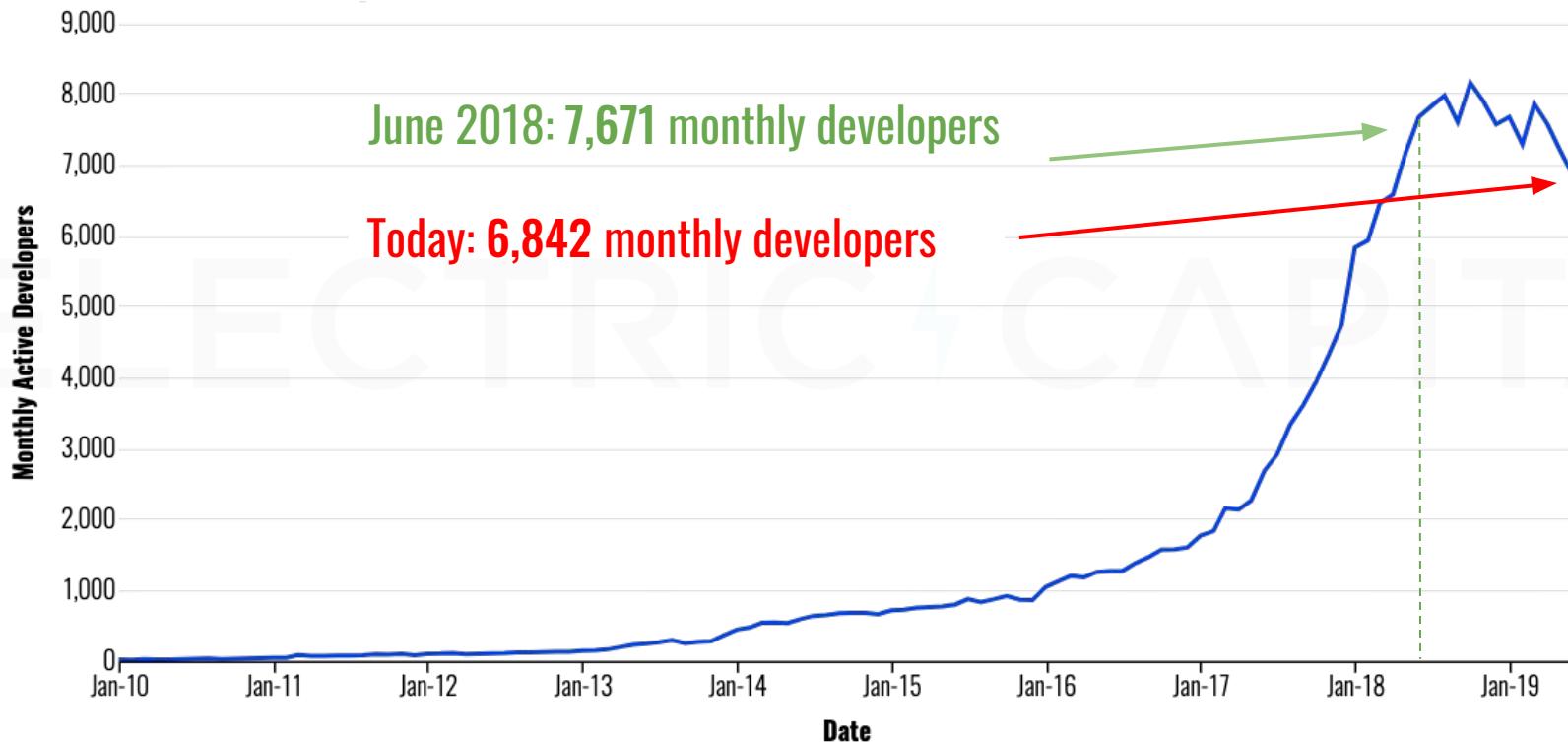
Part 0

Overview

During Crypto Winter, code commits across 27k repositories remained flat



But at first glance, open source crypto developers appear to be down...



Why does developer count appear to be down?

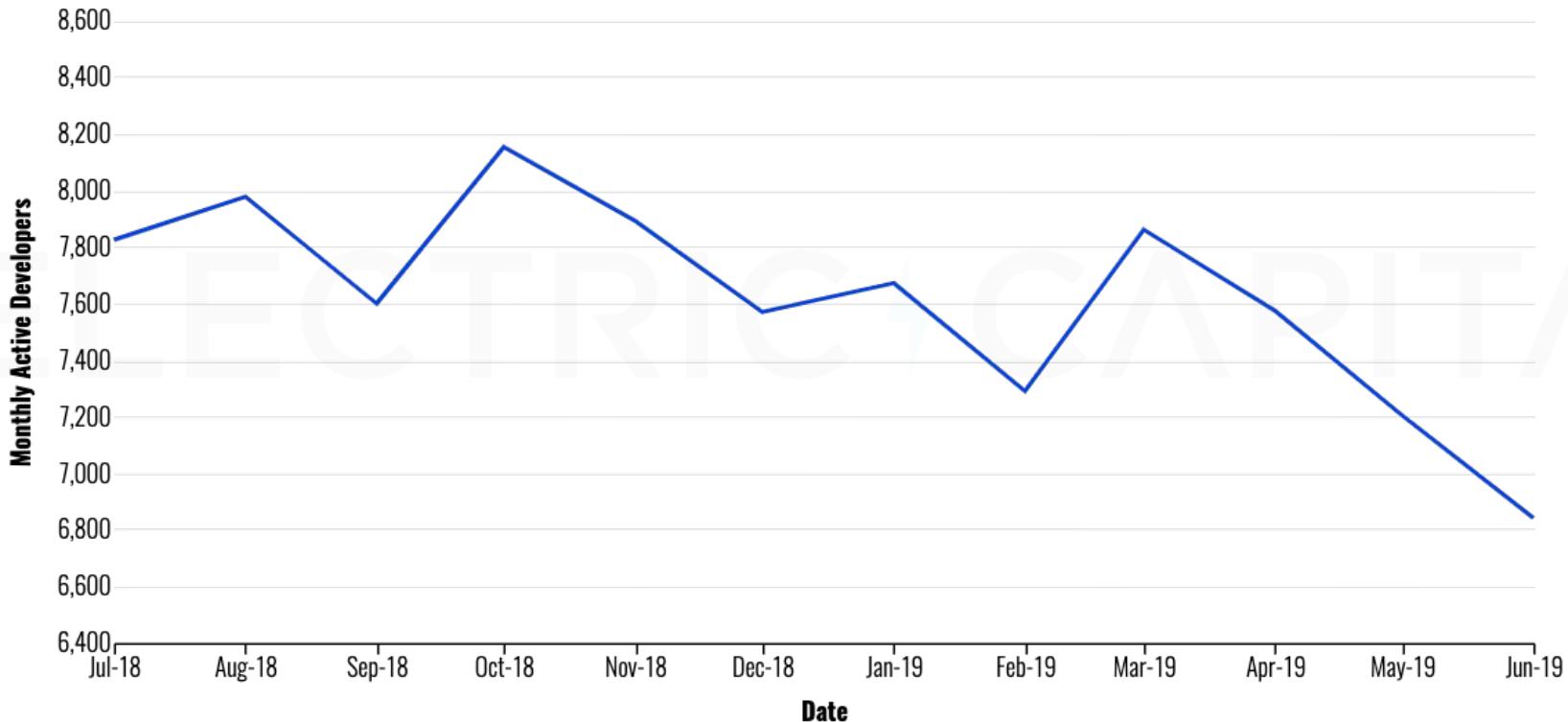
Let's segment by:

1. Frequency of Contribution
2. Top 100 Projects by Network Value
3. Project Category

Part 1

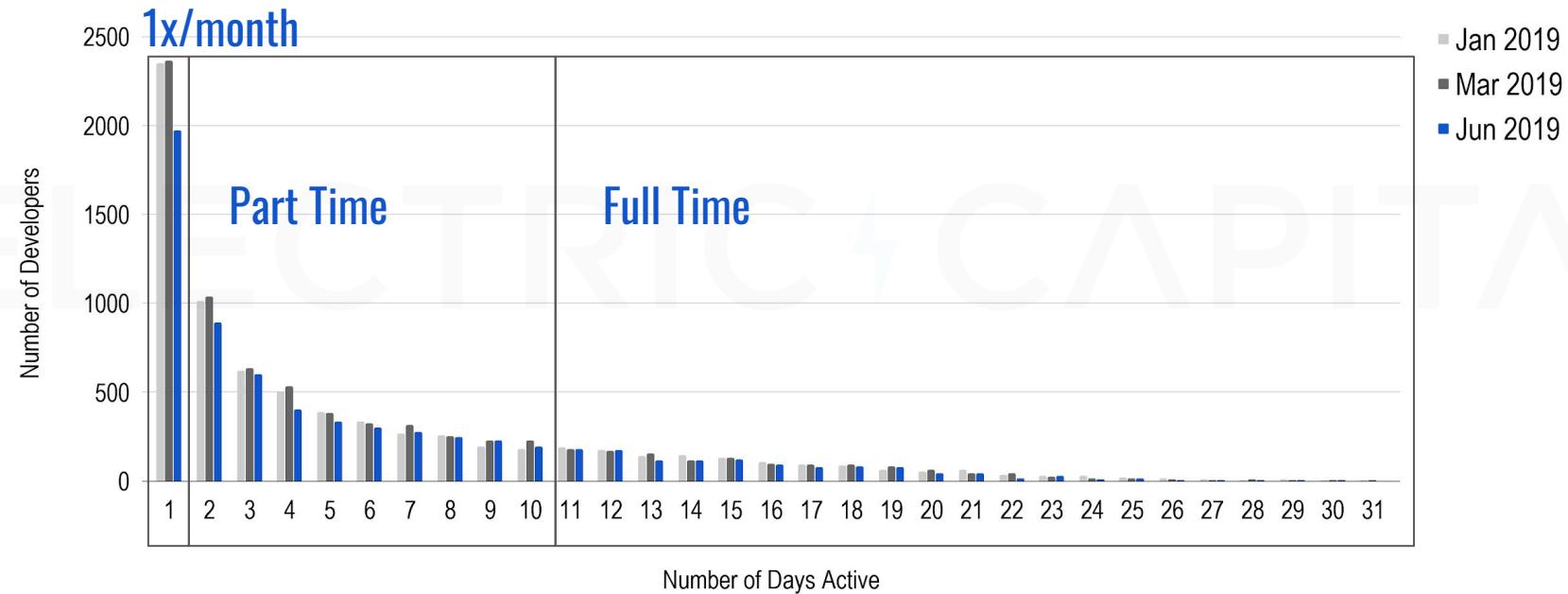
Type of Developer (Full Time, Part Time, One Time)

Crypto ecosystems lost 800+ developers in the last year...

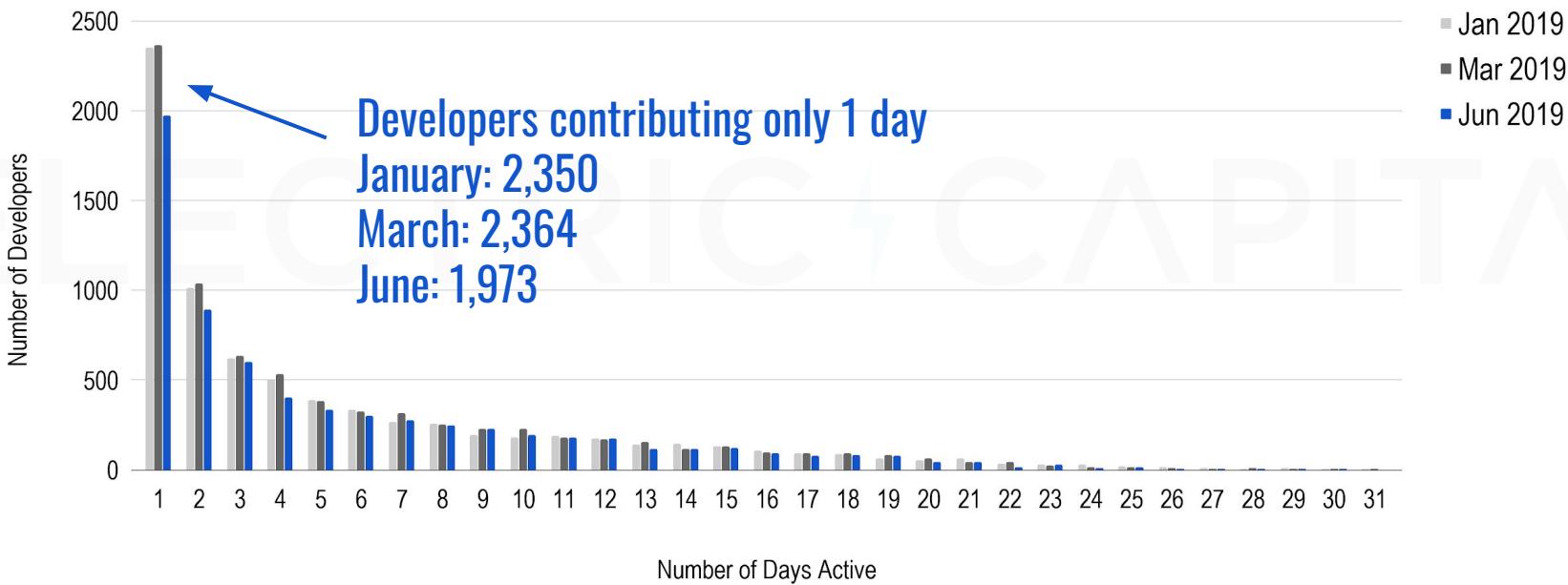


How frequently do these developers contribute?

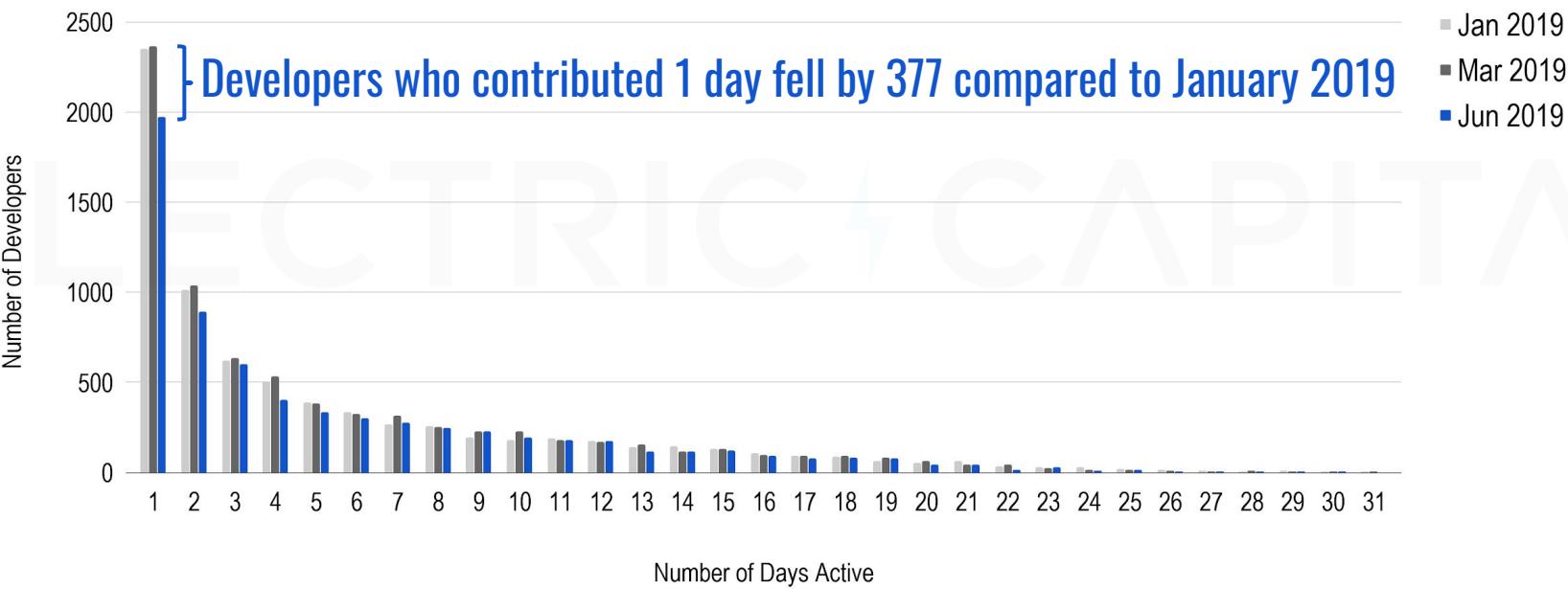
Let's bucket developers into One Time per month, Part Time, and Full Time



Most developers contribute infrequently and 29% contribute 1x/month

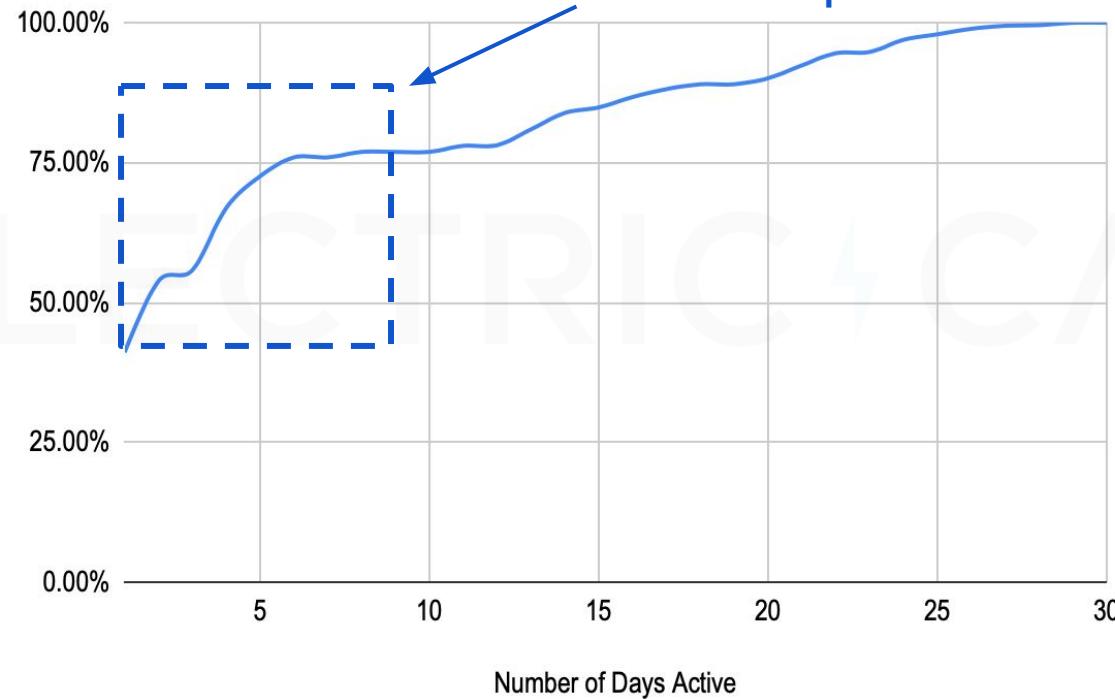


Almost 50% of developer loss came from these 1x/month contributors

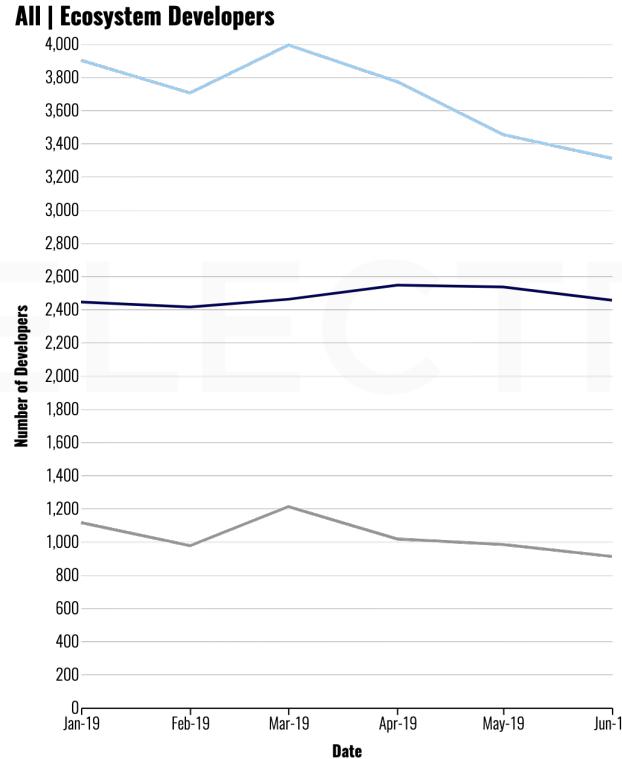


Almost 80% of Developer loss came from Part Time or 1x/month Contributors

77% of developer loss from devs active fewer than 10 days



Full Time developers stayed constant through H1 2019



Developer Type

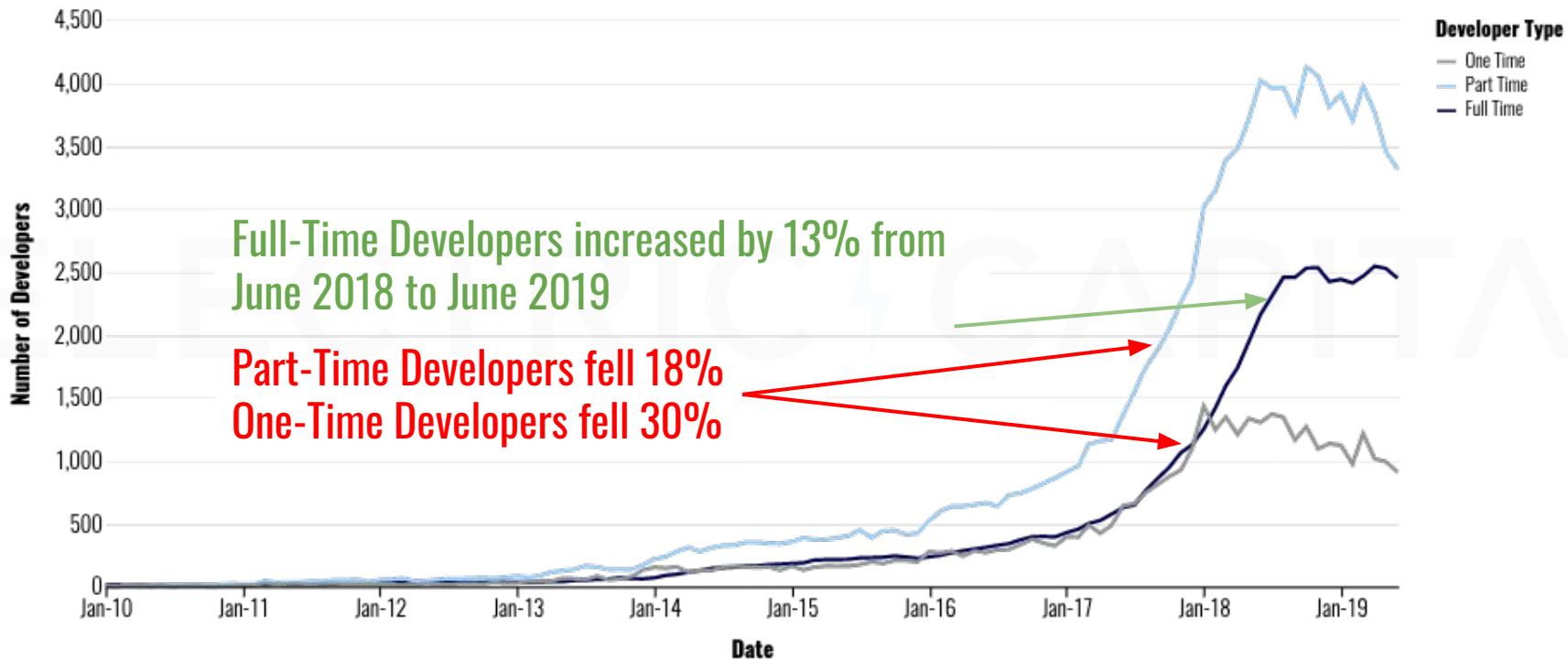
- One Time
- Part Time
- Full Time

Full Time developers stayed relatively constant through 2019

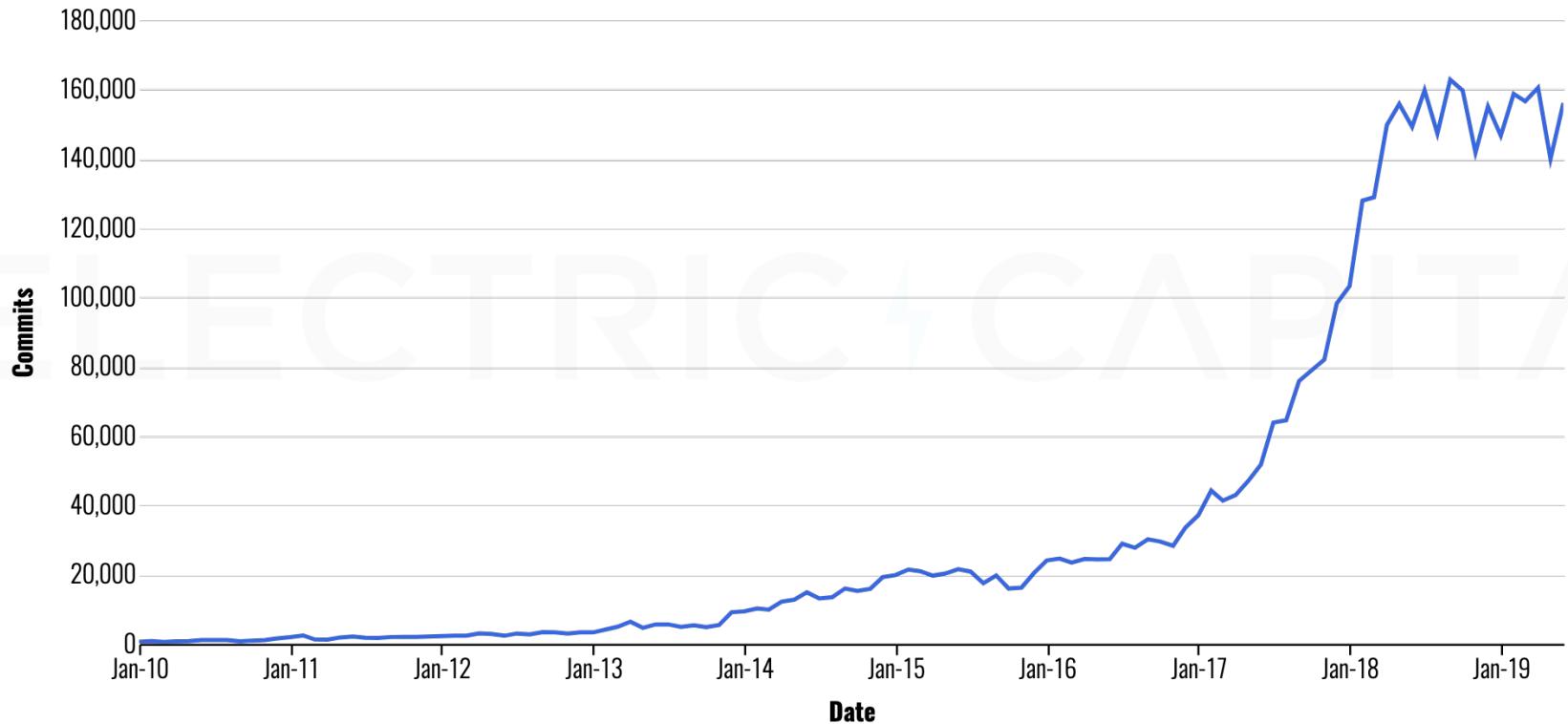
Jan 2019: 2,444
Jun 2019: 2,455

Zooming out to look at historical trends...

Full-Time developers increased YoY while infrequent contributors left



Since Full Time devs contribute the most, overall commit volume is consistent

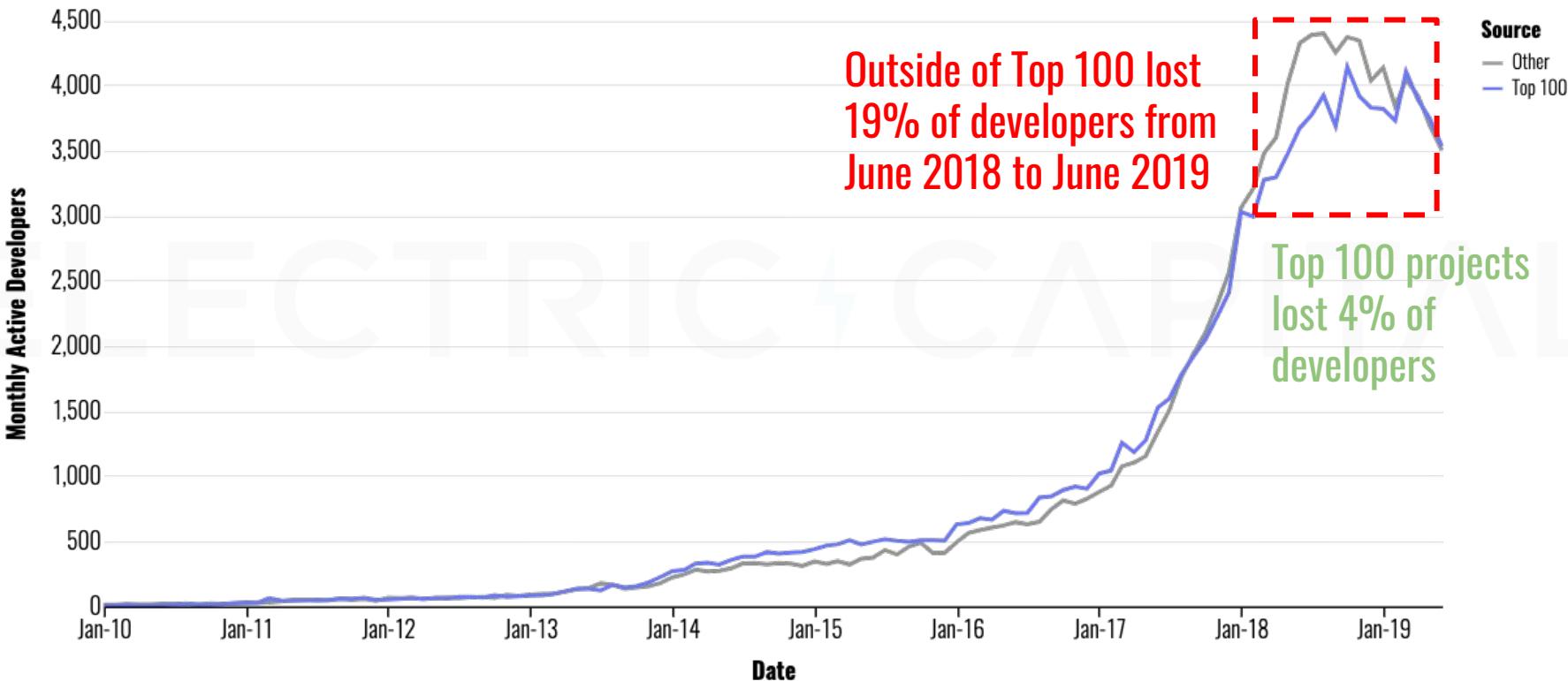


Is this consistent across top coins and projects?

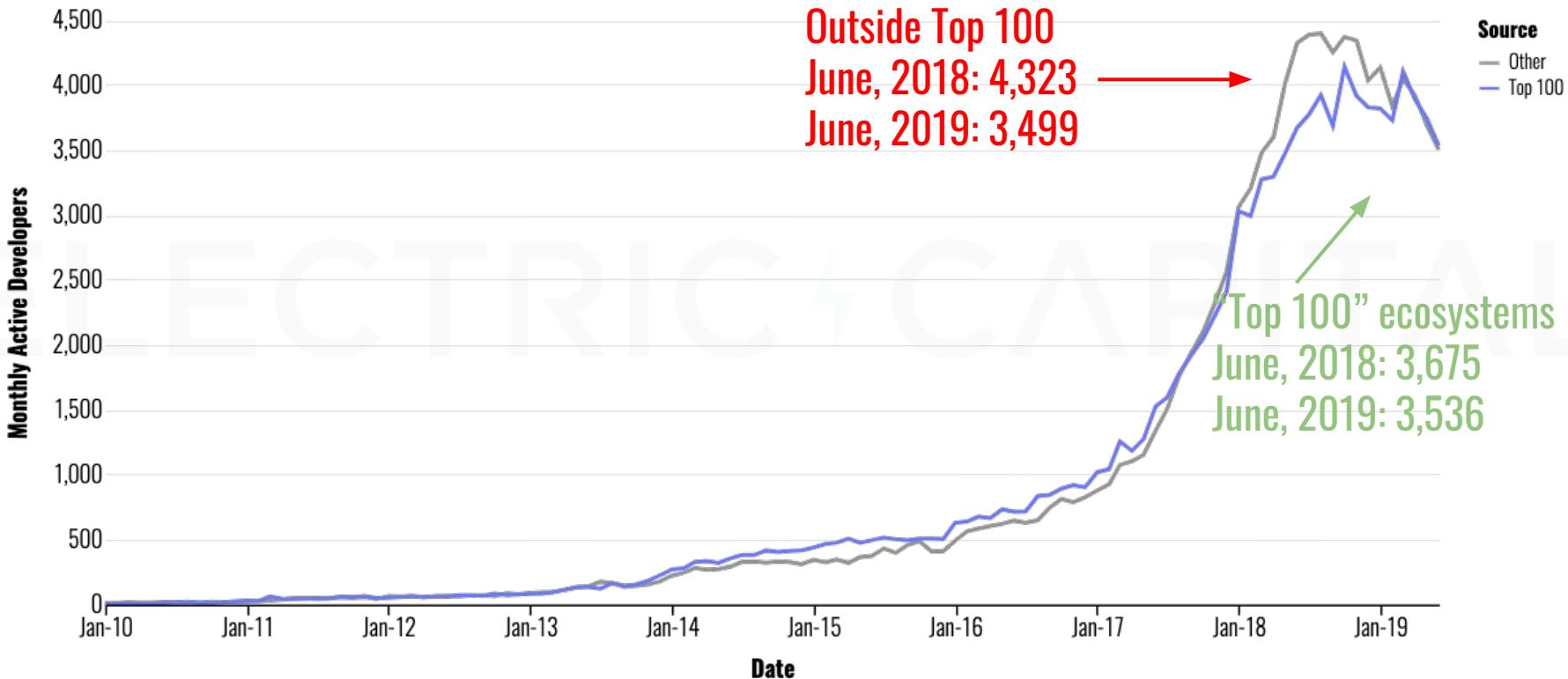
Part 2

Top 100 Ecosystems by Network Value

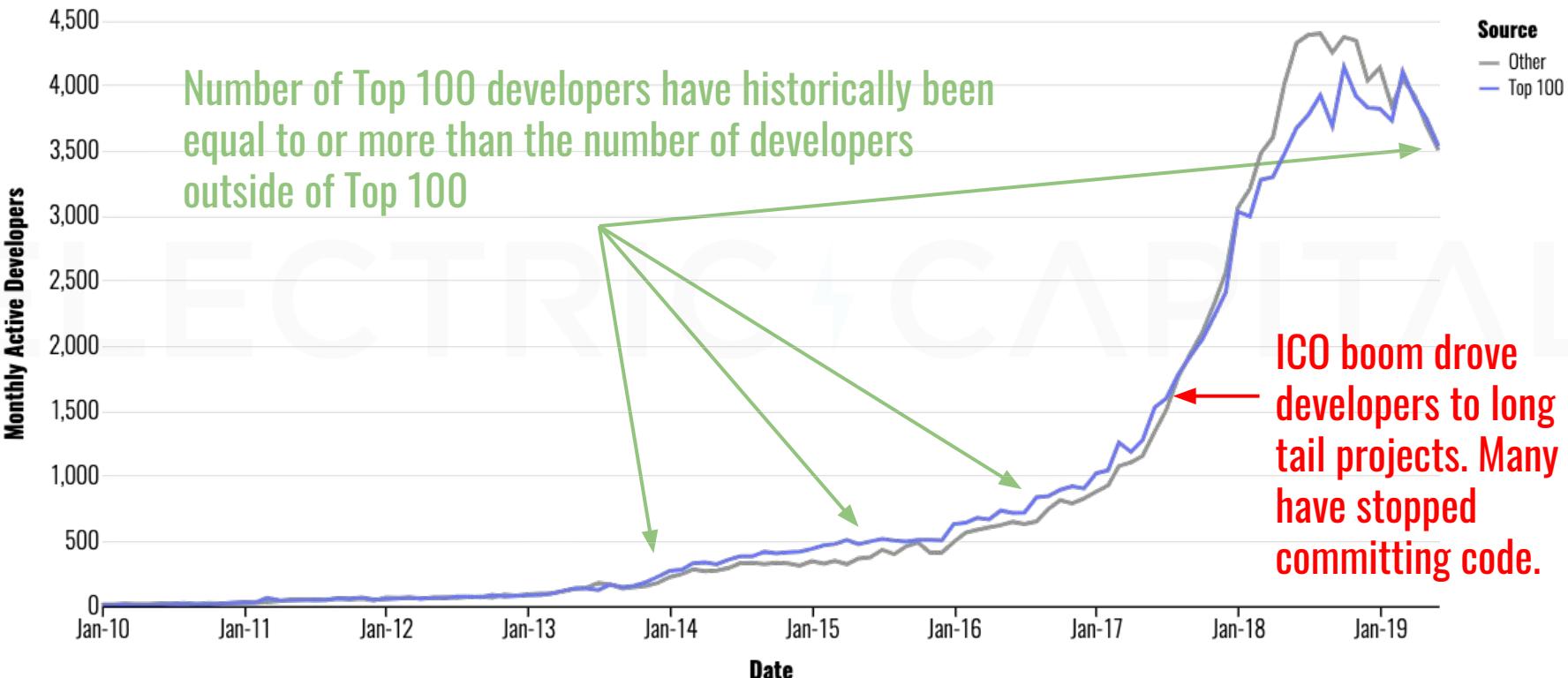
Top 100 projects lost 4% of their devs vs. Outside Top 100 lost 19% of devs



In absolute numbers, Top 100 lost 139 devs vs. Outside Top 100 lost 824 devs

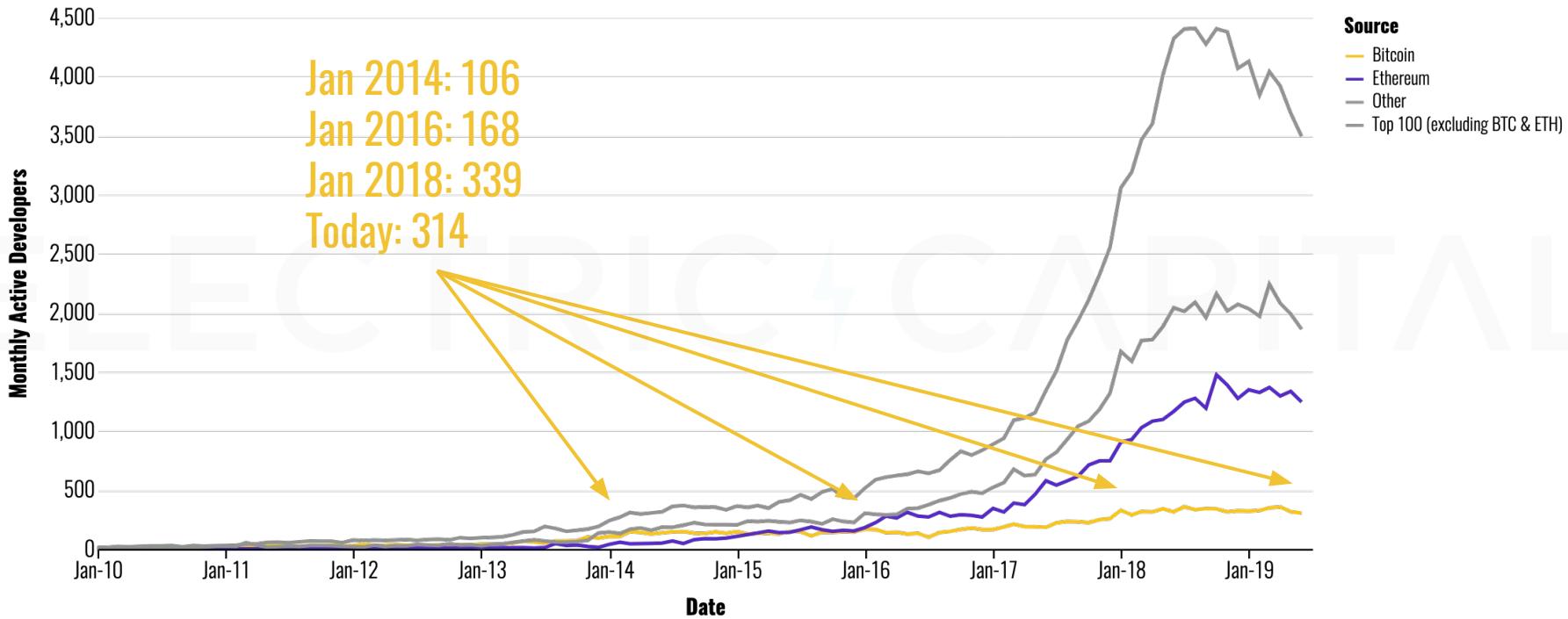


A return to normal as ICO projects die? Top 100 have 50% of all developers

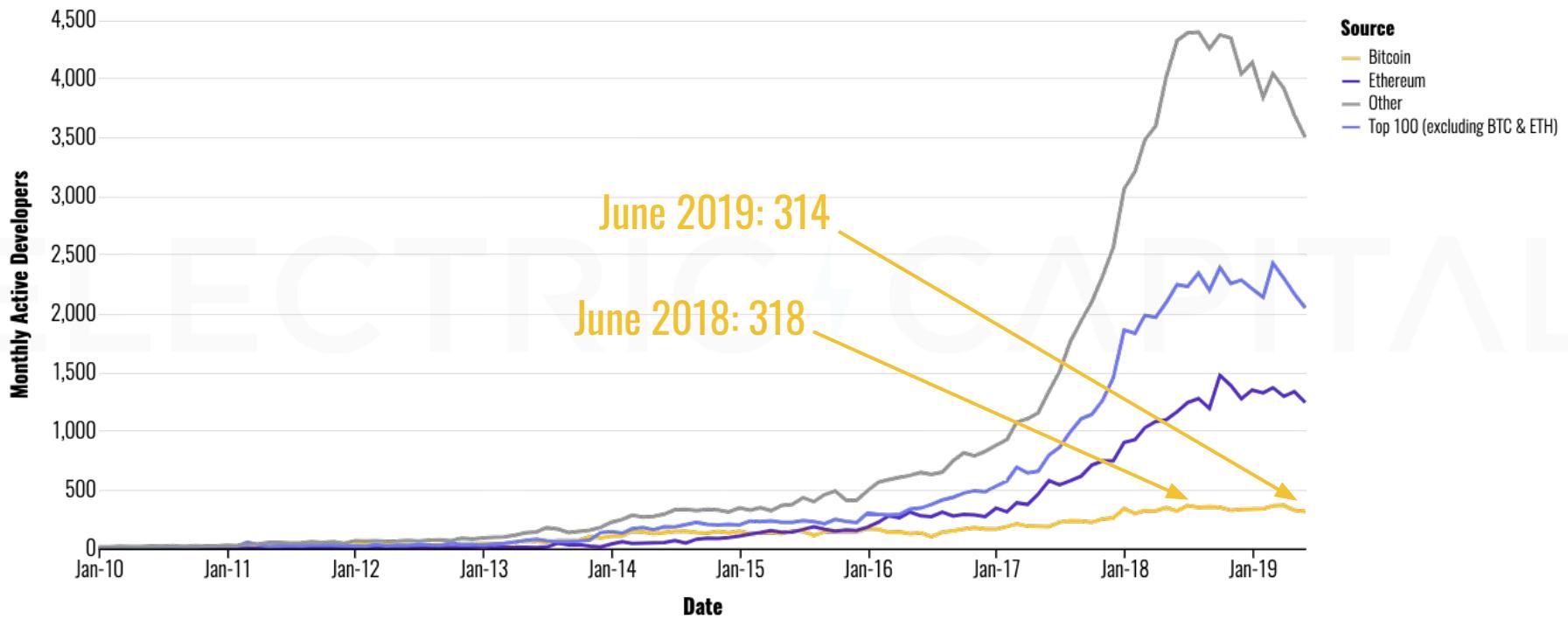


Looking at just Bitcoin and Ethereum Ecosystems

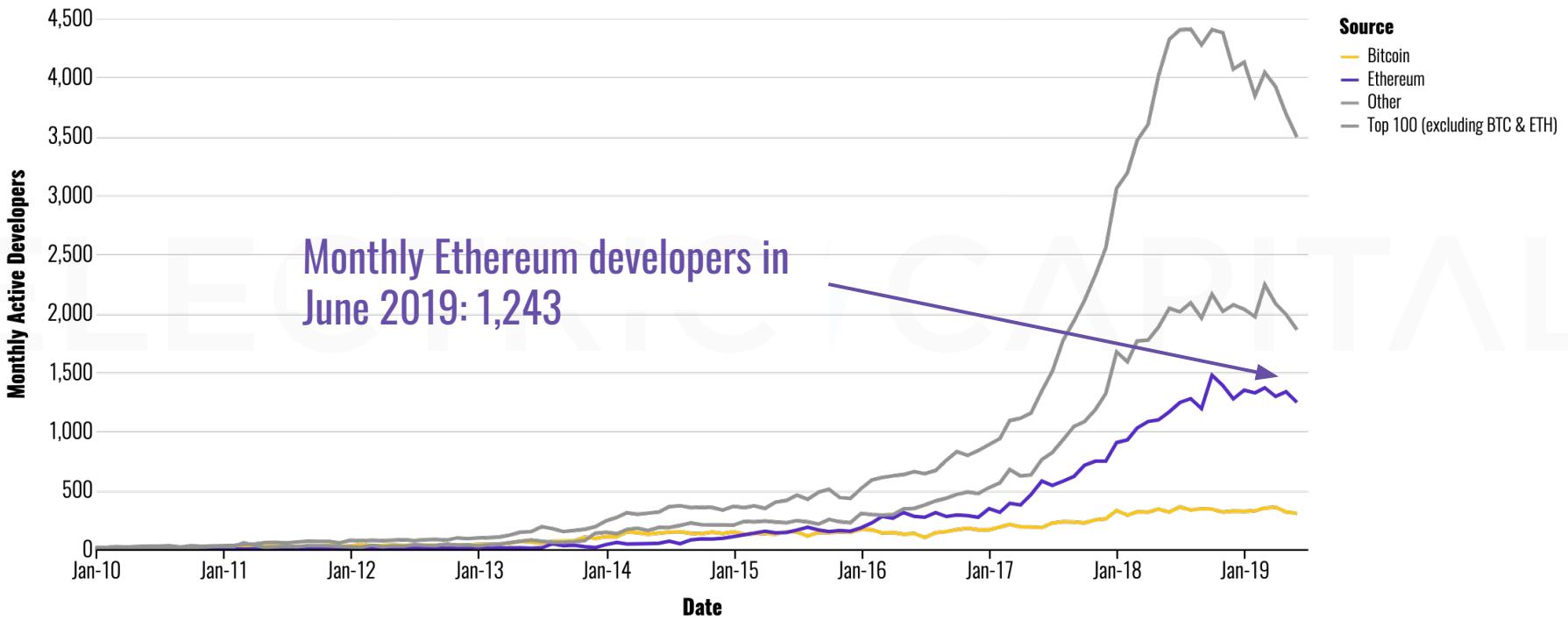
Bitcoin ecosystem is consistently healthy: 100+ developers/month since 2014!



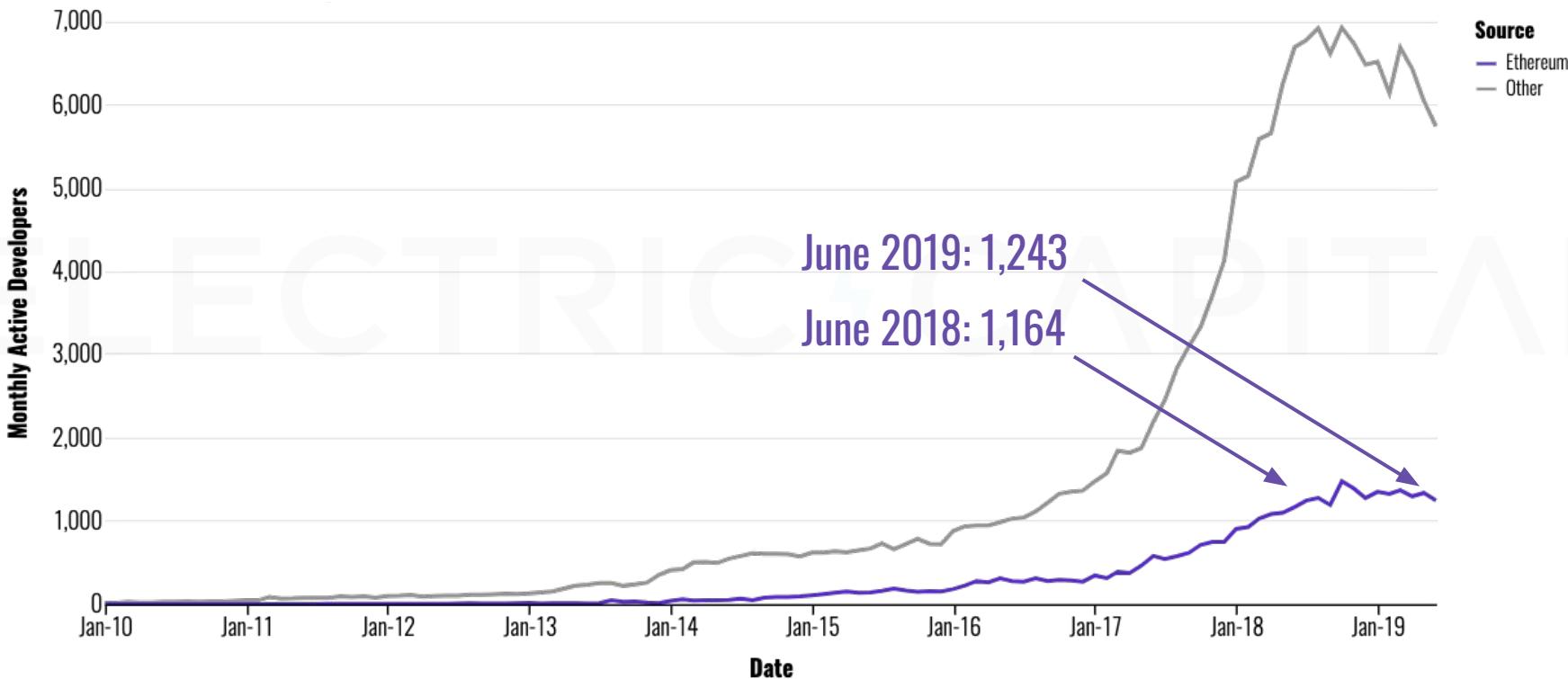
Bitcoin has almost the same Active Developer count in 2019 vs 2018



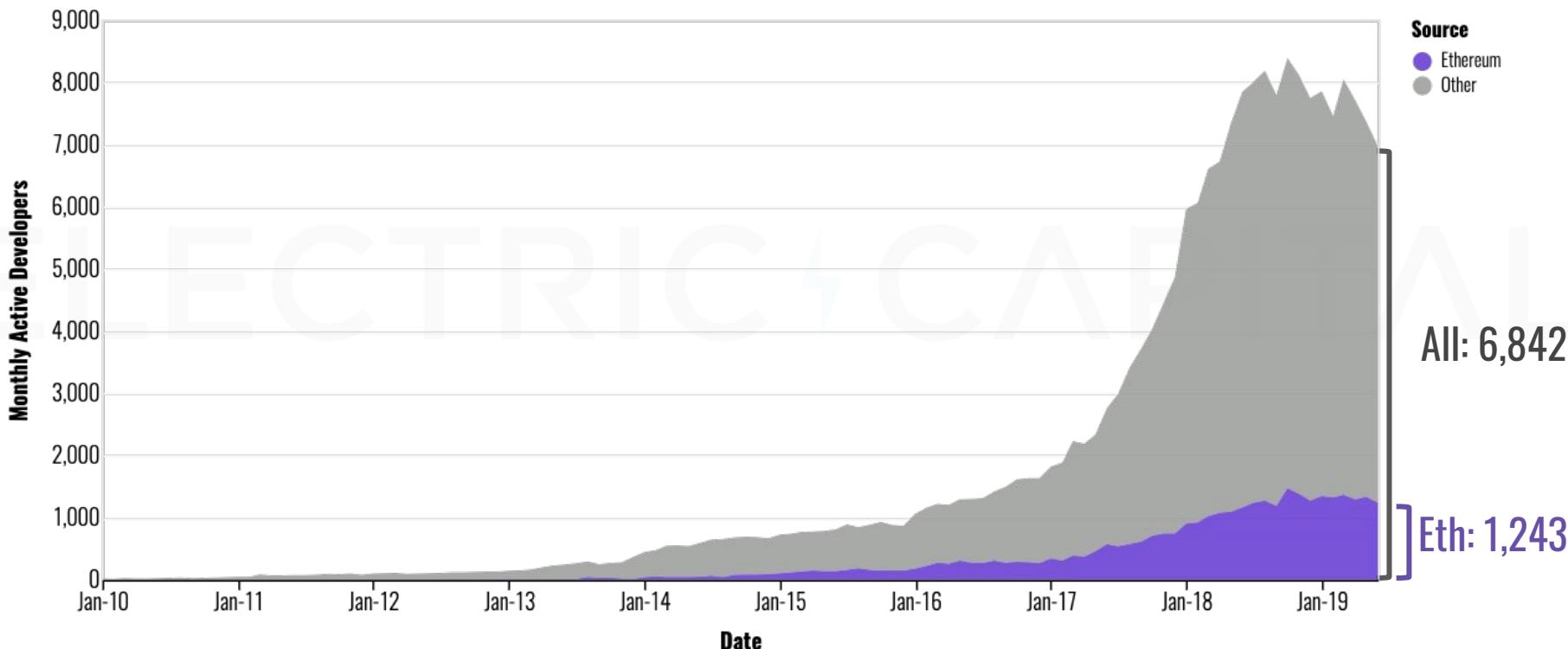
1.2k+ developers are working in the Ethereum ecosystem



Ethereum ecosystem gained 79 developers vs. June 2018

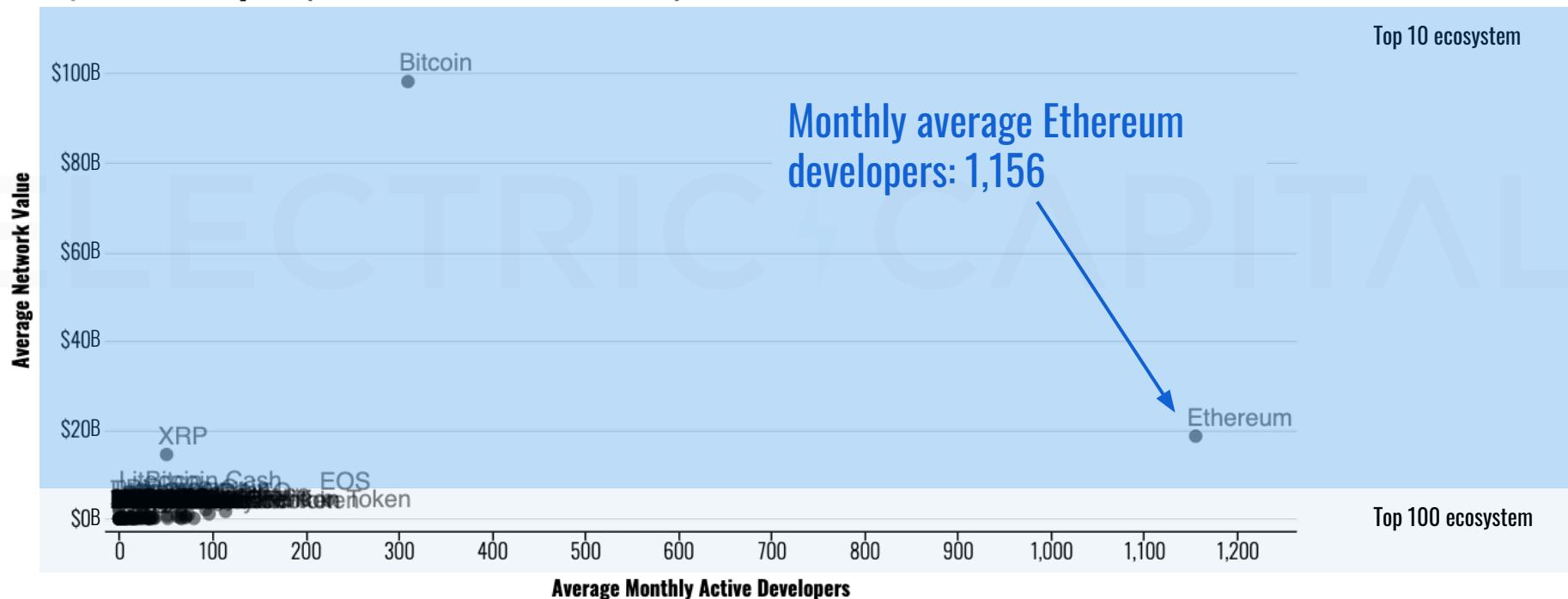


18% of all open source crypto developers work in the Ethereum ecosystem



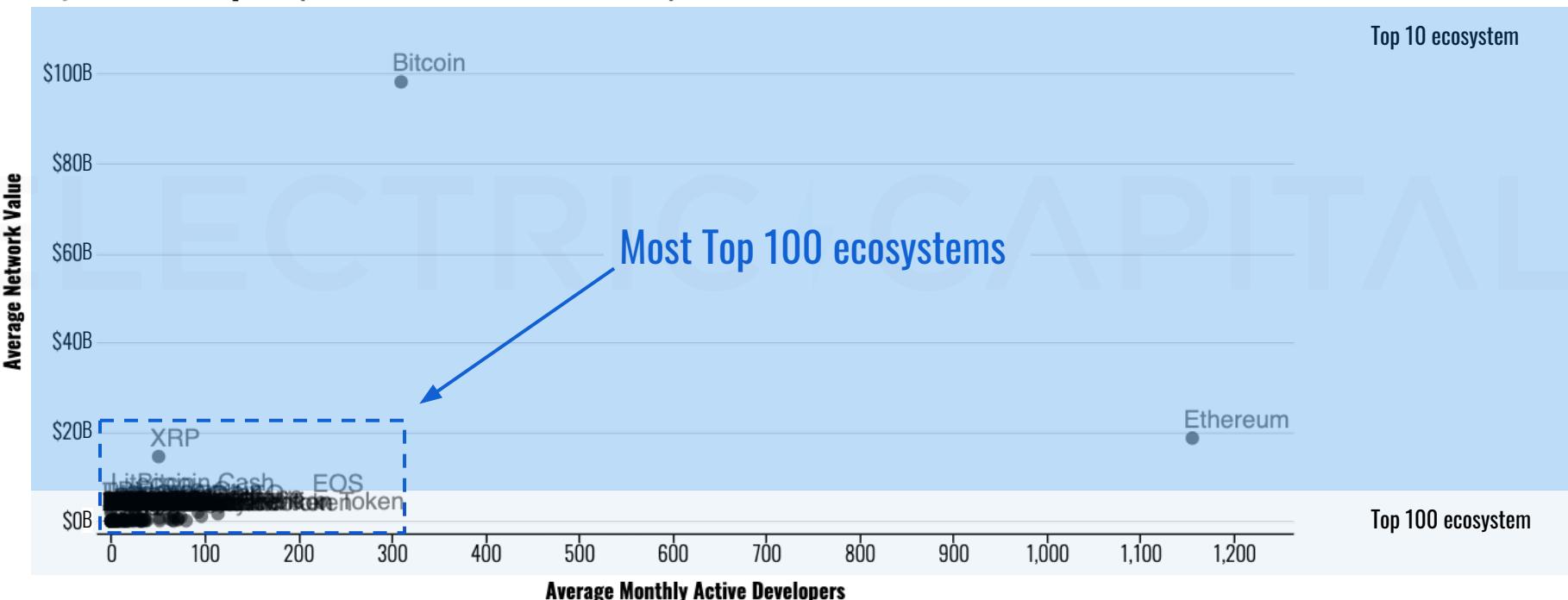
Ethereum ecosystem has ~4x the developers of the next biggest ecosystem

Ecosystem Developers (01/01/2019 to 06/30/2019)



Most ecosystems have < 250 developers

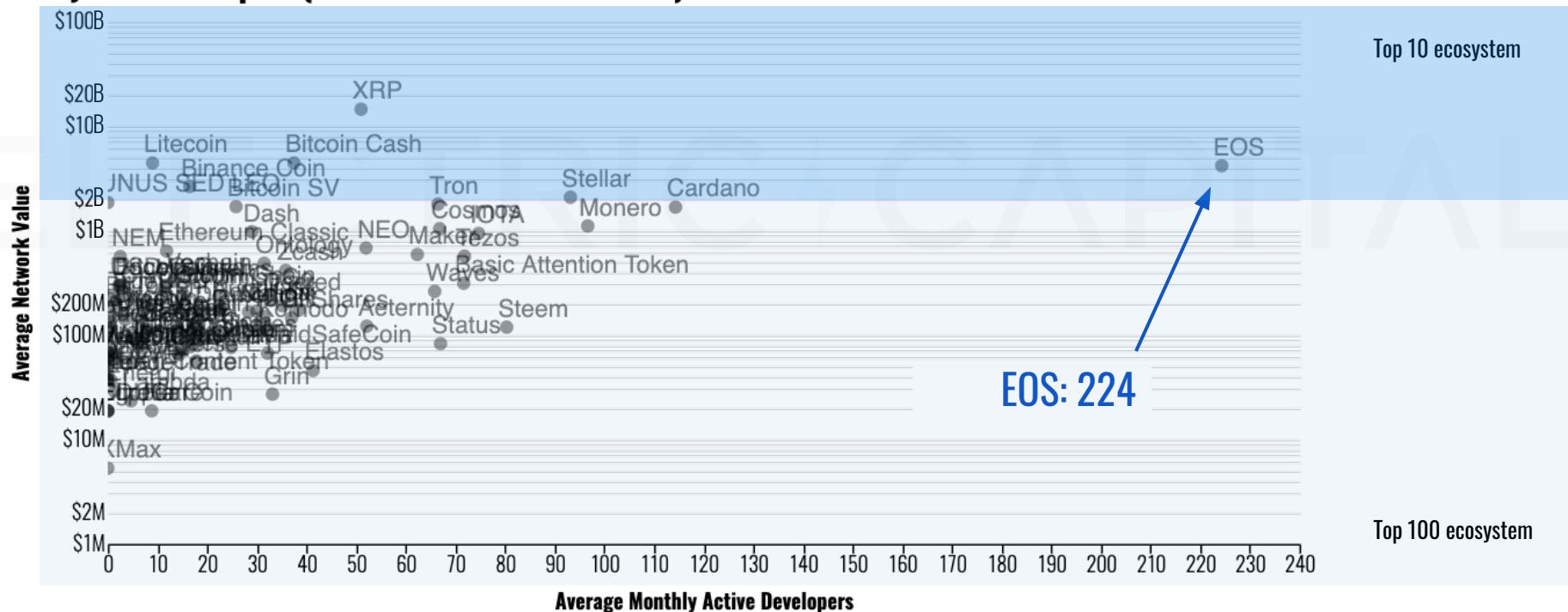
Ecosystem Developers (01/01/2019 to 06/30/2019)



Removing Ethereum and Bitcoin as outliers,
and switching graphs to log scale...

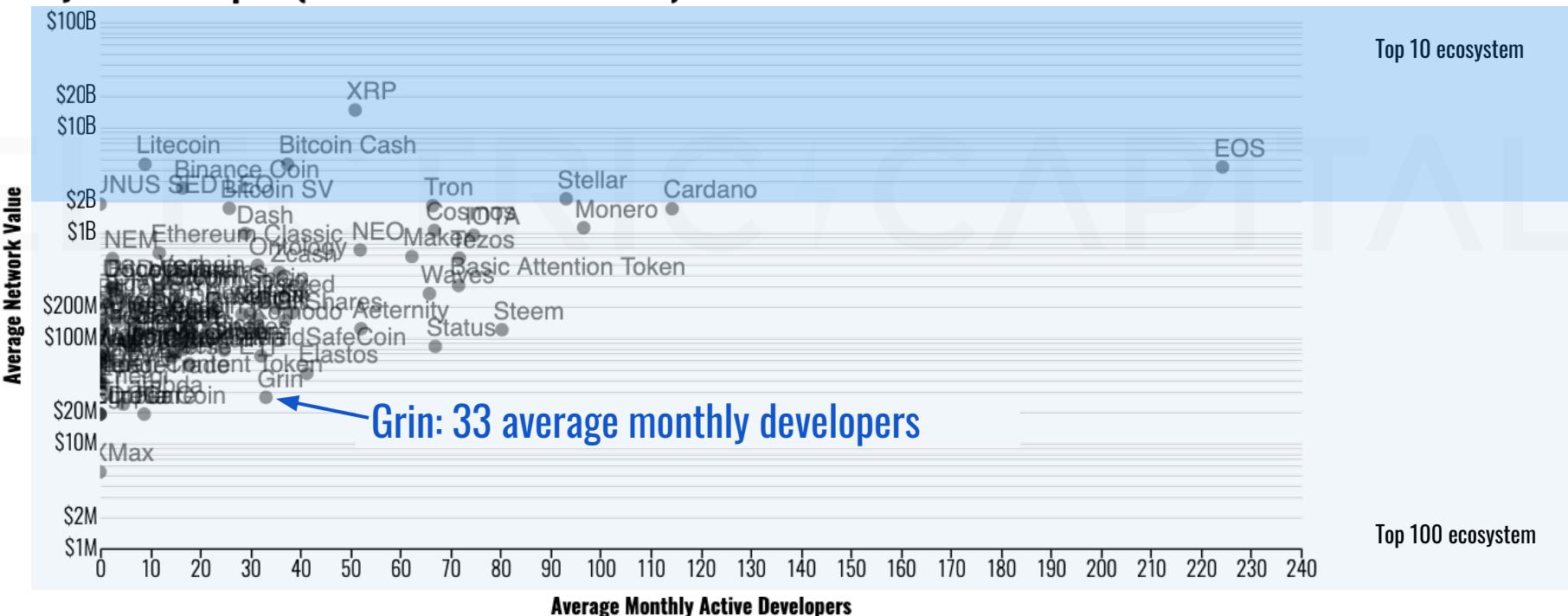
EOS stands out with a high number of ecosystem developers

Ecosystem Developers (01/01/2019 to 06/30/2019)



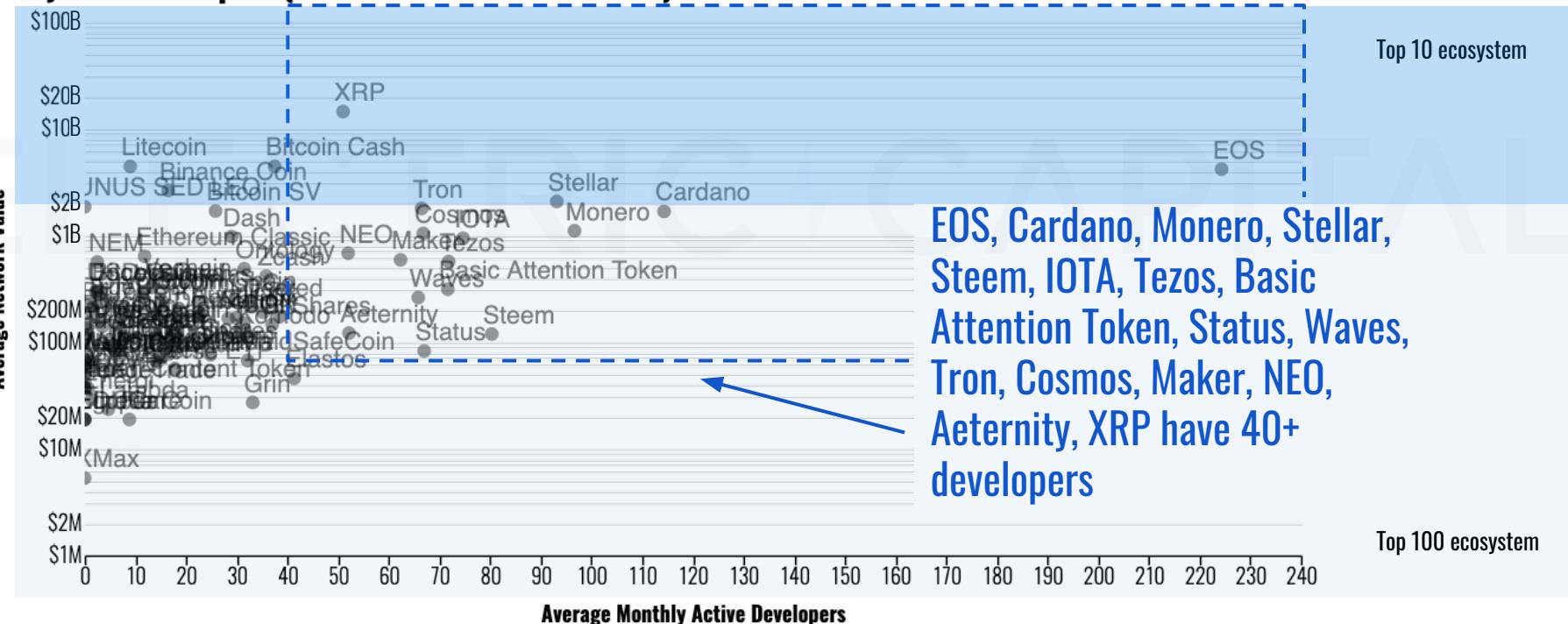
Grin has the most developers for ecosystems under \$50M

Ecosystem Developers (01/01/2019 to 06/30/2019)



Several ecosystems stand out with 40+ developers

Ecosystem Developers (01/01/2019 to 06/30/2019)



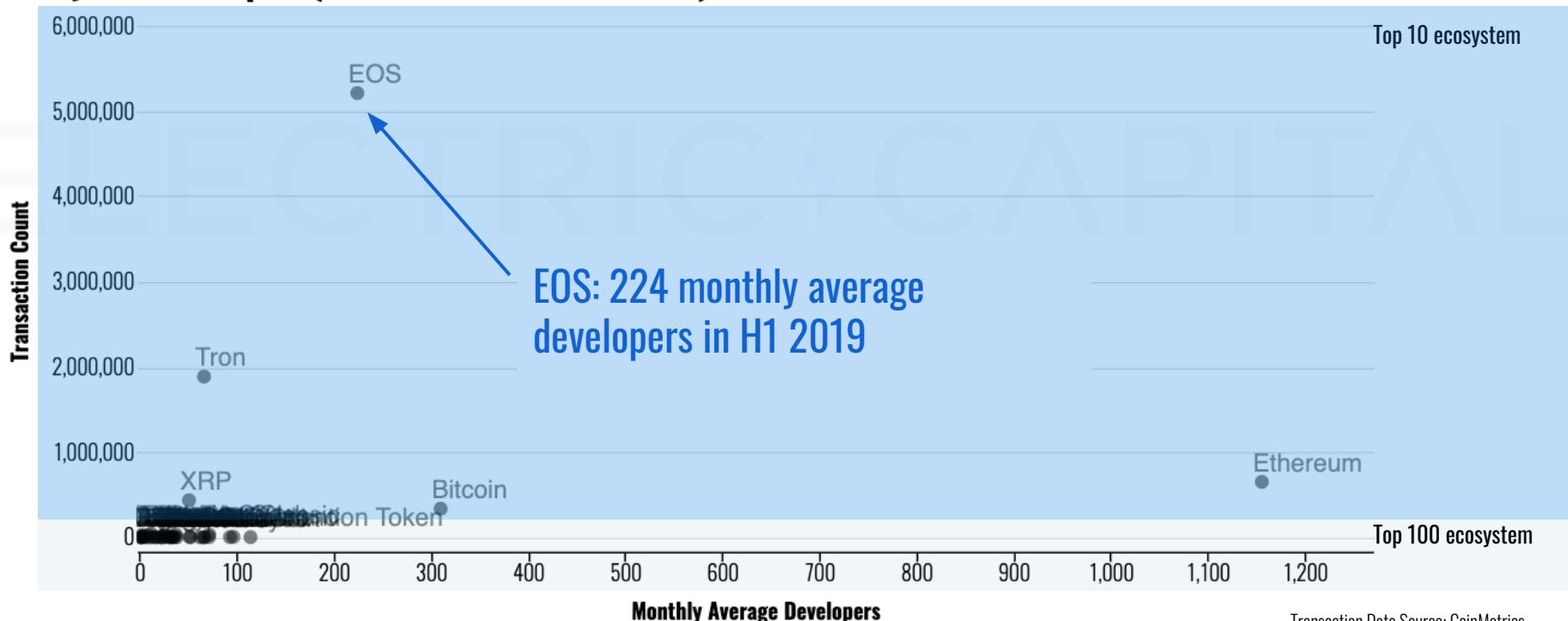
EOS, Cardano, Monero, Stellar, Steem, IOTA, Tezos, Basic Attention Token, Status, Waves, Tron, Cosmos, Maker, NEO, Aeternity, XRP have 40+ developers

Top 100 ecosystem

Looking at on-chain transaction count...

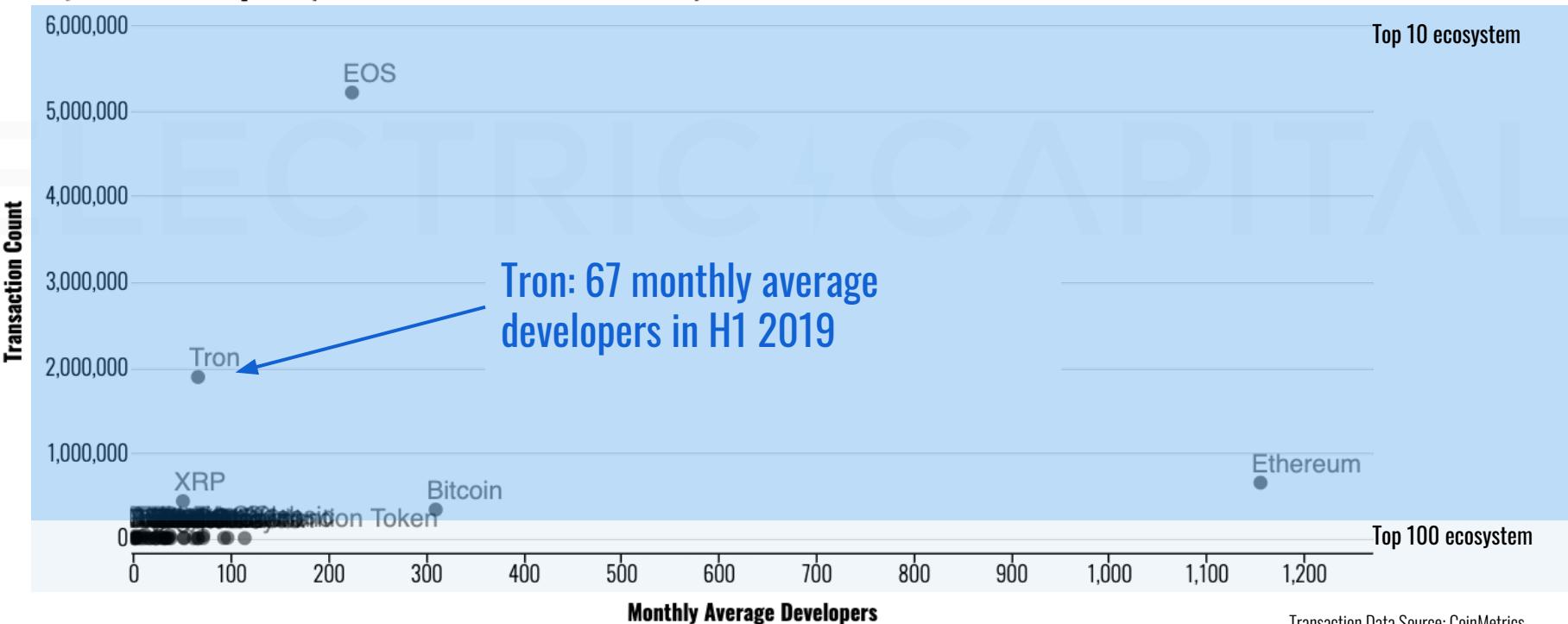
EOS has 224 developers supporting ~5M average daily transaction count

Ecosystem Developers (01/01/2019 to 06/30/2019)



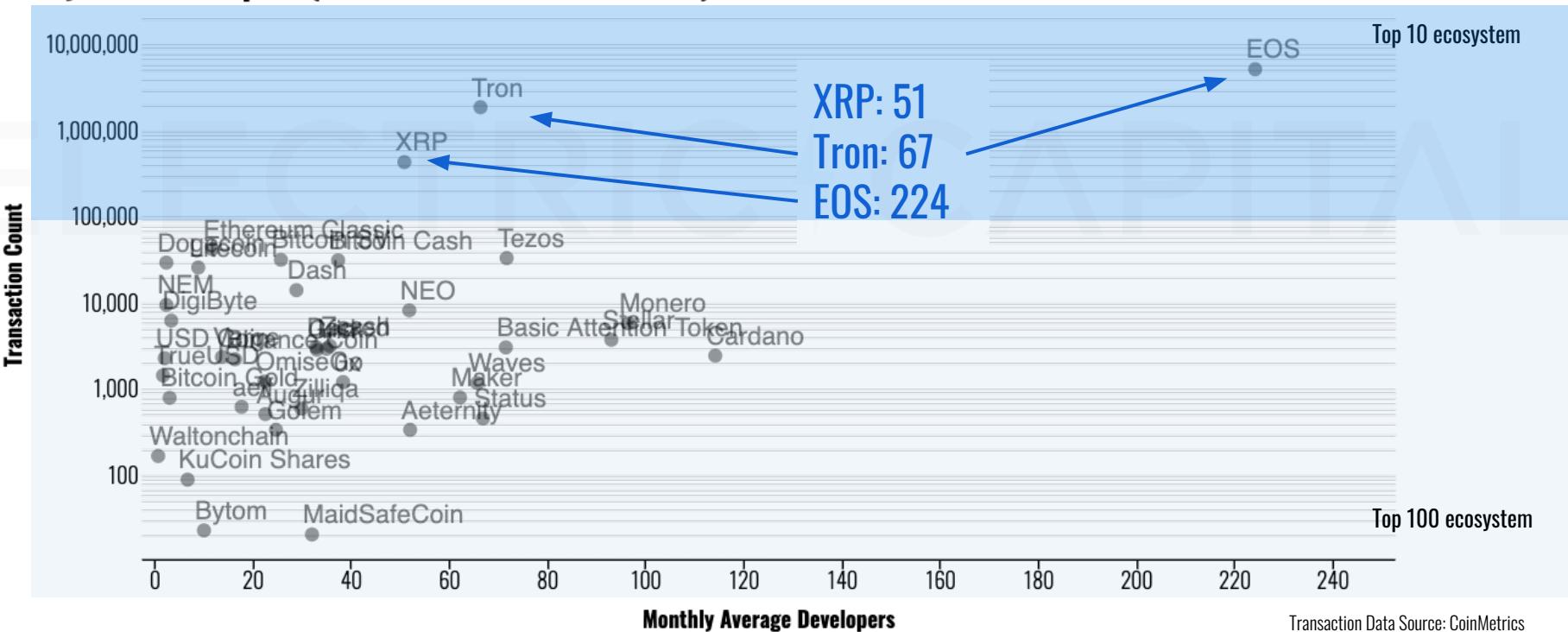
Tron has 67 developers supporting 2M daily transactions

Ecosystem Developers (01/01/2019 to 06/30/2019)



EOS, Tron, XRP have 100k+ daily transactions and 40+ developers

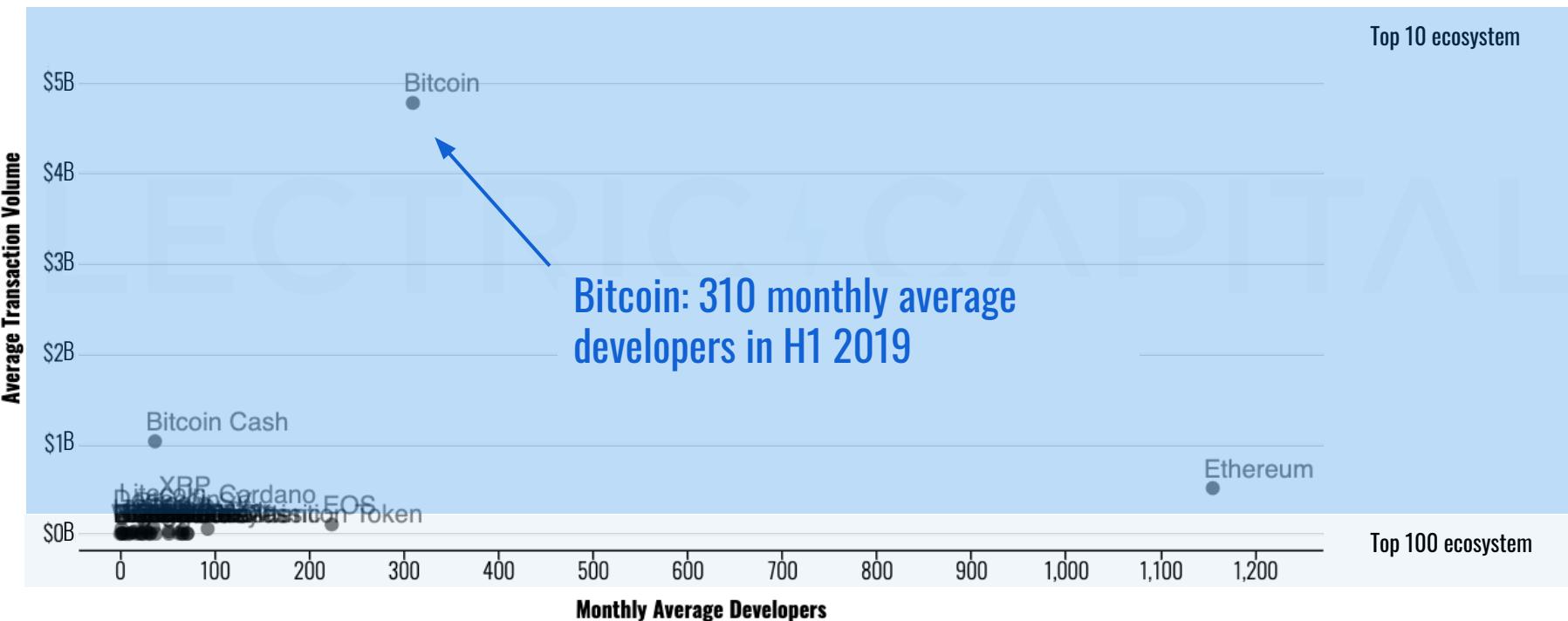
Ecosystem Developers (01/01/2019 to 06/30/2019)



Switching from transaction count to on-chain
transaction volume...

Bitcoin has 310 developers supporting ~\$5B USD daily transaction volume

Ecosystem Developers (01/01/2019 to 06/30/2019)



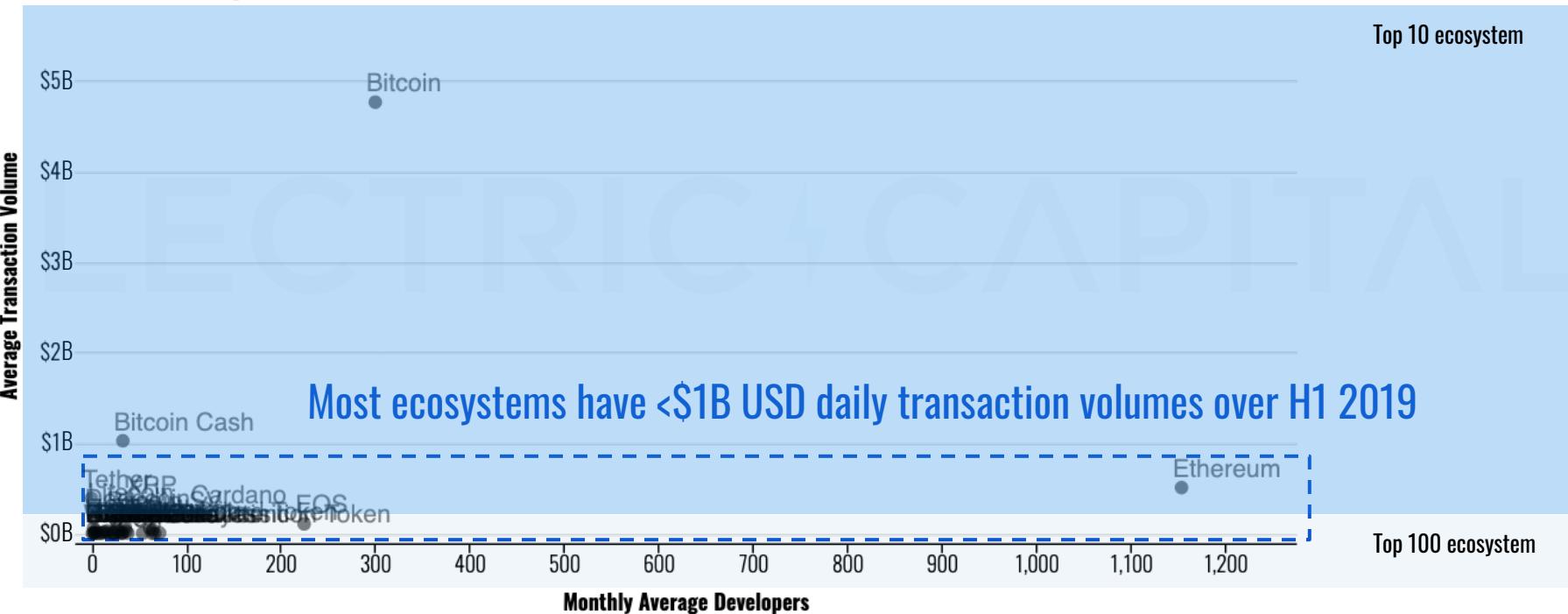
Bitcoin Cash has 38 developers supporting ~\$1B daily transaction volume

Ecosystem Developers (01/01/2019 to 06/30/2019)



Only three ecosystems > \$1B daily transaction volumes

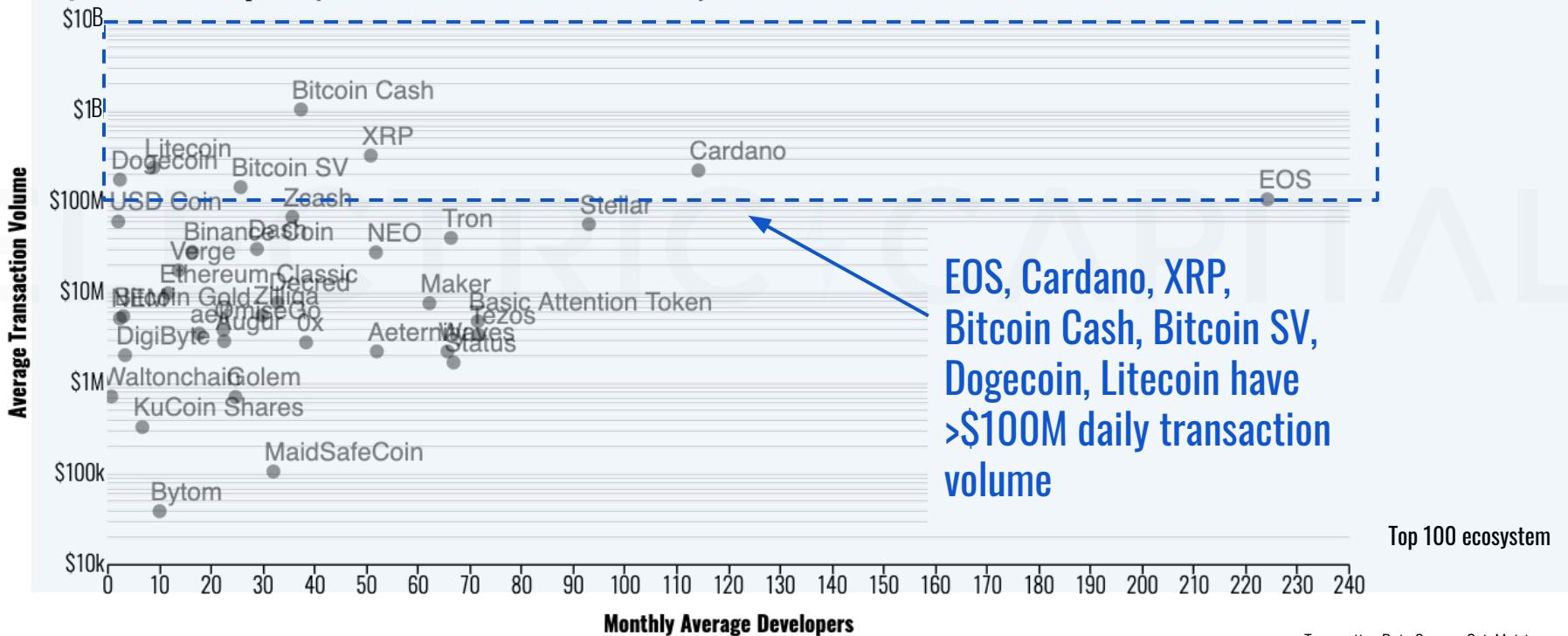
Ecosystem Developers (01/01/2019 to 06/30/2019)



Removing Ethereum and Bitcoin as outliers,
and switching to log scale...

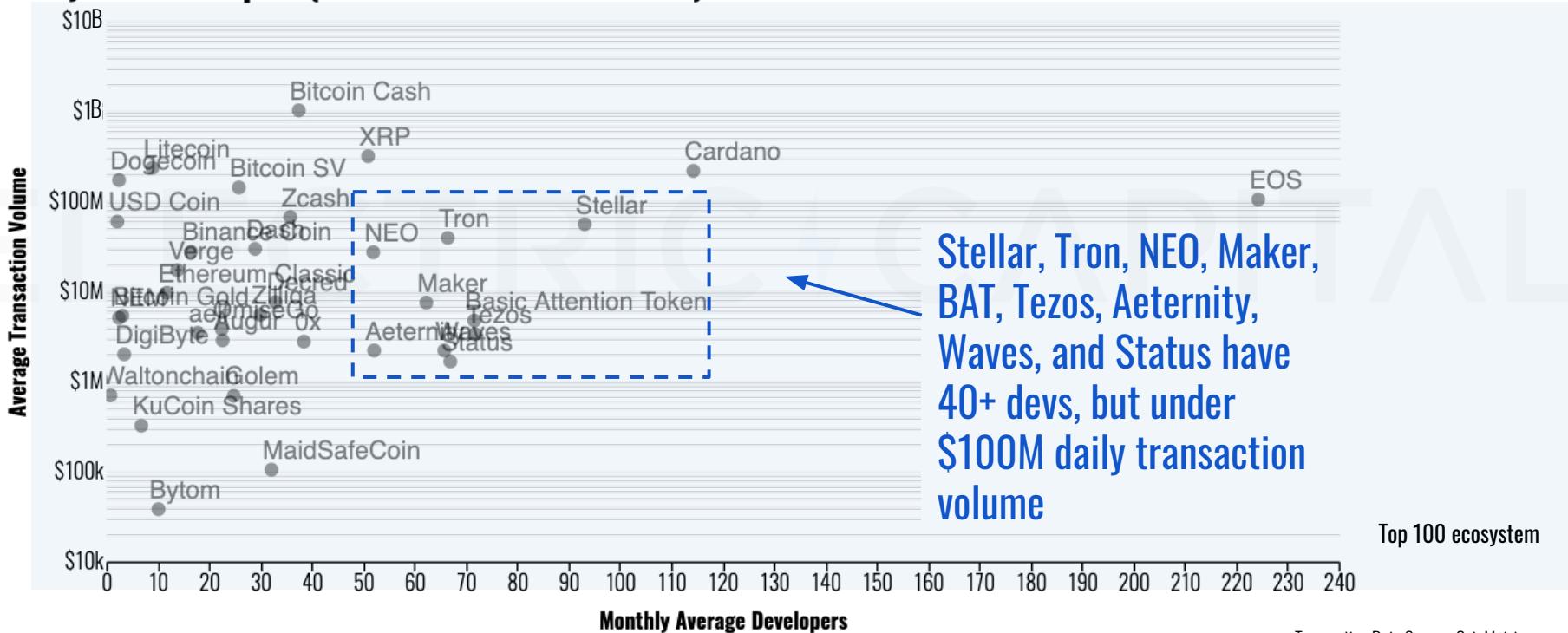
7 open source ecosystems have > \$100M daily transaction volume

Ecosystem Developers (01/01/2019 to 06/30/2019)



Stellar, Tron, BAT, Waves, Status, Aeternity have 40+ devs and < \$100M volume

Ecosystem Developers (01/01/2019 to 06/30/2019)



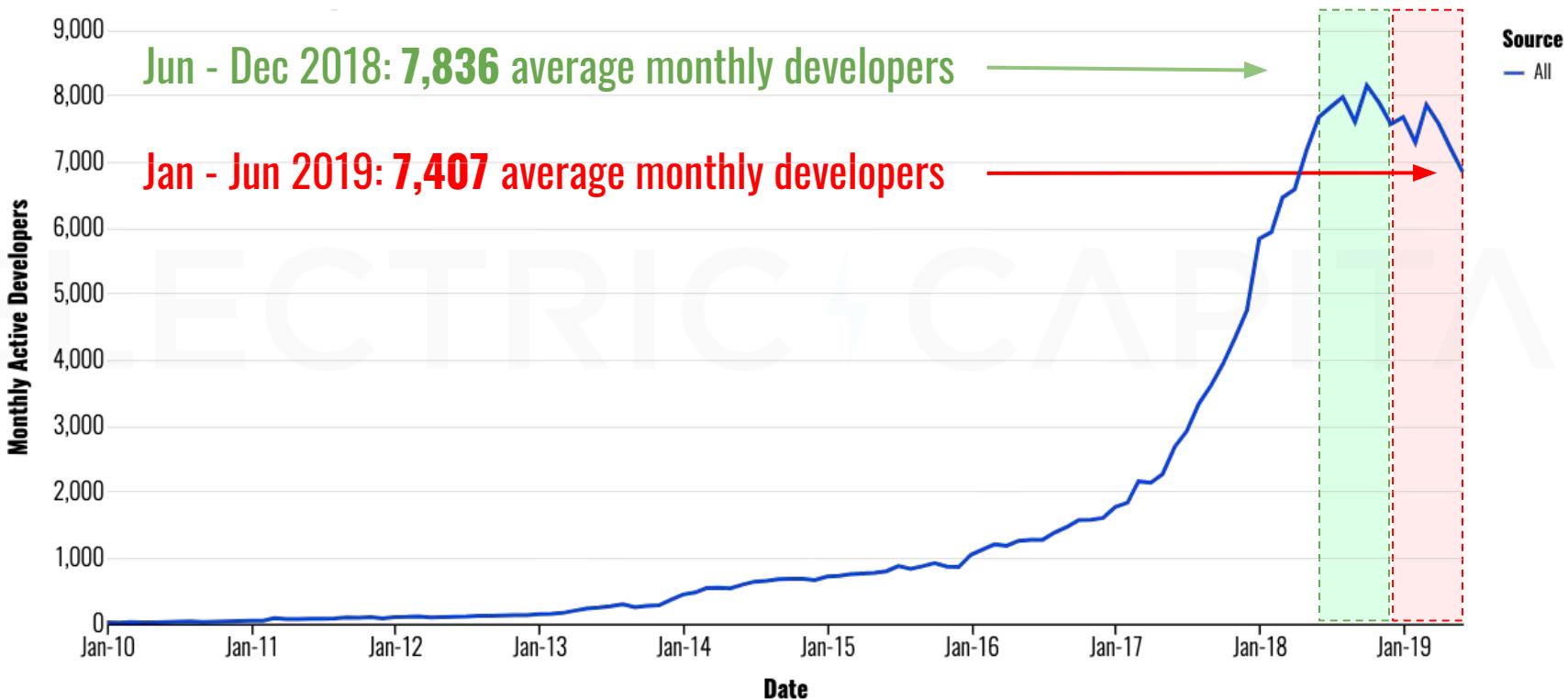
Stellar, Tron, NEO, Maker, BAT, Tezos, Aeternity, Waves, and Status have 40+ devs, but under \$100M daily transaction volume

Top 100 ecosystem

How did ecosystems change over the last year?

To smooth things out, let's look at average developers...

Average monthly developers in H1 2019 fell 5% vs H2 2018

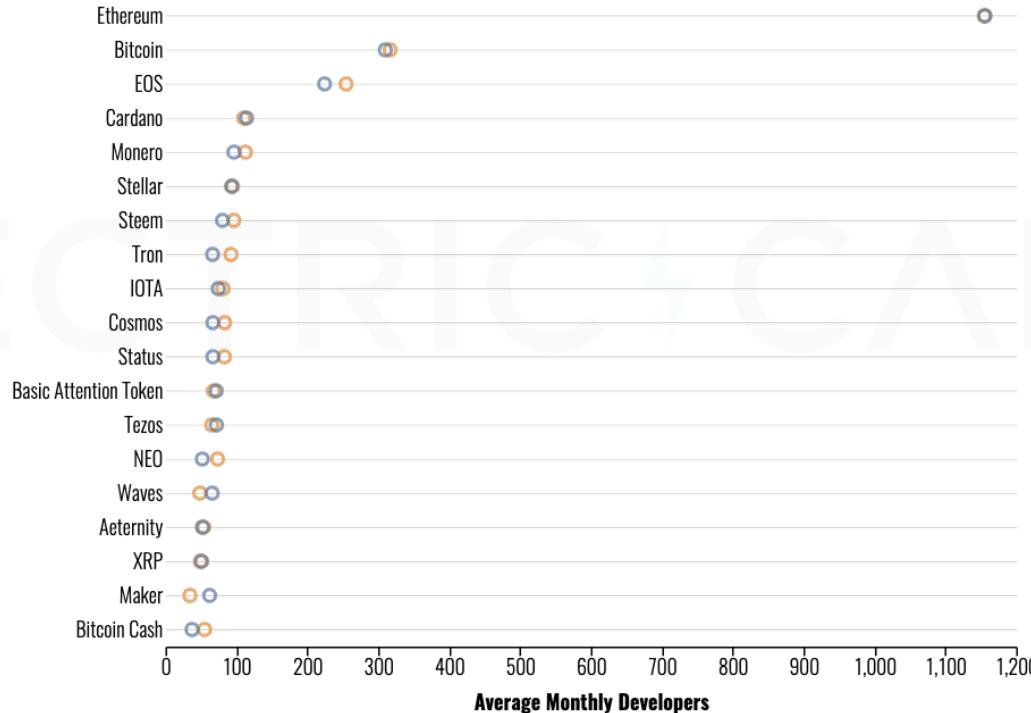


19 of Top 100 ecosystems averaged 40+ monthly developers

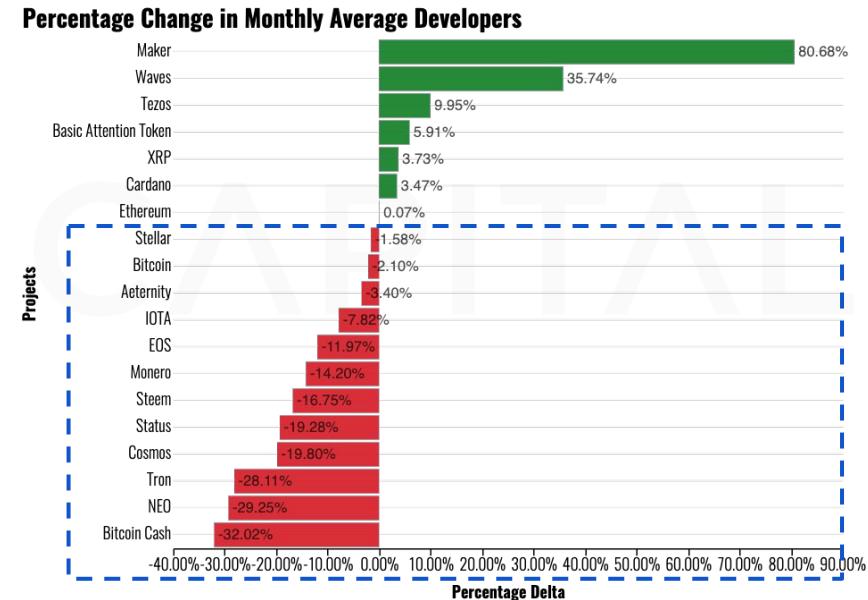
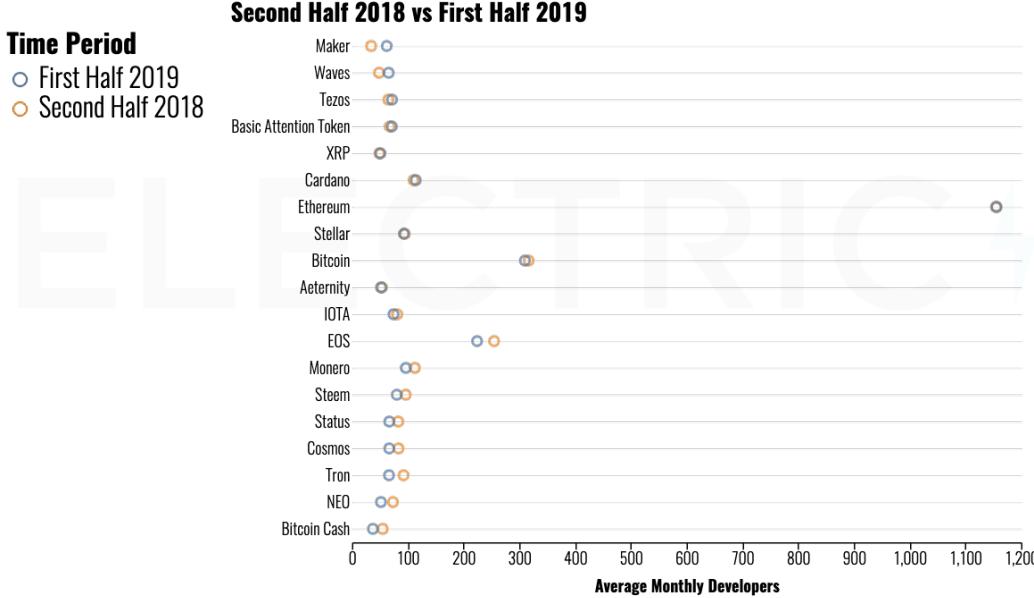
Second Half 2018 vs First Half 2019

Time Period

- First Half 2019
- Second Half 2018

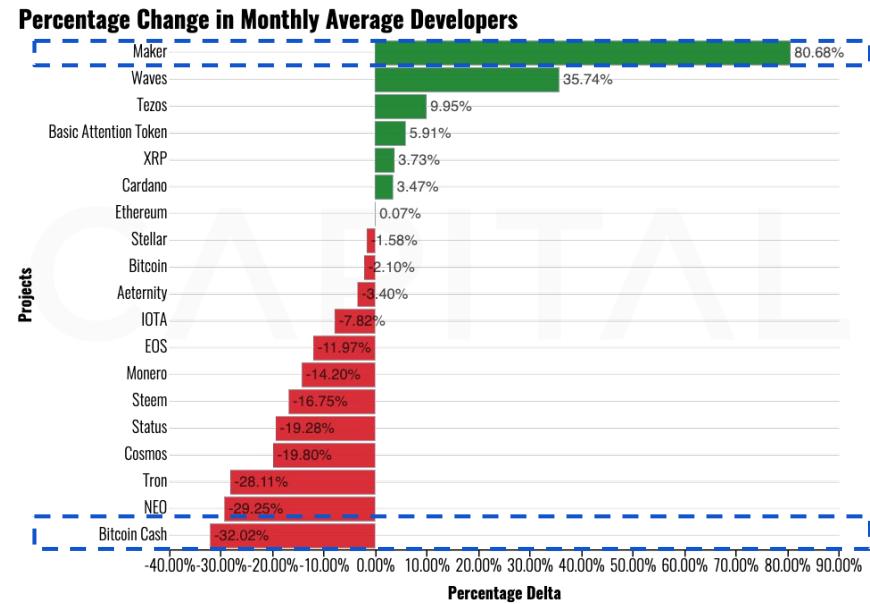
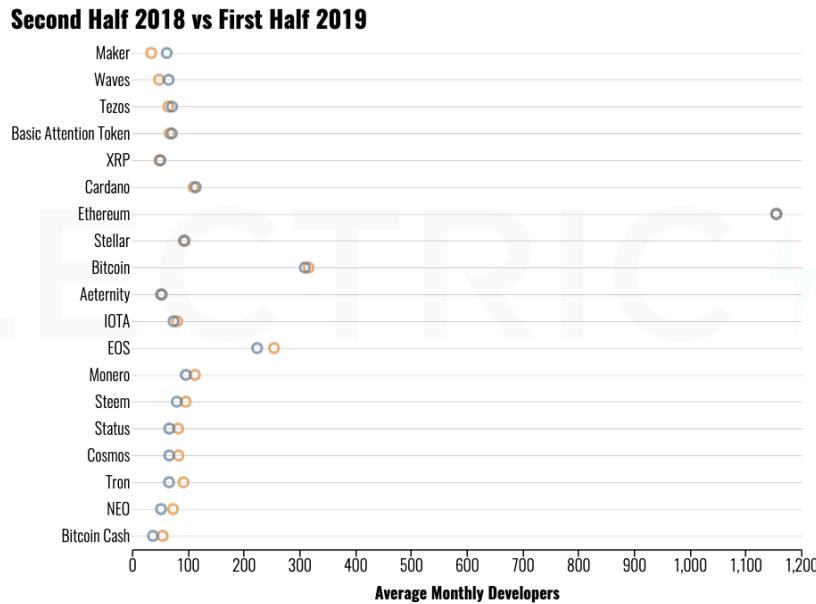


Majority of 40+ dev ecosystems lost developers



In percentage terms: Maker gained the most, Bitcoin Cash lost the most

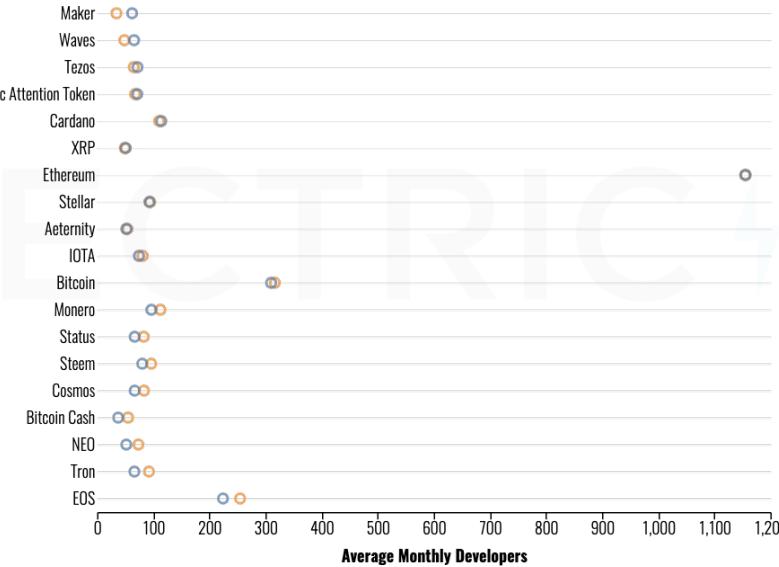
Time Period
First Half 2019
Second Half 2018



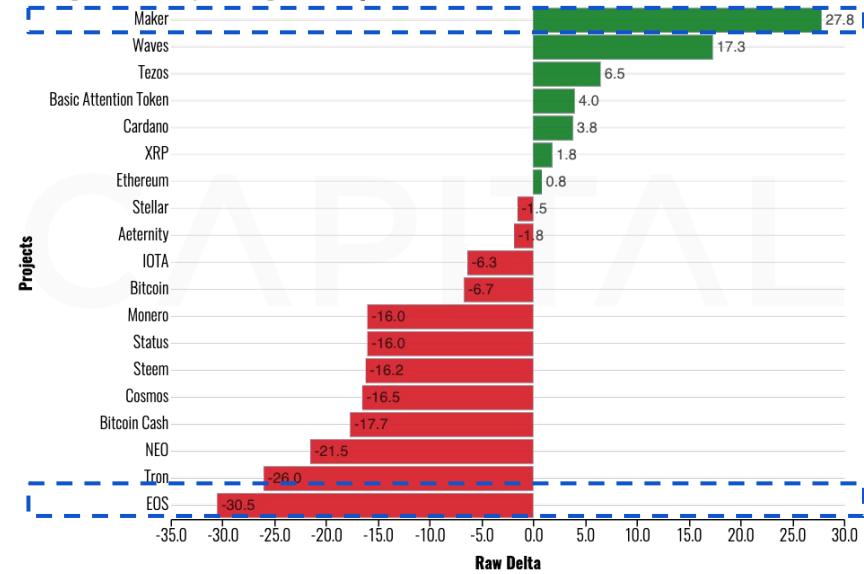
In raw numbers: Maker gained the most developers, EOS lost the most

Time Period
 ● First Half 2019
 ○ Second Half 2018

Second Half 2018 vs First Half 2019



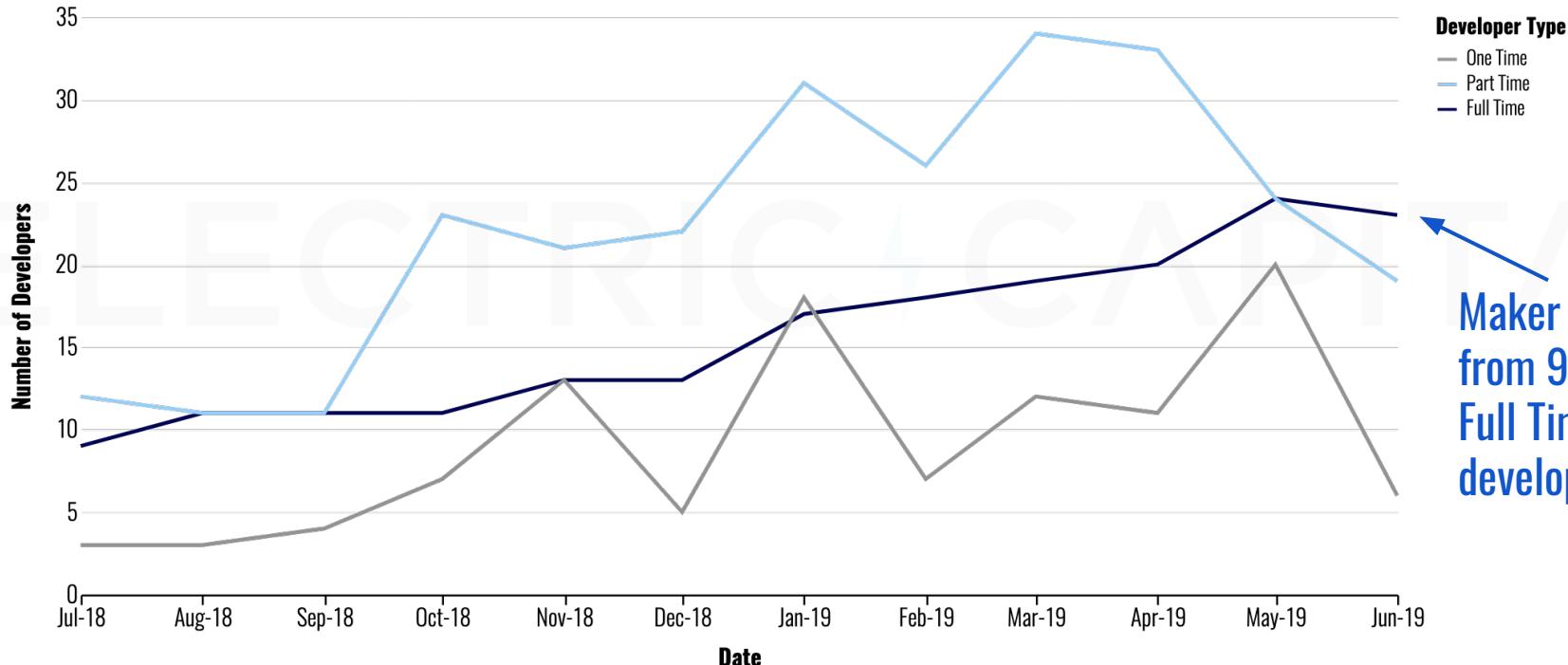
Change in Monthly Average Developers



Slicing Maker, Bitcoin Cash, and EOS by
Full Time, Part Time, and One Time developers...

Maker Full Time developers more than doubled since June 2018

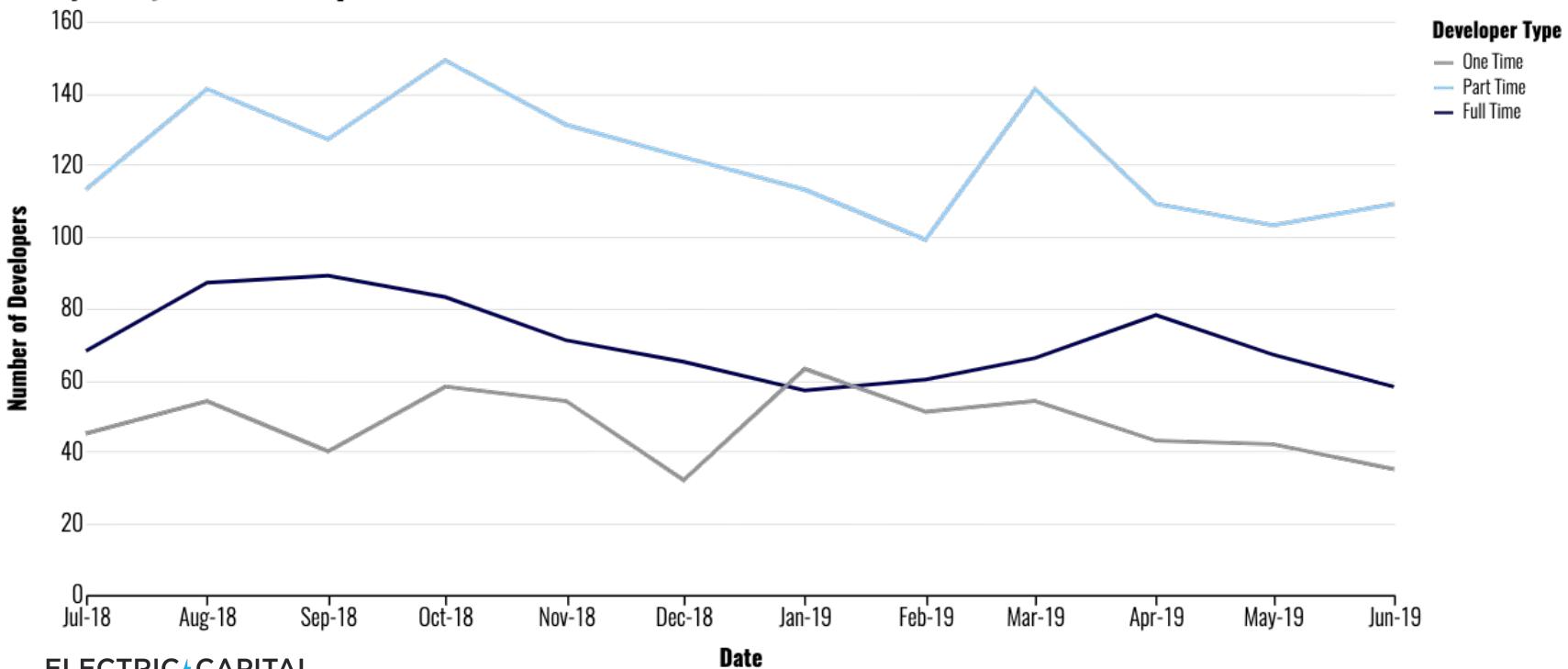
Maker | Ecosystem Developers



Maker grew
from 9 to 23
Full Time
developers

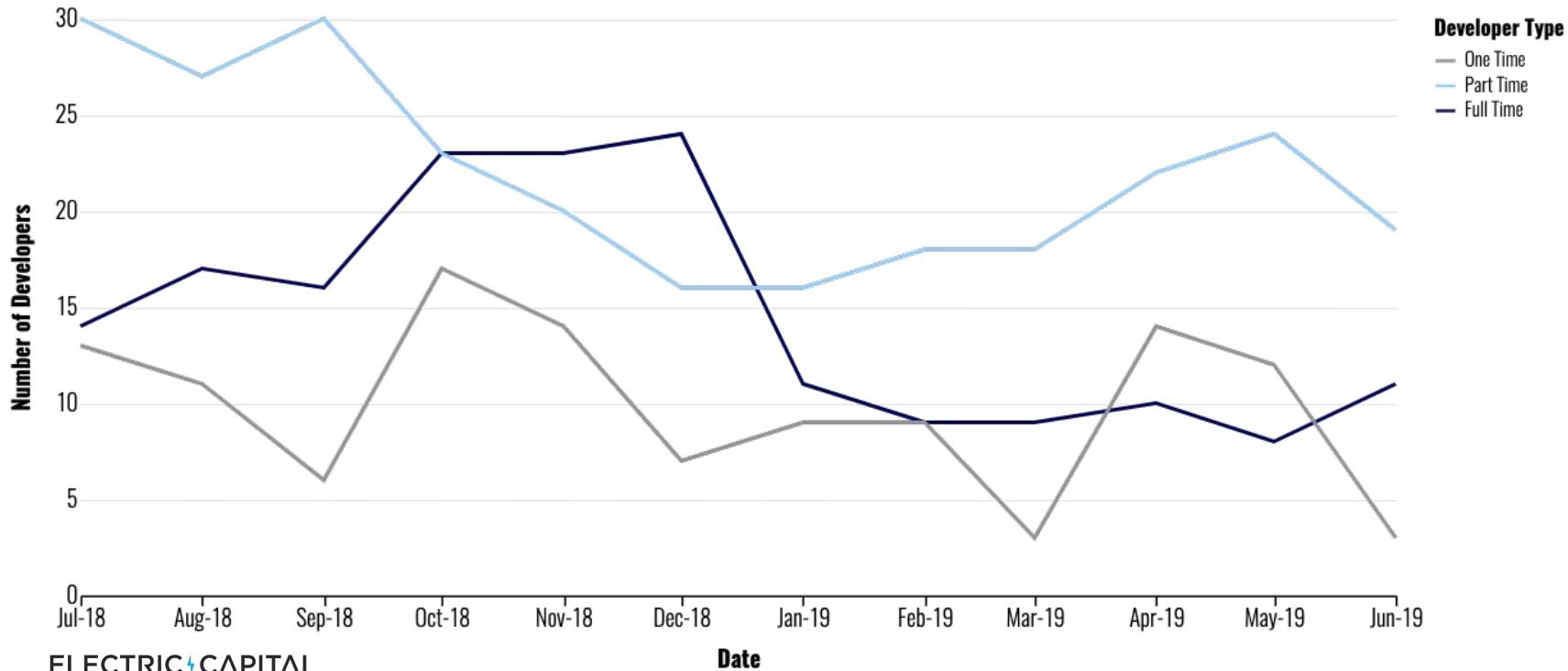
EOS fluctuated between 60 to 90 Full Time developers

EOS | Ecosystem Developers



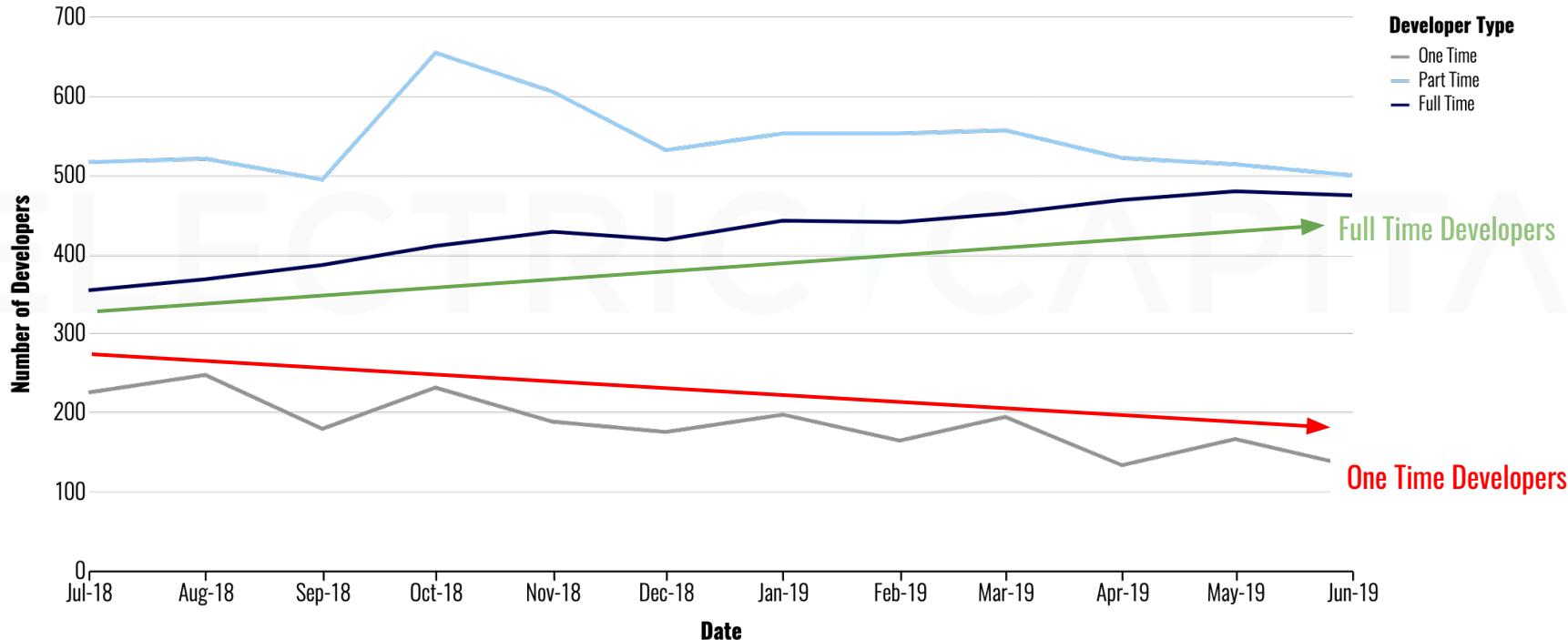
Bitcoin Cash Full Time developers dropped from 24 to 11 in January 2019

Bitcoin Cash | Ecosystem Developers

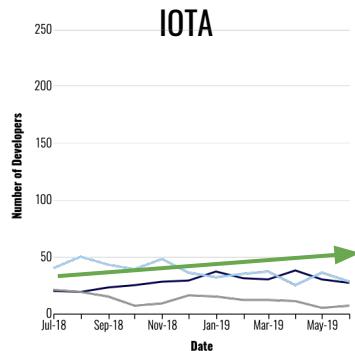
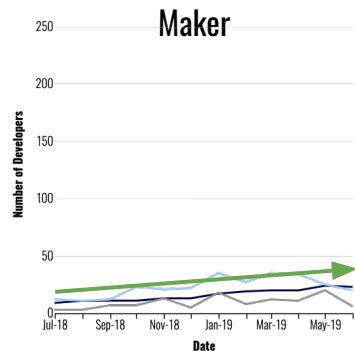
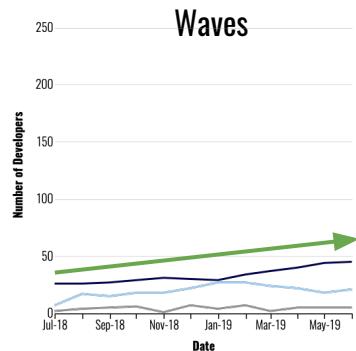
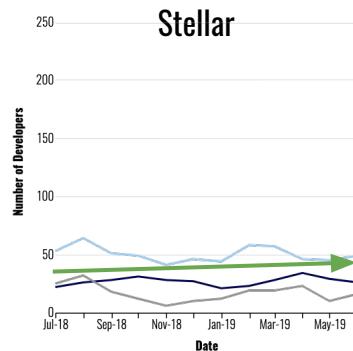
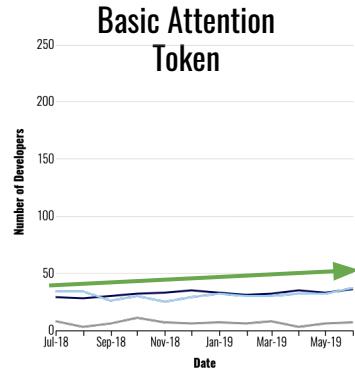
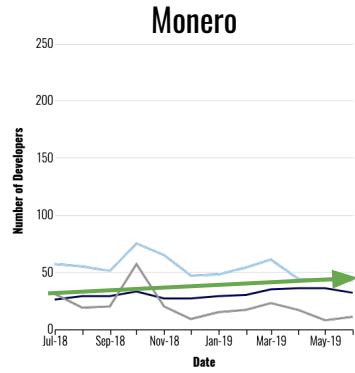
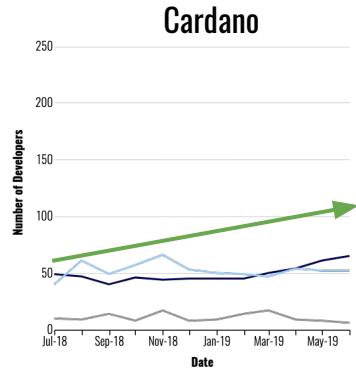
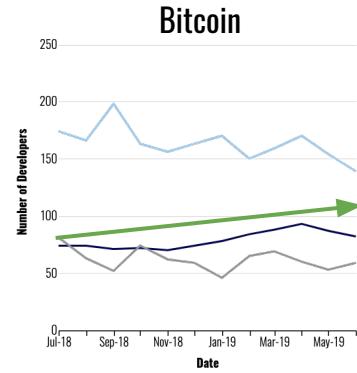


Though overall devs are flat, Ethereum gained 34% in Full Time devs v Jun 2019

Ethereum | Ecosystem Developers



Many projects gained Full Time developers (some despite overall developer loss)



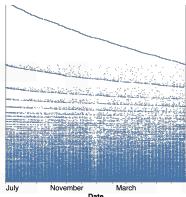
Developer Type

- One Time
- Part Time
- Full Time

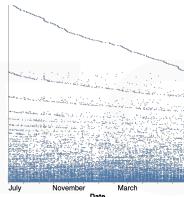
Looking at days when a developer committed code...

Each row (y-axis) is a dev. Each day (x-axis) that dev committed code has a dot

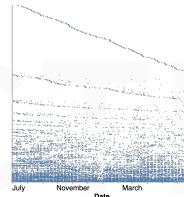
Ethereum



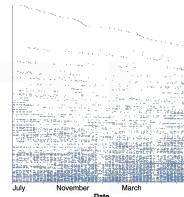
Bitcoin



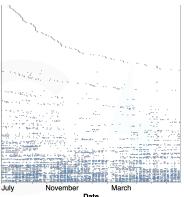
EOS



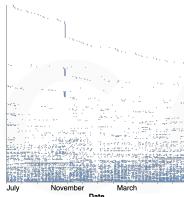
Cardano



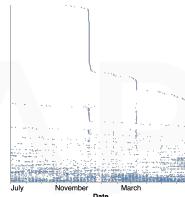
Tron



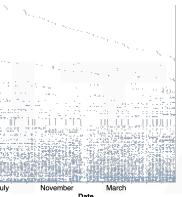
Status



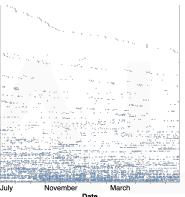
Cosmos



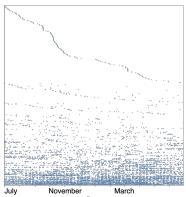
BAT



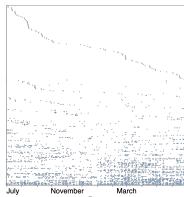
Steem



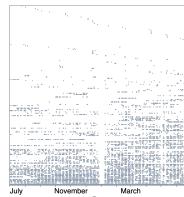
Monero



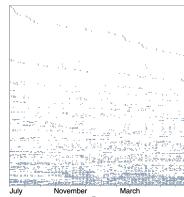
Stellar



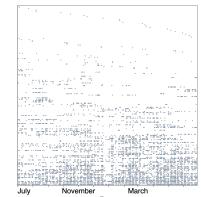
Waves



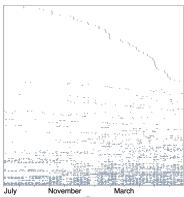
Tezos



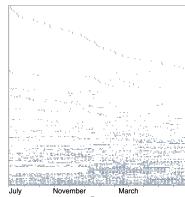
Aeternity



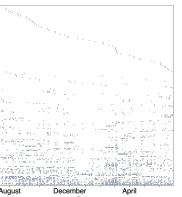
Maker



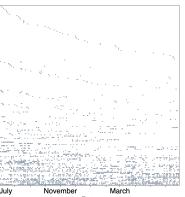
IOTA



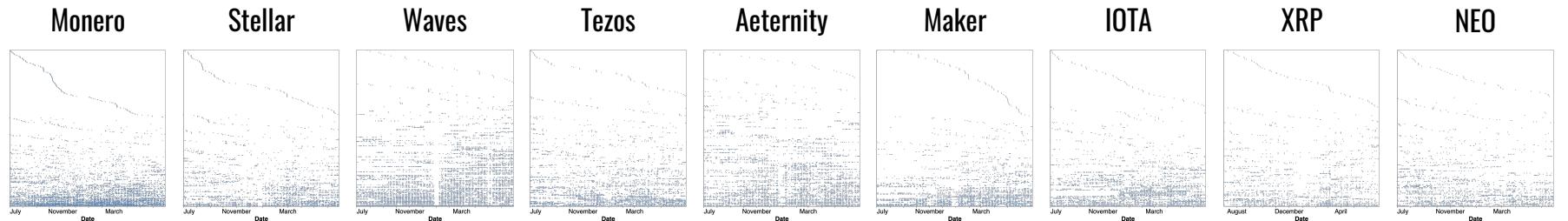
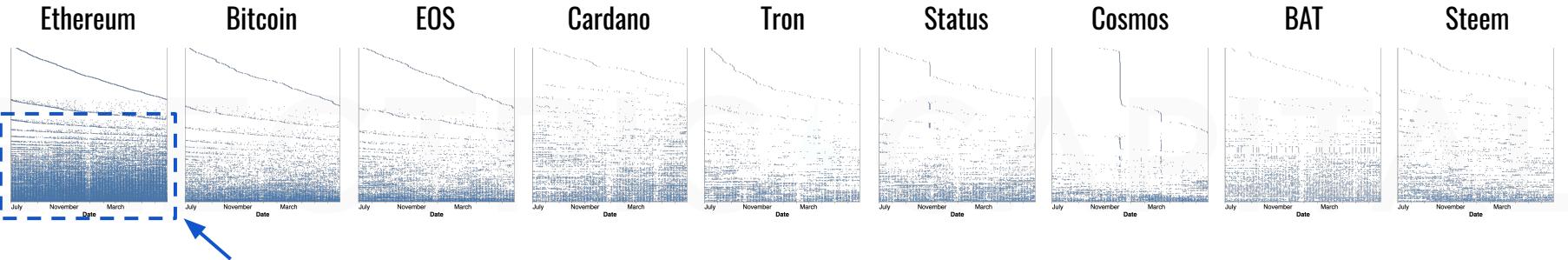
XRP



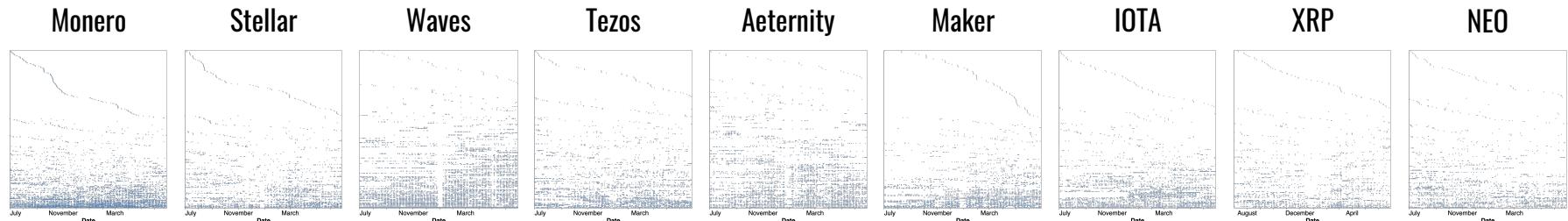
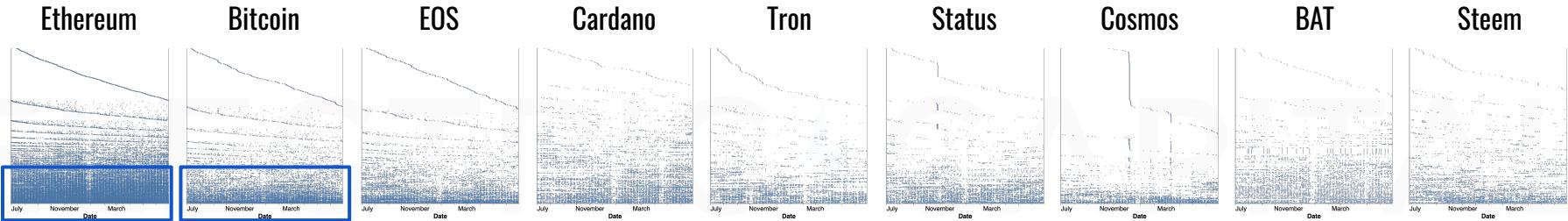
NEO



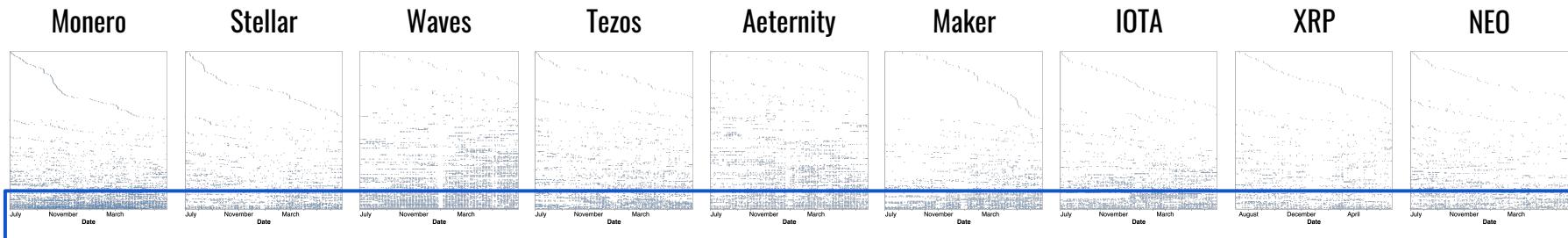
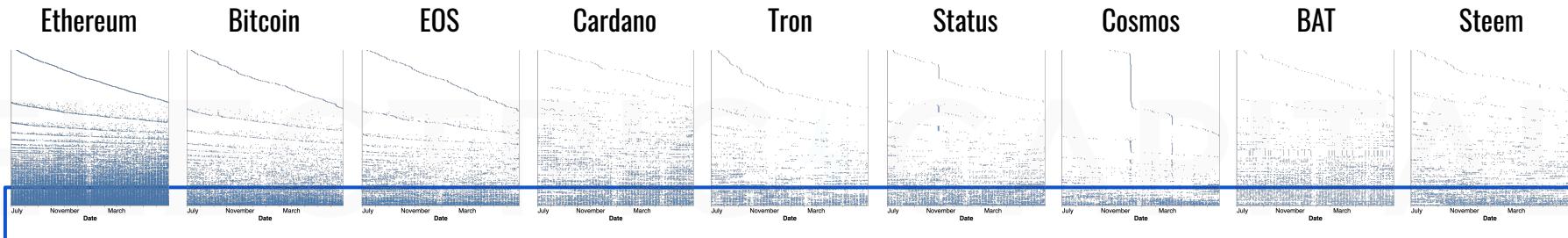
Ethereum has the highest number of Full Time developers



Ethereum and Bitcoin have many Full Time developers committing consistently

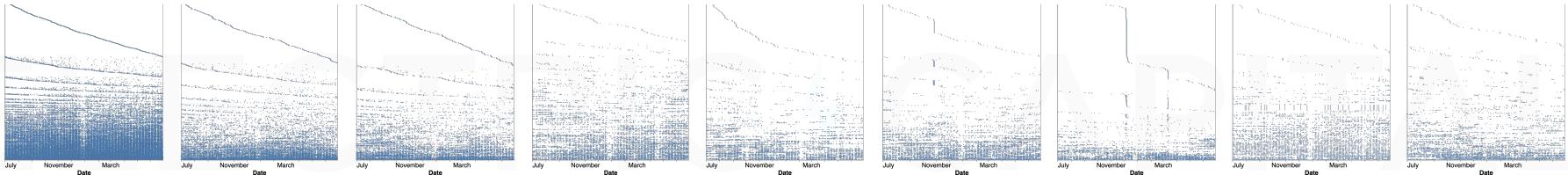


Many ecosystems have a dedicated core group of frequently committing devs

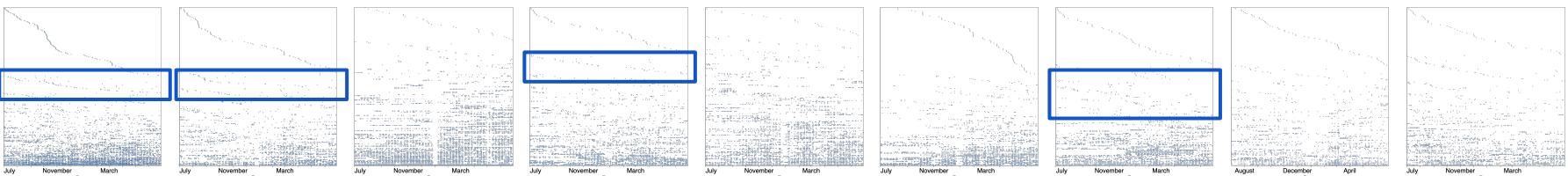


Many projects also have long term but infrequent committers

Ethereum Bitcoin EOS Cardano Tron Status Cosmos BAT Steem

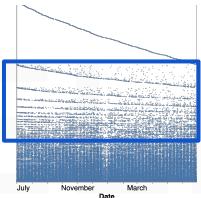


Monero Stellar Waves Tezos Aeternity Maker IOTA XRP NEO

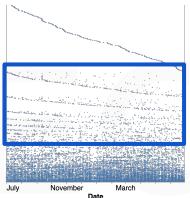


Some projects have many Part Time developers

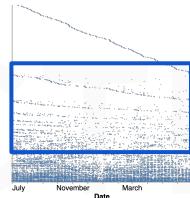
Ethereum



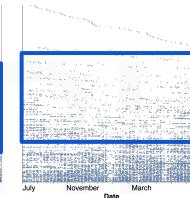
Bitcoin



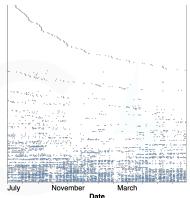
EOS



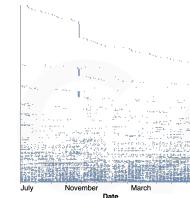
Cardano



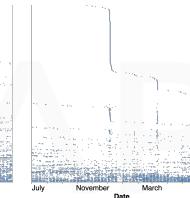
Tron



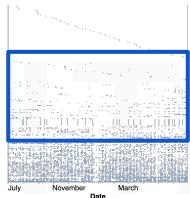
Status



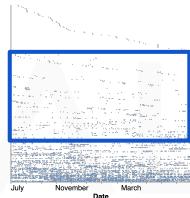
Cosmos



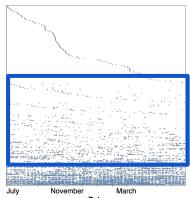
BAT



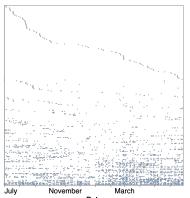
Steem



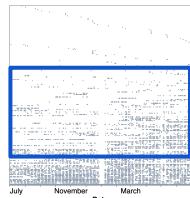
Monero



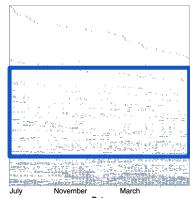
Stellar



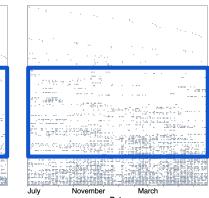
Waves



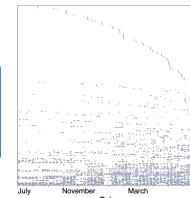
Tezos



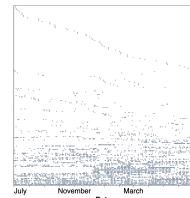
Aeternity



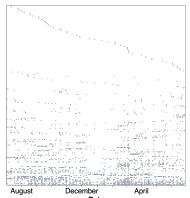
Maker



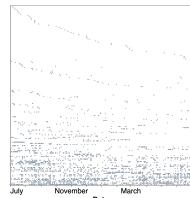
IOTA



XRP

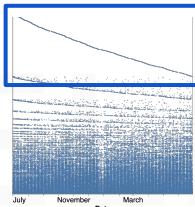


NEO

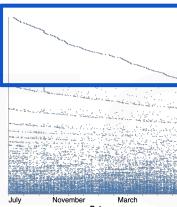


Most projects have One Time contributors

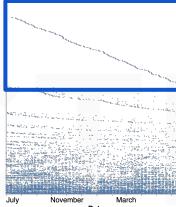
Ethereum



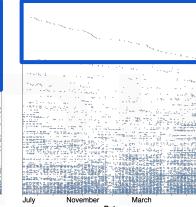
Bitcoin



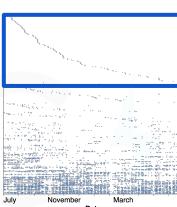
EOS



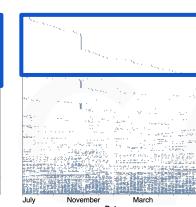
Cardano



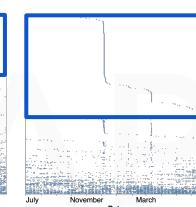
Tron



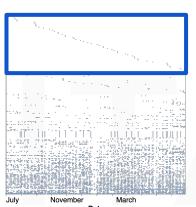
Status



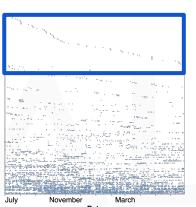
Cosmos



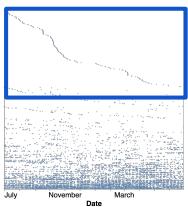
BAT



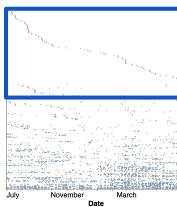
Steem



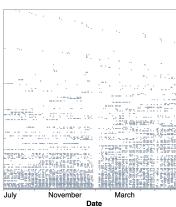
Monero



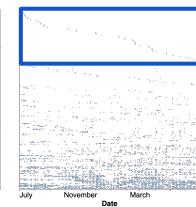
Stellar



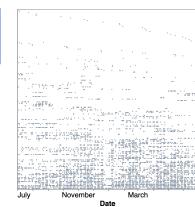
Waves



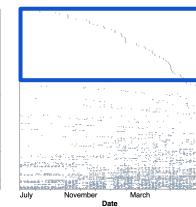
Tezos



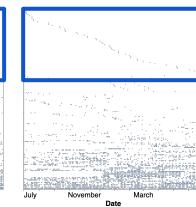
Aeternity



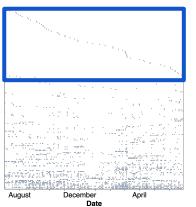
Maker



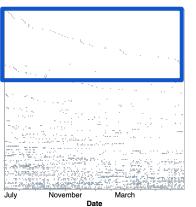
IOTA



XRP

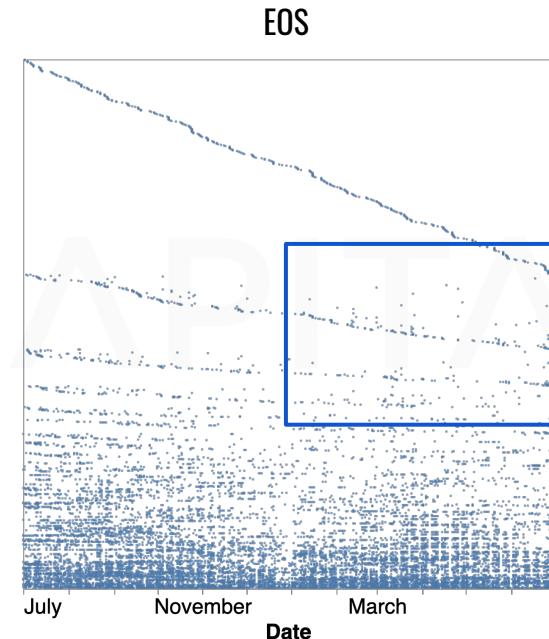
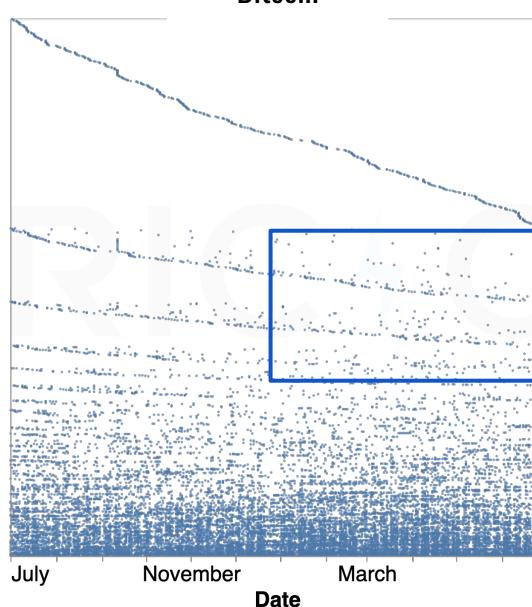
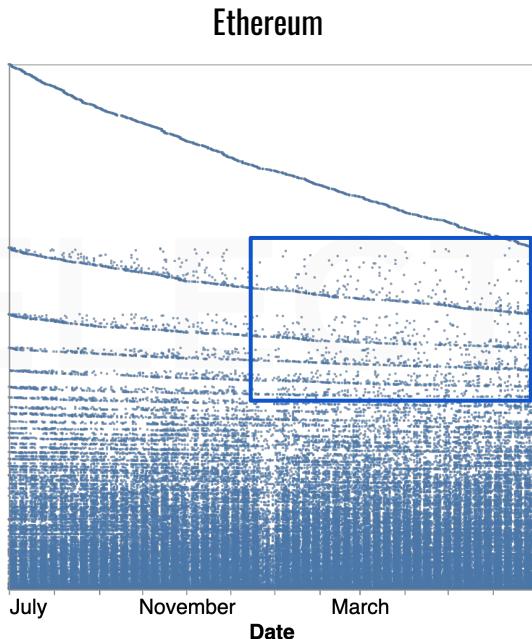


NEO



Ethereum, Bitcoin, EOS have new highly active, Part Time developers joining

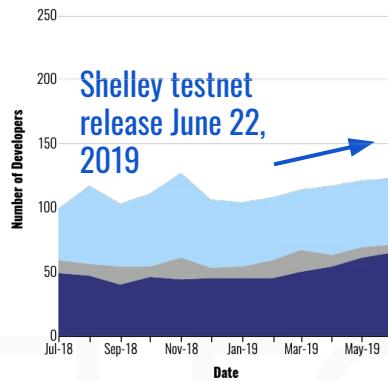
New Part-Time developers joined as contributors this year



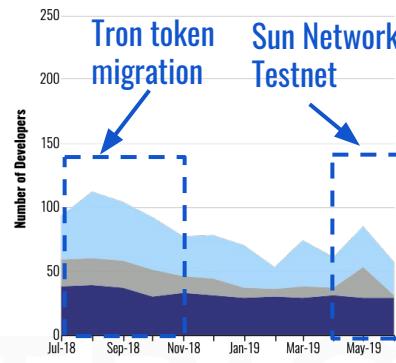
Test Nets and Launches drive engagement...

Test Nets and Launches drive engagement...

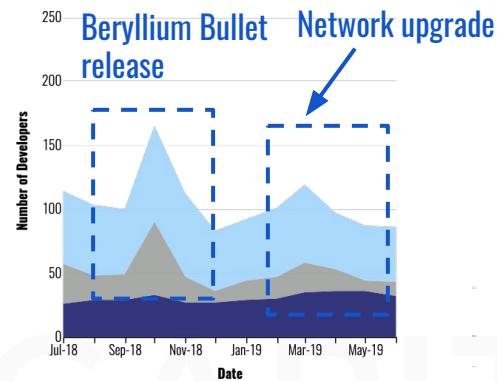
Cardano



Tron



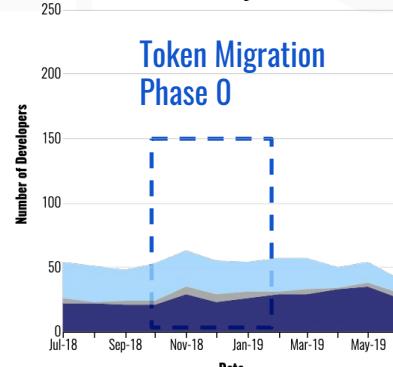
Monero



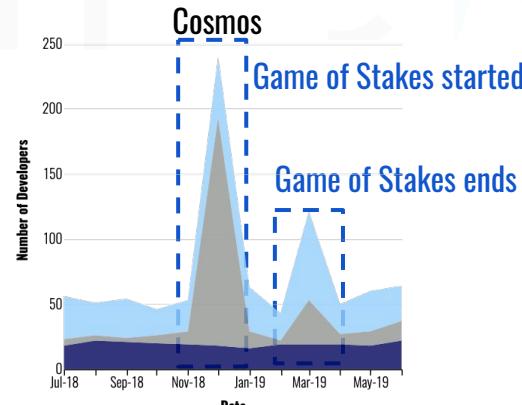
Developer Type

- Part Time
- One Time
- Full Time

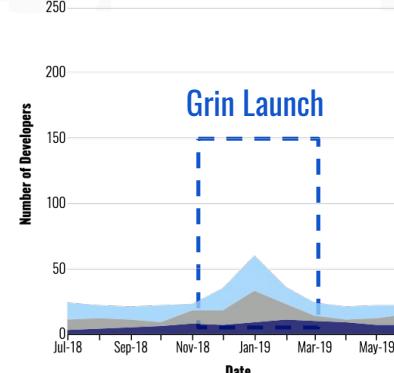
Aeternity



Cosmos



Grin

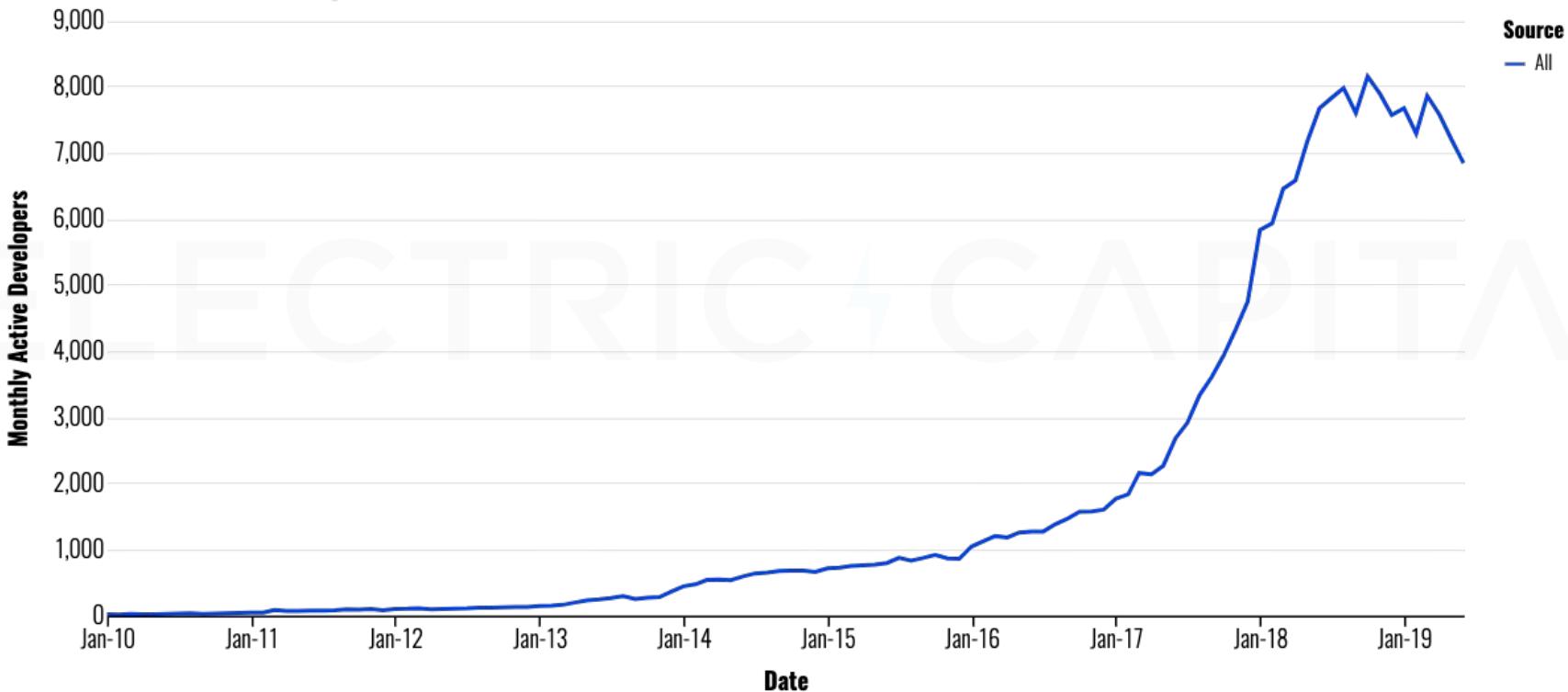


Are the trends consistent across all categories,
even outside top 100?

Part 3

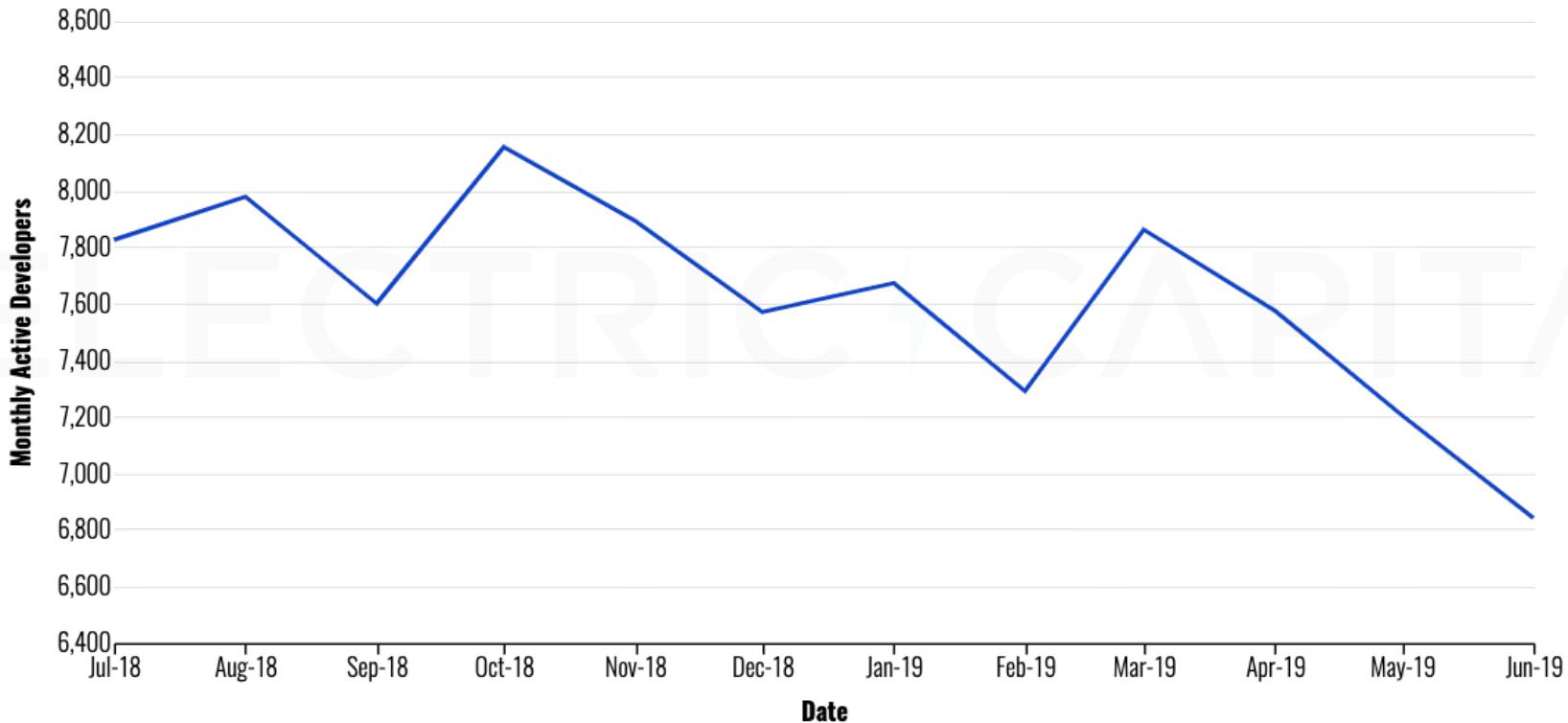
By Category

Since 2010, developers worked on 27k repos across 3.4k projects

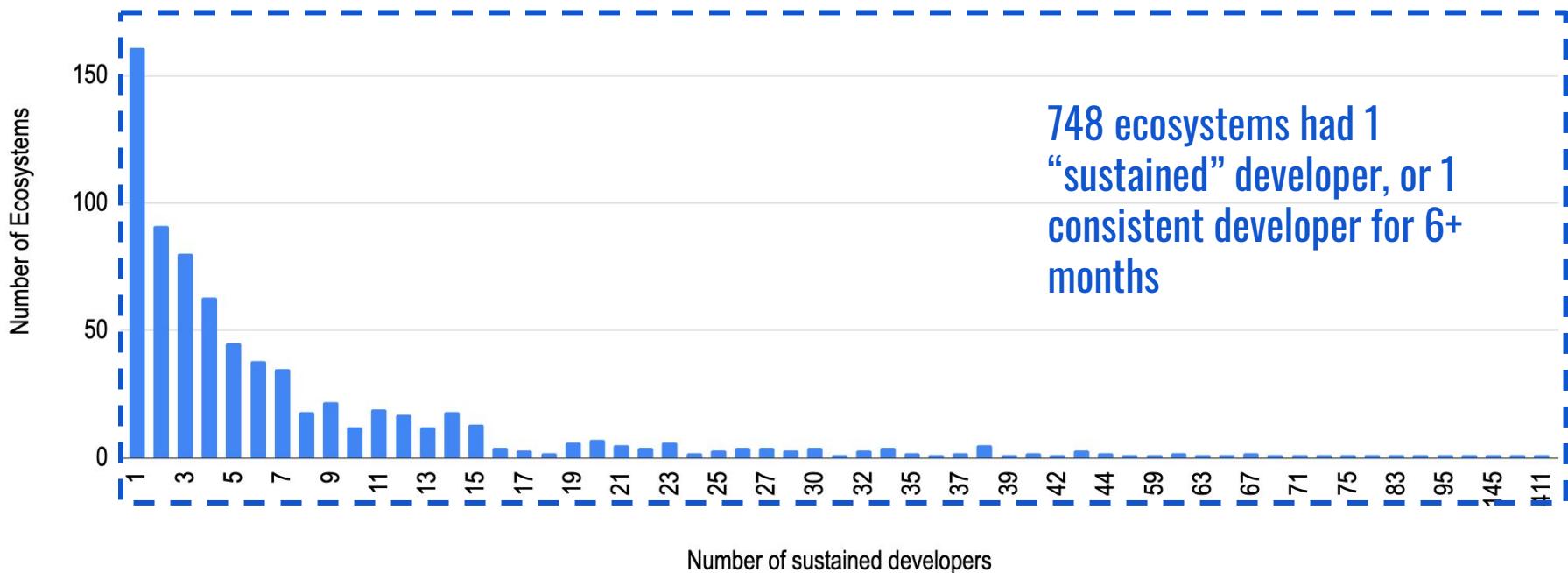


Let's just consider the last year...

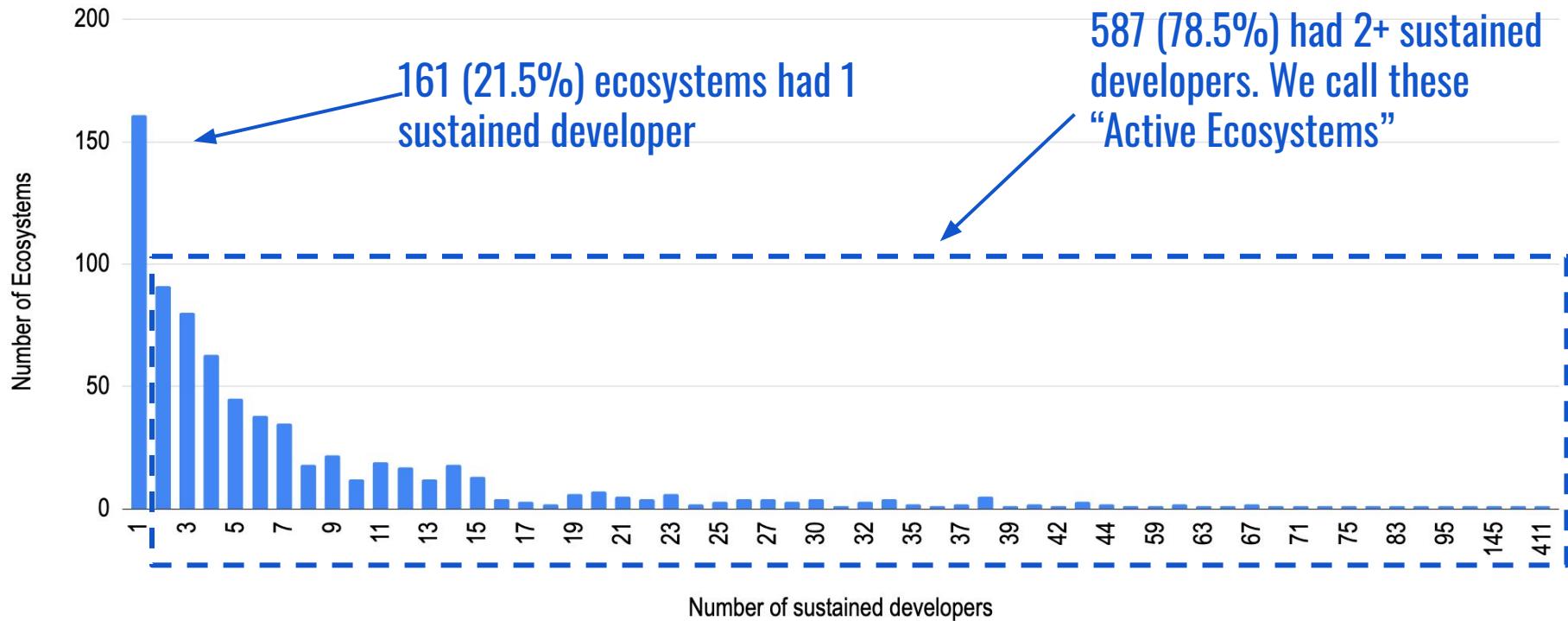
6.5k developers contributed to 15.3k repos across 1,140 ecosystems...



Of 1,140 ecosystems, 748 had at least 1 sustained developer...

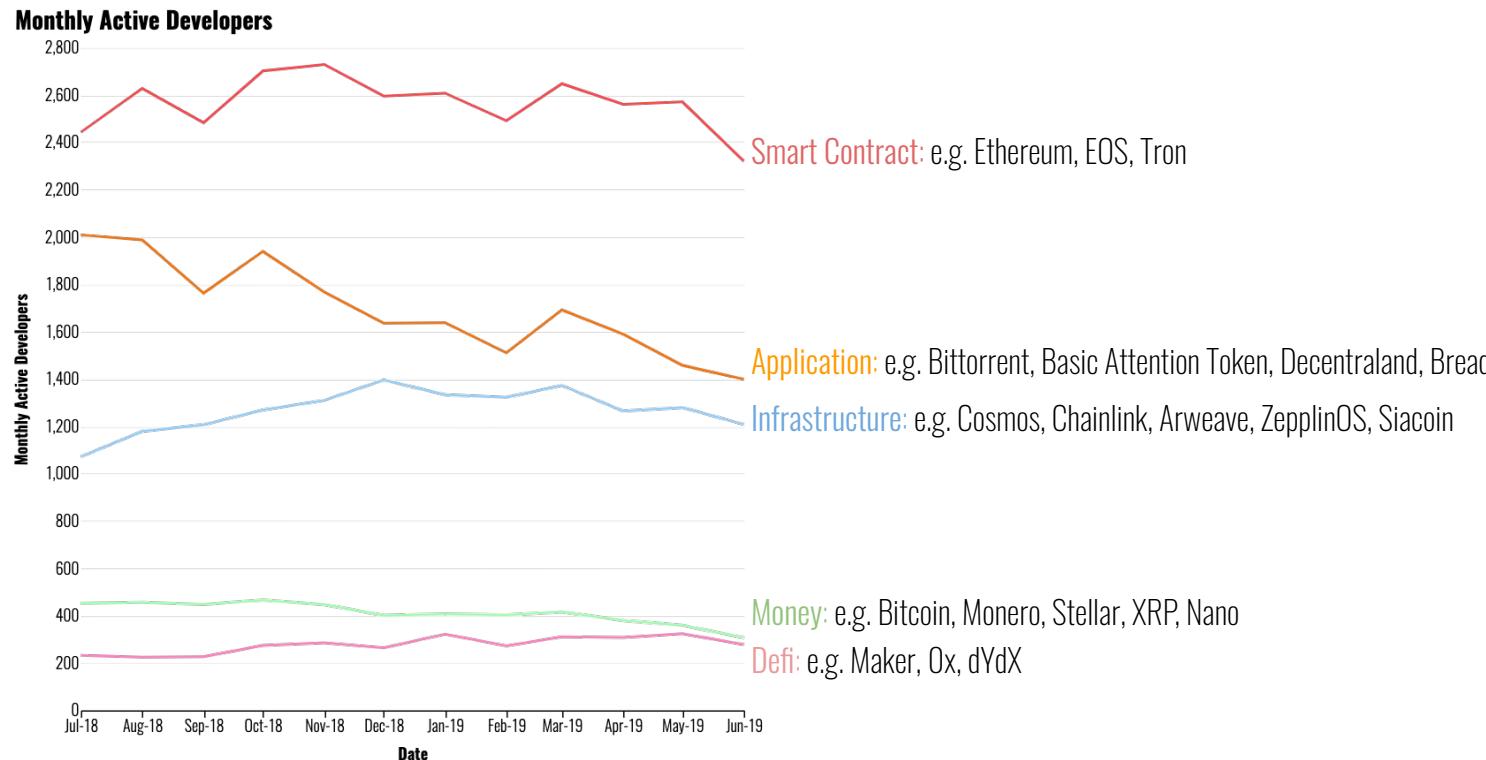


Active Ecosystems: 583 have 2+ developers for at least 6 months

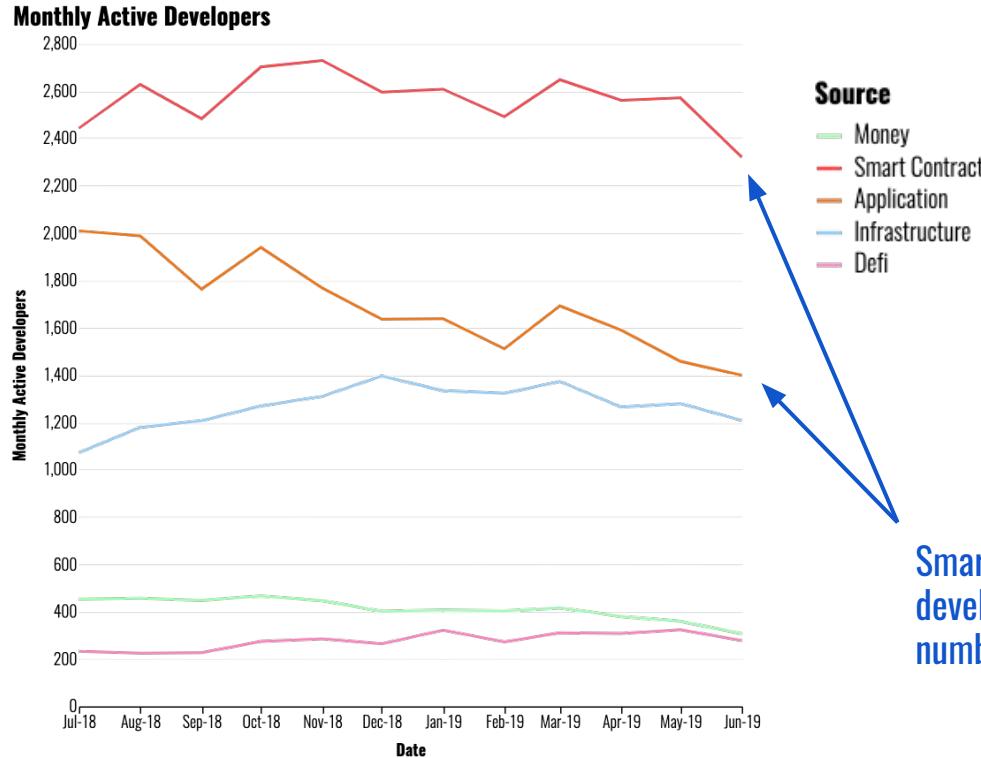


Focusing only on these Active Ecosystems...

Slicing Active Ecosystems by category: Smart Contracts, Money, dApps, Infrastructure, & Defi



Smart Contracts and Applications are losing developers

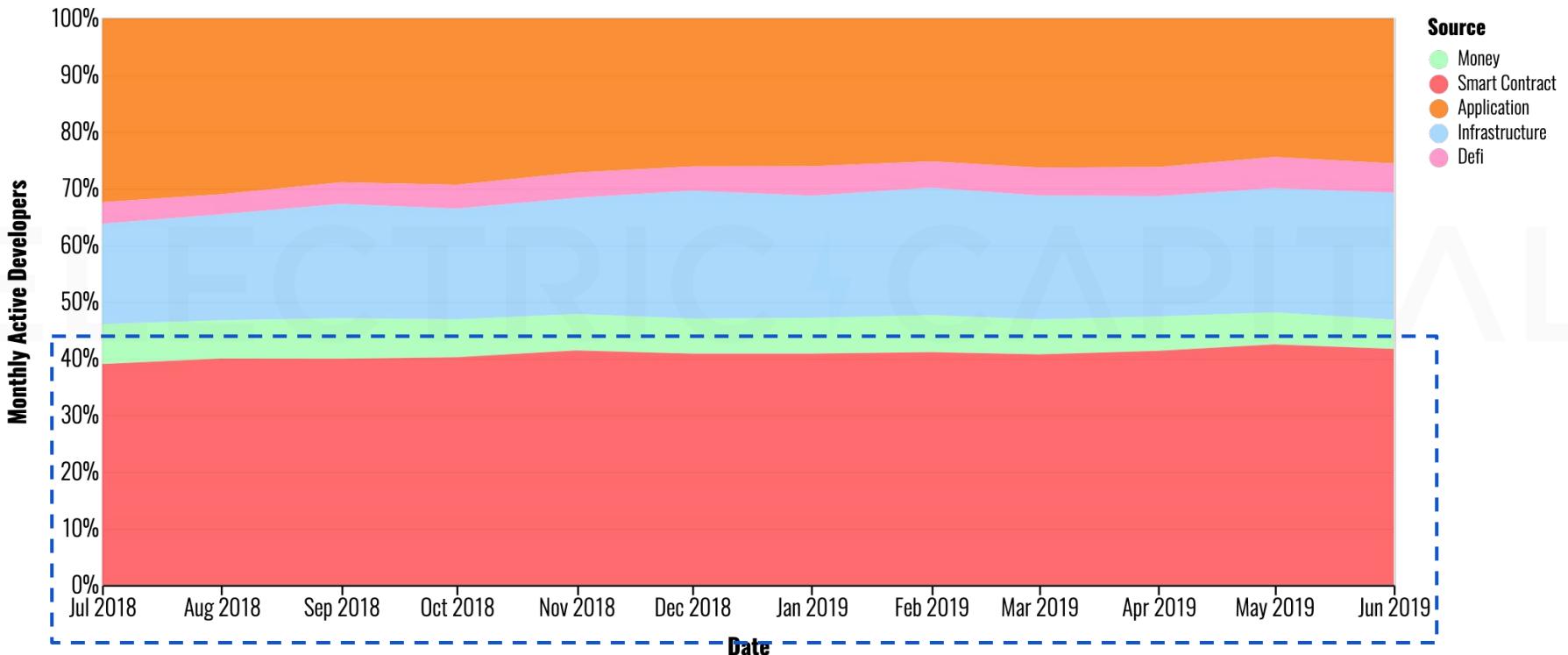


Source

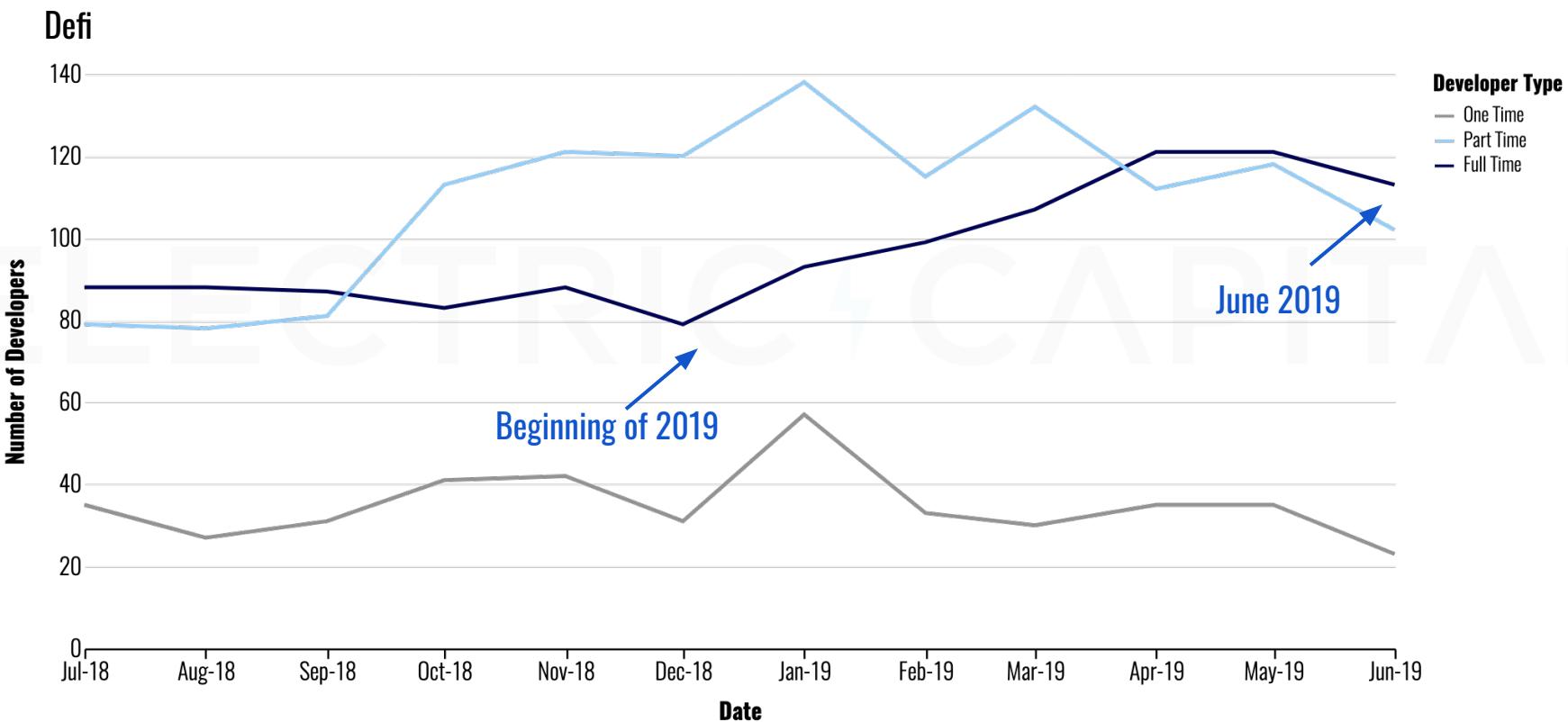
- Money
- Smart Contract
- Application
- Infrastructure
- Defi

Smart Contracts and Application
developers declining the most by raw
numbers

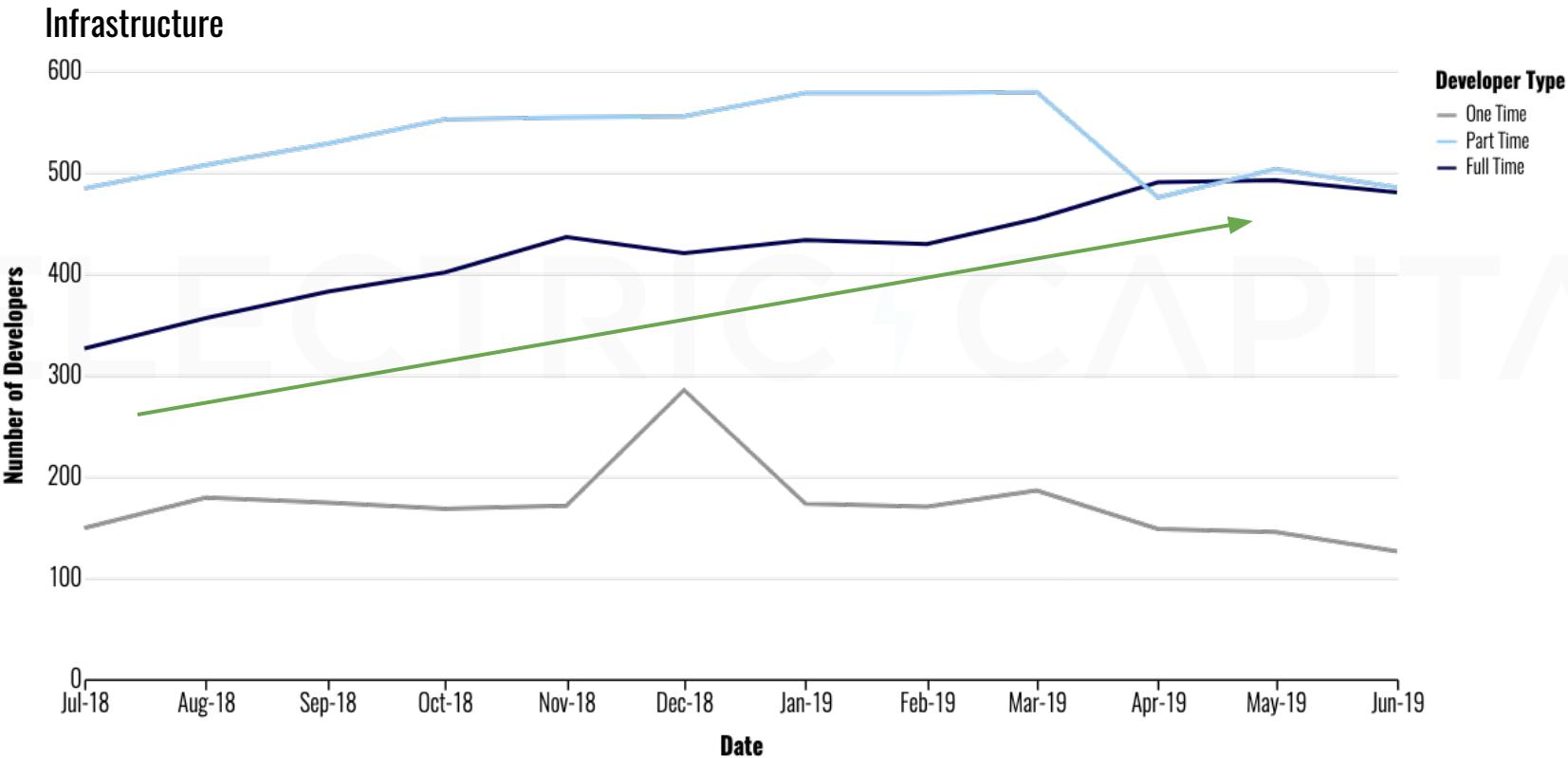
Smart Contract Platforms still account for ~40% of all developers



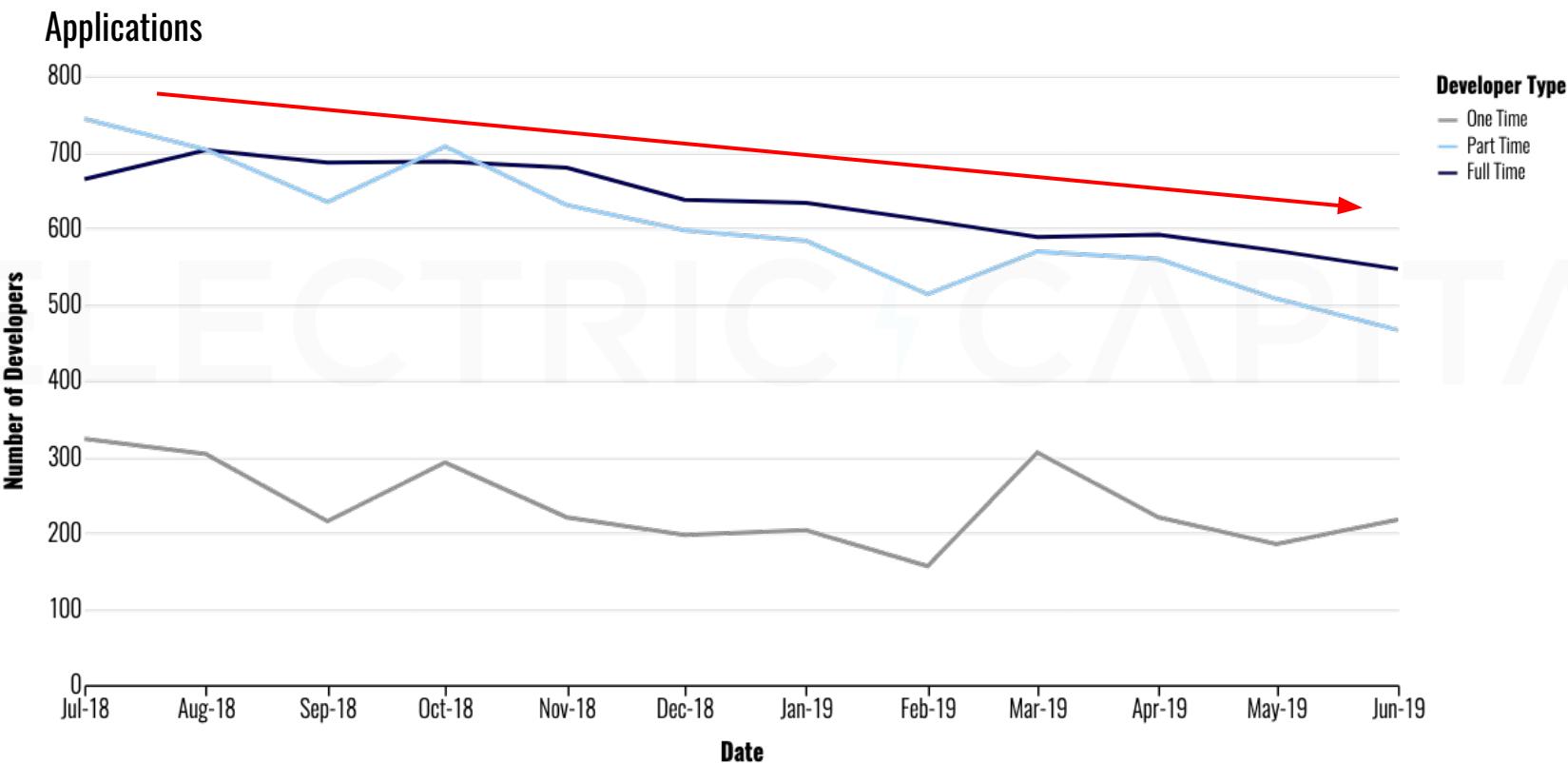
Full Time Defi developers increased since 2019



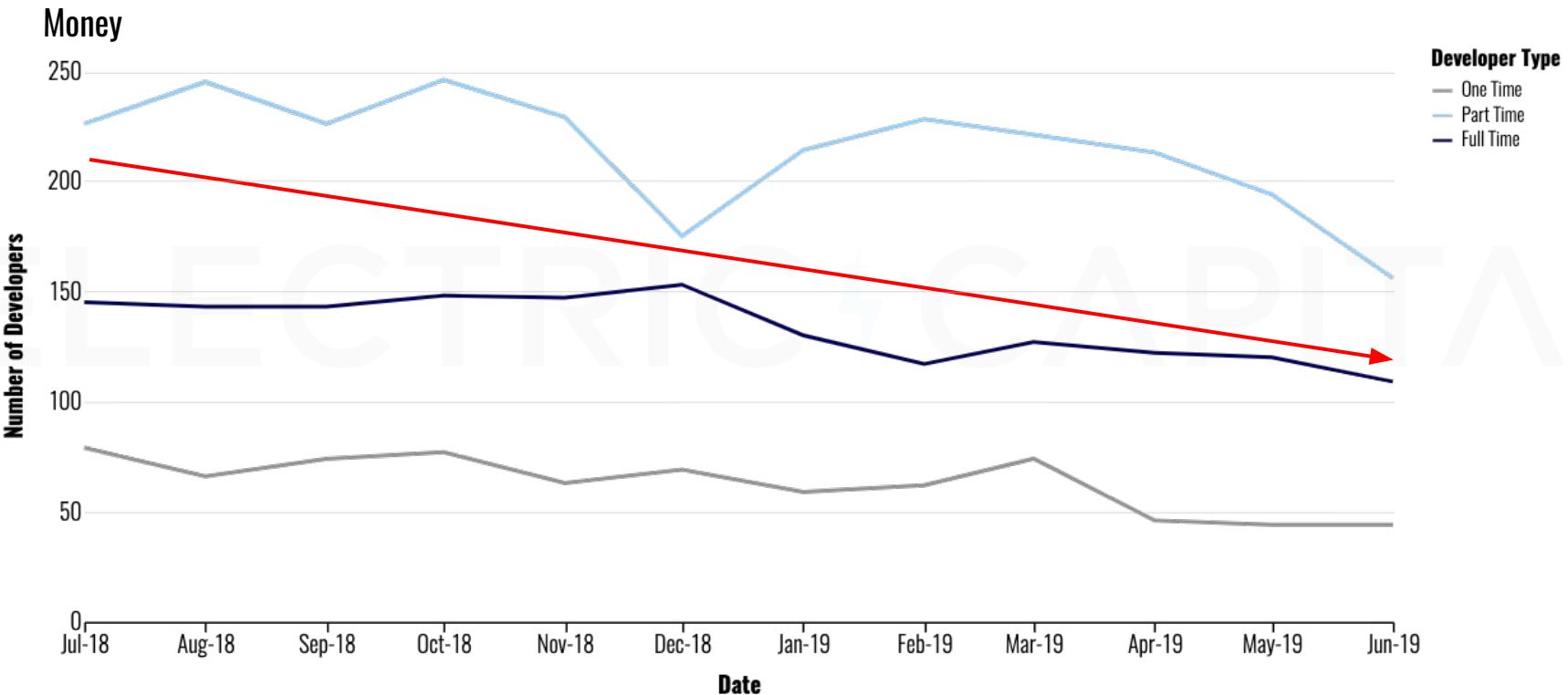
Full Time Infrastructure developers are increasing



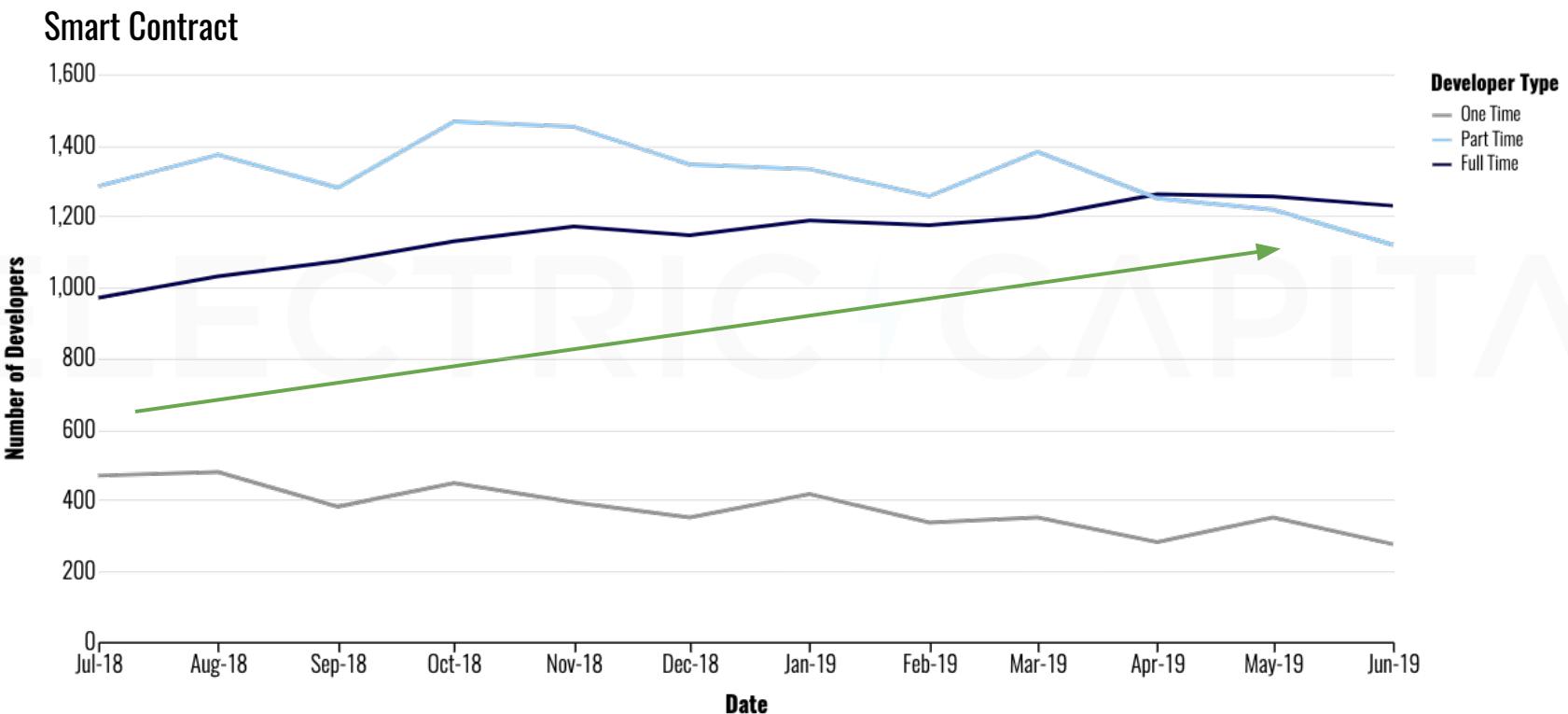
Full Time, Part Time, and One Time developers are decreasing for other dApps



All developer types are decreasing in Money ecosystems...



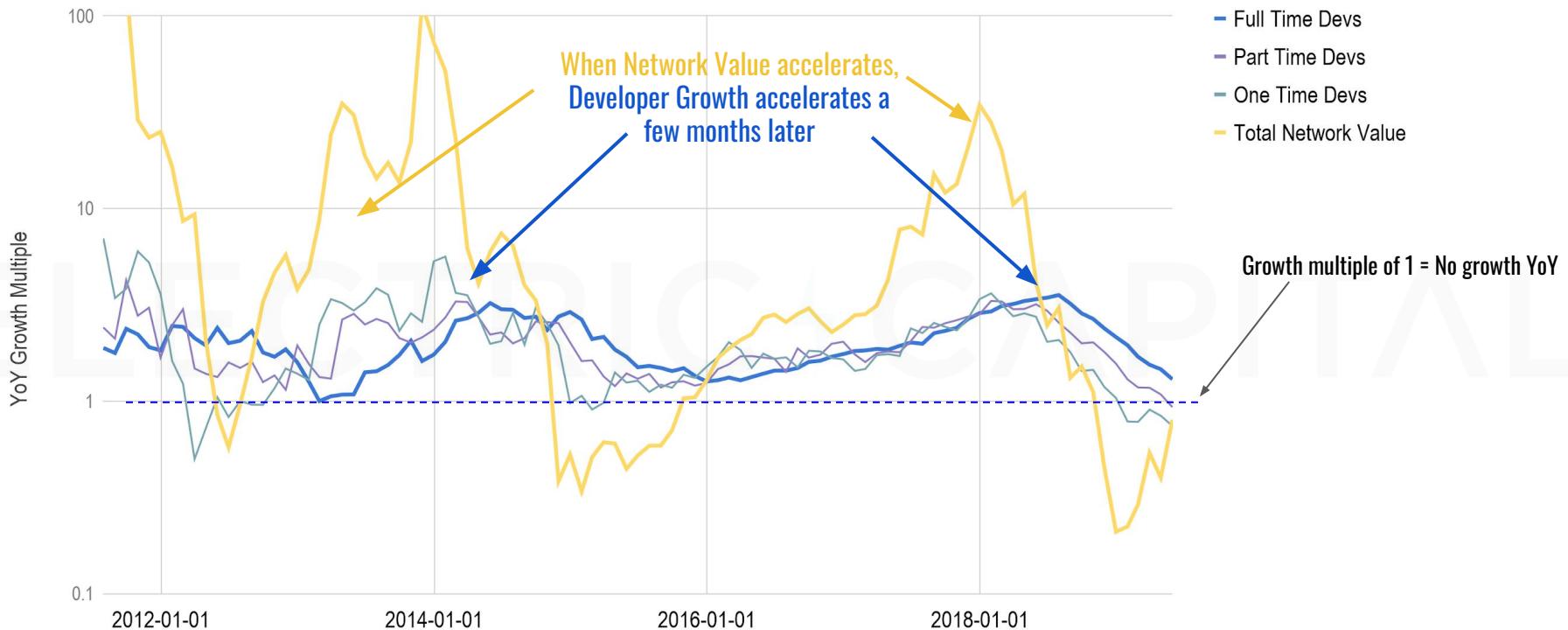
...while in Smart Contracts platform devs are down, full time devs are increasing



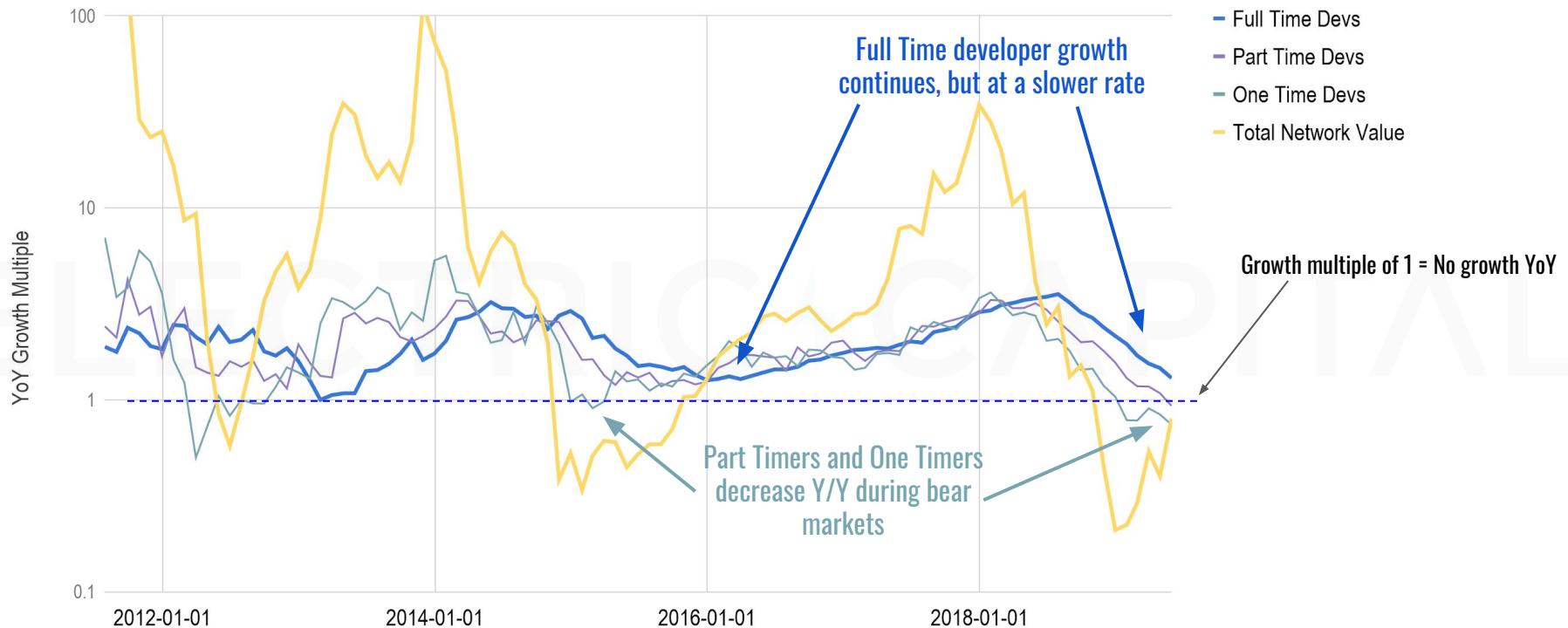
Bonus Section

Developer Growth in Context

As Network Value increases, Developer growth rises at a faster rate (2nd derivative)



When Network Value shrinks, Full Time dev growth *continues*, just more slowly



How do we put crypto and blockchain developers in context of other ecosystems?

Crypto and Blockchain compared to other large Open Source ecosystems

1243 monthly active Ethereum developers as of June 2019

1615 contributors to Apache projects in Q1 2019 [1]

1900 Linux Kernel developers [2]

6842 total monthly active crypto developers as of June 2019

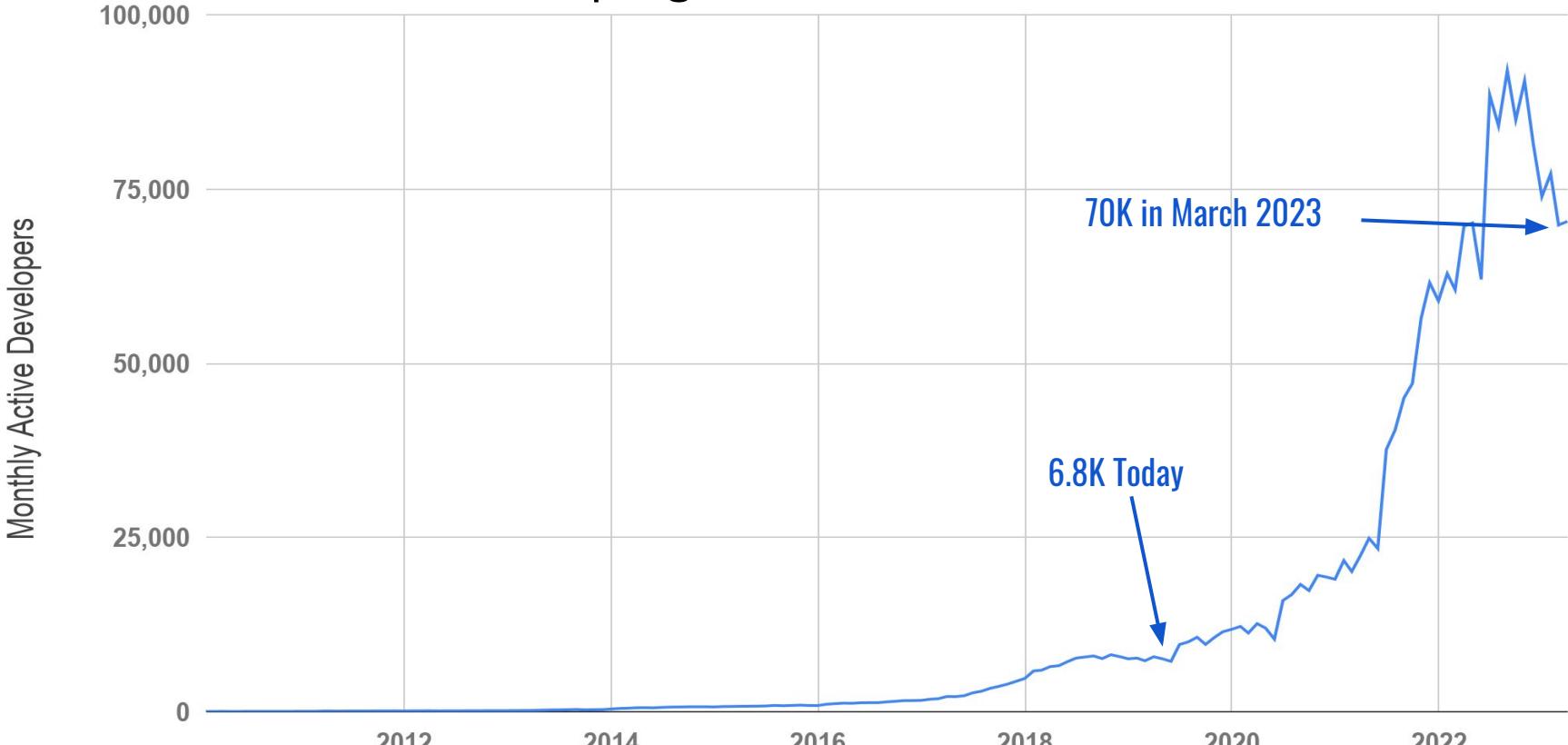
... still plenty of room to grow ...

4M+ NodeJS package manager users [3]

6M+ developers target Android [4]

1 - [report](#), 2 - [estimated](#), 3 - [2017 report](#), 4 - [report](#)

If the next 4 years of developer growth look like the last 4 years...



Executive Summary

1. Despite market downturns in 2018, **Full Time developers increased 13%** year-over-year in June 2019 and are **consolidating around high network value projects**.
2. **Code commit volume is consistent** but total monthly active developers are **down 10% Y/Y**.
3. **80% of developer loss** came from One Time per month and Part Time developers.
4. The biggest developer drop-off came from projects **outside of the Top 100** by network value.
5. **Smart Contracts, Infrastructure, and DeFi** ecosystems continue to gain Full Time developers
6. Overall crypto ecosystems are approaching the size of well known open source projects such as Apache, but still has **plenty of space to grow**.

Thank you to everyone who gave us feedback on early drafts!

Danny Aranda
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Alex Bosworth
[@alexbosworth](#)

Dan Elitzer
[@delitzer](#)

Kincaid O'Neil
[@kincaidoneil](#)

Marc-Antoine Ross
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Robert Bent
[@robbiebent1](#)

Thiago Canellas
[@eosriobrazil](#)

Steve Lee
[@moneyball](#)

Kevin Owocki
[@kevinowocki](#)

Riccardo Spagni
[@fluffypony](#)

Linda Xie
[@ljxie](#)

Spencer Bogart
[@CremeDeLaCrypto](#)

Jill Carlson
[@jillruthcarlson](#)

Scott Moore
[@notscottmoore](#)

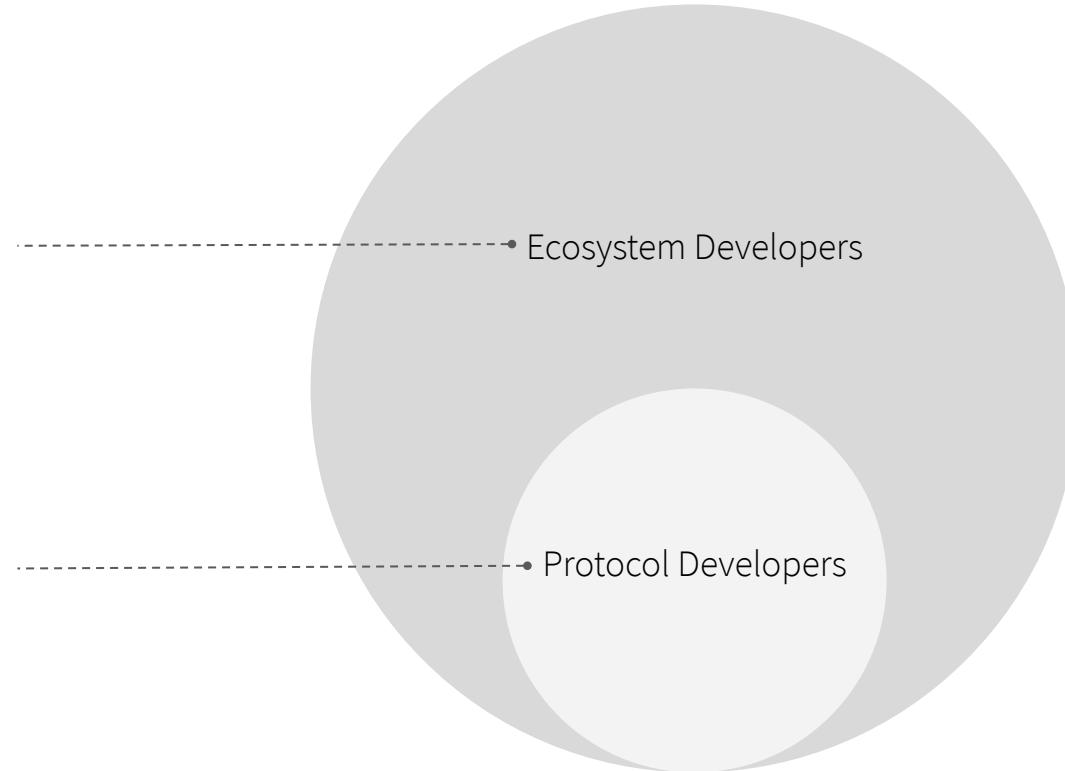
Justin Rice
[@StellarOrg](#)

Elizabeth Stark
[@starkness](#)

Appendix / Methodology

We've expanded the Developer Report to include all types of crypto developers

1. **Ecosystem Developers** are working on dapps, documentation, tooling, wallets, and anything else furthering the project.
2. **Protocol Developers** include developers working only on the core protocol.



For example, how do we break down the Bitcoin ecosystem?

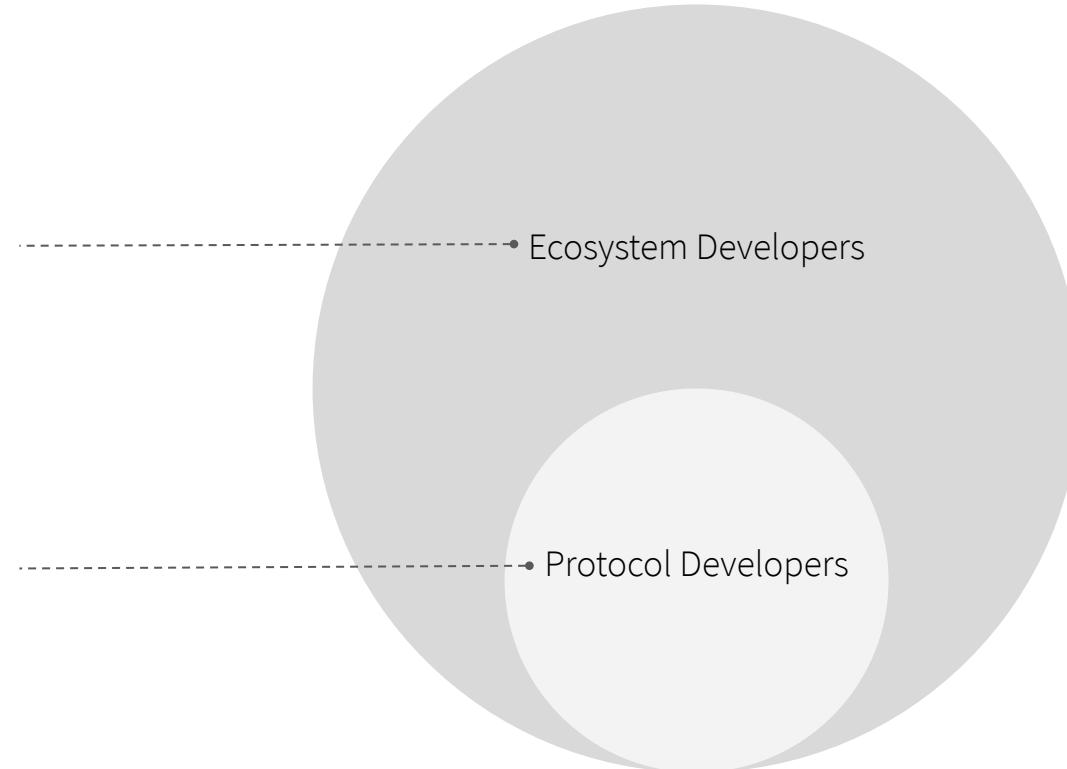
Bitcoin

1. **Ecosystem:**

- light clients like Electrum...
- layer 2 solutions like Lightning...
- libraries like libbitcoin...
- Bitcoin documentation like Mastering Bitcoin...
- apps that are built with Bitcoin...
- and anything that advances Bitcoin.

2. **Protocol:**

- Bitcoin Core
- btcsuite/btcd
- ...and more.



Ecosystems can live inside other ecosystems

MakerDao

0. **Parent Ecosystem:**

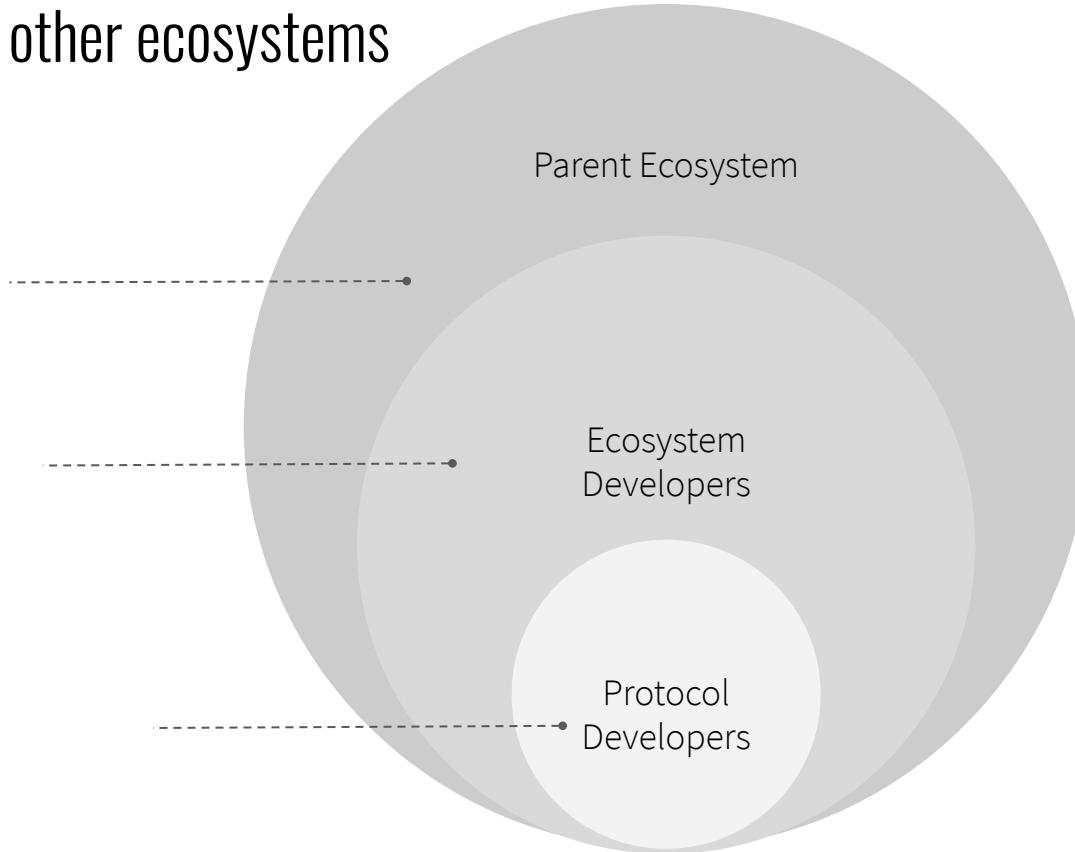
Ethereum

1. **Maker Ecosystem:**

- o xDai
- o awesome-makerdao
- o Market-maker-keeper
- o daipay
- o ...and more.

2. **Maker Protocol**

- o makerdao/sai
- o ...and more.



Commit Counting Methodology: Not all code commits are created equal.

1. Forks: Only new code counts towards developer activity. We omit code and developer activity from merging changes from the upstream codebase.
2. Fingerprinting: Fingerprinting is a technique used to identify commits originating from upstream projects. We look at the files and lines changed, the commit message, committer, author and associated dates.
3. Commits from Integrating Open Source Libraries: Integrating common libraries does not count toward code activity.
4. Branches: We look at commits from all branches (master/development, etc.) and tags. We look beyond Github's default view, which can be misrepresentative.
5. Limitations: We only look at open source repositories. There are many teams that are not yet open source.

How are developers counted?

1. Developers: We count original code authors as developers. This means that a developer who merges a pull request is not counted as an active developer on the project, but the original authors of the commits are.
2. Full Time developer: contributed code 10+ days out of a month
3. Part Time developer: contributed code 2-9 days out of a month
4. One Time developer: contributed code 1 day out of a month
5. 3-month rolling window: We look at the last 3 months of a developer's activity to determine their category.

Caveats

1. We consider open source repositories only. There are many more developers working on important closed source projects or ecosystems. Some teams will open source their code later.
2. This methodology undercounts developers in other roles besides original code contribution such as backporting, testing, release engineering or code review/feedback that aren't reflected in git repositories.
3. It will require more than just software engineers to build product and reach mainstream adoption.
4. Not all commits are created equal. Some may be routine, mechanical changes, whereas others represent hours of accumulated research and analysis.

Despite these caveats, we consider the analysis in this report directionally accurate and indicative of the overall health of the ecosystem.

We are always looking to improve so please share feedback with us at info@electriccapital.com

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