ELECTRIC⚡CAPITAL

DEVELOPER REPORT

January — December 2022

INTRODUCTION

Electric Capital is a leading crypto venture firm. We are early-stage investors in many well-known Layer-1 platforms, DeFi protocols, NFT projects, DAOs, and breakout crypto businesses. Learn more at **ElectricCapital.com**

We share this data publicly in the hopes of helping the crypto community have a clearer understanding of the industry's collective progress. We are grateful to everyone in the community who helps by contributing to our Github, the foundations who help us validate our analysis, and the friends who offer feedback on drafts.

Contributors

Maria Shen	Enrique Herreros	Curtis Spencer	Emre Caliskan	Avichal Garg	Ken Deeter	Mitchell Hammer	Mark Xia	Martha Shear	Adam Wolff	Gary Thung	Emily Myers	Photon
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+300 volunteers in the crypto community who added to our Github taxonomy and scrubbed data!

HOW WE MEASURE DEVELOPER ACTIVITY

An early and leading indicator of value creation in emerging platforms is developer engagement. Developers build killer applications that deliver value to end users, which attracts more customers, which then draws more developers.

Because crypto is significantly open source, we have a unique and unprecedented ability to understand an emerging industry that may be worth many trillions.

For the 2022 report, we analyzed 250M code commits. The taxonomy of projects is crowdsourced from **Crypto Ecosystems**, the foundations from many of the ecosystems, as well as CoinGecko, CoinMarketCap, DappRadar, DefiLlama, Github,Gitlab, and others.

We infer non-original commits, which account for 65% of the total, and credit only the original authors and original ecosystems that produce code. We try our best to eliminate bots and de-duplicate developers with multiple accounts.

More details are in the appendix.

The taxonomy of projects is available at our Github:
github.com/electric-capital/crypto-ecosystems

CAVEATS

We undercount developers because we rely on open-source repositories only

There are many more crypto developers than are accounted for in our report. Some teams are working on closed-source projects or deploy their code on-chain without ever open-sourcing their contracts. We also undercount developers in roles such as backporting, testing, or release engineering as their efforts may not result in unique code contributions.

Some teams first work in a closed source environment, then open-source their code later. We and the community add new open-source repositories to a common mapping found at **Crypto Ecosystems**. Not all open-source repositories will make it into the taxonomy in time for this report every year.

It requires more than just software engineers to build crypto products that reach mainstream adoption, so this is a dramatic undercounting of the number of people building in crypto.

Not all commits are created equal

Some code commits may be routine changes, whereas others represent hours of accumulated research and analysis. Despite these caveats, we consider the analysis in this report directionally and relatively accurate.

Feedback

We are always looking to improve. Please share feedback with us at **devreport@electriccapital.com**

EXECUTIVE SUMMARY

Developers are a leading indicator of value creation.

Developers build apps that deliver value to users. Killer apps attract customers, and those customers bring more developers. Because crypto is significantly open source, we have an unprecedented ability to measure developer adoption and fundamental traction in an emerging industry.

Crypto developers are +5% YoY, despite 70%+ decline in prices.

- 23,343 monthly developers as of Dec 2022

- 471,000+ monthly code commits are made toward open-source crypto projects

- +8% YoY growth in Full-Time developers. Full-Time devs contribute 76% of code commits

- All-time high of 61,000+ developers contributed code for the first time in 2022

Crypto developers increased meaningfully since 2018.

- Crypto network value is back to Jan 2018 levels, but monthly developers increased +297%.

- 3x growth in Bitcoin monthly active developers, from 372 to to 946 since Jan 18

- 5x growth in Ethereum monthly active developers, from 1084 to 5819 since Jan 2018

- Solana, Polkadot, Cosmos, & Polygon grew from fewer than 200 devs to 1,000+ developers since Jan 2018

Major ecosystems are emerging beyond Bitcoin and Ethereum.

- 72% of monthly active devs work outside the Bitcoin and Ethereum ecosystems

- Solana, NEAR, and Polygon grew 40% YoY and have 500+ total monthly active developers

- Sui, Aptos, Starknet, Mina, Osmosis, Hedera, Optimism, and Arbitrum grew 50%+ YoY and have 100+ total monthly active developers

- 3,901 developers work in DeFi every month across multiple chains, +240% since DeFi summer. 50% of DeFi developers are outside of Ethereum

- 900+ developers write code monthly in NFTs across chains, +299% since 2021

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DEVELOPER OVERVIEW

WE ARE NOW 14 YEARS INTO THE CREATION OF OPEN-SOURCE CRYPTO

Bitcoin v0.1 released

Satoshi Nakamoto satoshi at vistomail.com

Thu Jan 8 14:27:40 EST 2009

Announcing the first release of Bitcoin, a new electronic cash system that uses a peer-to-peer network to prevent double-spending.

It's completely decentralized with no server or central authority.

See bitcoin.org for screenshots.

Download link:
http://downloads.sourceforge.net/bitcoin/bitcoin-0.1.0.rar

Windows only for now. Open source C++ code is included.

- Unpack the files into a directory
- Run BITCOIN.EXE
- It automatically connects to other nodes

If you can keep a node running that accepts incoming connections, you'll really be helping the network a lot. Port 8333 on your firewall needs to be open to receive incoming connections.

The software is still alpha and experimental. There's no guarantee the system's state won't have to be restarted at some point if it becomes necessary, although I've done everything I can to build in extensibility and versioning.

You can get coins by getting someone to send you some, or turn on Options->Generate Coins to run a node and generate blocks. I made the proof-of-work difficulty ridiculously easy to start with, so for a little while in the beginning a typical PC will be able to generate coins in just a few hours. It'll get a lot harder when competition makes the automatic adjustment drive up the difficulty. Generated coins must wait 120 blocks to mature before they can be spent.

IN THE FIRST 7 YEARS: 1,000+ MONTHLY ACTIVE DEVELOPERS WROTE CODE

All Crypto Monthly Active Developers Since 2009
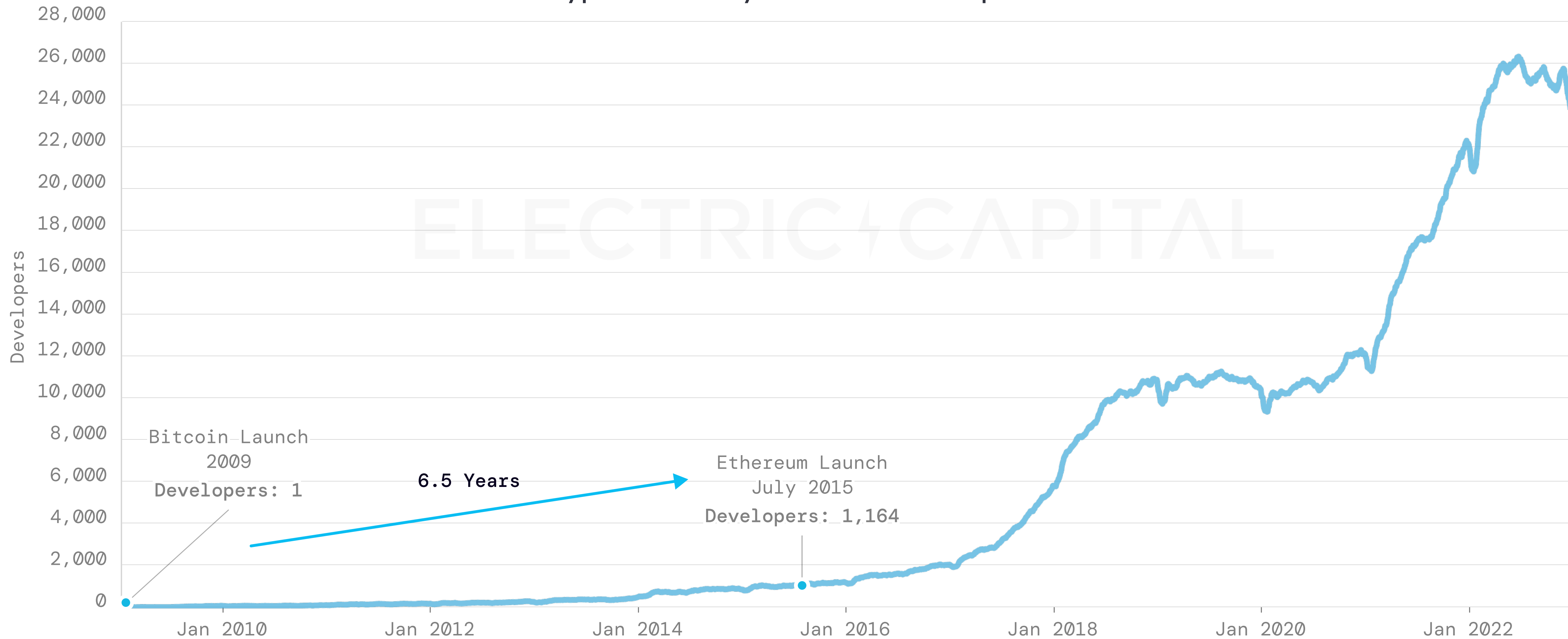
Bitcoin Launch
2009
Developers: 1

6.5 Years

Ethereum Launch
July 2015
Developers: 1,164

We use July 30, 2015 as the Ethereum Launch Date, when the genesis block was created.

IN THE NEXT 7 YEARS: CRYPTO GAINED +22,000 MORE MONTHLY ACTIVE DEVS

All Crypto Monthly Active Developers Since 2009

December 2022
Developers: 23,343

Bitcoin Launch
2009
Developers: 1

First
6.5 Years

Ethereum Launch
July 2015
Developers: 1,164

Second
7.5 Years

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Developers (y-axis): 0 – 28,000

Jan 2010, Jan 2012, Jan 2014, Jan 2016, Jan 2018, Jan 2020, Jan 2022
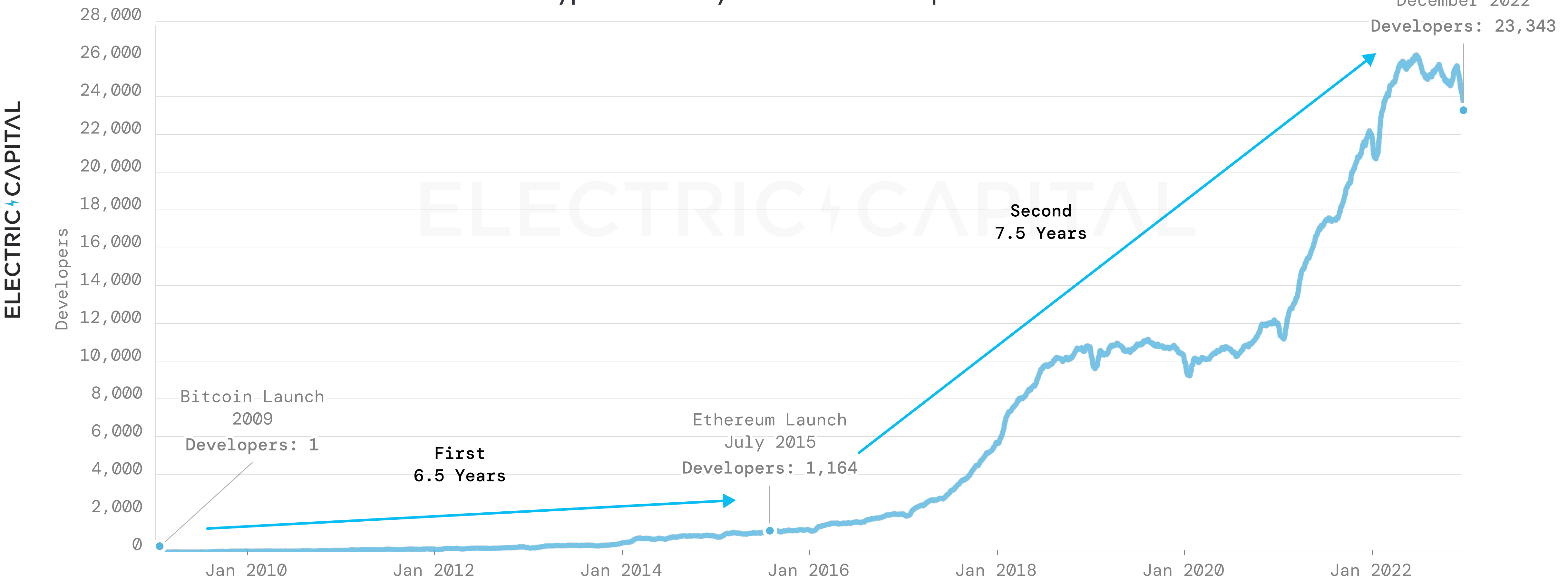
We use July 30, 2015 as the Ethereum Launch Date, when the genesis block was created.

THERE ARE NOW 23,343 MONTHLY ACTIVE DEVELOPERS IN CRYPTO

All Crypto Monthly Active Developers Since 2009

December 2022
Developers: 23,343
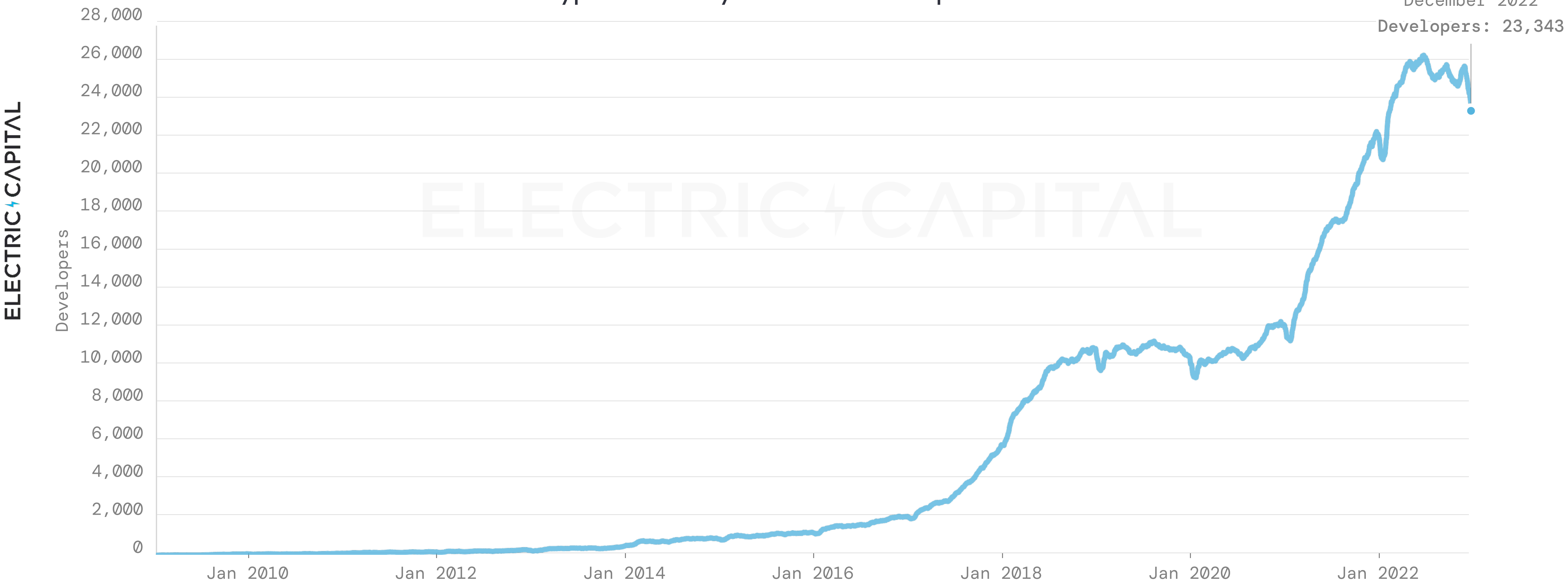
+5% MONTHLY ACTIVE DEVELOPERS FROM DECEMBER 2021 TO DECEMBER 2022

All Crypto Monthly Active Developers Since 2009

Dec 2021
22,309

Dec 2022
23,343
+1,034

+5%

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Developers

28,000
26,000
24,000
22,000
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0

Jan 2010   Jan 2012   Jan 2014   Jan 2016   Jan 2018   Jan 2020   Jan 2022
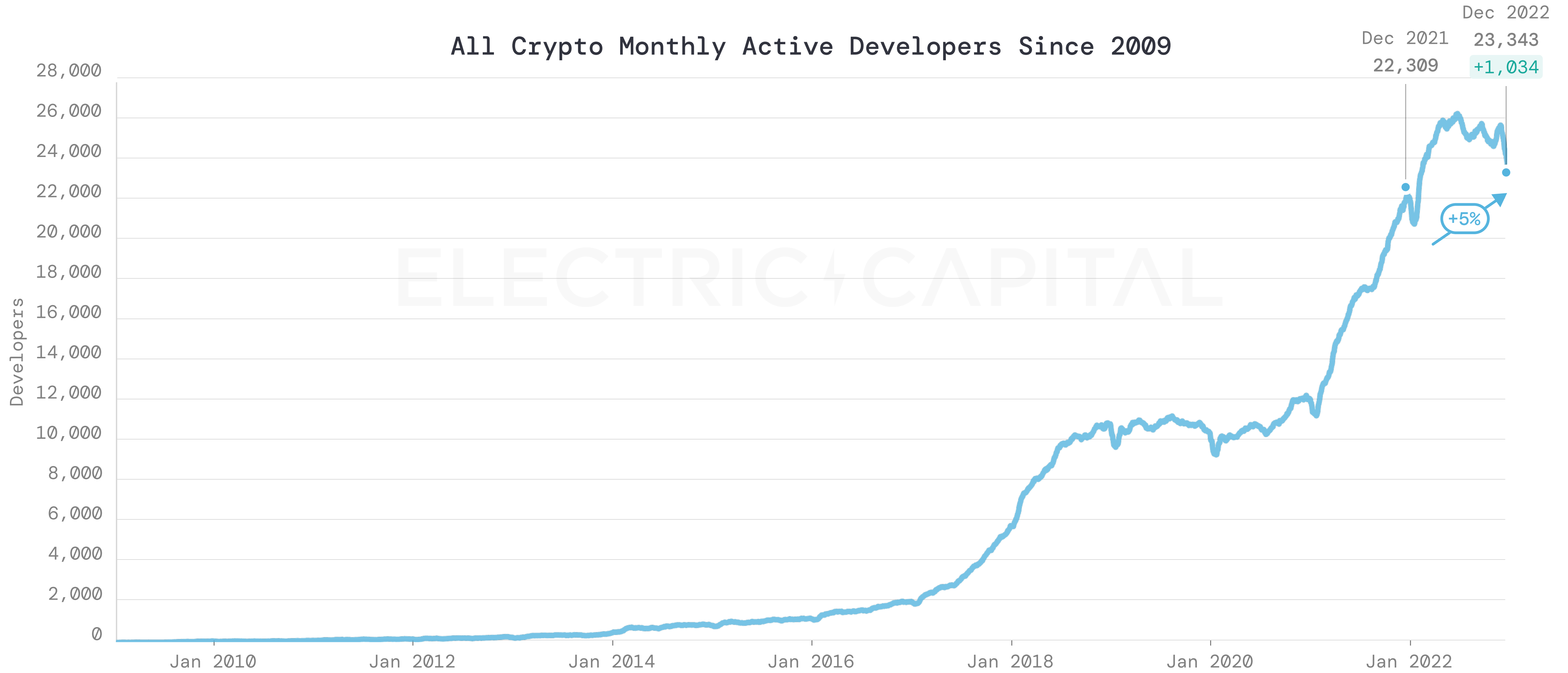
MONTHLY ACTIVE DEVS INCREASE ALONGSIDE PRICES IN A MARKET CYCLE

Monthly Active Developers vs Crypto Network Value
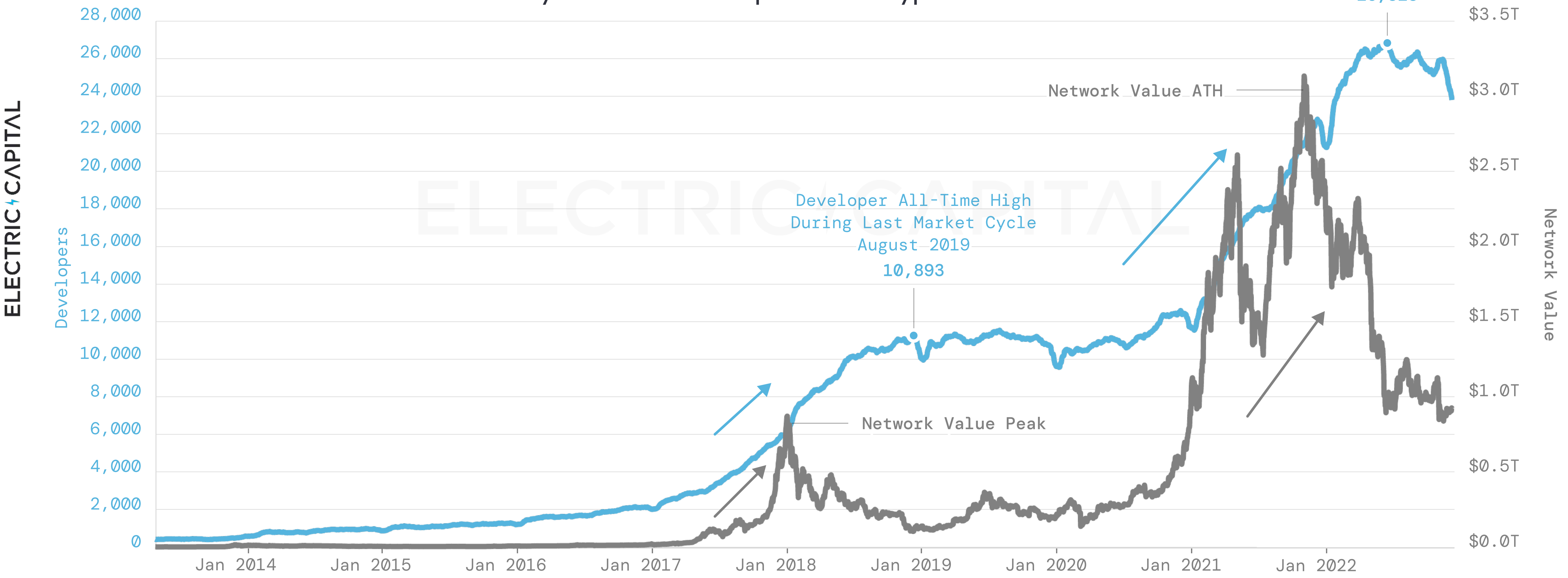
Developer All-Time High
Jun 2022
26,323

Developer All-Time High
During Last Market Cycle
August 2019
10,893

Network Value ATH

Network Value Peak

Total Network Value is the value of total crypto market cap from CoinGecko. Total Network Value reached a high Jan 6, 2018. Total Network Value reached an all-time high Nov 8, 2021.

DURING THE LAST MARKET CYCLE: MONTHLY DEVELOPERS GREW BY +8,043 TO OVER 10,000 FOR THE FIRST TIME

Monthly Active Developers vs Crypto Network Value

+8,043 monthly active developers through the last market cycle

Developer All-Time High During Last Market Cycle
10,893

Developers
2,850

Network Value Trough

Network Value Climb

Total Network Value is the value of total crypto market cap from Coingecko. Total Network Value began to climb May 11, 2017. Total Network Value reached a trough Dec 14, 2018. Previous Dev ATH was on Dec 16, 2018.

DURING THE CURRENT MARKET CYCLE: MONTHLY ACTIVE DEVELOPERS GREW BY +15,621 AND HIT AN ALL-TIME HIGH

Monthly Active Developers vs Crypto Network Value

Developer All-Time High
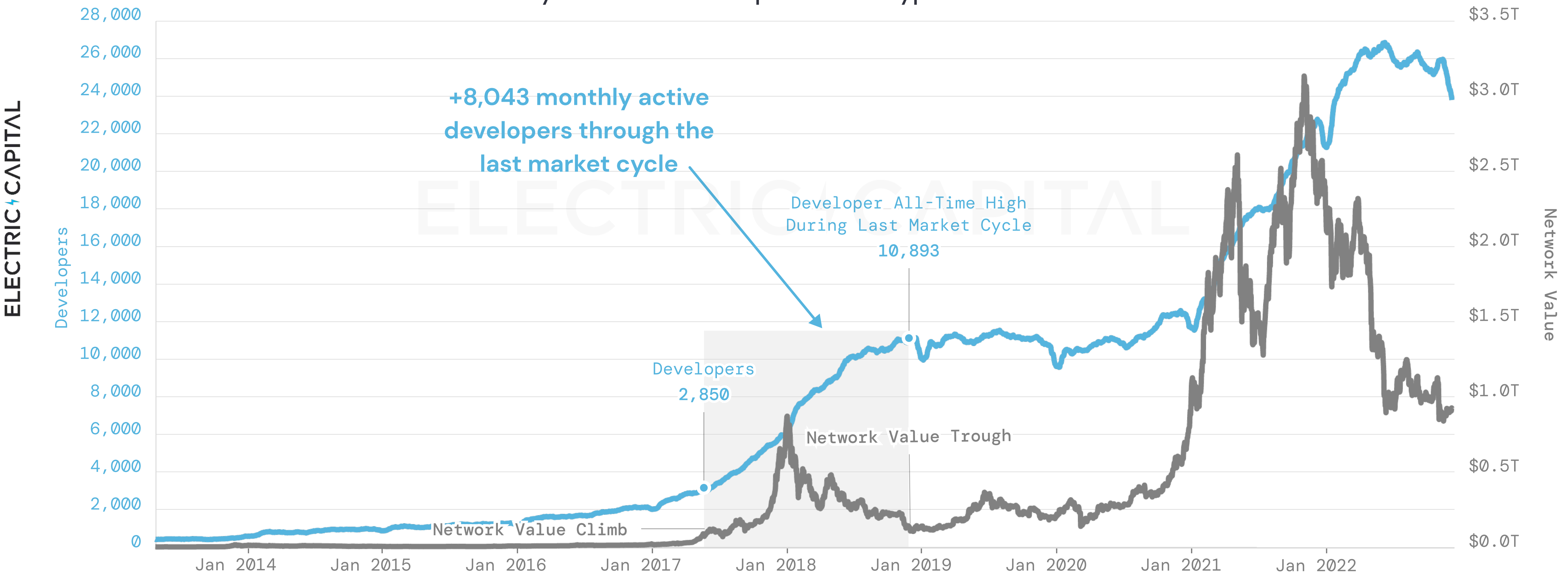26,323

+15,621 monthly active developers & hit an all-time high

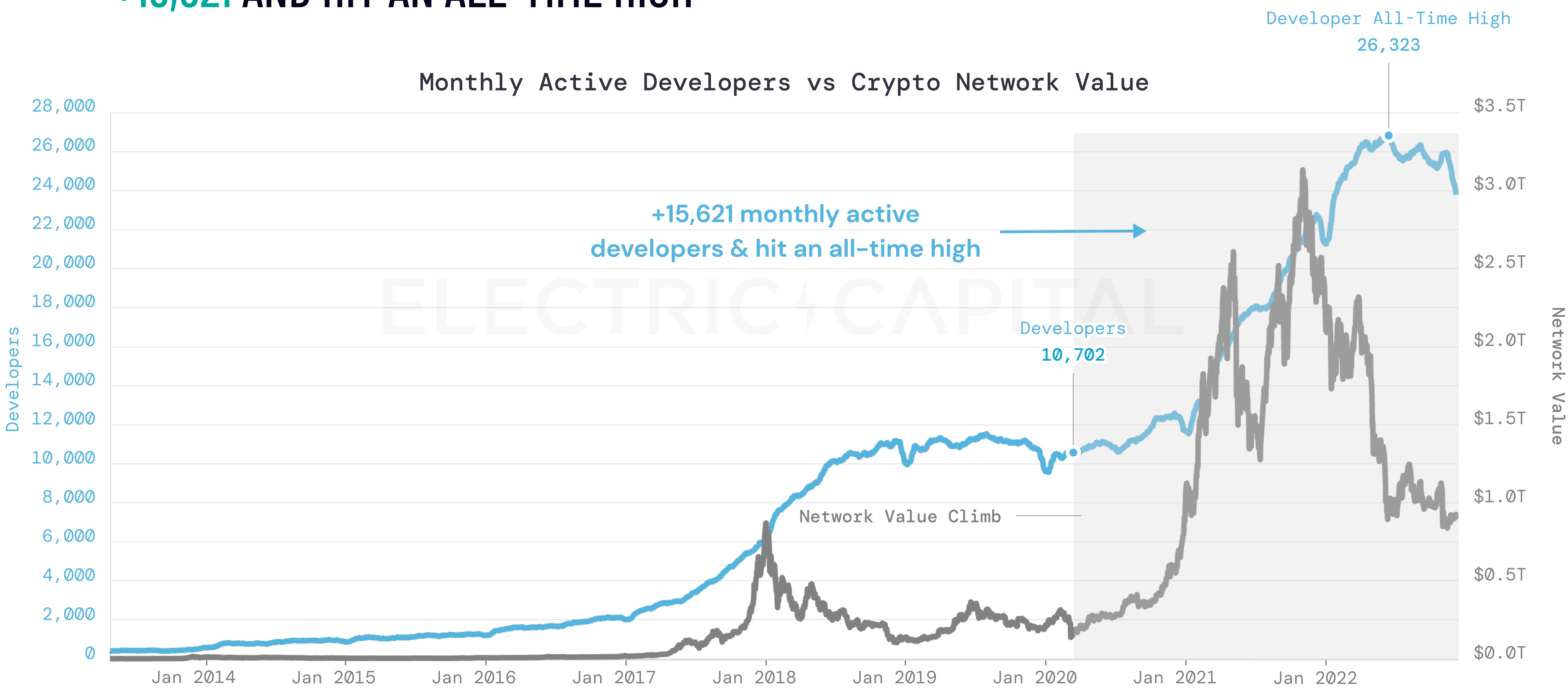Developers
10,702

Network Value Climb

Total Network Value is the value of total crypto market cap from Coingecko. Total Network Value began to climb May 11, 2020. Total Network Value reached an All-Time High Nov 8, 2021.

FROM LAST CYCLE'S DEVELOPER PEAK TO THIS CYCLE'S DEVELOPER PEAK: MONTHLY ACTIVE DEVELOPERS GREW BY +141%

Monthly Active Developers vs Crypto Network Value

Developer All-Time High
26,323

Developer All-Time High
During Last Market Cycle
10,893

+141%

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Developers

Network Value

28,000 — $3.5T
26,000
24,000 — $3.0T
22,000
20,000 — $2.5T
18,000
16,000 — $2.0T
14,000
12,000
10,000 — $1.5T
8,000
6,000 — $1.0T
4,000 — $0.5T
2,000
0 — $0.0T

Jan 2014   Jan 2015   Jan 2016   Jan 2017   Jan 2018   Jan 2019   Jan 2020   Jan 2021   Jan 2022

Previous Developer ATH was on Dec 16, 2018. Developer All Time High was on June 16, 2022.

DEVELOPERS ARE STAYING WHILE NETWORK VALUE IS DOWN: DEVELOPERS ARE DOWN -11% FROM PEAK WHILE NETWORK VALUE IS DOWN -71%
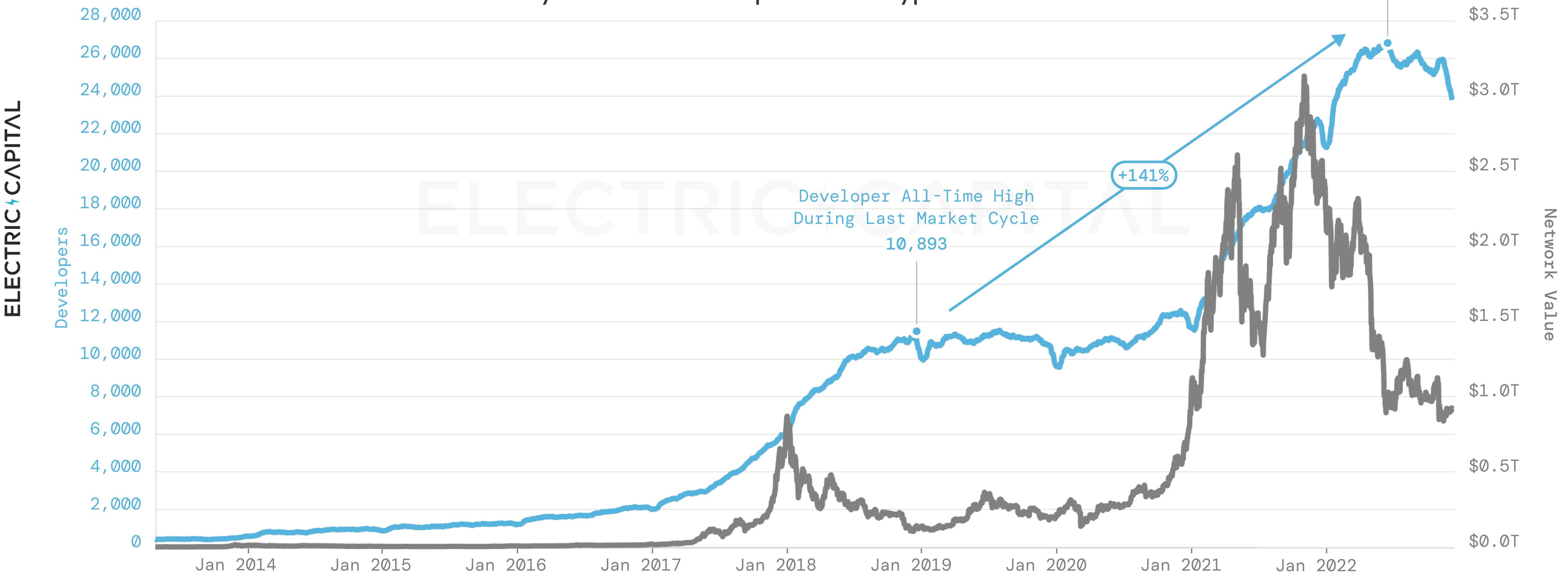

Monthly Active Developers vs Crypto Network Value
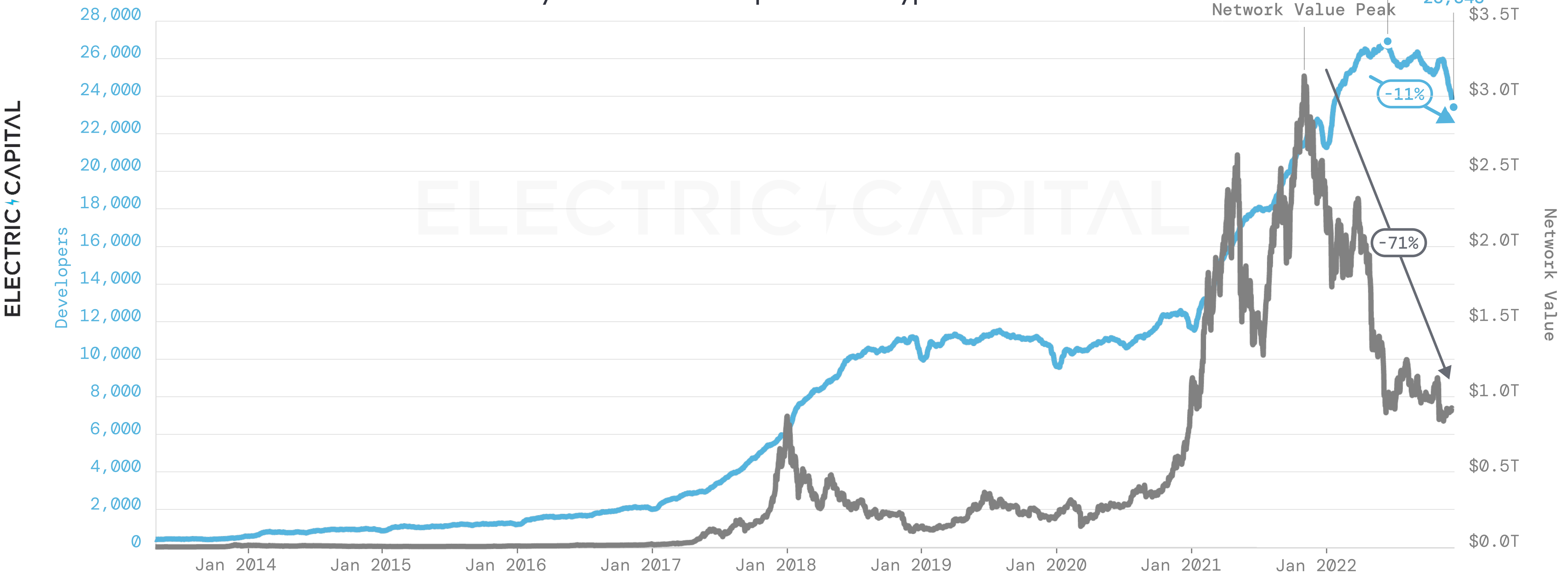
Total Network Value is the value of total crypto market cap from Coingecko. Total Network Value reached an all-time high Nov 8, 2021.

DEVELOPERS ARE STICKY: NETWORK VALUE IS ROUGHLY BACK TO JANUARY 2018 LEVELS, BUT MONTHLY ACTIVE DEVELOPERS INCREASED +297%
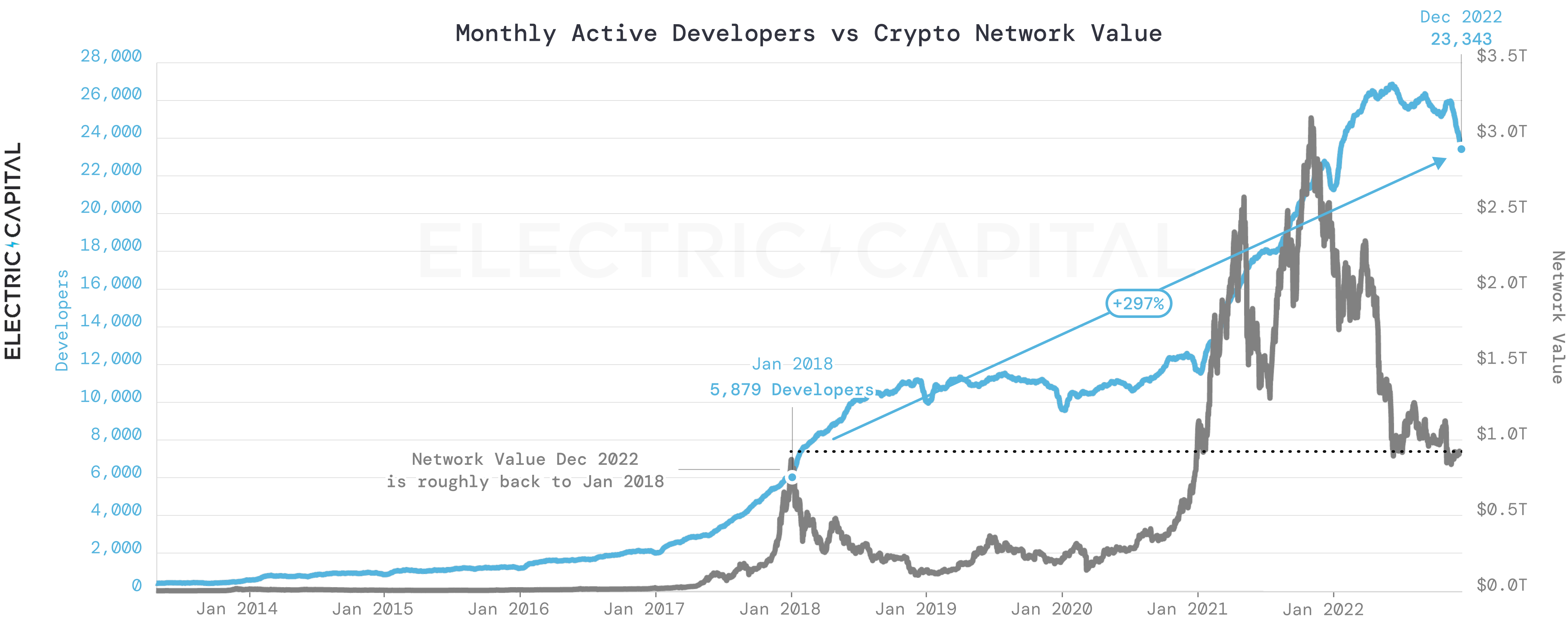
Monthly Active Developers vs Crypto Network Value

Dec 2022
23,343

Jan 2018
5,879 Developers

Network Value Dec 2022
is roughly back to Jan 2018

+297%

Total Network Value is the value of total crypto market cap from Coingecko.

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HOW MANY NEW DEVELOPERS ENTERED CRYPTO?

THE HIGHEST NUMBER OF NEW DEVELOPERS EVER WROTE OPEN-SOURCE CRYPTO CODE IN 2022: 61,127 NEW DEVELOPERS

Number of Developers by Year Joined

2022 saw the highest number of new crypto developers in history
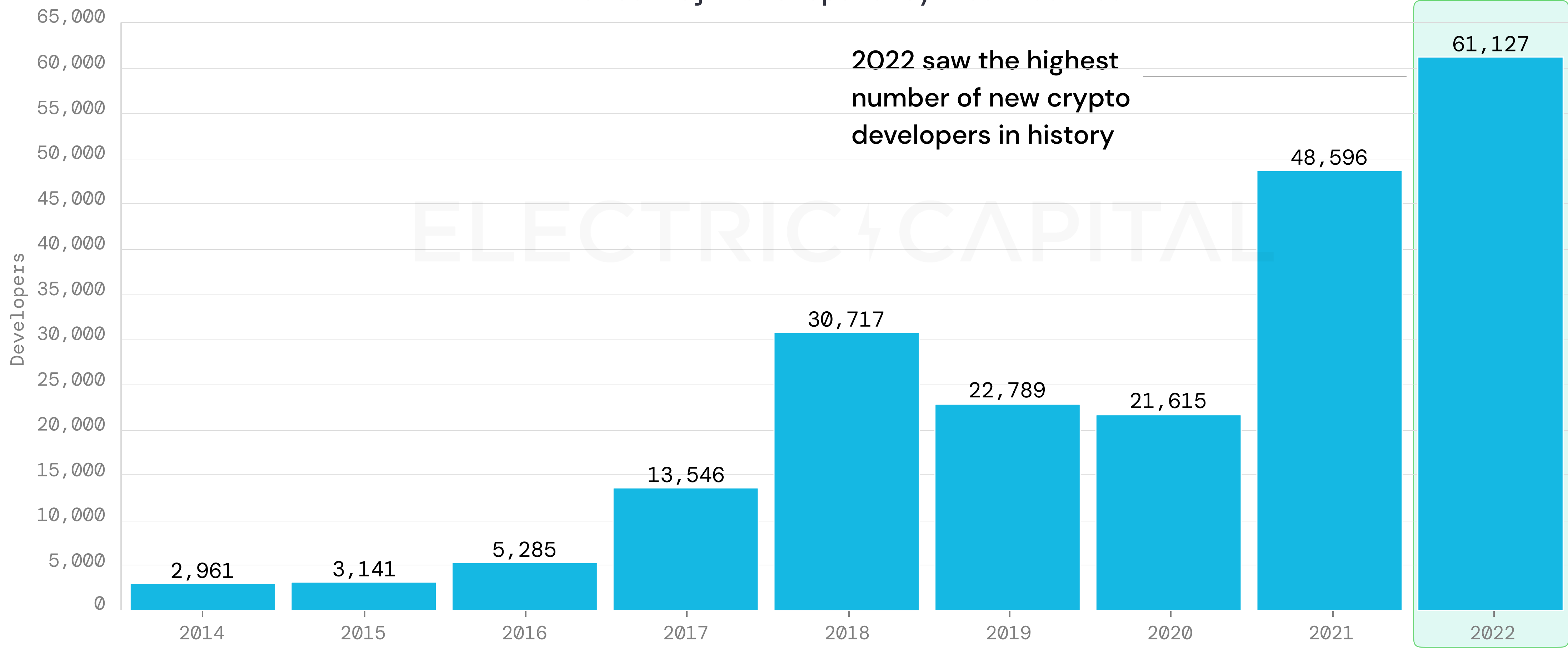
All 2022 numbers end at Dec 15, 2022. This means 2022 new developers is an undercounting of new developers for that year.

IN THE 2021 & 2022 MARKET UPSWING, 109,723 NEW DEVELOPERS CONTRIBUTED OPEN-SOURCE CODE, A +148% INCREASE COMPARED TO 2017 AND 2018 AT 44,263

Number of Developers by Year Joined

109,723 new developers contributed open source code in this market cycle

44,263 new developers contributed open-source code in the last market cycle

61,127

48,596

30,717

22,789

21,615

13,546

5,285

2,961

3,141

2014 2015 2016 2017 2018 2019 2020 2021 2022

52% OF MONTHLY ACTIVE DEVELOPERS STARTED CONTRIBUTING IN 2022

Developers by Start Year
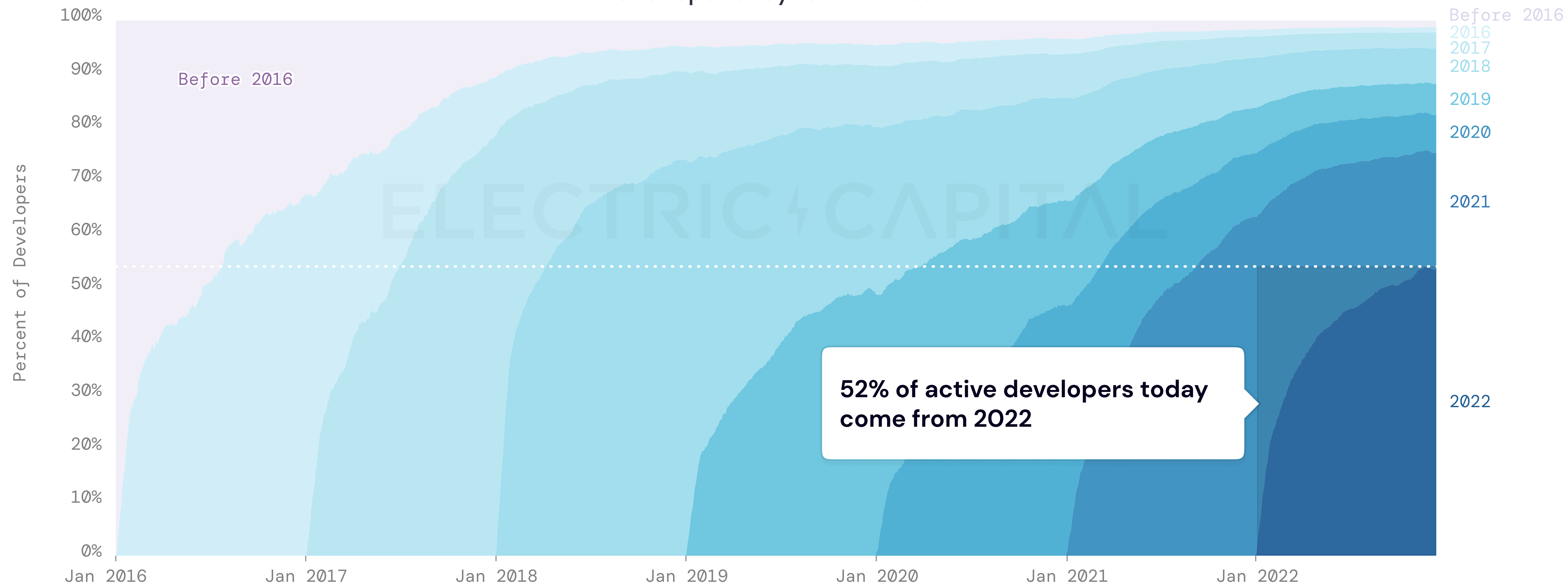
52% of active developers today come from 2022

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HOW ACTIVE ARE DEVELOPERS?

LET'S LOOK AT ACTIVITY BY FREQUENCY AND VOLUME OF COMMITS

FREQUENCY: 30% OF DEVS COMMIT CODE 1 DAY IN A MONTH, 50% COMMIT CODE 2-9 DAYS, AND 20% OF DEVELOPERS COMMIT CODE 10+ DAYS IN A MONTH

One day of contribution:
~30% of devs

All Crypto Developers by Active Days Histogram
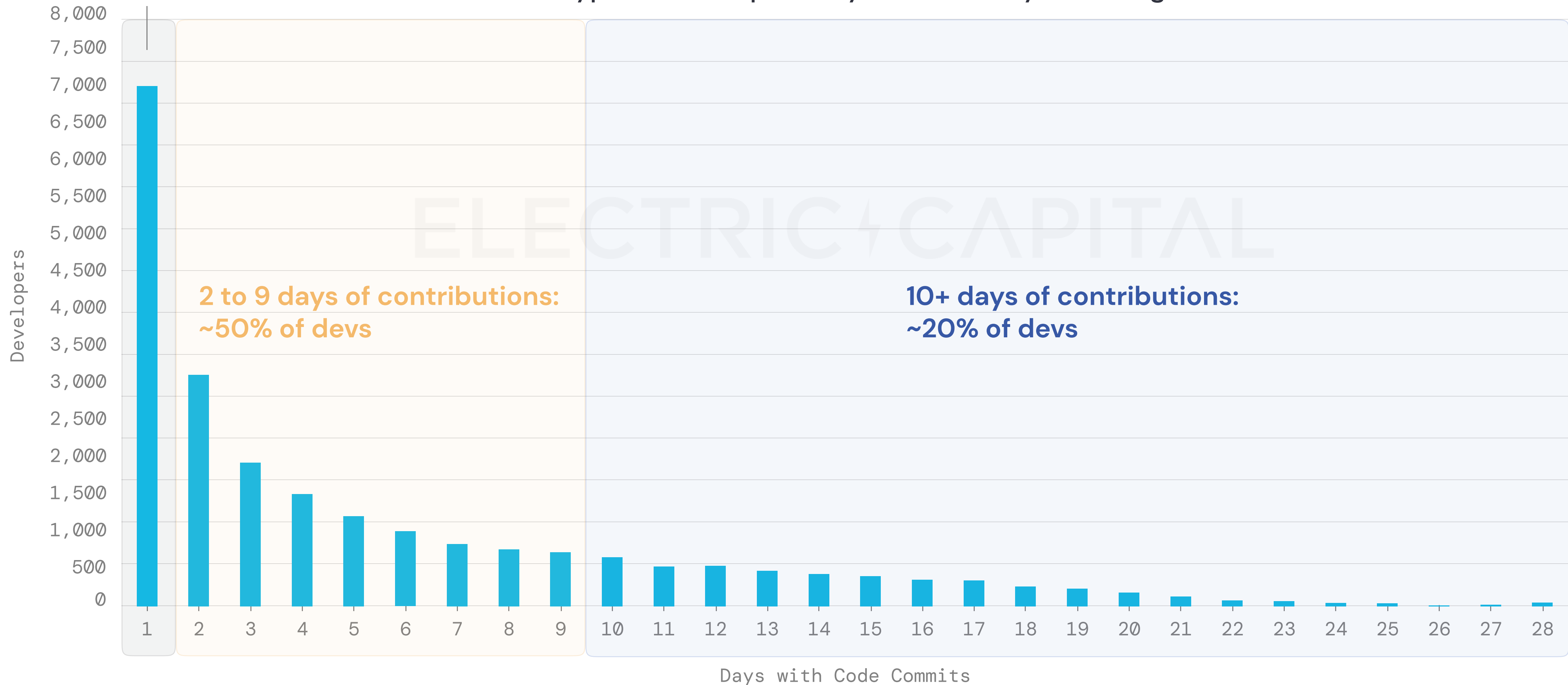
2 to 9 days of contributions:
~50% of devs

10+ days of contributions:
~20% of devs

Developers

Days with Code Commits

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*Developers active for one-day in a month are not necessarily One-Time developers. One-Time developers are those who were active only one day in a 3-month period.

WE CAN BUCKET THESE DEVELOPERS INTO <u>ONE-TIME</u>, <u>PART-TIME</u>, & <u>FULL-TIME</u>

One-Time Developer Candidates*

All Crypto Developers by Active Days Histogram

Part-Time Developers

Full-Time Developers

Days with Code Commits
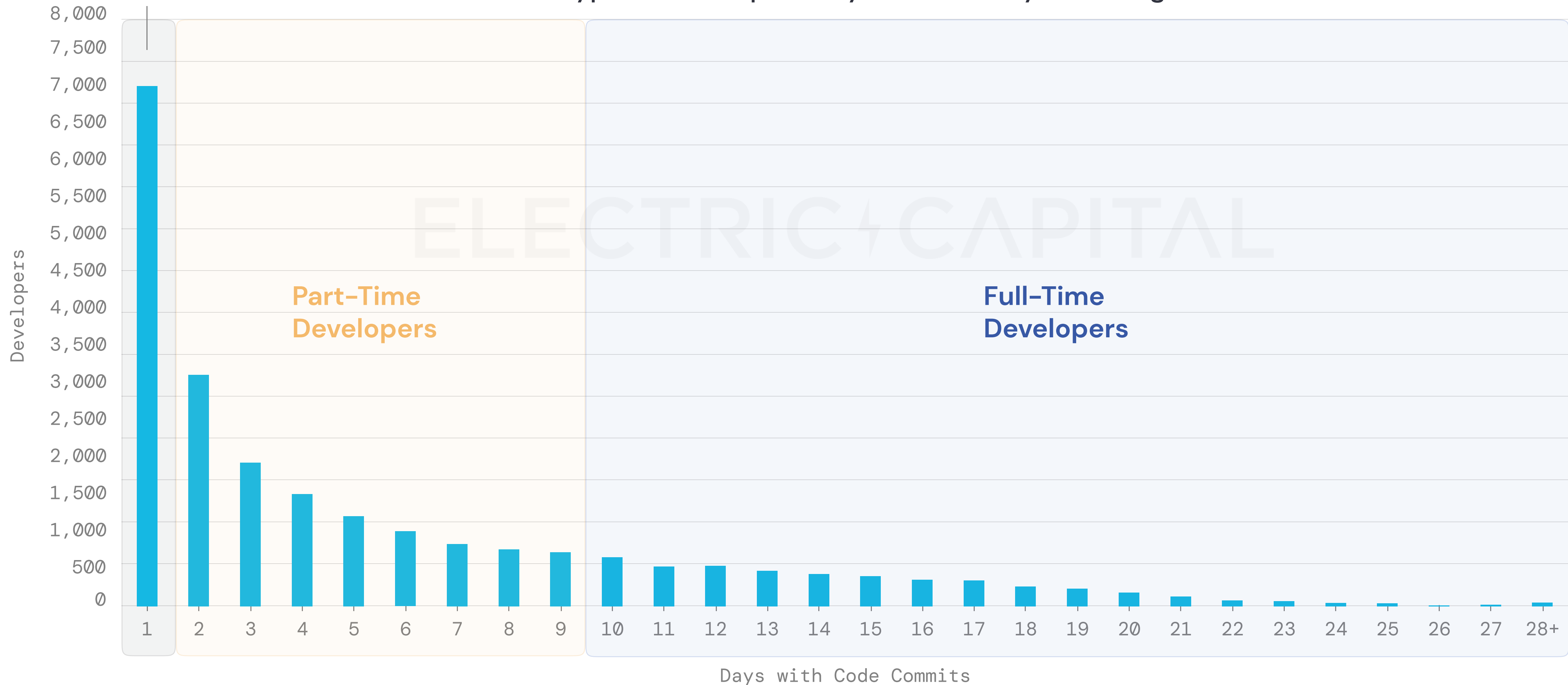
Developers

*Developers active for one-day in a month are not necessarily One-Time developers. One-Time developers are those who were active only one day in a 3-month period.

VOLUME: THERE ARE 471K+ MONTHLY COMMITS IN OPEN-SOURCE CRYPTO

All Crypto Monthly Commits
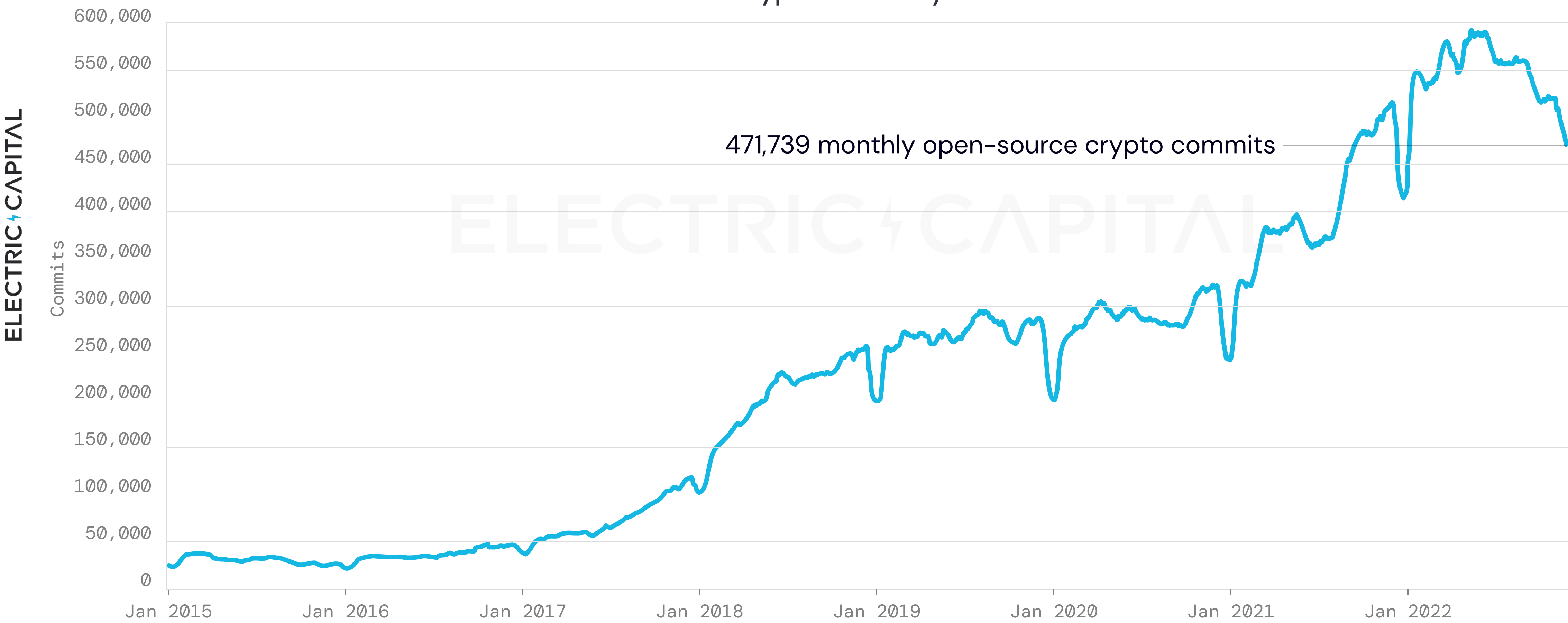
471,739 monthly open-source crypto commits

WE CAN SEGMENT BY FREQUENCY OF CONTRIBUTION: FULL-TIME DEVS CONTRIBUTE THE MOST COMMITS: 356K COMMITS A MONTH

All Crypto Monthly Commits

Full-Time developers contribute
356,208 commits per month
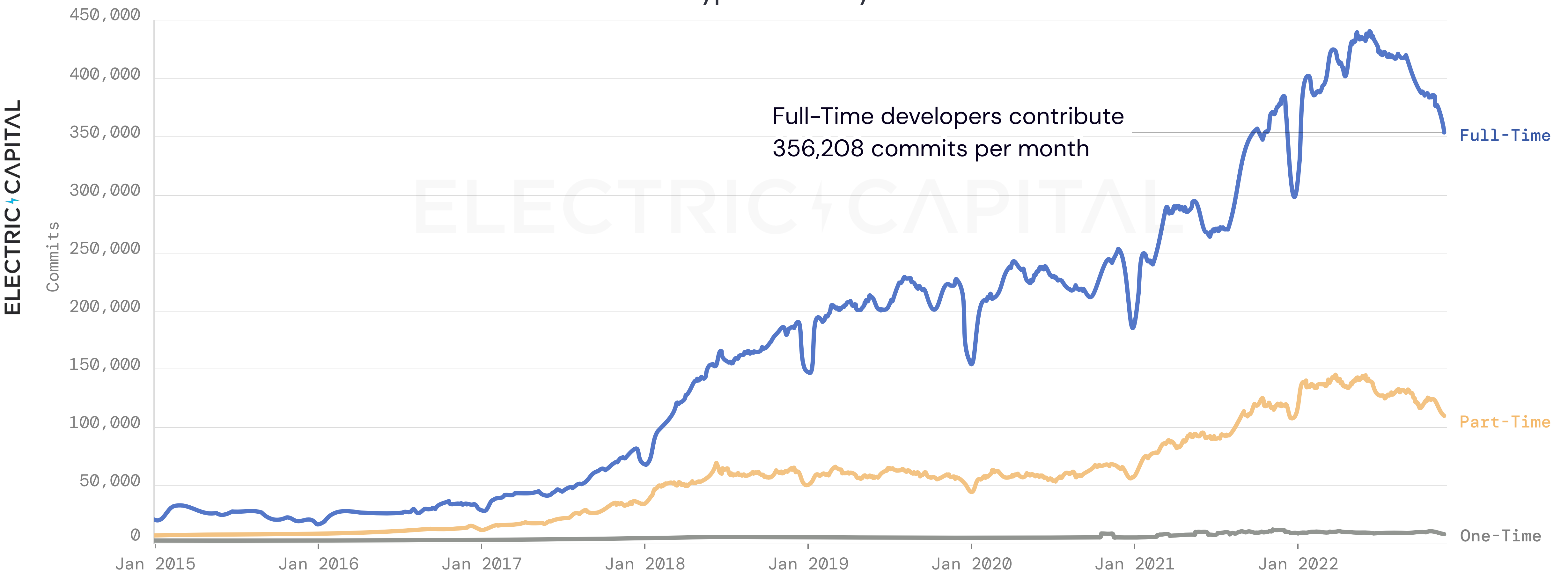
FULL-TIME DEVELOPERS ARE THE BIGGEST CODE CONTRIBUTORS: FULL-TIME DEVELOPERS CONTRIBUTE 76% OF ALL COMMITS

All Monthly Commits
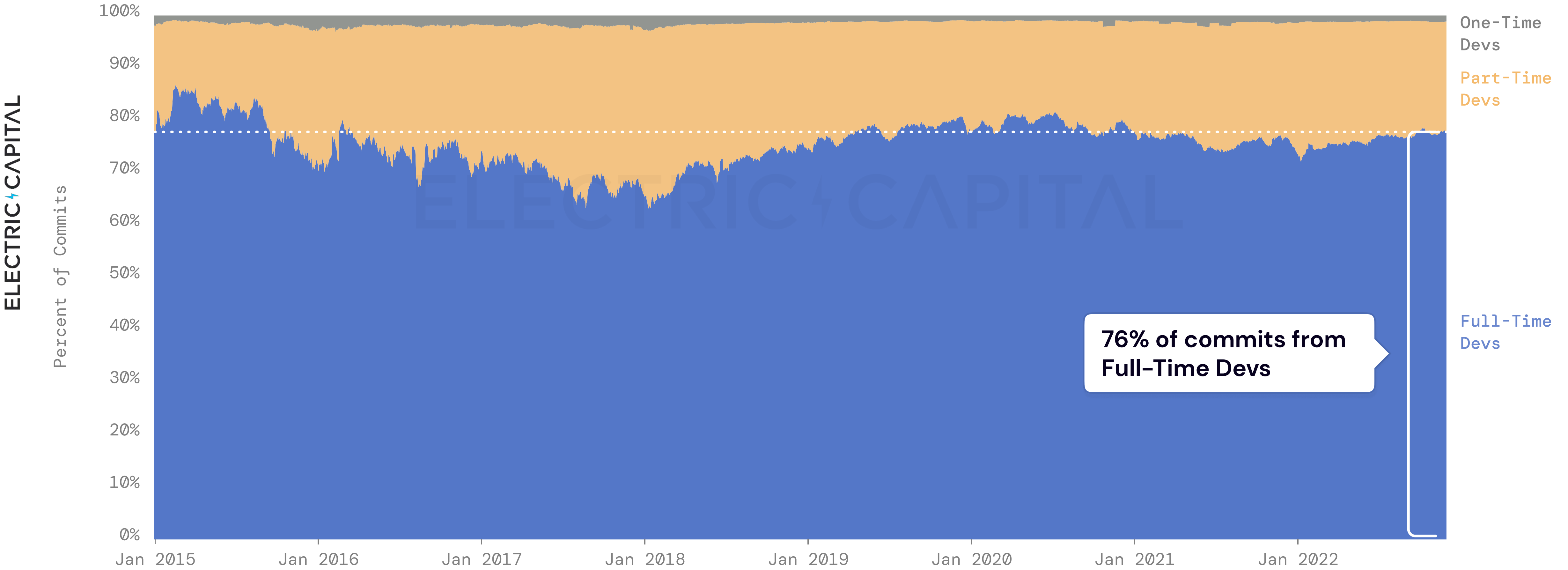
PART-TIME DEVELOPERS CONTRIBUTE MORE COMMITS IN BULL MARKETS

All Monthly Commits
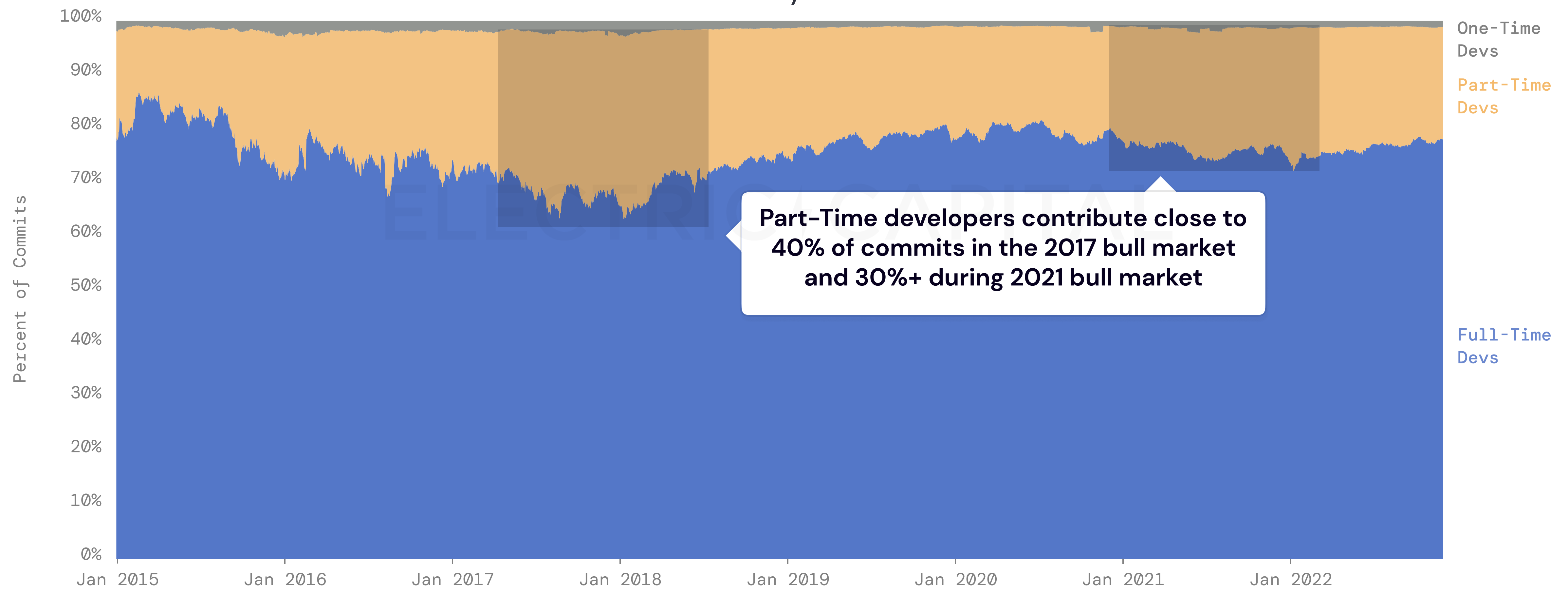
Part-Time developers contribute close to 40% of commits in the 2017 bull market and 30%+ during 2021 bull market

One-Time Devs

Part-Time Devs

Full-Time Devs

Percent of Commits

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**APPLY THIS FREQUENCY BASED SEGMENTATION
TO DEVELOPERS IN 2022…**

+5% MONTHLY ACTIVE DEVELOPERS FROM DECEMBER 2021 TO DECEMBER 2022

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All Crypto Monthly Active Developers Since 2009
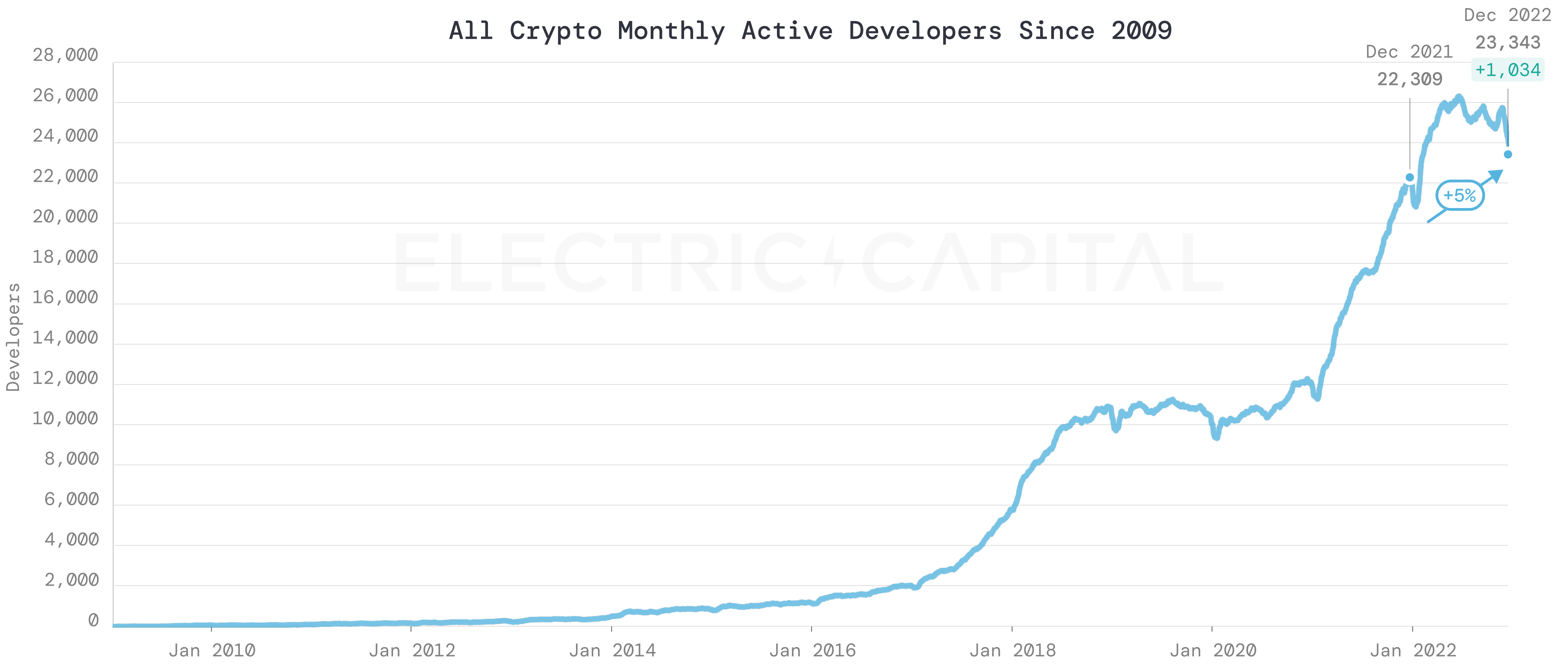
WE CAN SEGMENT DEVELOPERS BASED ON FREQUENCY OF CONTRIBUTION

All Crypto Monthly Active Developers
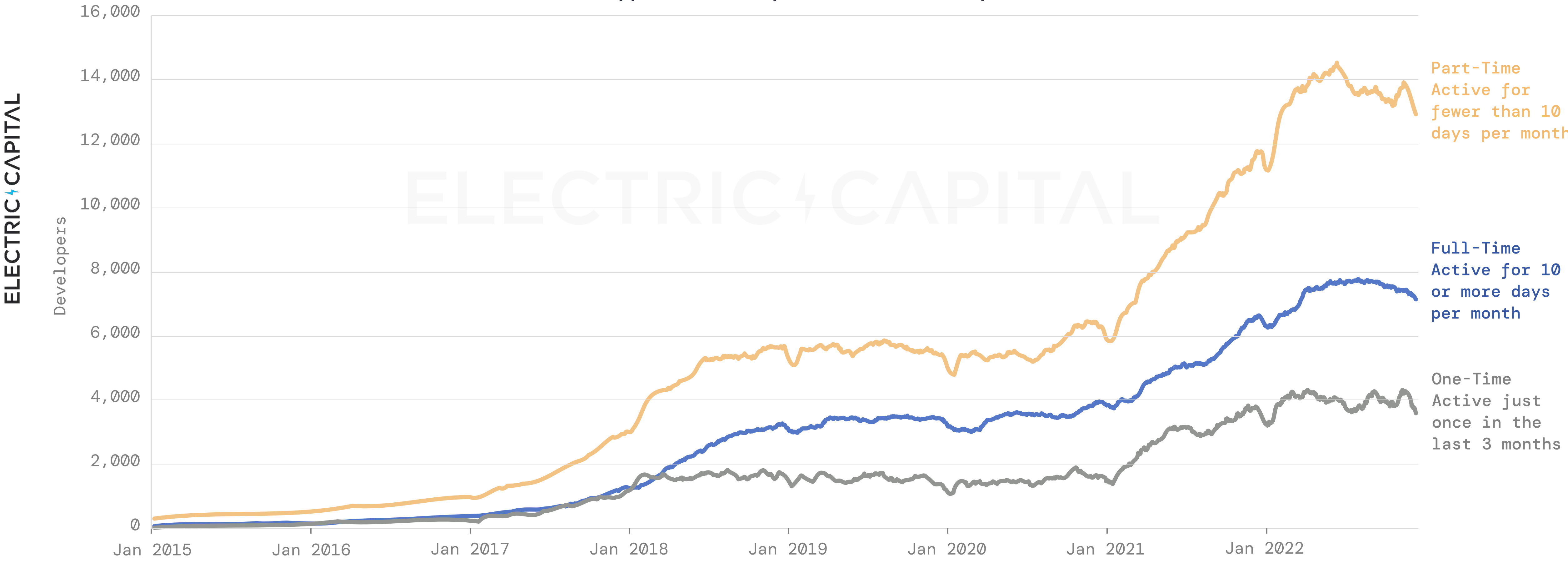
+8% <u>FULL-TIME</u> DEVELOPERS YEAR OVER YEAR TO 7,179 <u>FULL-TIME</u> DEVELOPERS

All Crypto Monthly Active Developers

Dec 2022
12,619
+832

Dec 2021
11,787

+7%   Part-Time

Dec 2022
7,179
+521

Dec 2021
6,658

+8%   Full-Time

One-Time

-8%

Dec 2021
3,864

Dec 2022
3,545
-319
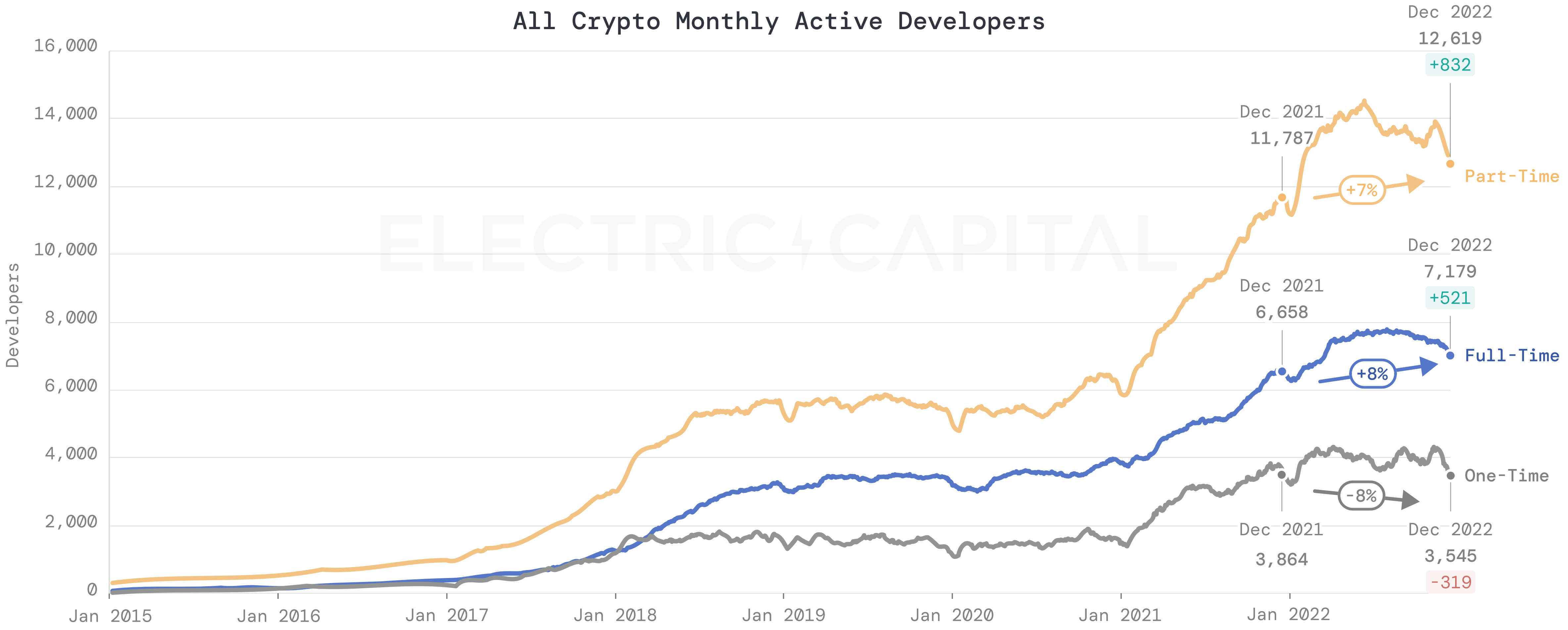
DEVELOPERS REACHED ALL-TIME HIGH IN JUNE 2022

All Crypto Monthly Active Developers Since 2009

Jun 2022
All-Time High
26,323
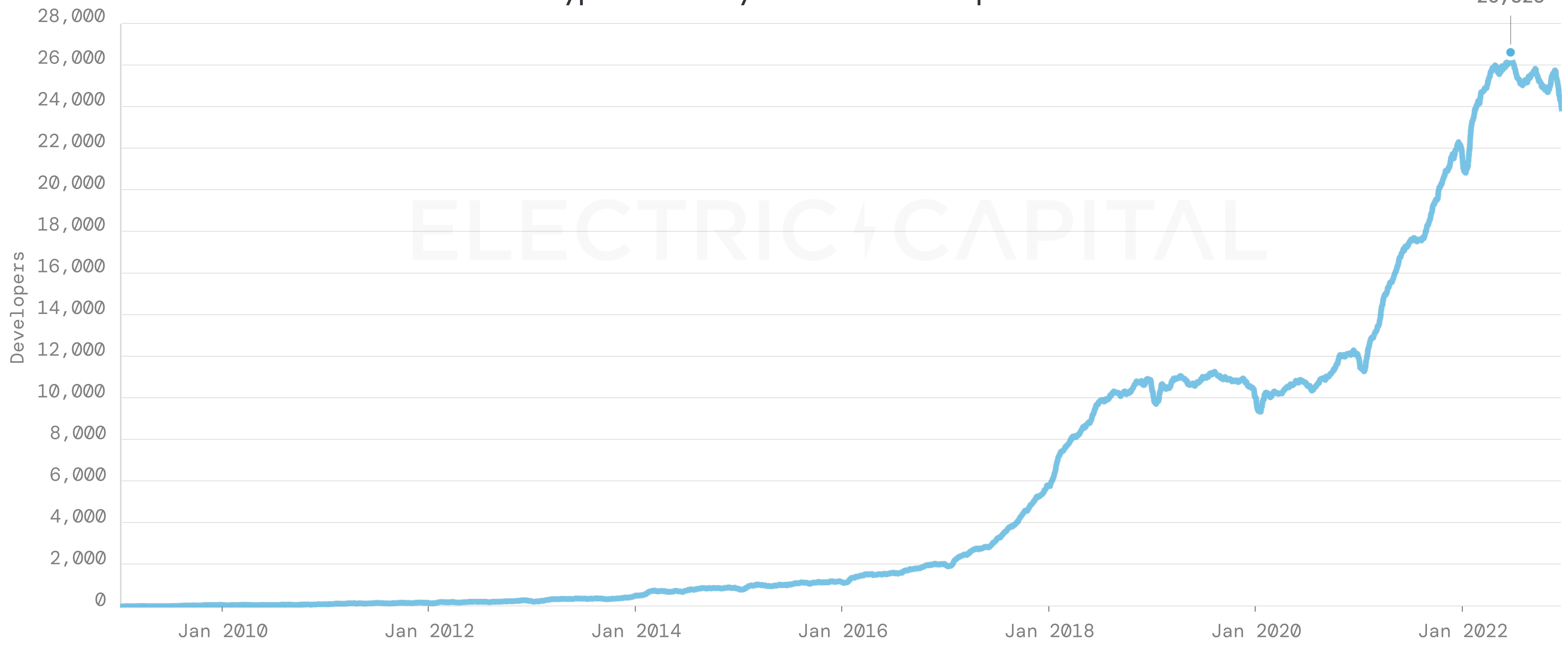
SINCE ALL-TIME HIGH: MONTHLY ACTIVE DEVELOPERS FELL -11%

All Crypto Monthly Active Developers Since 2009

Dec 2022
23,343
-2,980

Jun 2022
All-Time High
26,323

-11%
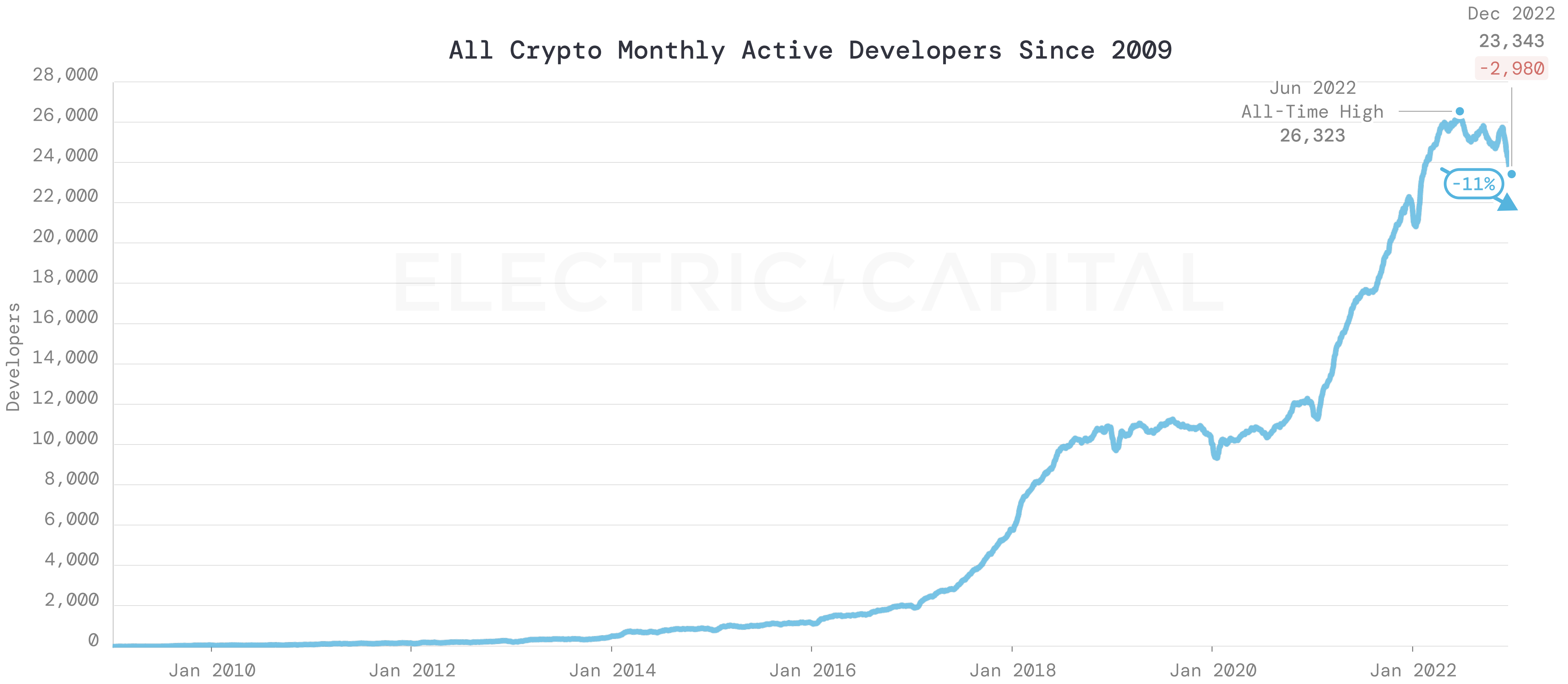
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Developers

SINCE ALL-TIME HIGH: DEVELOPER LOSSES ARE MOSTLY FROM PART-TIME (-13%) AND ONE-TIME (-14%) DEVELOPERS

All Crypto Monthly Active Developers

June 2022
14,486

Dec 2022
12,619
-1,867

Part-Time

-13%

June 2022
7,707

Dec 2022
7,179
-528

Full-Time

-7%

June 2022
4,130

One-Time

-14%

Dec 2022
3,545
-585
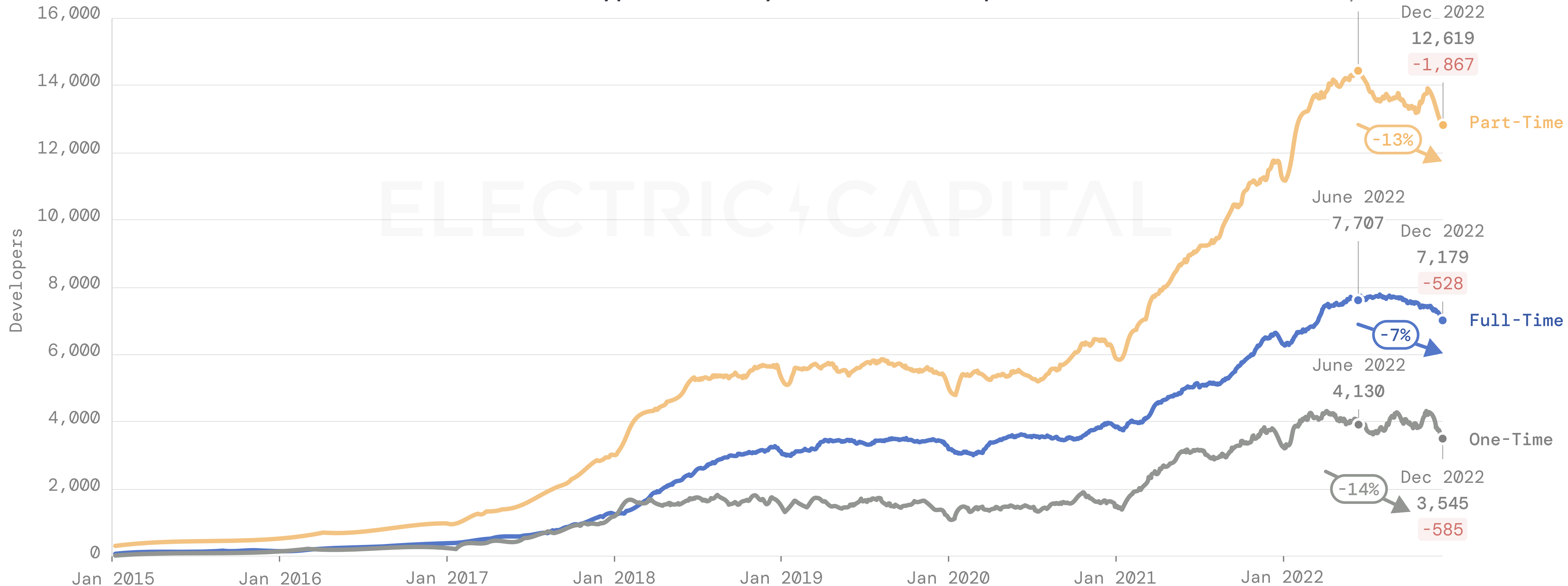
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**HOW DO WE RECONCILE
61K DEVELOPERS WHO CONTRIBUTED TO CRYPTO IN 2022
VS. 23K MONTHLY ACTIVE DEVELOPERS?**

WE CAN LOOK MORE GRANULARLY AT RETENTION BY MONTHLY COHORTS

Each row represents the developers that joined each month
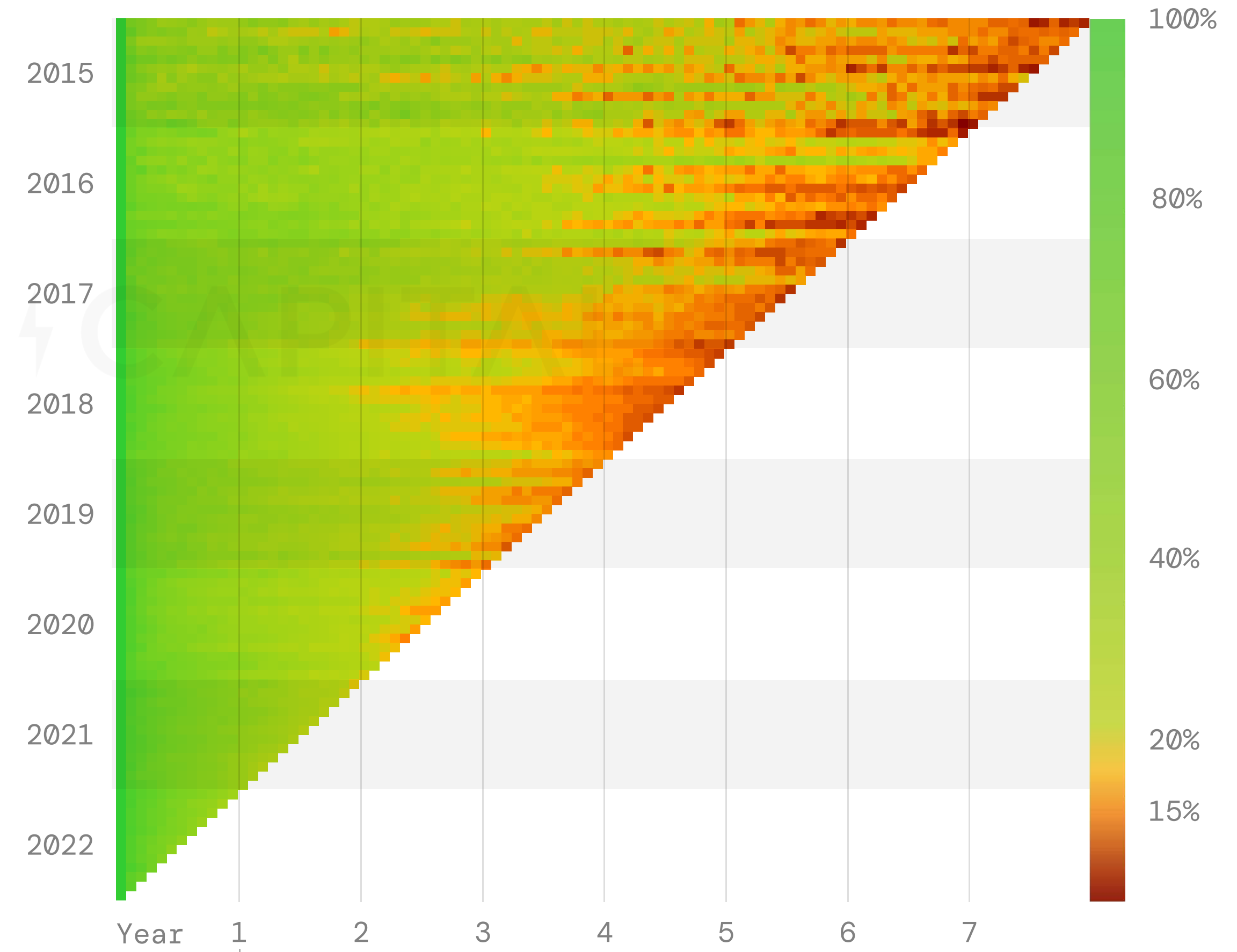
Each column represents the percent of developers from that month that commited code the next month

Full-Time Developer Retention

FULL-TIME DEVELOPERS HAVE SIGNIFICANTLY BETTER RETENTION OVER TIME: 30% OF FULL-TIME DEVS CONTINUED TO CONTRIBUTE THROUGH YEAR 2

Full-Time Developer Retention

Total Developer Retention

On average, 30% of full-time developers continued to commit code through Year 2

Only 8% of total developers continued to commit code through Year 2

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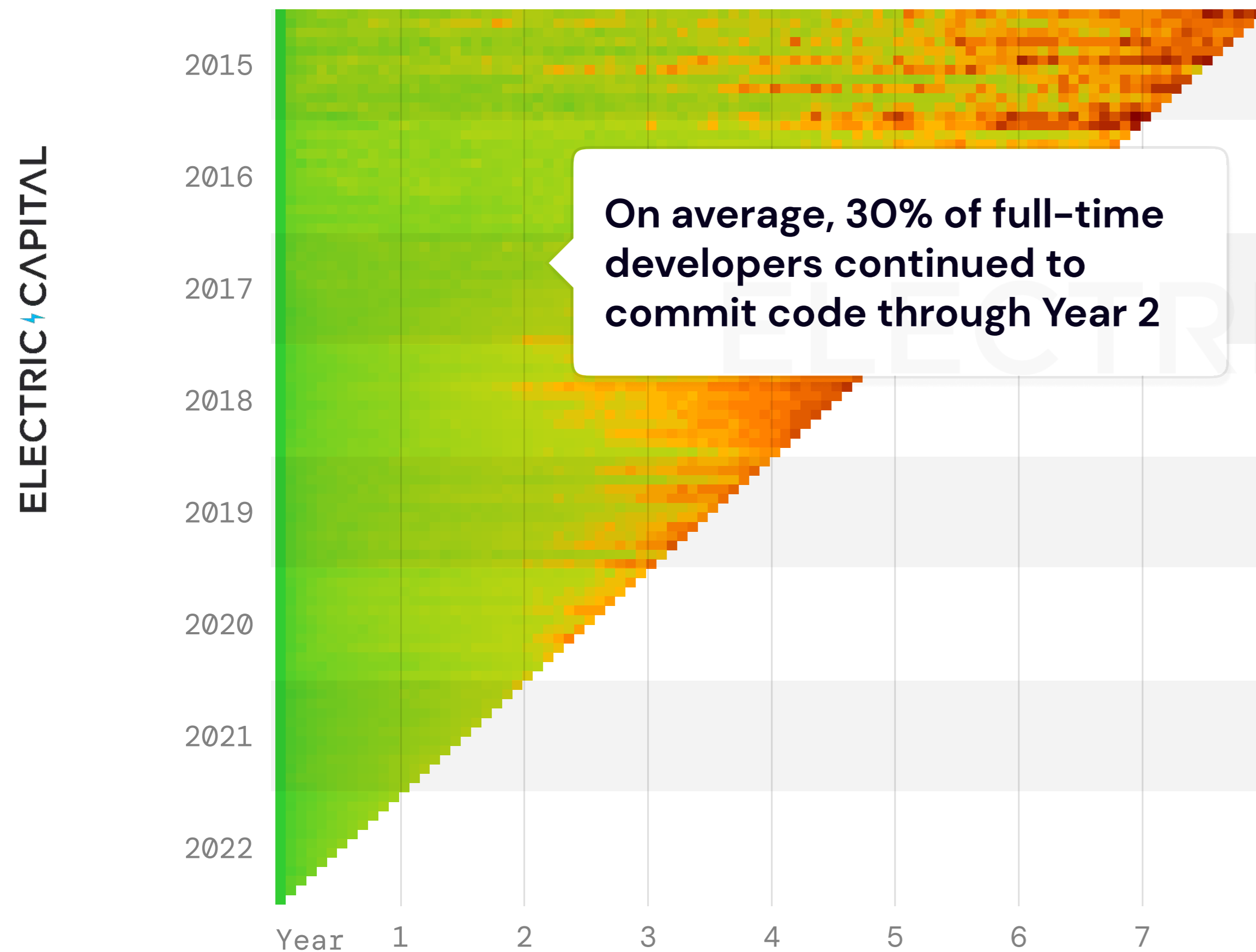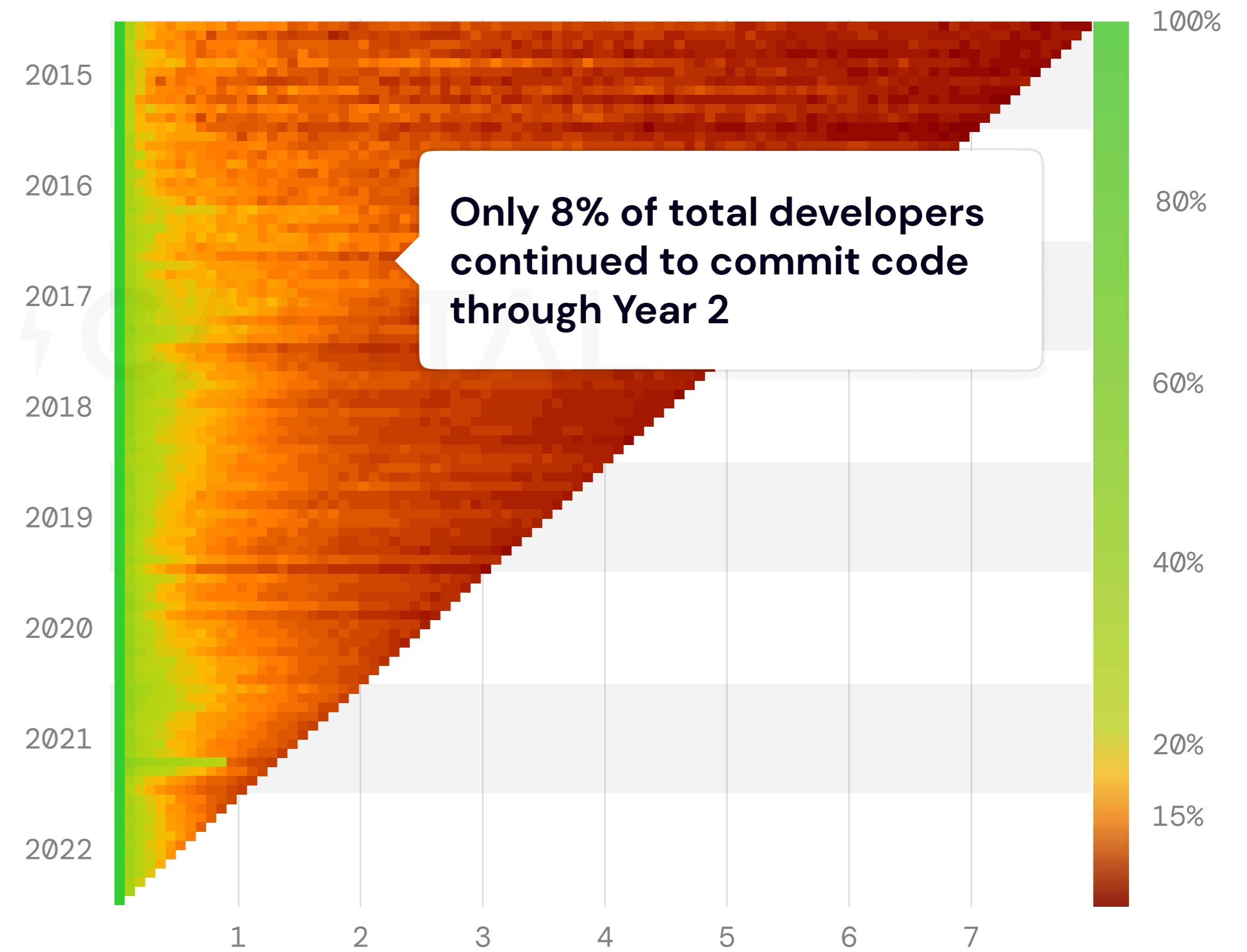
HOW ACTIVE WERE DEVELOPERS WHO LEFT?

95% OF MONTHLY DEVELOPERS WHO LEAVE ARE ONE-TIME AND PART-TIME DEVELOPERS

All Developer Churn

95% of all churned developers are One-Time and Part-Time
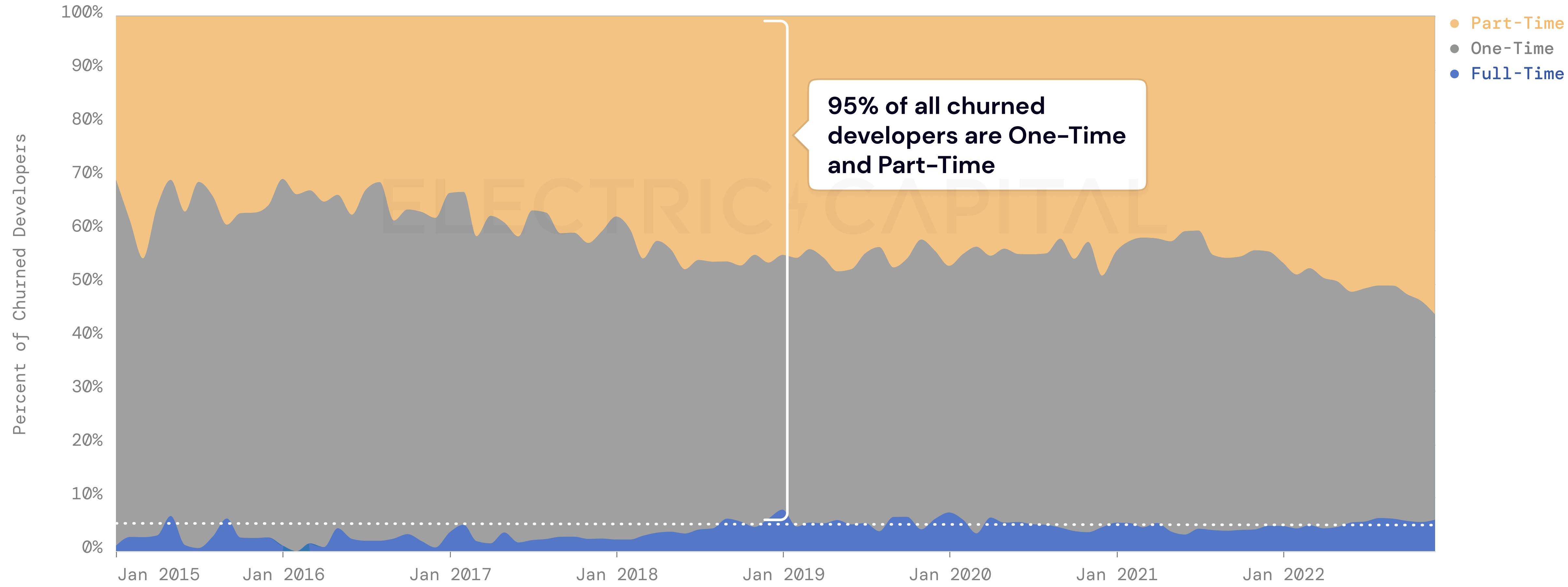
HEAVY CONTRIBUTORS STAY: <u>FULL-TIME</u> DEVELOPERS ONLY ACCOUNT FOR 5% OF CHURN

All Developer Churn

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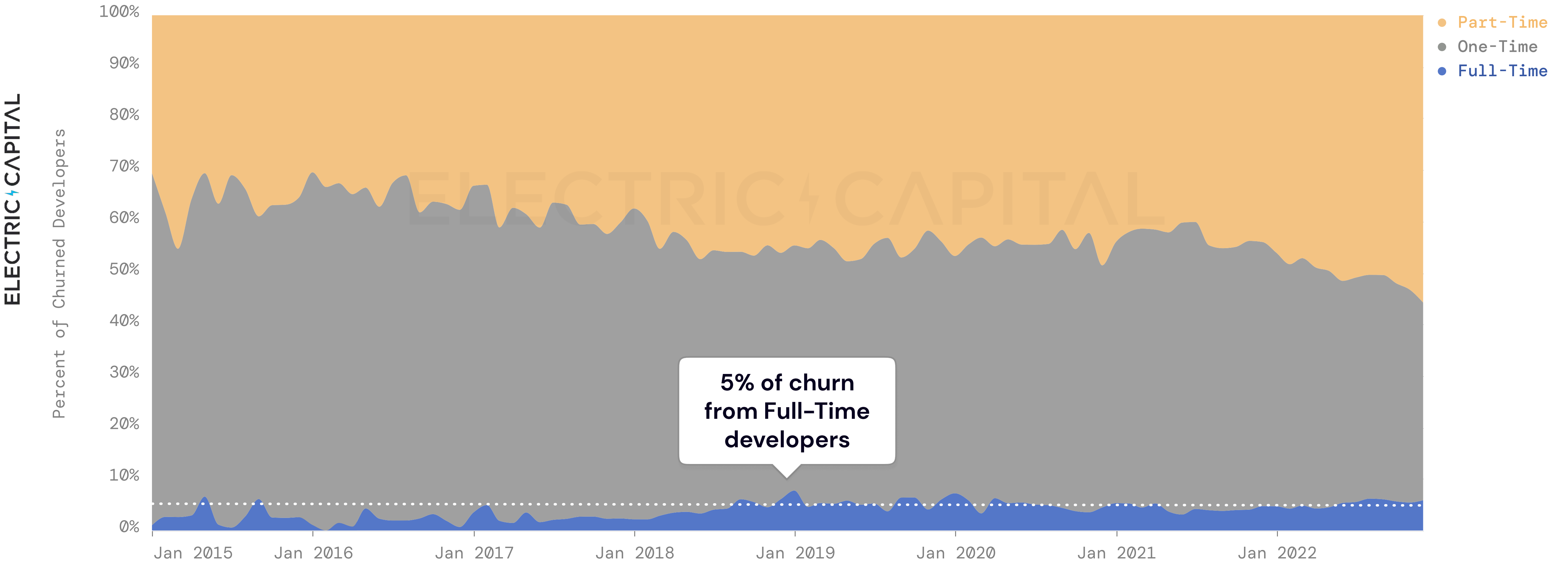
WHAT ARE THESE DEVELOPERS WORKING ON?
LET'S SEGMENT BY ECOSYSTEMS

BITCOIN & ETHEREUM ACCOUNT FOR 28% OF ALL DEVELOPERS IN CRYPTO

Normalized Monthly Active Developers - Top 200 from 2022 vs Ethereum vs Bitcoin vs Other

Legend:
- Top 200 from 2022
- Other
- Ethereum
- Bitcoin

BTC & ETH account for 28% of all developers in crypto
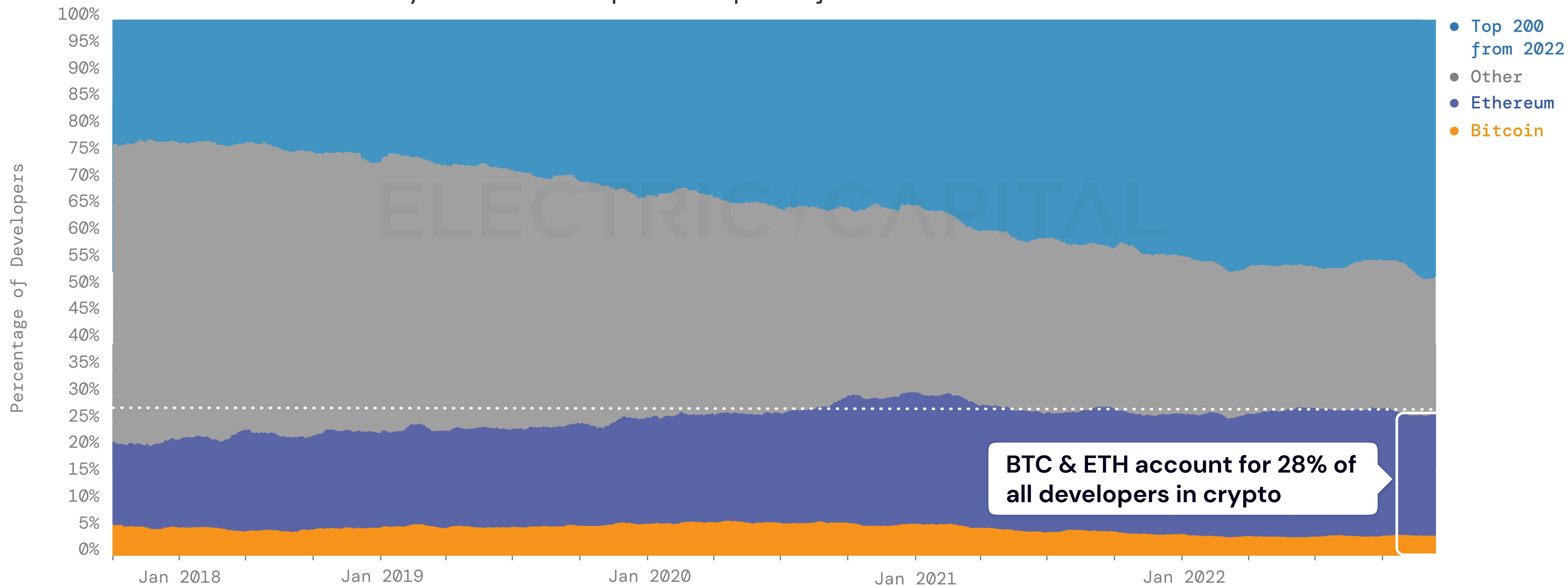
50% OF DEVELOPERS WORK IN THE TOP 200 ECOSYSTEMS BY NETWORK VALUE OUTSIDE OF BITCOIN & ETHEREUM

Normalized Monthly Active Developers - Top 200 from 2022 vs Ethereum vs Bitcoin vs Other

50% of all developers in crypto today work in the Top 200 ecosystems (excl ETH & BTC)

Legend:
- Top 200 from 2022
- Other
- Ethereum
- Bitcoin

Y-axis: Percentage of Developers (0% – 100%)

X-axis: Jan 2018, Jan 2019, Jan 2020, Jan 2021, Jan 2022

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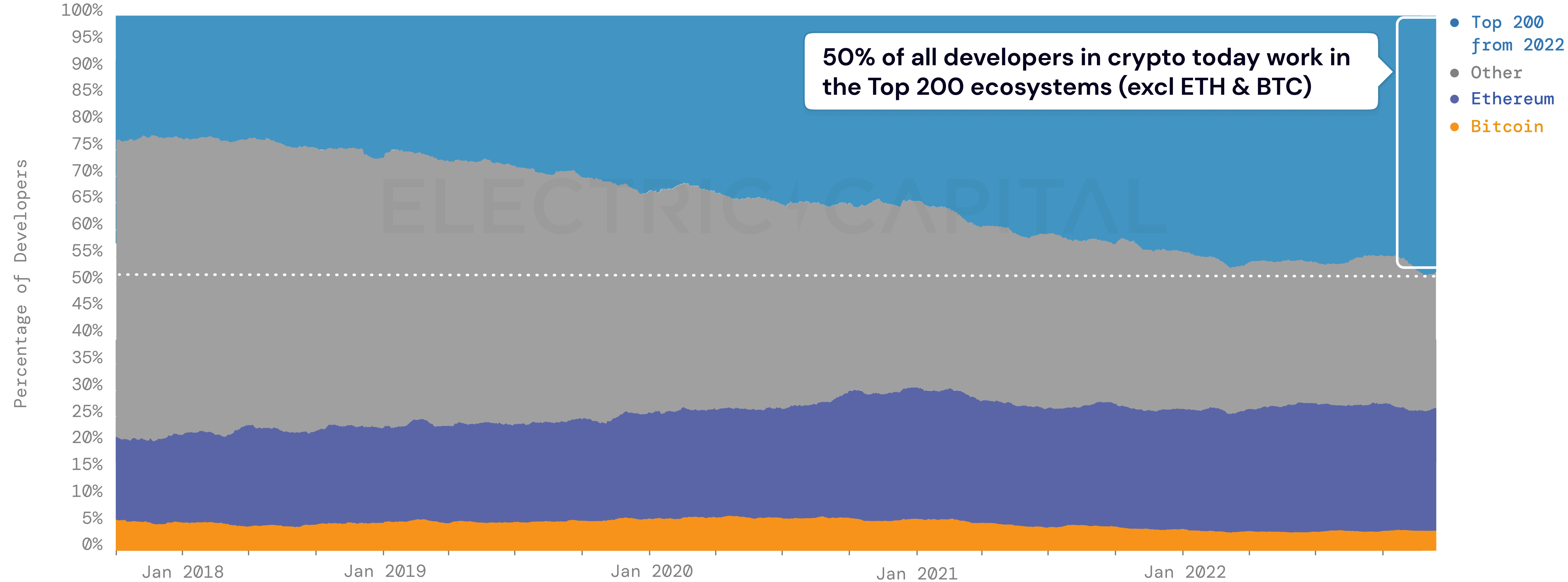
LET'S DEEP DIVE INTO BITCOIN, ETHEREUM,
AND OTHER TOP 200 ECOSYSTEMS...

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02

ECOSYSTEM DEEP DIVE

ECOSYSTEMS ARE COMPRISED OF COMMUNITY AND PROTOCOL LEVEL DEVELOPERS

Ecosystem Developers

Developers roll into a broad ecosystem of related communities with shared security at the base layer. Examples: Ethereum, Solana, Polygon, and NEAR.

Community Developers

Developers working on decentralized applications, tooling, docs, wallets, and anything else furthering the project.

Protocol Developers

Working on the core protocol only
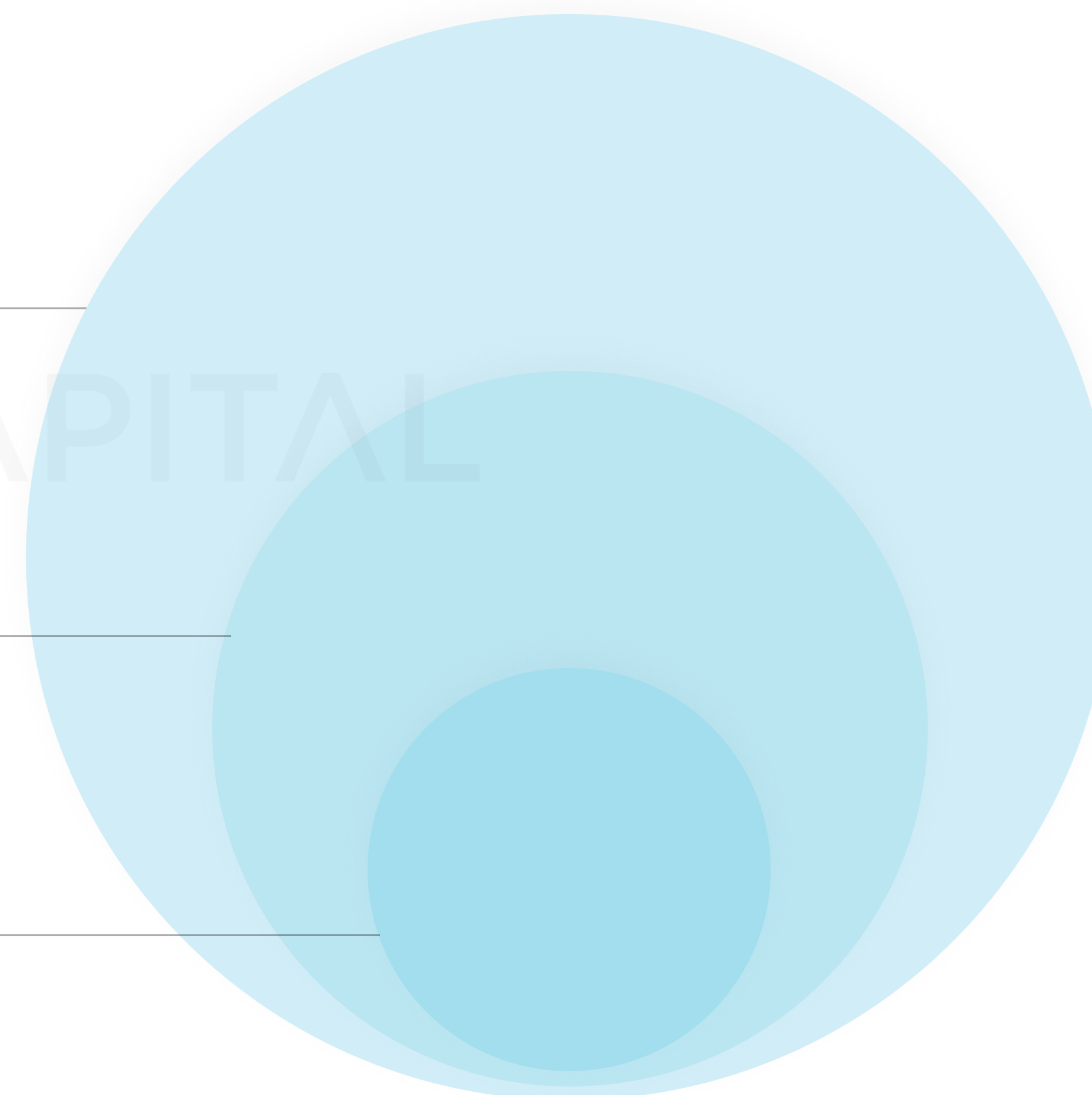
COMMUNITY EXAMPLE: OPTIMISM

Communities can live in ecosystems; the Optimism ecosystem lives inside the Ethereum ecosystem.

Optimism Community

- Velodrome
- Lyra
- Perpetual Protocol
- Sonne Finance
- & many more!

Optimism Protocol

- Contracts (L1 and L2 smart contracts for Optimism)
- Cannon (fault prover)

Parent Ecosystem
Ethereum

Commmunity Developers
Velodrome, Lyra, Perpetual, etc.

Optimism Protocol Developers
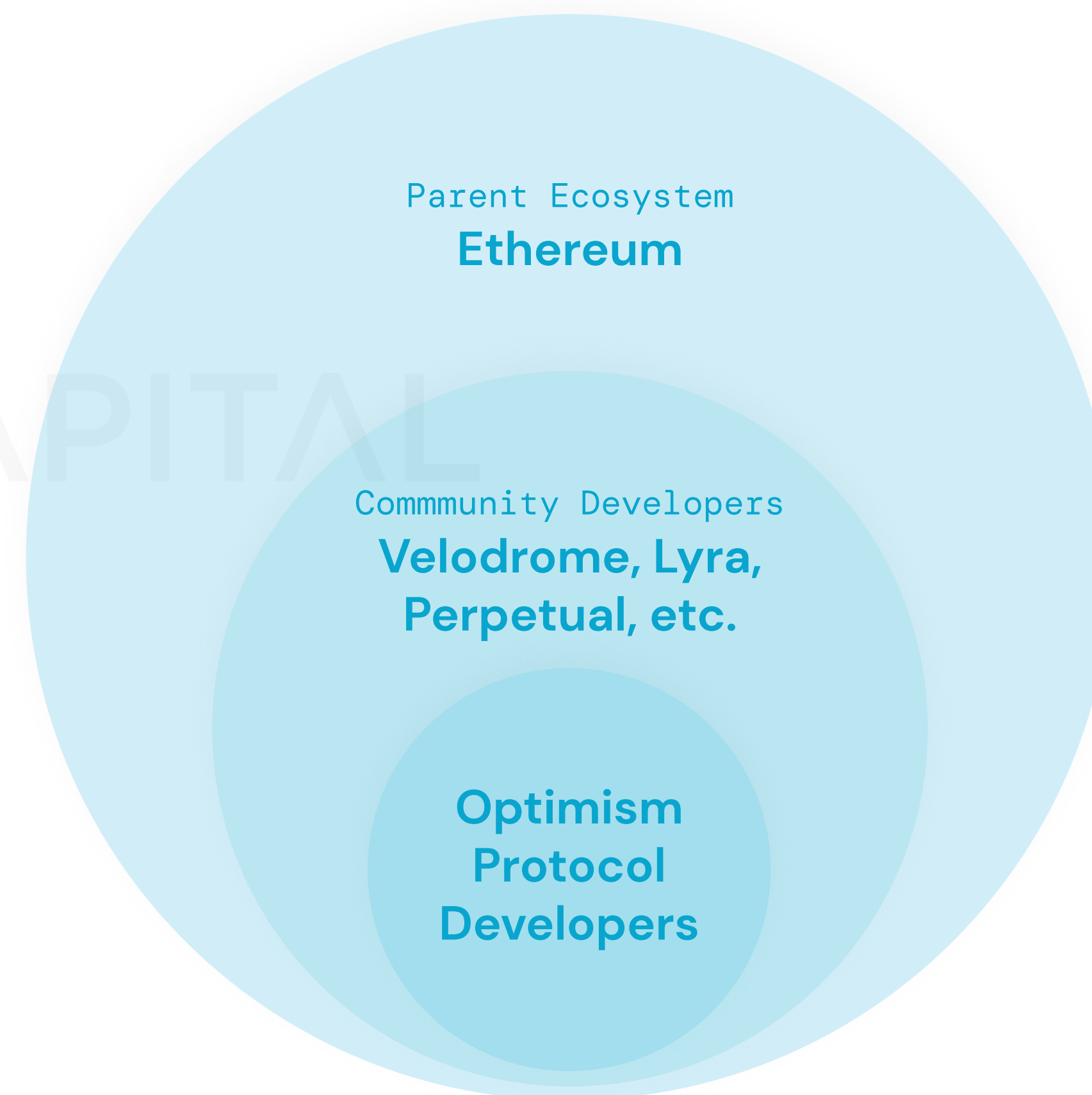
ELECTRIC⚡CAPITAL

BITCOIN

BITCOIN MONTHLY ACTIVE DEVS ARE FLAT BETWEEN DEC 2021 AND DEC 2022

Bitcoin Monthly Active Developers
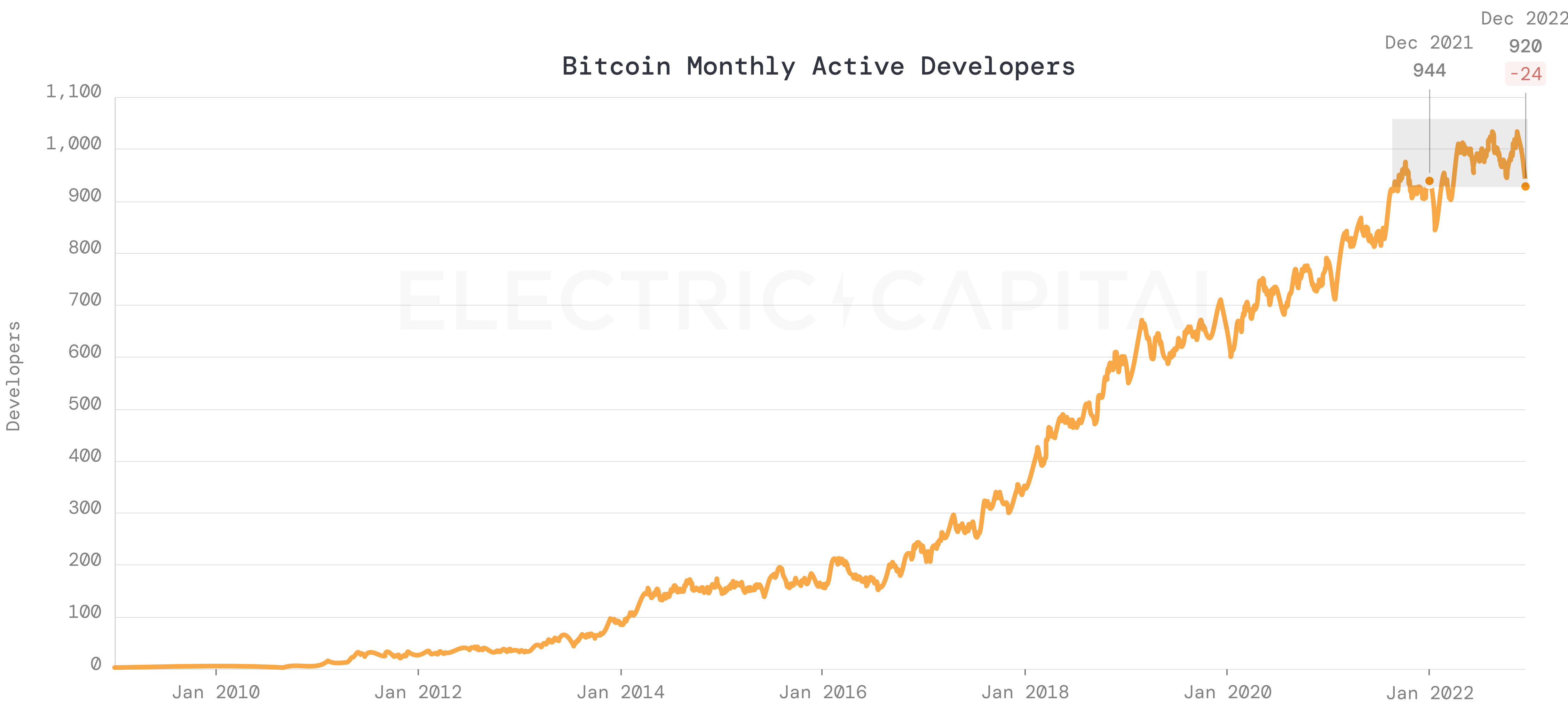
BITCOIN: MOST YOY LOSS COMES FROM <u>ONE-TIME</u> DEVELOPERS (-32%)

Bitcoin Monthly Active Developers

Dec 2022
507
+41

Dec 2021
466

Part-Time
9%

Dec 2021
312

Dec 2022
300
-12

Full-Time
-4%

Dec 2021
166
-53

Dec 2022
113

One-Time
-32%

ELECTRIC CAPITAL
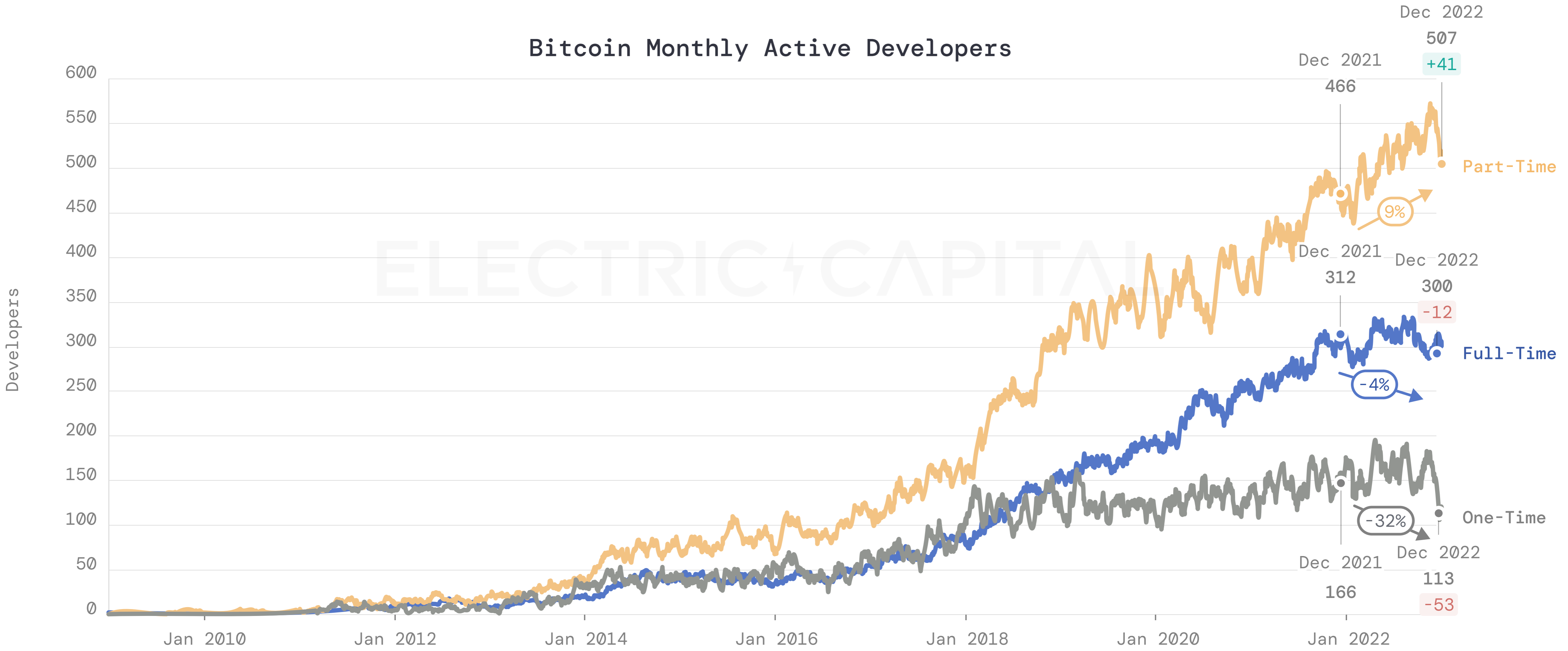
Developers

100+ _NEW_ DEVELOPERS CONTRIBUTE TO BITCOIN PROJECTS EVERY MONTH

Number of Developers by Month Joined

Roughly 100 developers join monthly since November 2017

+1,000 *NEW* BITCOIN DEVELOPERS PER YEAR ACROSS MARKET CONDITIONS

Number of Developers by Year Joined
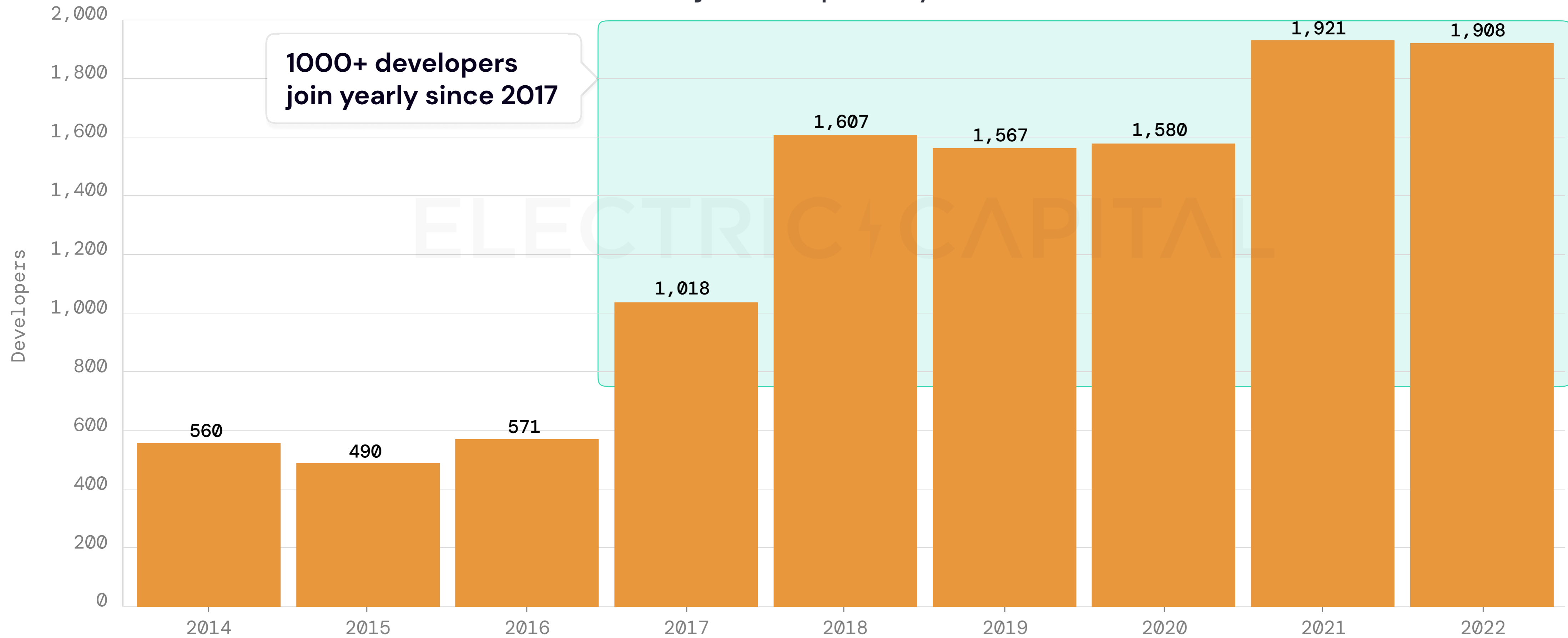
1000+ developers join yearly since 2017

- 2014: 560
- 2015: 490
- 2016: 571
- 2017: 1,018
- 2018: 1,607
- 2019: 1,567
- 2020: 1,580
- 2021: 1,921
- 2022: 1,908

ELECTRIC⚡CAPITAL

ETHEREUM

+5% MONTHLY ACTIVE ETHEREUM DEVELOPERS FROM DEC 2021 TO DEC 2022

Ethereum Monthly Active Developers
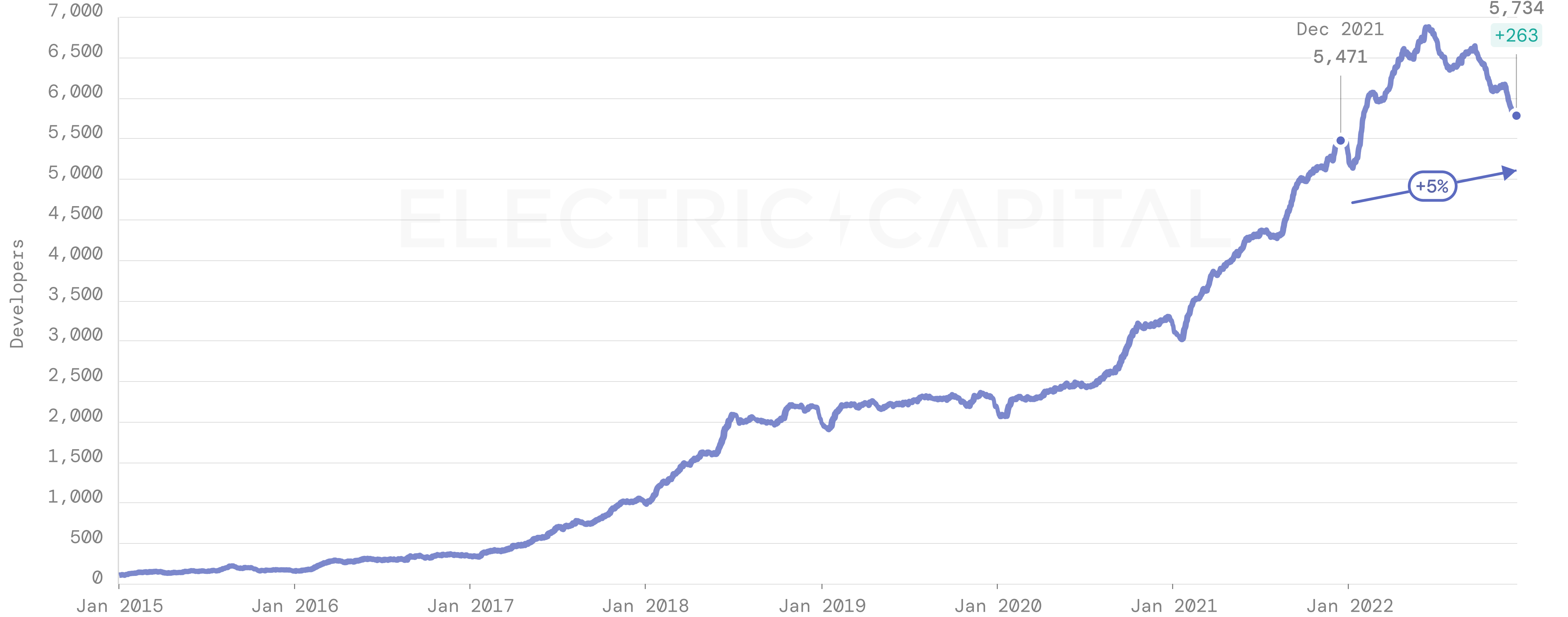
ETHEREUM'S GROWTH COMES FROM FULL-TIME (+9%) AND PART-TIME (+6%) DEVELOPERS, LOSSES COME FROM ONE-TIME DEVELOPERS (-8%)

Ethereum Monthly Active Developers
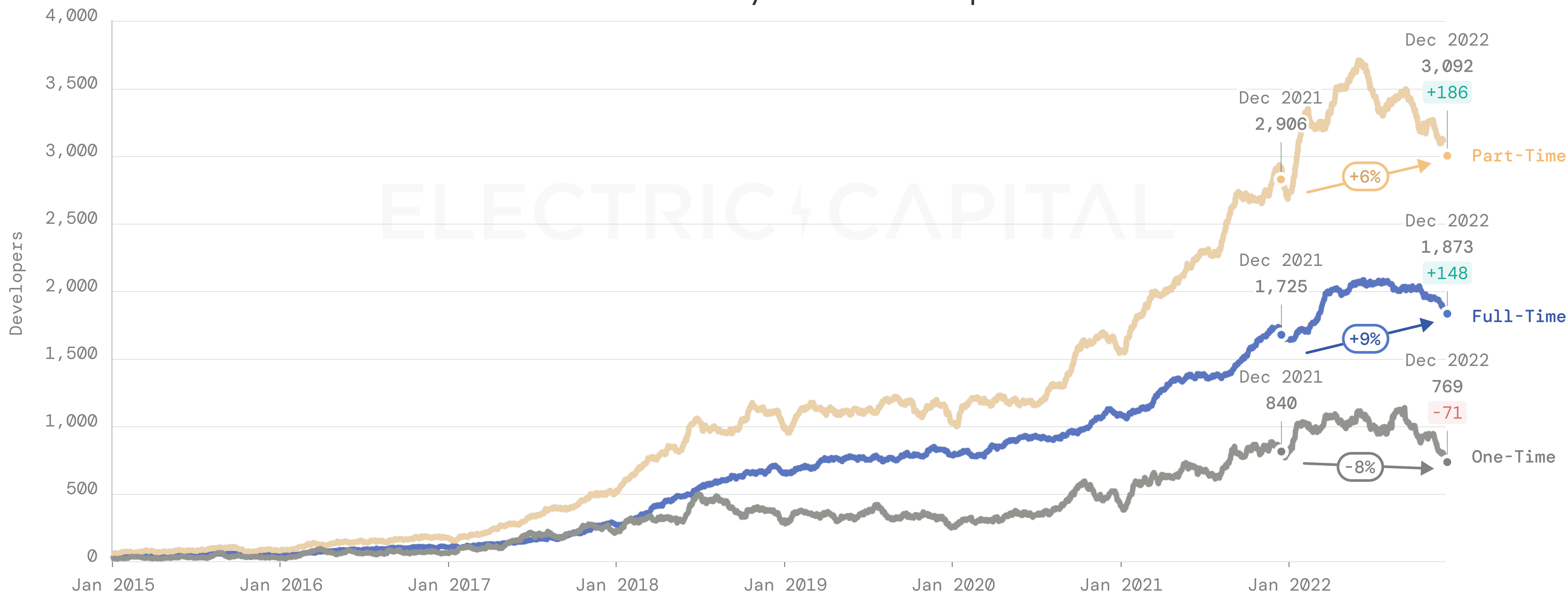
SINCE ALL-TIME HIGH: -16% DECLINE IN MONTHLY ACTIVE ETHEREUM DEVS

Ethereum Monthly Active Developers

June 2022
6,860   Dec 2022
5,734
-1,126

-16%
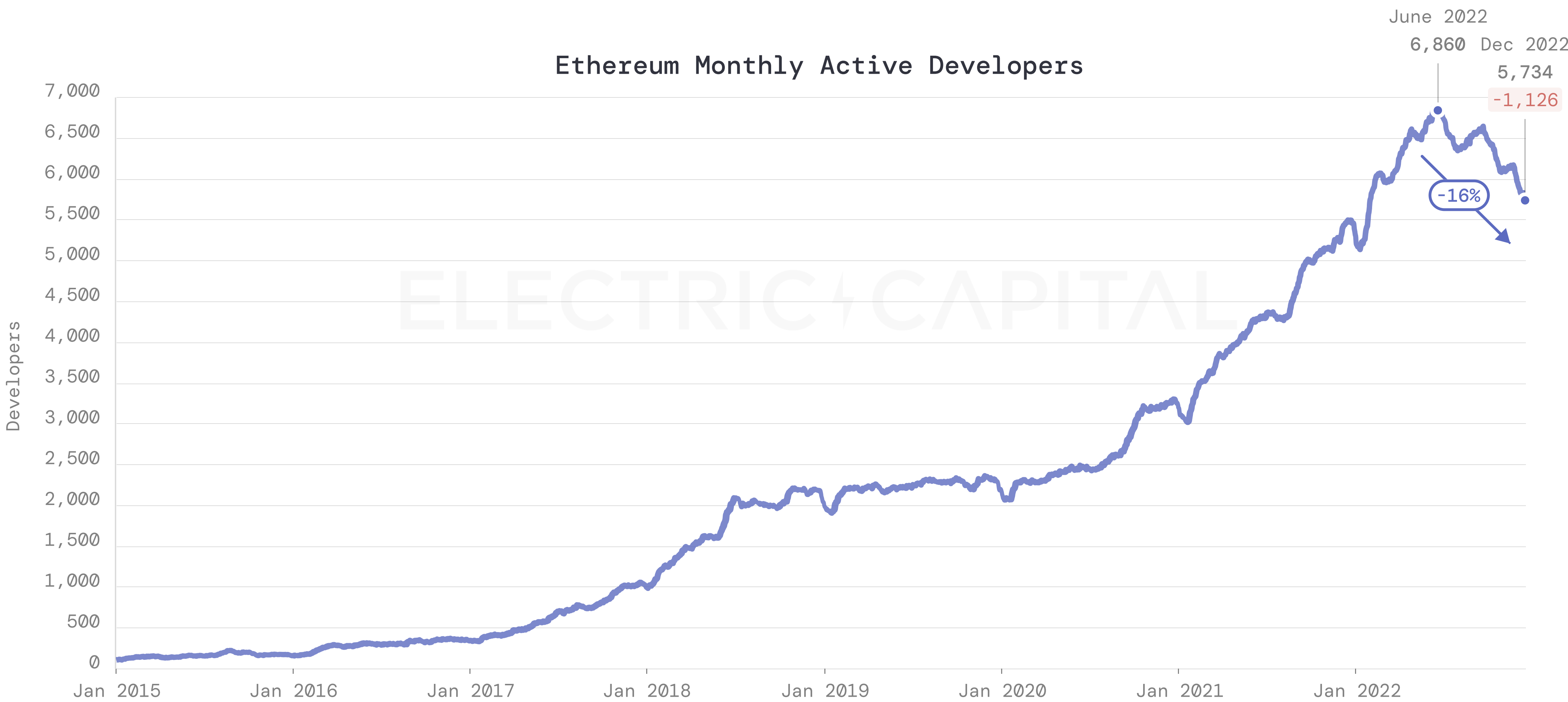
SINCE ATH: MOST LOSS COMES FROM <u>ONE-TIME</u> (-30%) & <u>PART-TIME</u> (-16%) DEVS

Ethereum Monthly Active Developers

Jun 2022
3,691
Dec 2022
3,092
-599
-16% Part-Time

Jun 2022
2,067
Dec 2022
1,873
-194
-9% Full-Time

Jun 2022
1,102
Dec 2022
769
-333
-30% One-Time

Developers

4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0

Jan 2015   Jan 2016   Jan 2017   Jan 2018   Jan 2019   Jan 2020   Jan 2021   Jan 2022
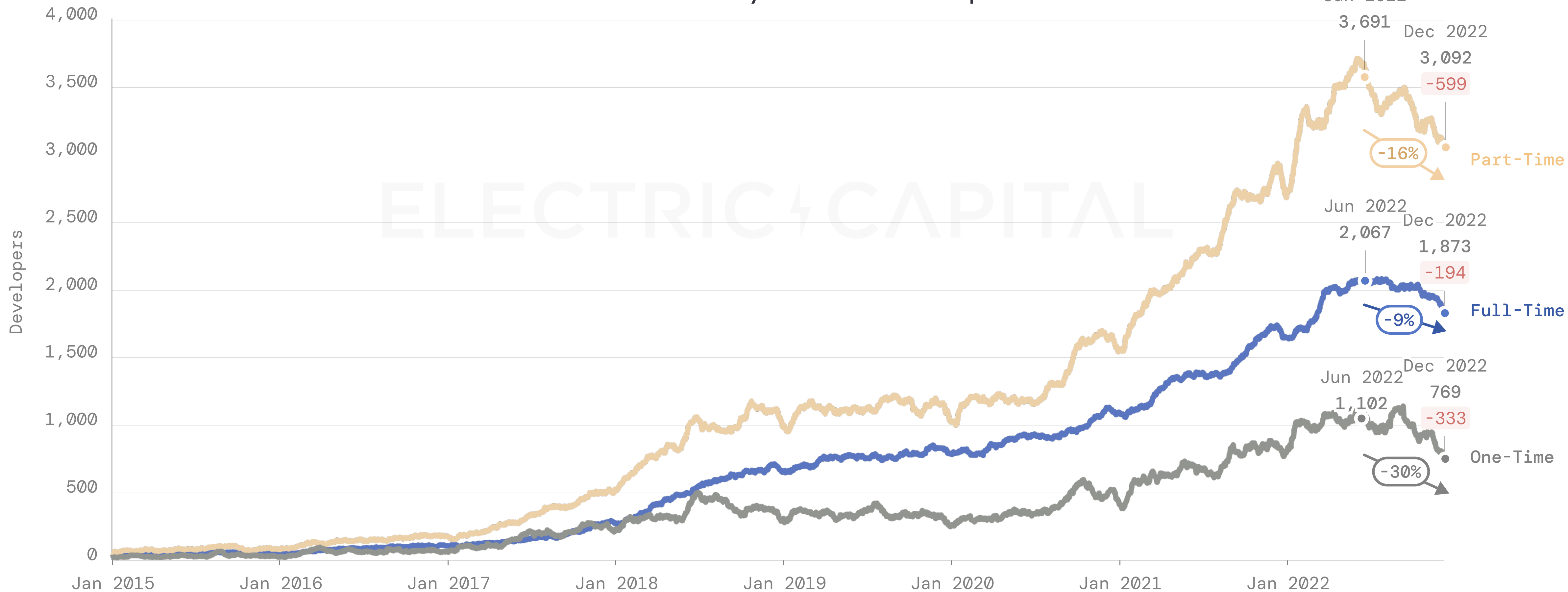
2022: +14,691 NEW ETHEREUM DEVELOPERS, THE HIGHEST IN HISTORY

Number of Developers by Year Joined
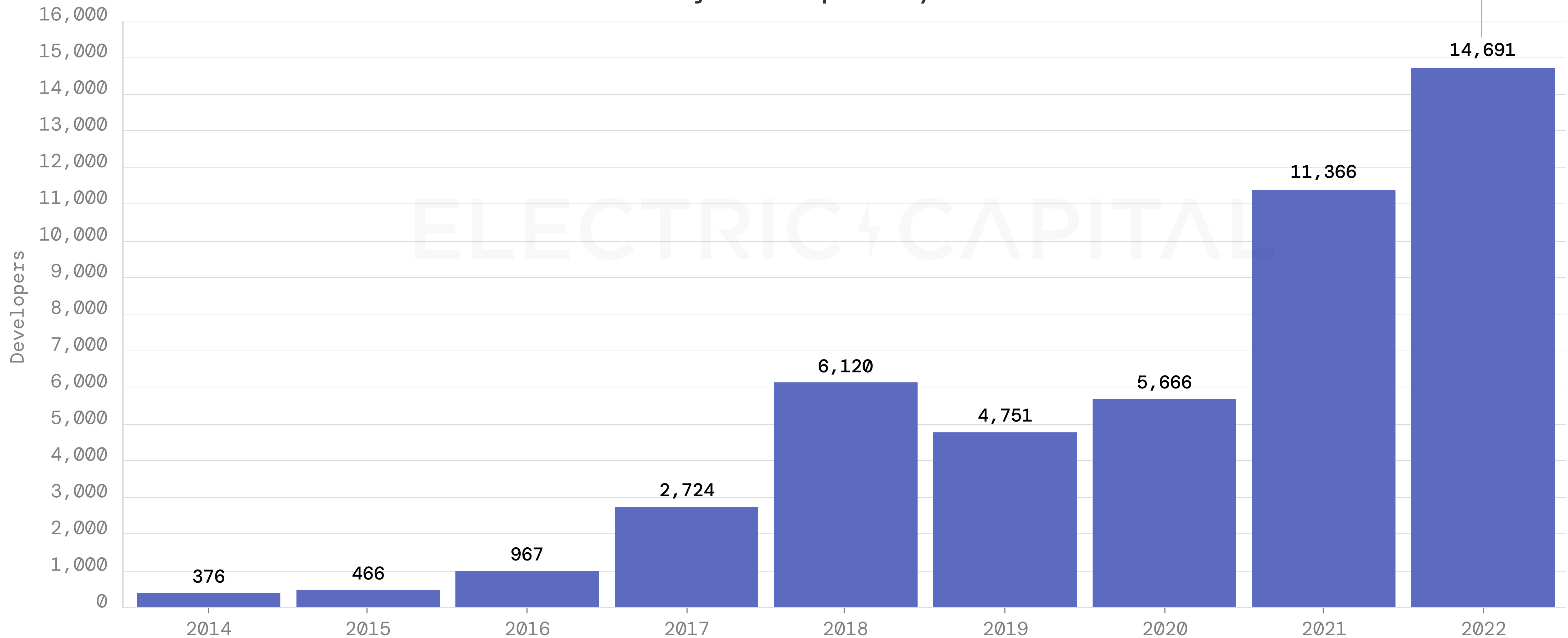
800+ NEW ETHEREUM DEVELOPERS PER MONTH SINCE FEB 2021

Number of Developers by Month Joined

800 developers join monthly since Feb 2021

ETHEREUM ACCOUNTS FOR 16%+ OF ALL NEW DEVELOPERS IN CRYPTO

Ethereum Developers by Month Joined
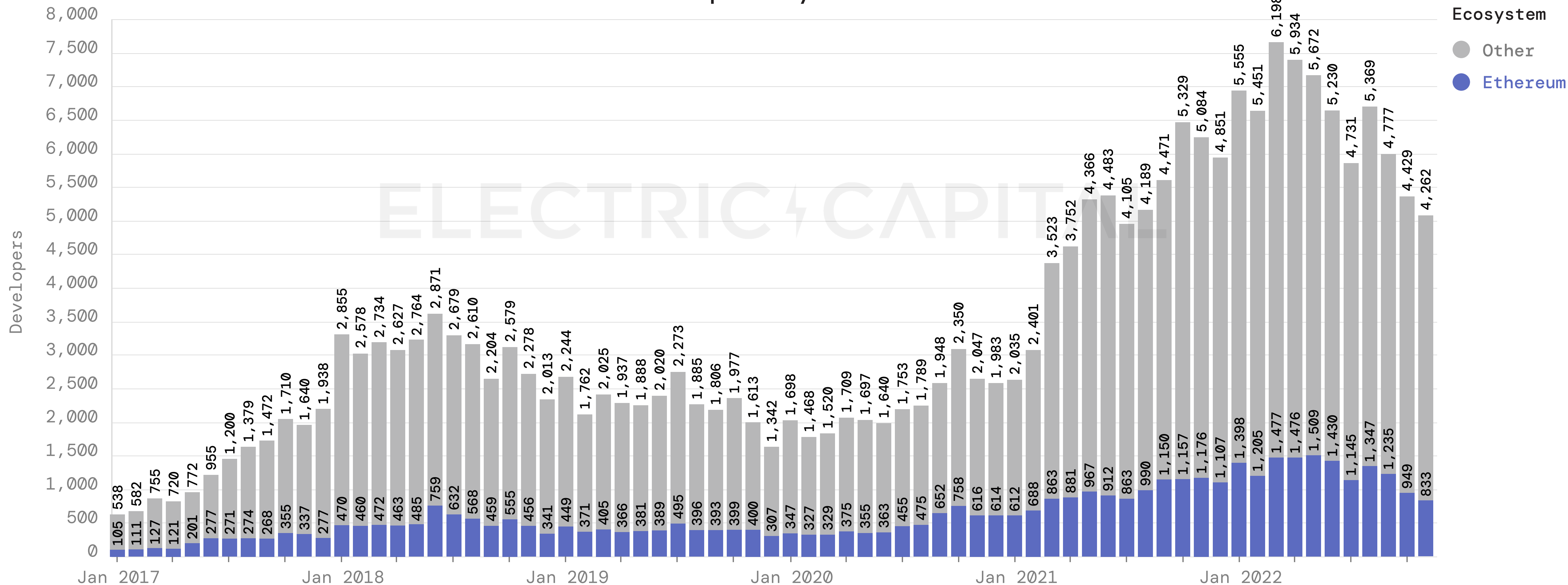
ELECTRIC CAPITAL

LET'S DIVE INTO THE TOP 200 ECOSYSTEMS BY NETWORK VALUE OUTSIDE OF BITCOIN AND ETHEREUM...

WE CAN BREAK OUT ETHEREUM AND BITCOIN FROM THE TOP 200:
THE TOP 200 GREW +12% YEAR OVER YEAR

Top 200 from 2022 (Excluding Bitcoin & Ethereum) vs Other Ecosystems
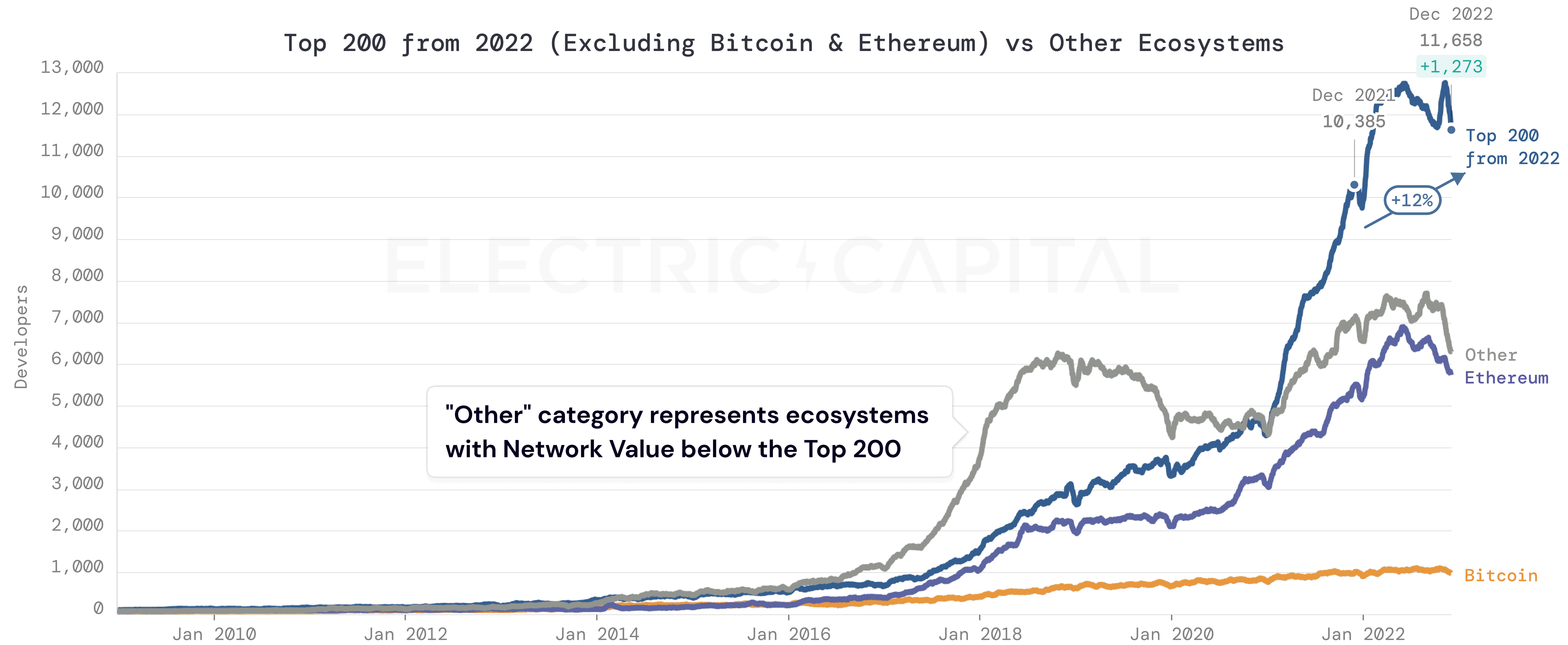
"Other" category represents ecosystems with Network Value below the Top 200

Dec 2022
11,658
+1,273

Dec 2021
10,385

+12%

Top 200
from 2022

Other

Ethereum

Bitcoin

SINCE PEAK: IN THE TOP 200, MONTHLY ACTIVE DEVELOPERS DECLINED -8%

Top 200 from 2022 (Excluding Bitcoin & Ethereum) vs Other Ecosystems
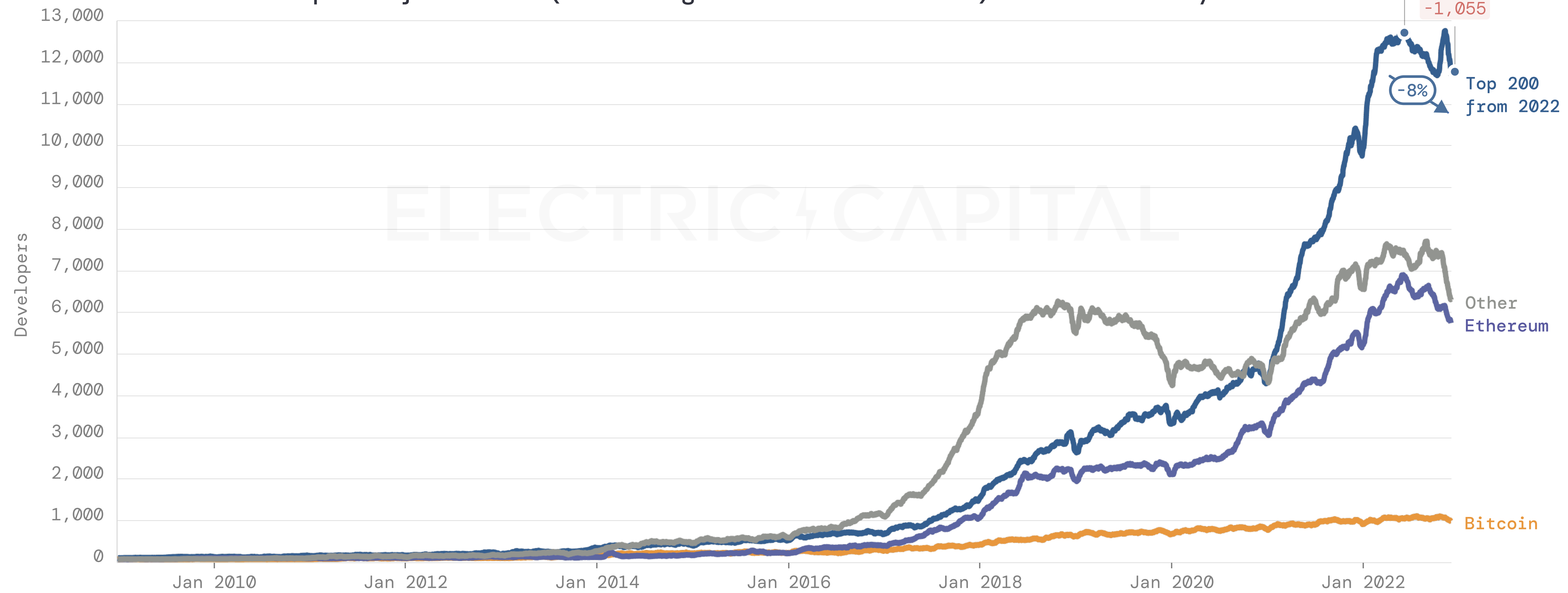
June 2022
12,725

Dec 2022
11,670
-1,055

-8%

Top 200
from 2022

Other
Ethereum

Bitcoin

ELECTRIC CAPITAL

Developers

13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0

Jan 2010   Jan 2012   Jan 2014   Jan 2016   Jan 2018   Jan 2020   Jan 2022

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations.

PRIOR TOP 200 COHORTS ARE NOT AS RETENTIVE AS ETHEREUM

Top 200 from 2016 to 2022
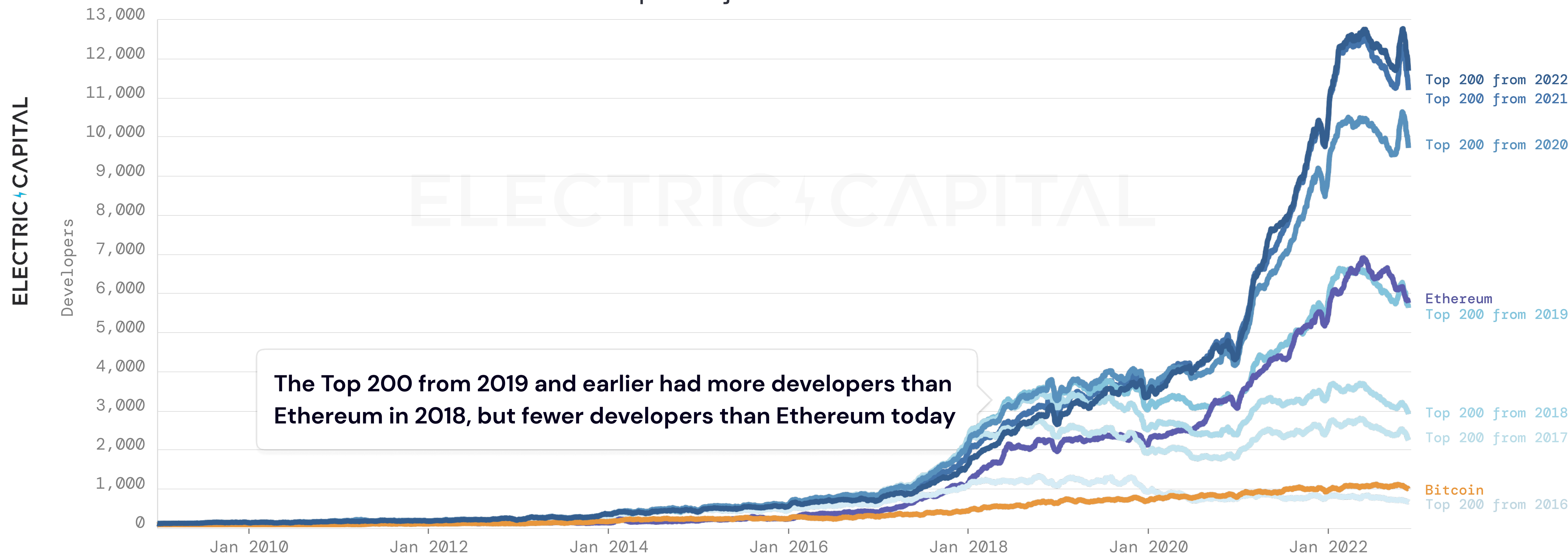
> The Top 200 from 2019 and earlier had more developers than Ethereum in 2018, but fewer developers than Ethereum today

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations.

ELECTRIC CAPITAL

HOW DO INDIVIDUAL ECOSYSTEMS COMPARE YEAR OVER YEAR?

LET'S COMPARE DECEMBER 2021 VS DECEMBER 2022

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations.

WE CAN COMPARE DECEMBER 2021 VS DECEMBER 2022 TO VISUALIZE YEAR OVER YEAR DEVELOPER GROWTH FOR EACH ECOSYSTEM
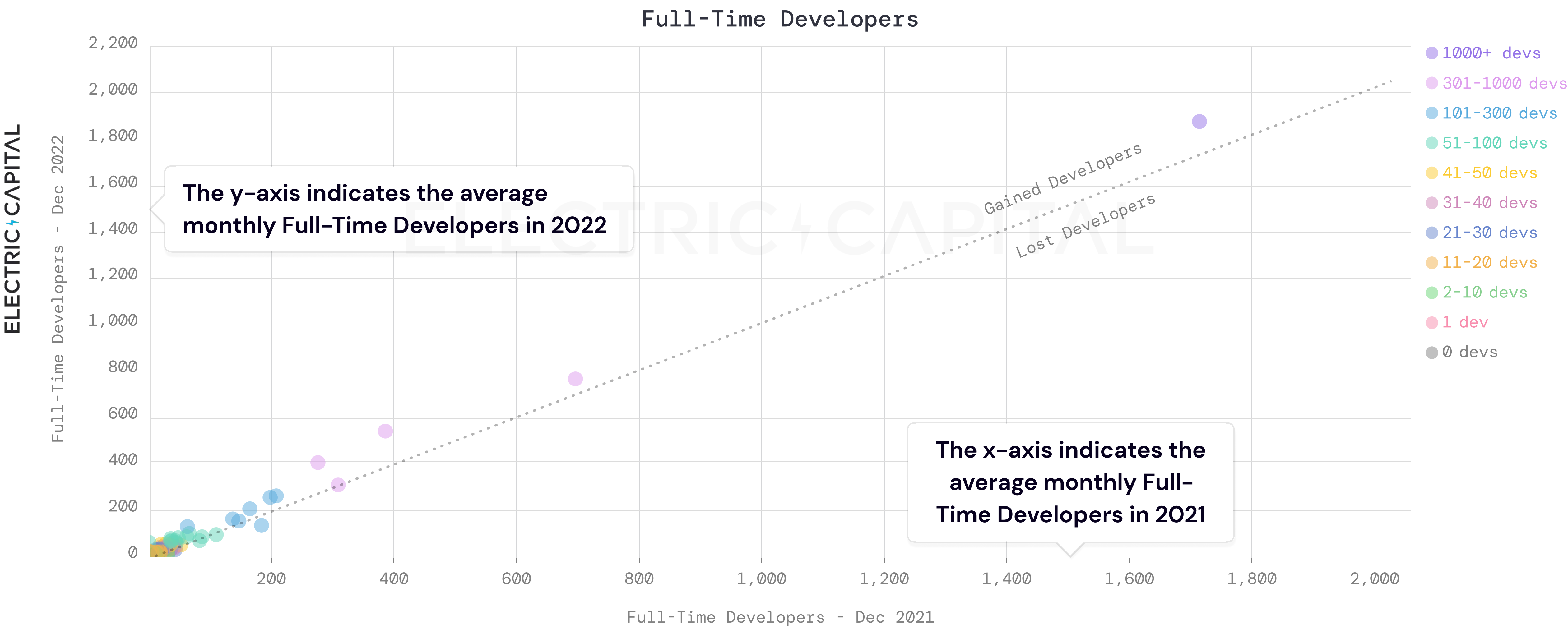
Full-Time Developers

The y-axis indicates the average monthly Full-Time Developers in 2022

Gained Developers

Lost Developers

The x-axis indicates the average monthly Full-Time Developers in 2021

Legend:
- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Y-axis: Full-Time Developers - Dec 2022
X-axis: Full-Time Developers - Dec 2021

We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

LET'S START WITH THE MOST IMPORTANT DEVELOPER SEGMENT:
<u>FULL-TIME</u> DEVELOPERS

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations

ELECTRIC CAPITAL

ETHEREUM <u>FULL-TIME</u> DEV COMMUNITY IS 2.5X THE NEXT LARGEST COMMUNITY
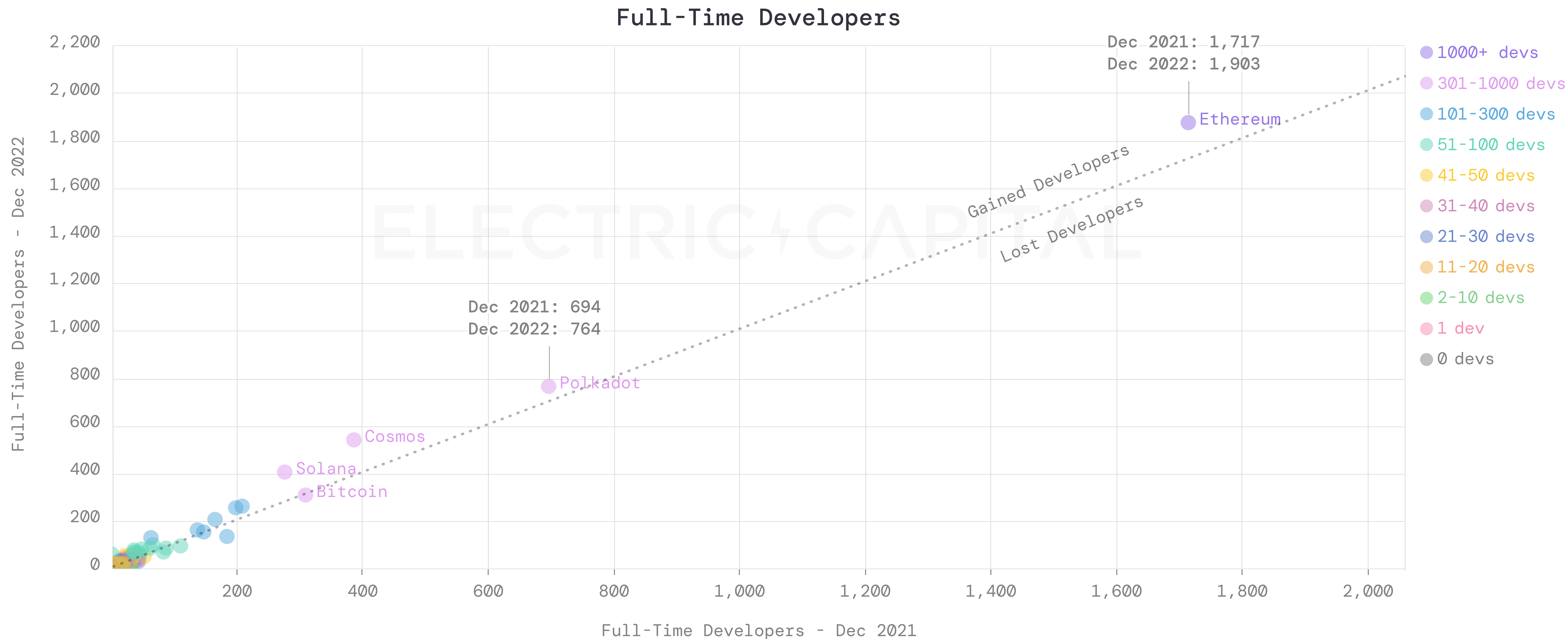
Full-Time Developers

Dec 2021: 1,717
Dec 2022: 1,903

Ethereum

Gained Developers

Lost Developers

Dec 2021: 694
Dec 2022: 764

Polkadot

Cosmos

Solana

Bitcoin

Legend:
- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Y-axis: Full-Time Developers - Dec 2022 (0 to 2,200)
X-axis: Full-Time Developers - Dec 2021 (0 to 2,000)

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

ECOSYSTEMS WITH 300+ <u>FULL-TIME</u> DEVS *ALL* GREW: ETHEREUM, POLKADOT, COSMOS, SOLANA, & BITCOIN
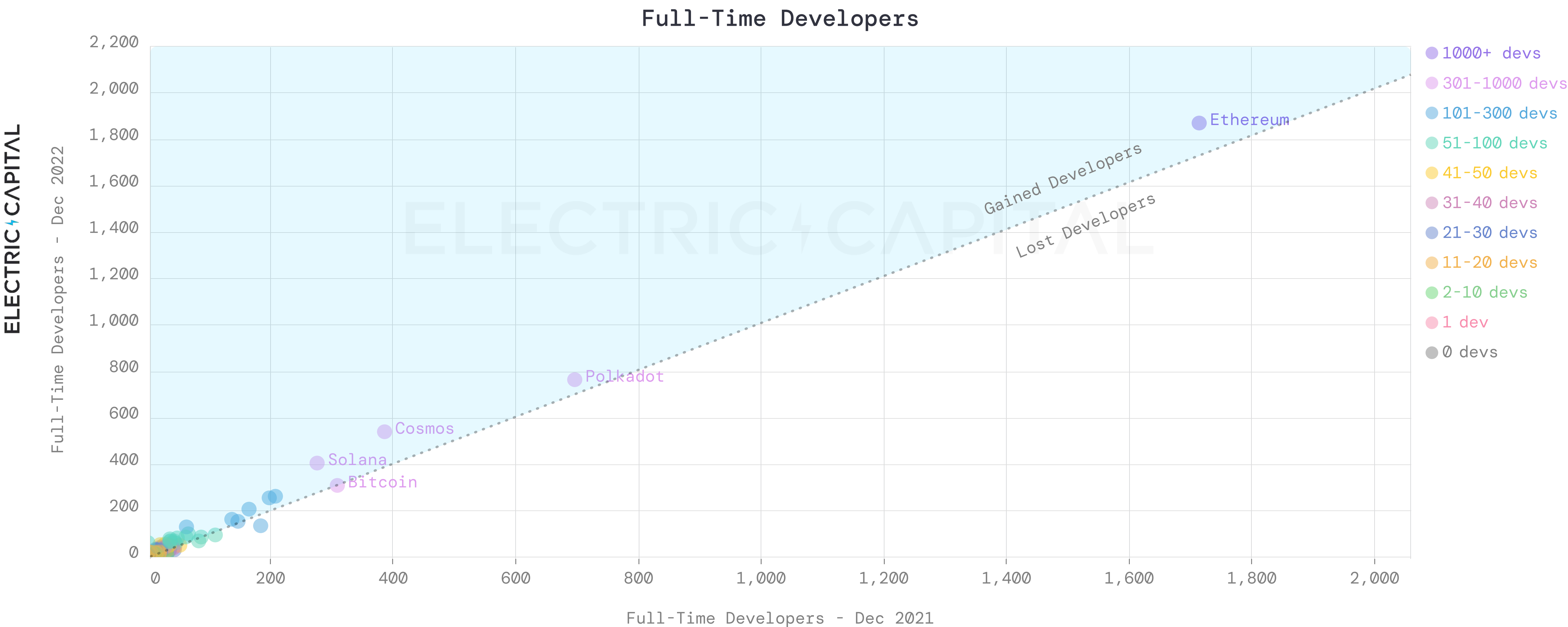
Full-Time Developers

Legend:
- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Y-axis: Full-Time Developers - Dec 2022
X-axis: Full-Time Developers - Dec 2021

Labeled points: Ethereum, Polkadot, Cosmos, Solana, Bitcoin

Dotted line labels: Gained Developers / Lost Developers

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

LET'S ZOOM IN TO BETTER VISUALIZE CHANGE YEAR OVER YEAR FOR OTHER ECOSYSTEMS

Full-Time Developers

Legend:
- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Y-axis: Full-Time Developers - Dec 2022
X-axis: Full-Time Developers - Dec 2021

Data points labeled: Ethereum, Polkadot, Cosmos, Solana, Bitcoin

Callout: **Let's focus on this range**

Gained Developers / Lost Developers

ELECTRIC⚡CAPITAL

ZOOMING IN ON ECOSYSTEMS WITH 100 TO 300 <u>FULL-TIME</u> DEVELOPERS...

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations.

ECOSYSTEMS WITH 200+ FULL-TIME DEVELOPERS: KUSAMA +25%, POLYGON +22%, AND NEAR +22% GREW YEAR OVER YEAR

Full-Time Developers

Y-axis: Full-Time Developers - Dec 2022

X-axis: Full-Time Developers - Dec 2021

Legend:
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Labeled points: Polygon, Kusama, NEAR, Cardano, Tezos, BNB Chain, Internet Computer, Starknet

Annotations: +100%, +50%, Gained Developers, Lost Developers

ECOSYSTEMS WITH 100+ <u>FULL-TIME</u> DEVELOPERS: STARKNET +243%, INTERNET COMPUTER +94%, & CARDANO +14% GREW YOY WHILE TEZOS STAYED FLAT

Full-Time Developers

Legend:
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Axis labels:
- Full-Time Developers – Dec 2022 (y-axis)
- Full-Time Developers – Dec 2021 (x-axis)

Plotted labels: Polygon, Kusama, NEAR, Cardano, Tezos, BNB Chain, Starknet, Internet Computer

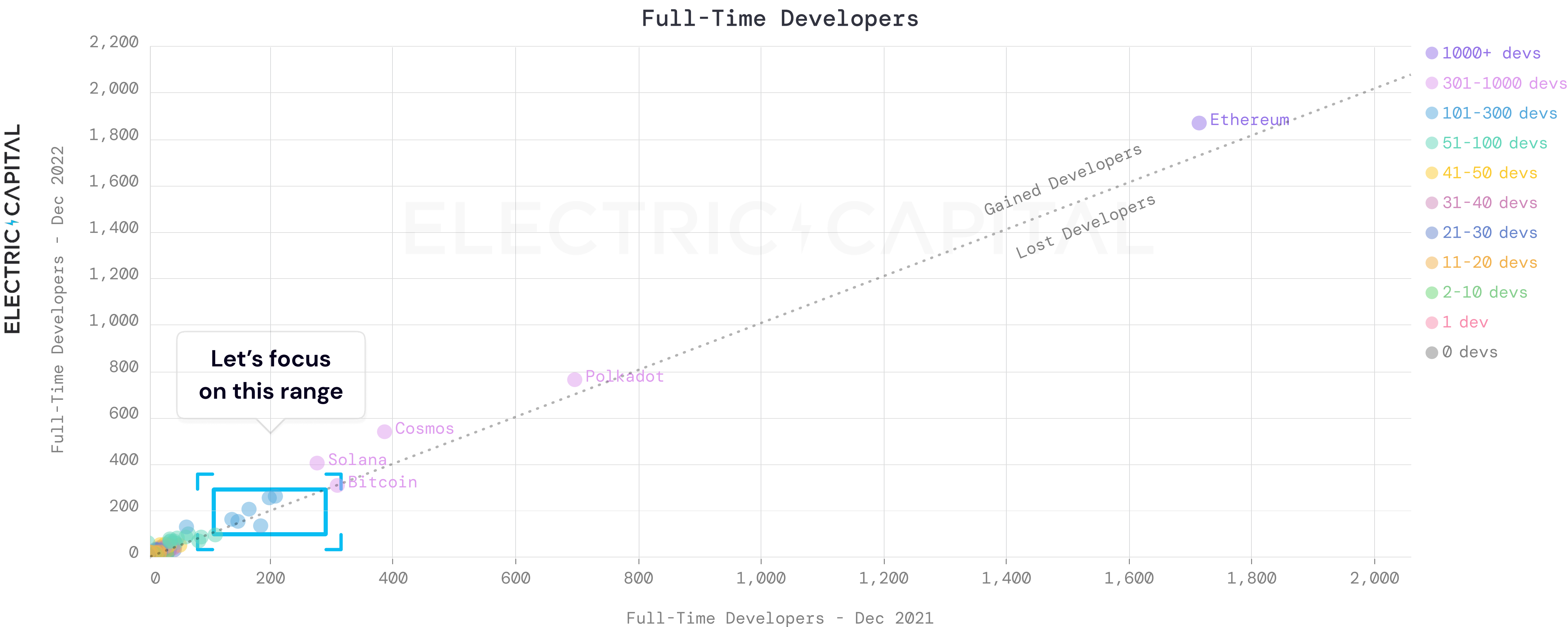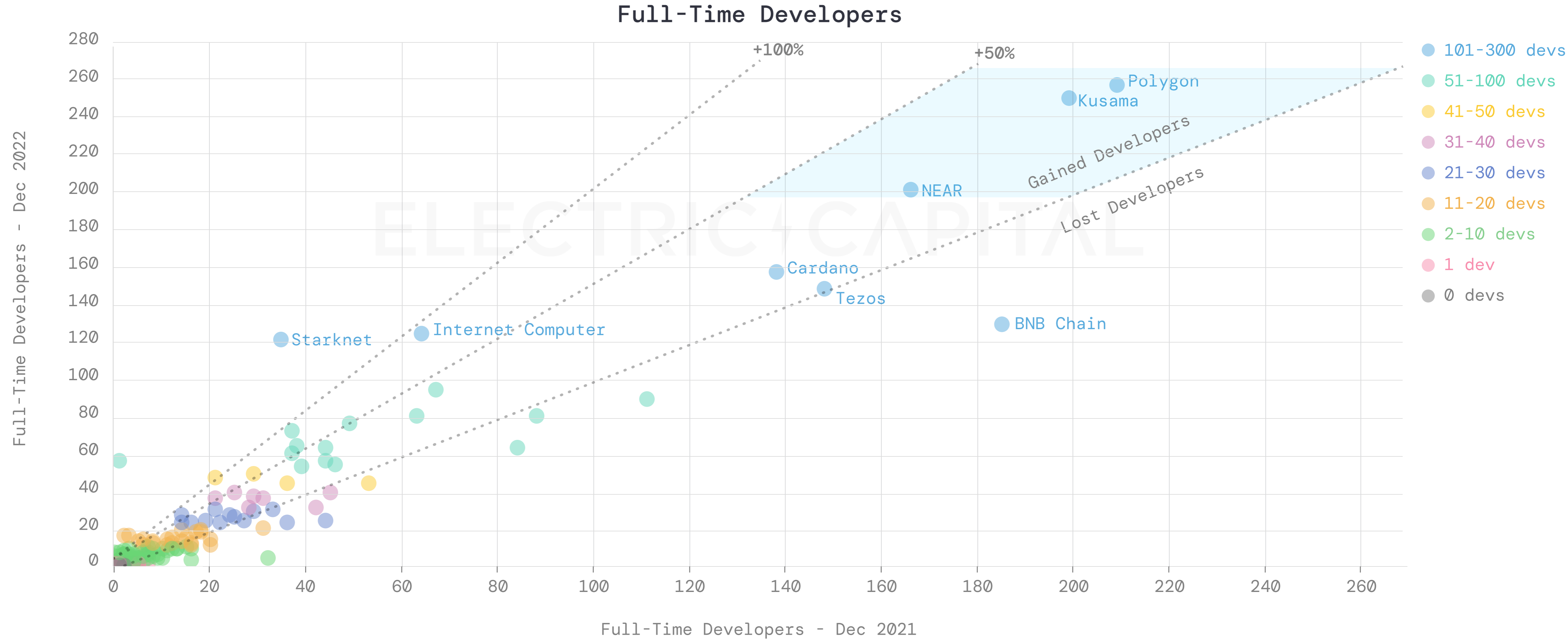Annotations: +100%, +50%, Gained Developers, Lost Developers

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

ELECTRIC CAPITAL

ZOOMING IN ON ECOSYSTEMS WITH 50 TO 100 FULL-TIME DEVELOPERS...

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations.

APTOS & SUI ARE THE FASTEST GROWING <u>FULL-TIME</u> DEVELOPER ECOS OF 2022

Full-Time Developers

- 101-300 devs
- 51-100 devs
- 41-50 devs
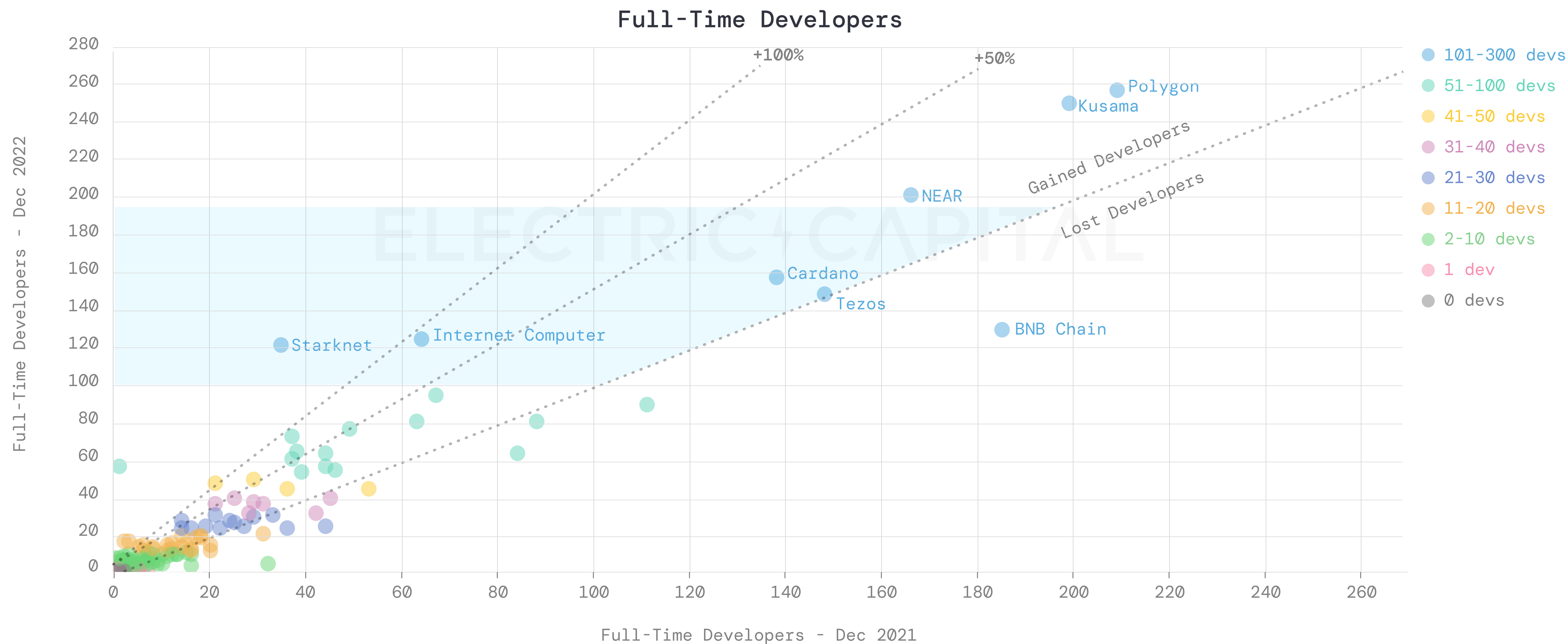- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

ECOSYSTEMS WITH 50+ <u>FULL-TIME</u> DEVS: OSMOSIS +107%, ARBITRUM +68%, AND OPTIMISM +68% GREW YEAR OVER YEAR

Full-Time Developers

Legend:
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Labeled ecosystems: Starknet, Internet Computer, Aptos, Filecoin, Avalanche, Moonbeam, Celo, Arbitrum, Optimism, Osmosis, The Graph, Flow, Sui Network, Basic Attention Token, Algorand, Gnosis

X-axis: Full-Time Developers - Dec 2021
Y-axis: Full-Time Developers - Dec 2022
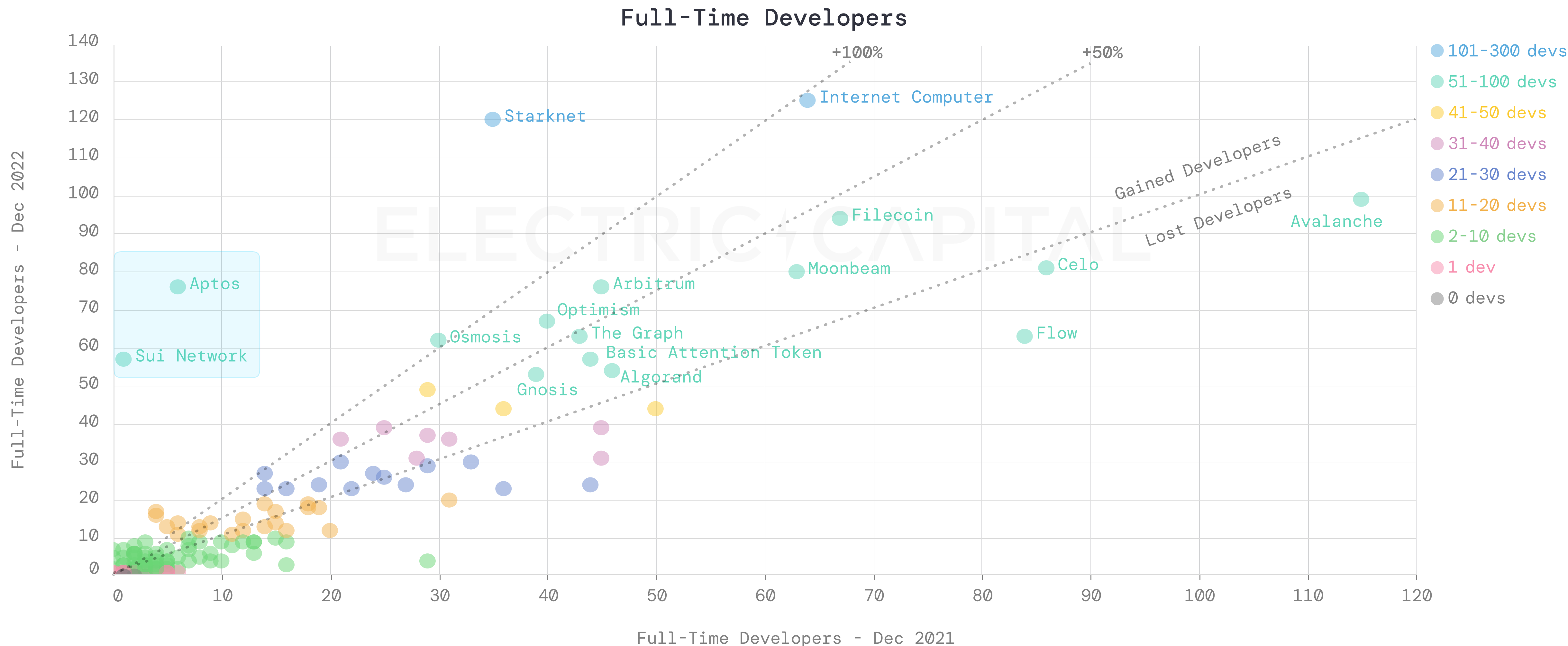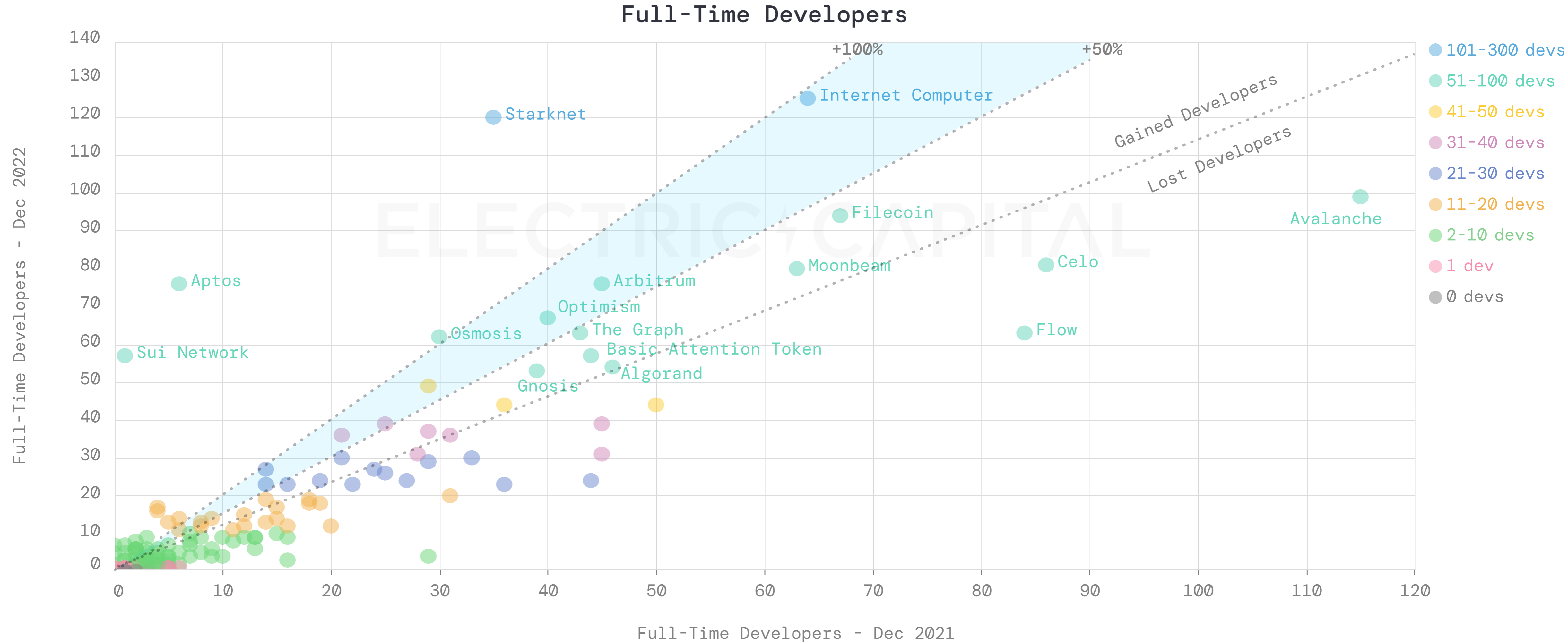
+100%   +50%
Gained Developers
Lost Developers

We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

THE GRAPH +47%, FILECOIN +40%, GNOSIS +36%, BASIC ATTENTION TOKEN +30%, MOONBEAM +27%, ALGORAND +17% GAINED DEVS YOY

Full-Time Developers

Full-Time Developers - Dec 2022 (y-axis)
Full-Time Developers - Dec 2021 (x-axis)

Legend:
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Labeled points: Internet Computer, Starknet, Avalanche, Filecoin, Aptos, Moonbeam, Celo, Arbitrum, Optimism, The Graph, Osmosis, Flow, Basic Attention Token, Algorand, Sui Network, Gnosis

+100%, +50%, Gained Developers, Lost Developers
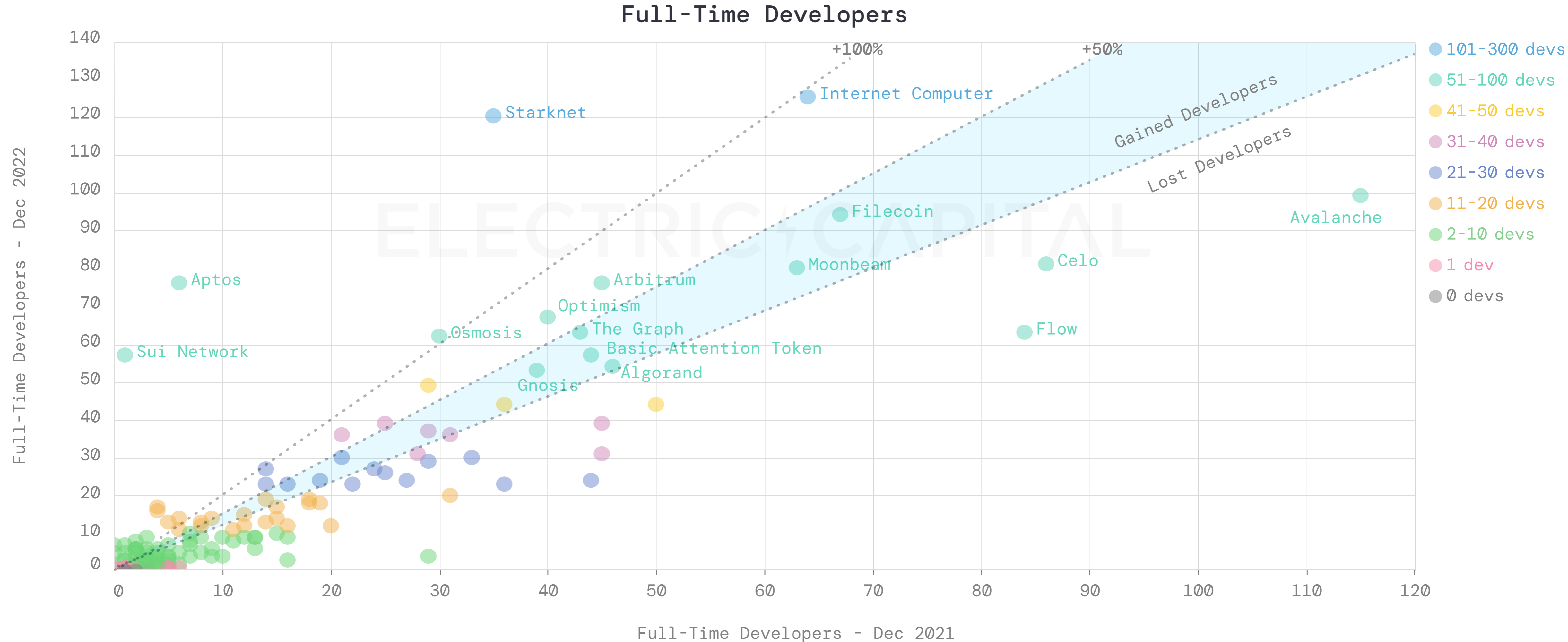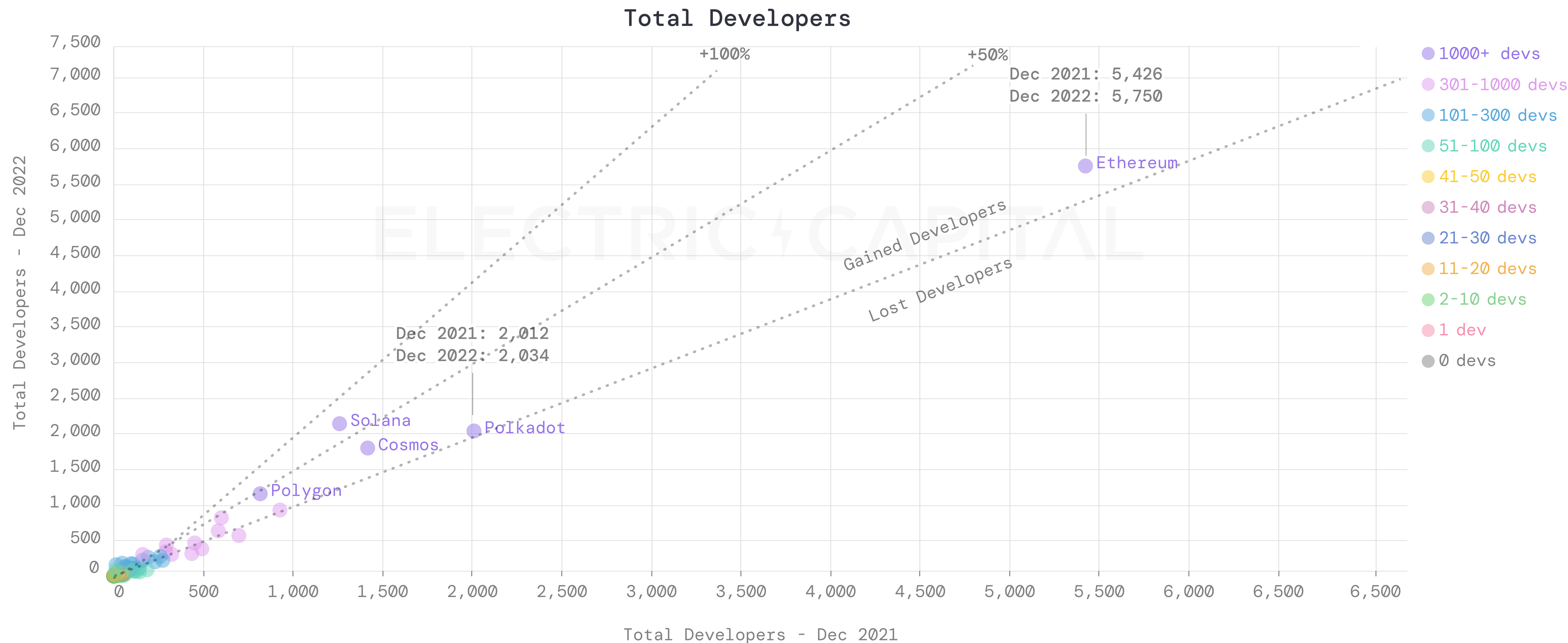
We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

ELECTRIC⚡CAPITAL

BY TOTAL DEVELOPERS...

ETHEREUM IS THE LARGEST TOTAL (<u>FULL-TIME</u> + <u>PART-TIME</u> + <u>ONE-TIME</u>) DEVELOPER ECOSYSTEM AND 2.8X LARGER THAN THE NEXT

Total Developers

+100%   +50%

Dec 2021: 5,426
Dec 2022: 5,750

Ethereum

Gained Developers

Lost Developers

Dec 2021: 2,012
Dec 2022: 2,034

Solana
Cosmos
Polkadot
Polygon

Total Developers – Dec 2022

Total Developers - Dec 2021

Legend:
- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.
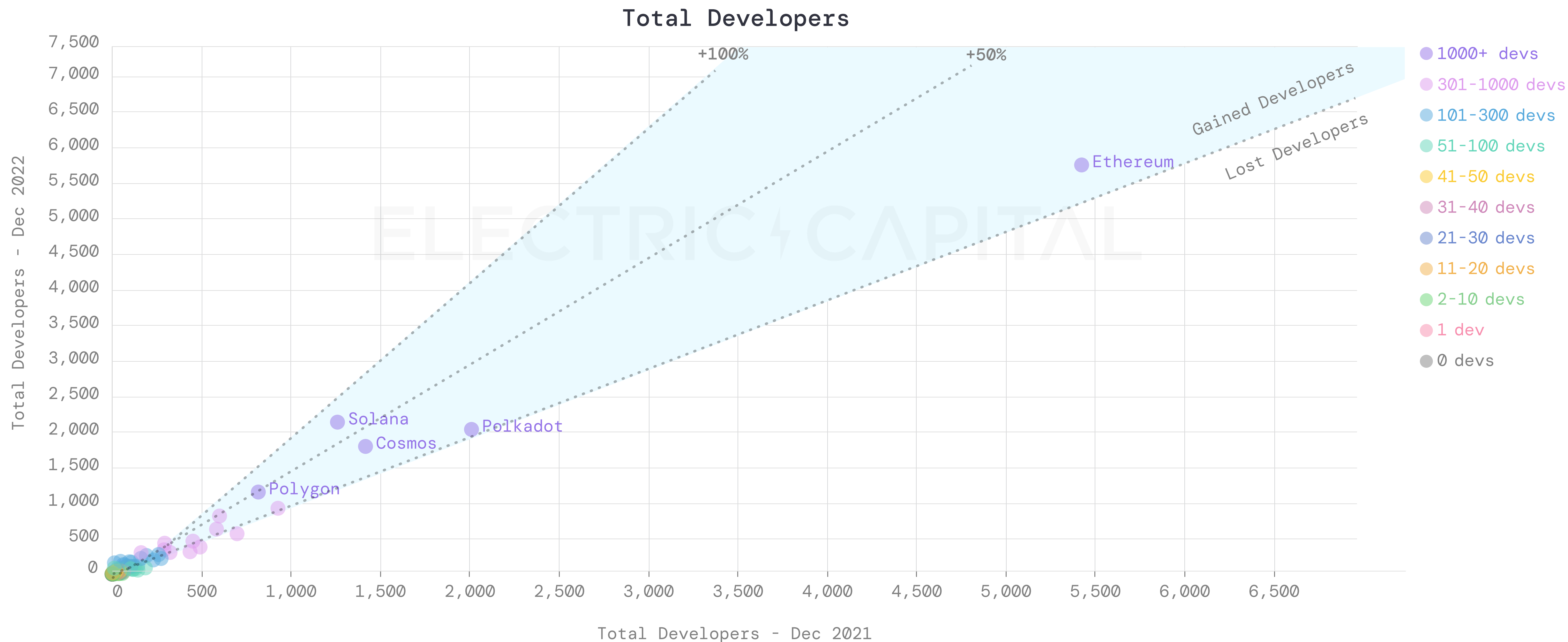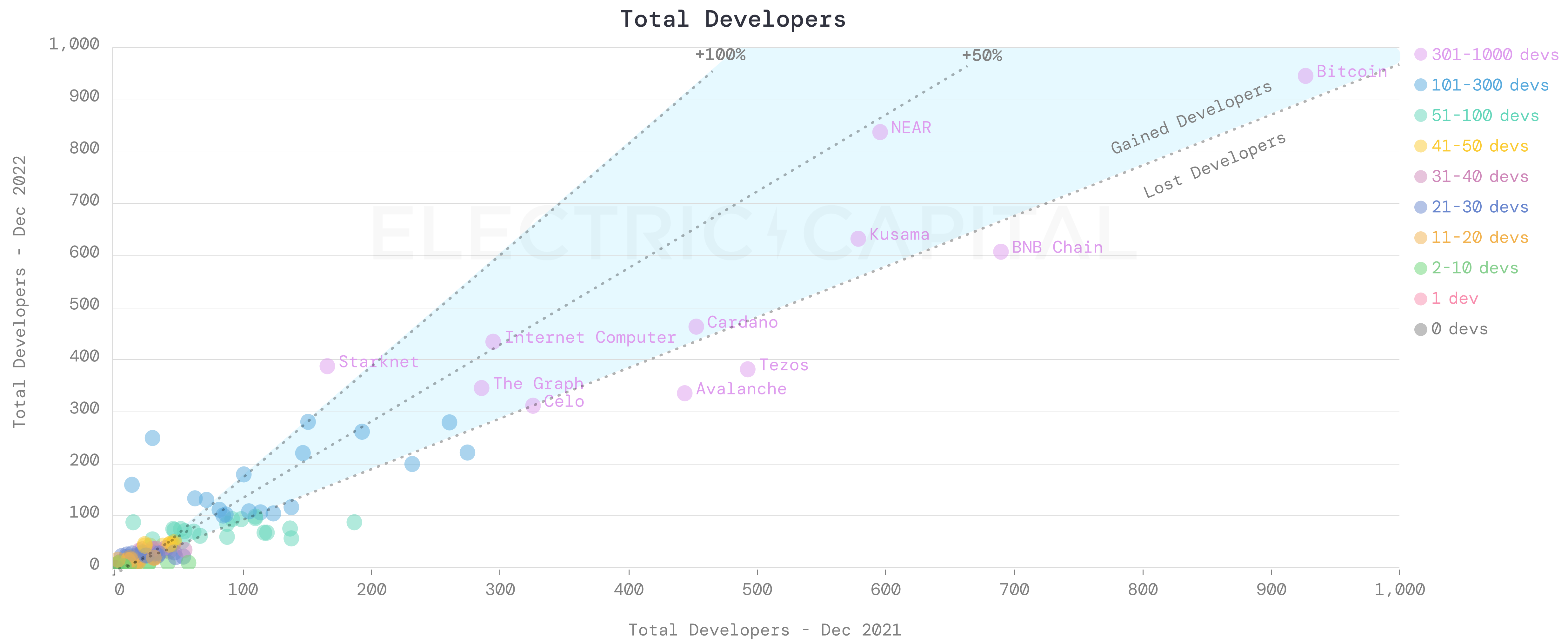
ECOSYSTEMS WITH 1,000+ TOTAL DEVELOPERS GREW: SOLANA +83%, POLYGON +40%, COSMOS +25%, AND POLKADOT +2%

Total Developers

Y-axis: Total Developers – Dec 2022
X-axis: Total Developers – Dec 2021

Legend:
- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Labeled points: Ethereum, Solana, Cosmos, Polkadot, Polygon

+100%   +50%   Gained Developers   Lost Developers

We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.
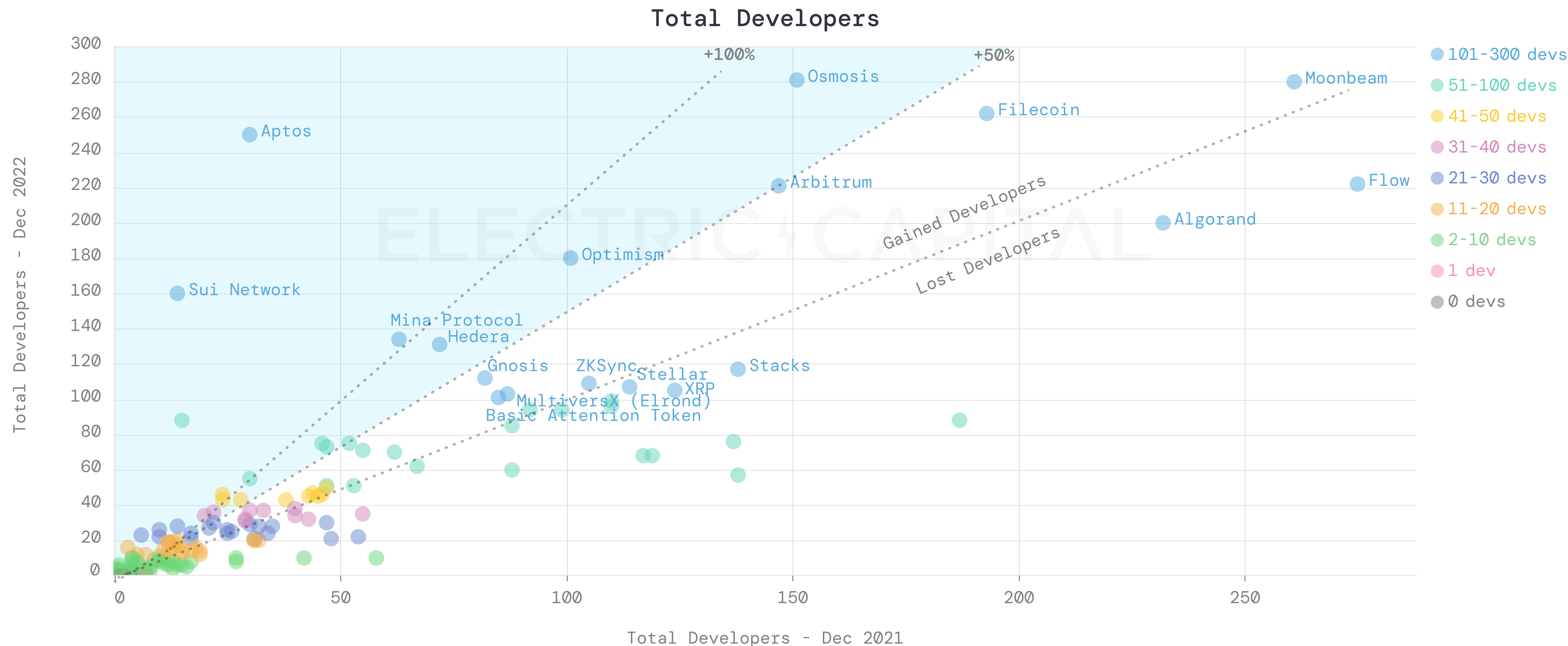
ECOSYSTEMS WITH 300+ TOTAL DEVS: STARKNET +134%, ICP +48%, NEAR +41%, THE GRAPH +21%, KUSAMA +9%, BITCOIN +2%, CARDANO +2%, & CELO FLAT

Total Developers

Legend:
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Y-axis: Total Developers – Dec 2022
X-axis: Total Developers – Dec 2021

Labeled points: Bitcoin, NEAR, Kusama, BNB Chain, Cardano, Internet Computer, Tezos, Starknet, The Graph, Avalanche, Celo

+100%, +50%, Gained Developers, Lost Developers

We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.
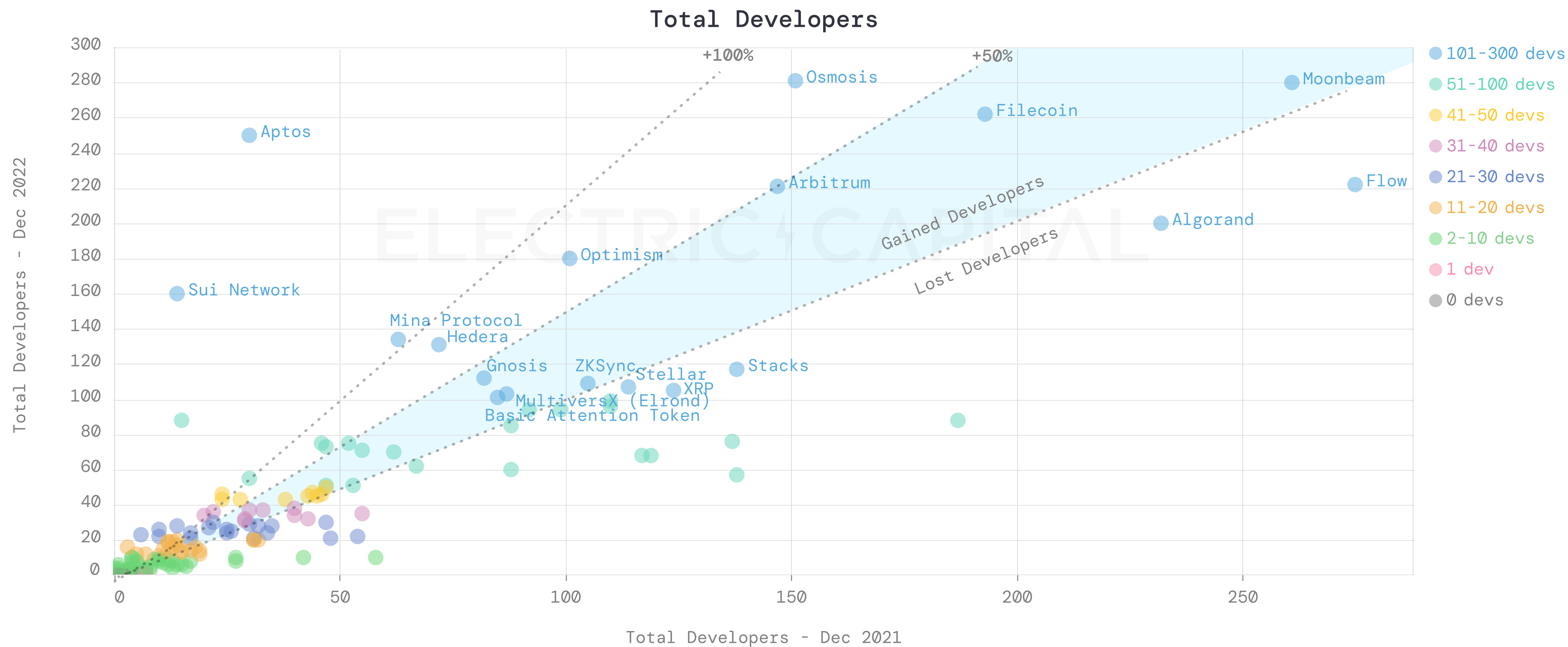
ECOSYSTEMS WITH 100+ TOTAL DEVS: SUI +1,043%, APTOS +733%, MINA +113%, OSMOSIS +86%, HEDERA +82%, OPTIMISM +78%, & ARBITRUM +50%

Total Developers

Total Developers – Dec 2022 (y-axis)

Total Developers – Dec 2021 (x-axis)

Legend:
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Labeled points: Moonbeam, Osmosis, Filecoin, Aptos, Arbitrum, Flow, Optimism, Algorand, Sui Network, Mina Protocol, Hedera, Gnosis, ZKSync, Stellar, XRP, Stacks, MultiversX (Elrond), Basic Attention Token

+100%   +50%   Gained Developers   Lost Developers

We only count open–source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

ECOSYSTEMS WITH 100+ TOTAL DEVS: GNOSIS +37%, FILECOIN +36%, BASIC ATTENTION TOKEN +19%, MULTIVERSX +18%, MOONBEAM +7%, & ZKSYNC +4%
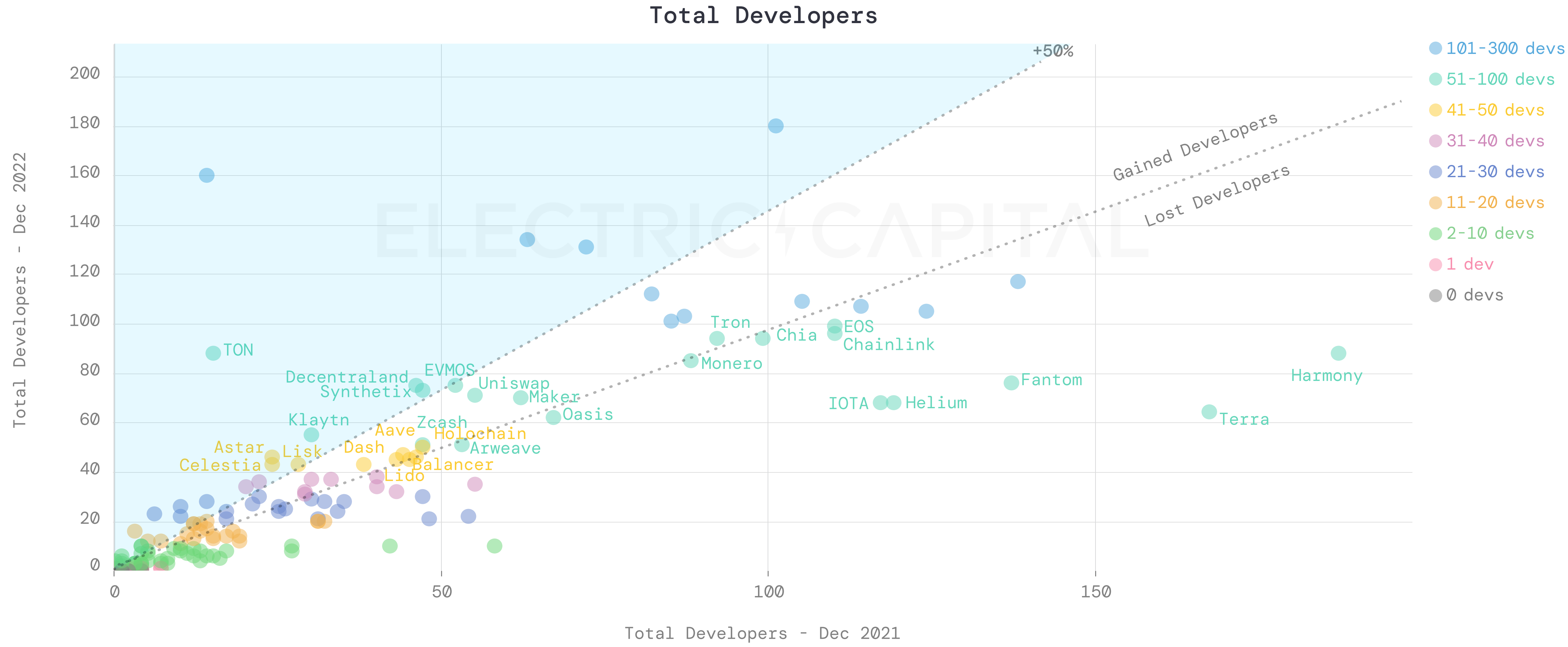

Total Developers

Total Developers – Dec 2022 (y-axis)

Total Developers – Dec 2021 (x-axis)

Legend:
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Labeled points: Osmosis, Moonbeam, Filecoin, Aptos, Arbitrum, Flow, Optimism, Algorand, Sui Network, Mina Protocol, Hedera, Gnosis, ZKSync, Stellar, Stacks, XRP, MultiversX (Elrond), Basic Attention Token

We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

ECOSYSTEMS WITH 40+ TOTAL DEVS: TON +487%, ASTAR +92%, KLAYTN +83%, CELESTIA +79%, DECENTRALAND +63%, SNX +55%, & LISK +55%

Total Developers

ECOS WITH 40+ TOTAL DEVS CONT'D: EVMOS +44%, UNISWAP +29%, DASH +13%, MAKER +13%, ZCASH +9%, HOLOCHAIN +7%, AAVE +6%, LIDO +5%, TRON +2%, BALANCER & WAVES FLAT
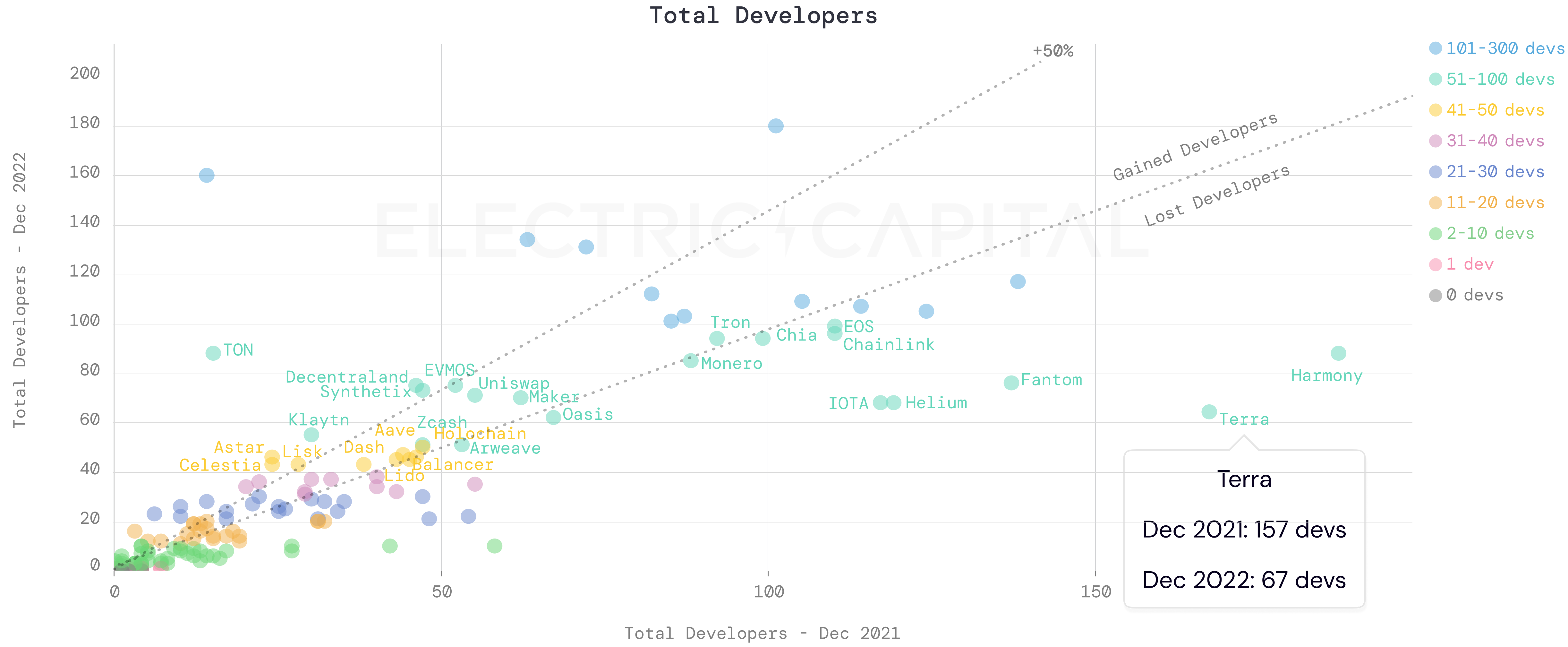

Total Developers
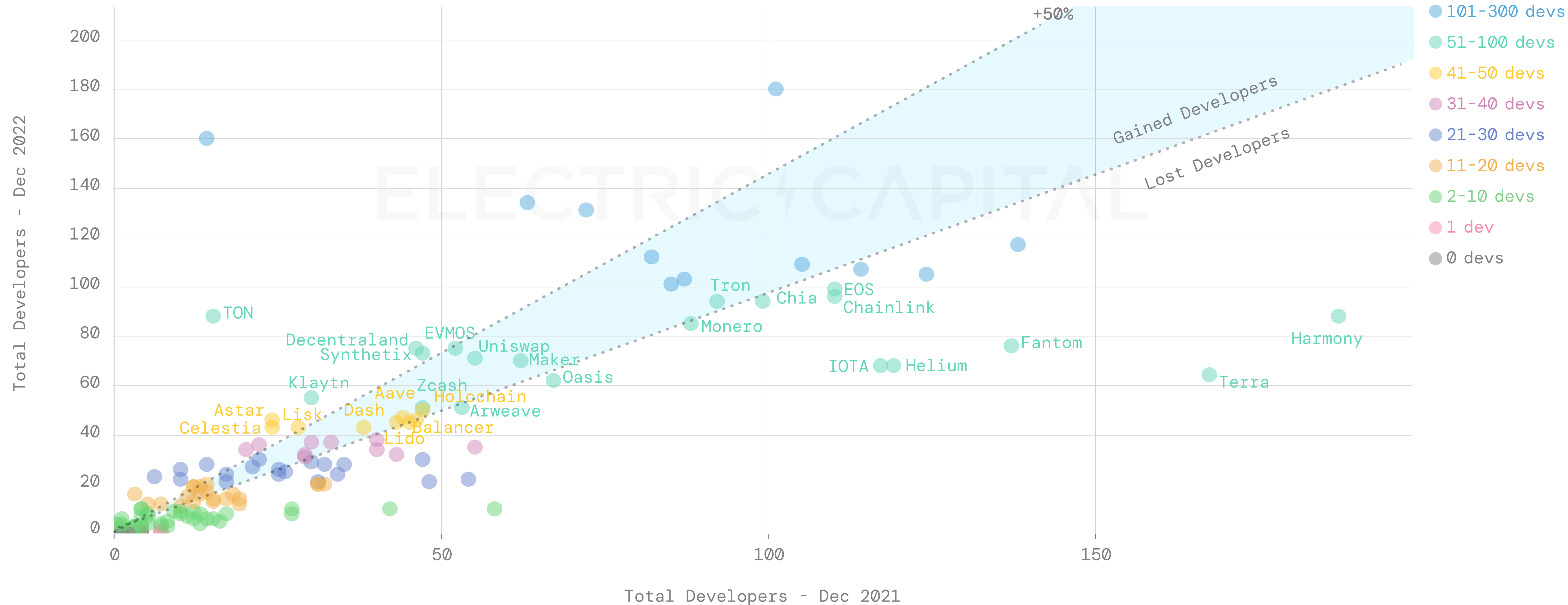
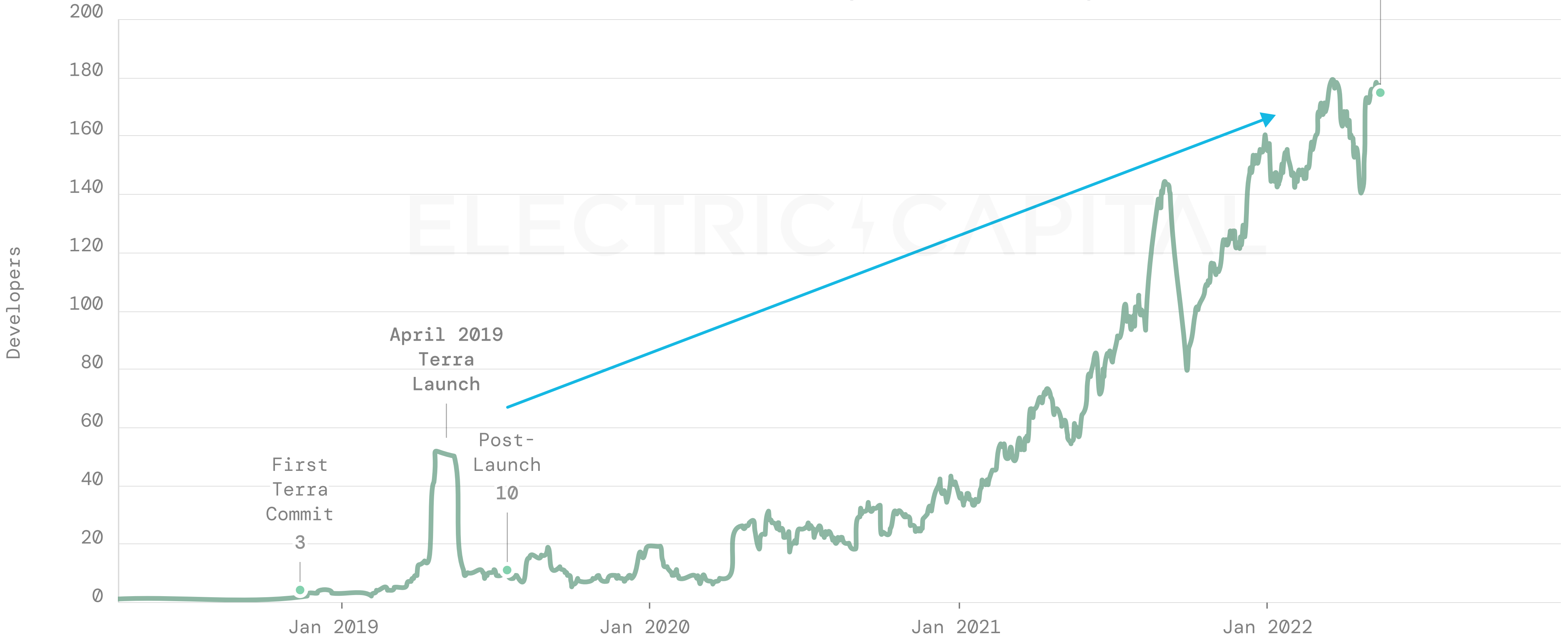# TERRA IS DOWN -57% <u>TOTAL</u> DEVELOPERS...WHAT HAPPENED TO TERRA?

Total Developers

Terra
Dec 2021: 157 devs
Dec 2022: 67 devs

ELECTRIC⚡CAPITAL

WHAT HAPPENED TO TERRA?

Top 200 determined based on "Market Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations

TERRA GREW TO 175 DEVELOPERS IN 3.5 YRS FROM LAUNCH TO NETWORK HALT

Terra Classic Monthly Active Developers

May 2022
Network Halt
175

April 2019
Terra
Launch

Post-
Launch
10

First
Terra
Commit
3

Developers

200
180
160
140
120
100
80
60
40
20
0

Jan 2019   Jan 2020   Jan 2021   Jan 2022

ELECTRIC CAPITAL

7 DAYS AFTER THE NETWORK HALTED, TERRA 2.0 LAUNCHED

Terra Classic Monthly Active Developers
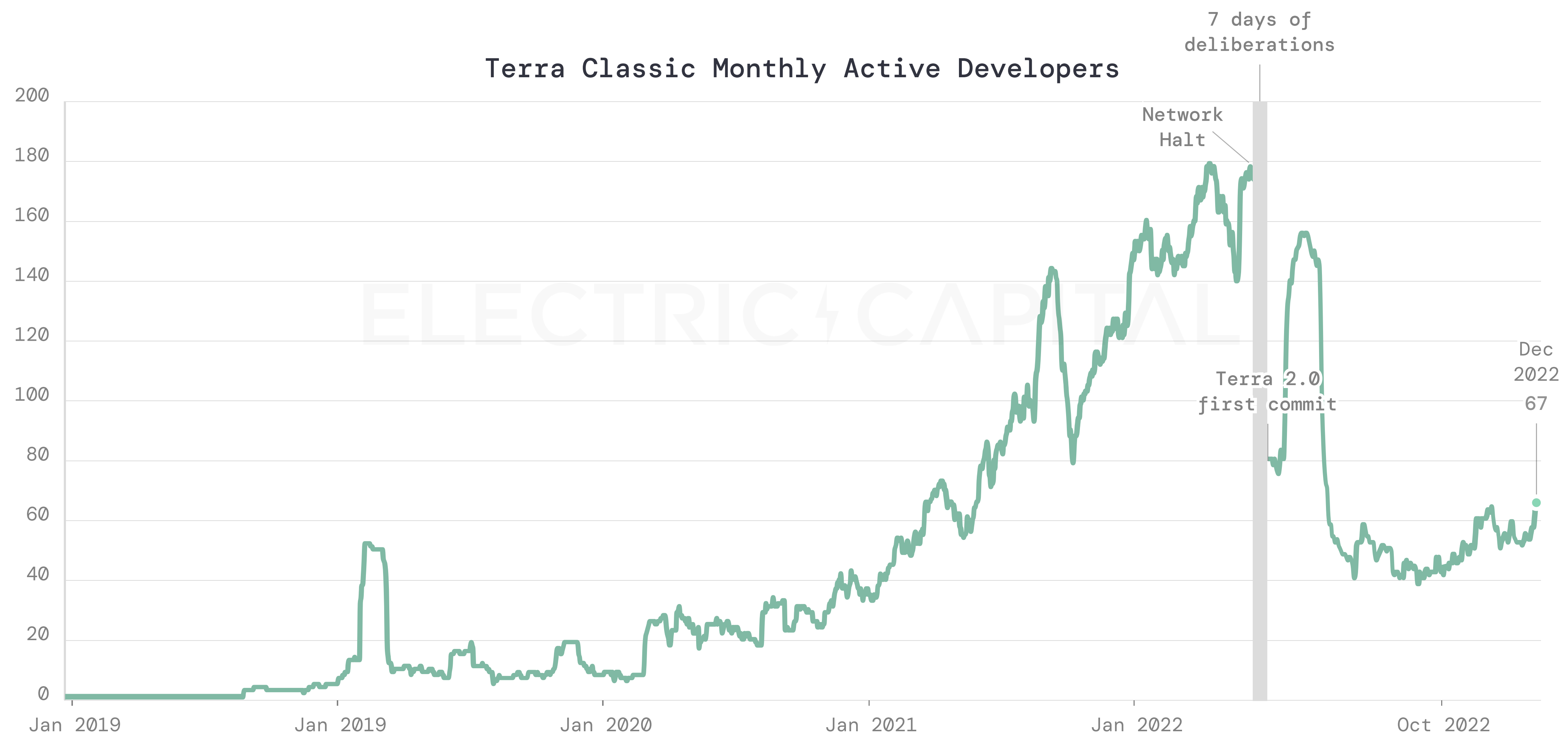
LET'S LOOK AT WHERE ACTIVE TERRA DEVELOPERS WENT AFTER TERRA'S COLLAPSE

H1 2022

Terra developers who were active in H1 2022 before Terra's collapse

H2 2022

Terra developers who were active in H2 2022 after Terra's collapse

323 Terra Classic

323 developers were active in Terra in H1 2022

180 No Commits in Open-Source Crypto

49 Other

42 Cosmos

35 Terra 2.0

11 Osmosis

5 Solana
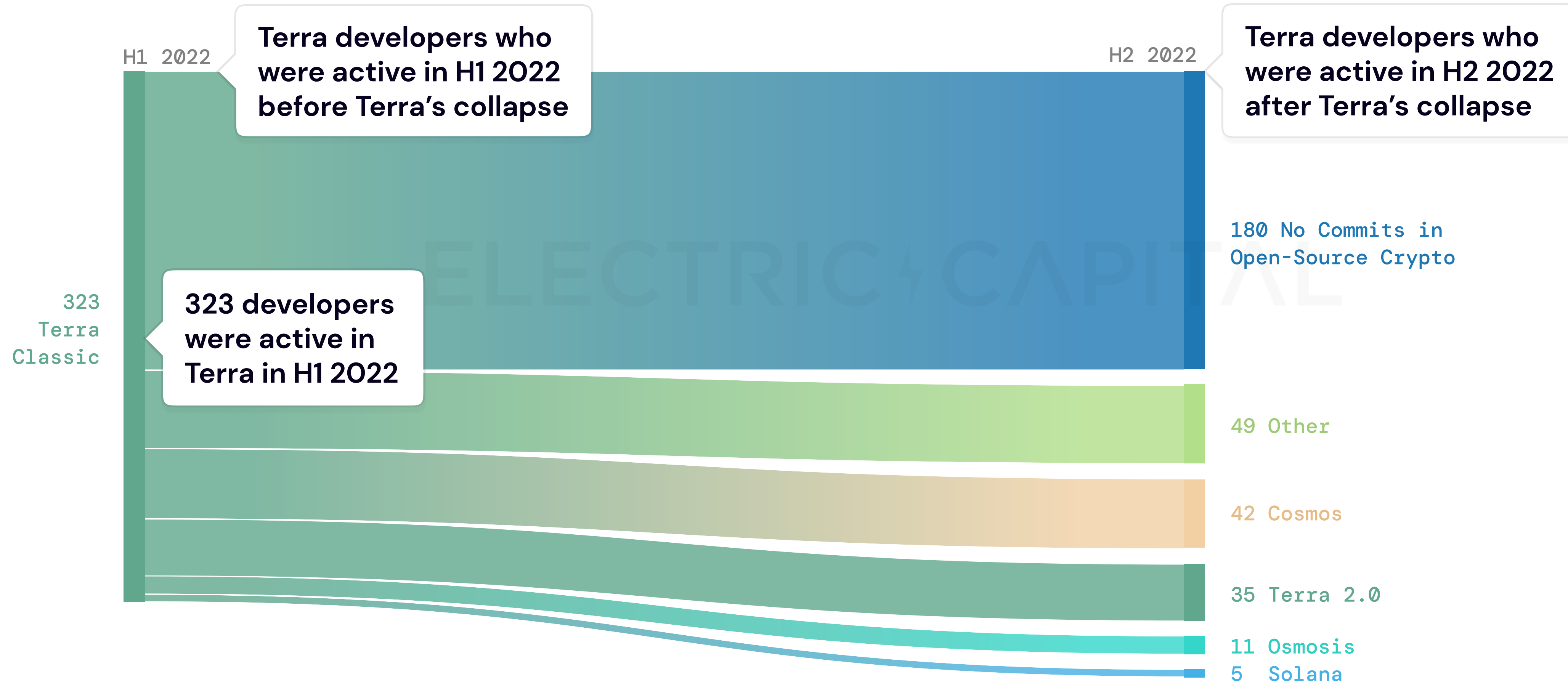
56% OF TERRA DEVS ACTIVE IN H1 2022 STOPPED CONTRIBUTING TO OPEN SOURCE CRYPTO REPOSITORIES

H1 2022

H2 2022

323 Terra Classic

180 No Commits in Open-Source Crypto

49 Other

42 Cosmos

35 Terra 2.0

11 Osmosis

5 Solana

56% stopped contributing code to open-source crypto
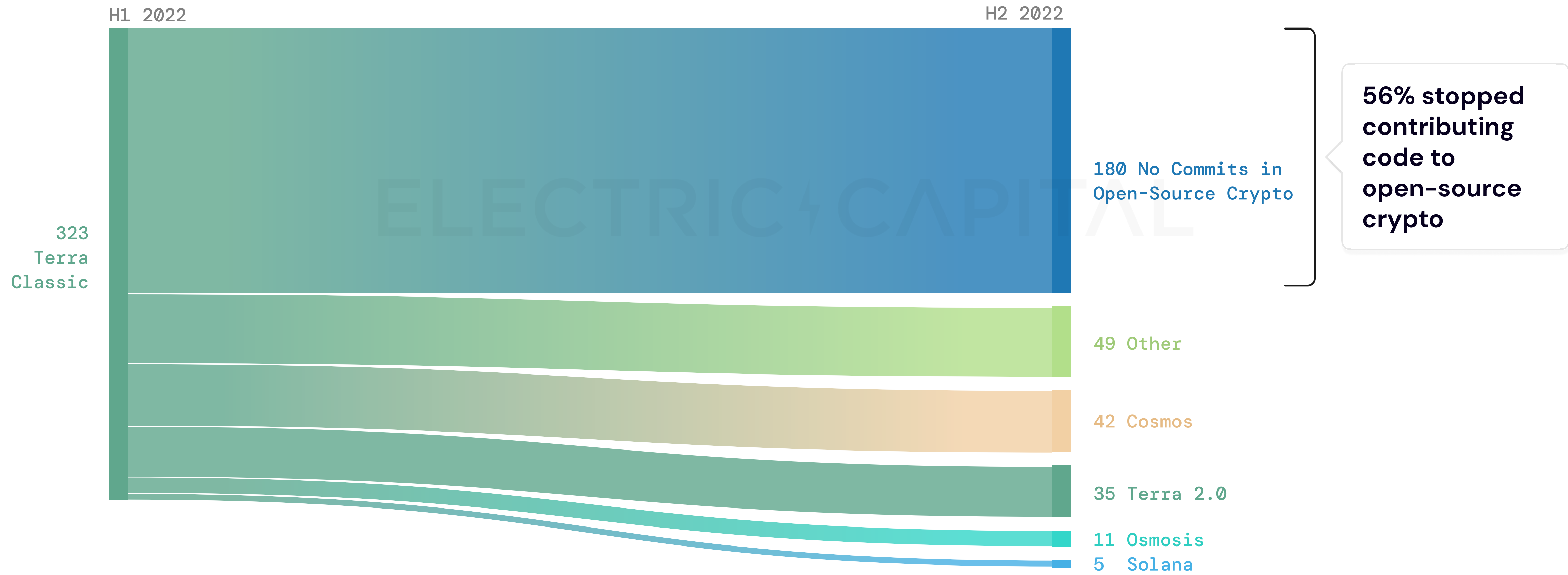
42% OF TERRA DEVELOPERS MIGRATED TO ANOTHER CRYPTO ECOSYSTEM: THE LARGEST SHARE WENT TO COSMOS (13%)

H1 2022

H2 2022

323 Terra Classic

180 No Commits in Open-Source Crypto

49 Other

42 Cosmos

35 Terra 2.0

11 Osmosis

5 Solana

143 devs went to other crypto ecosystems

42 devs went to Cosmos
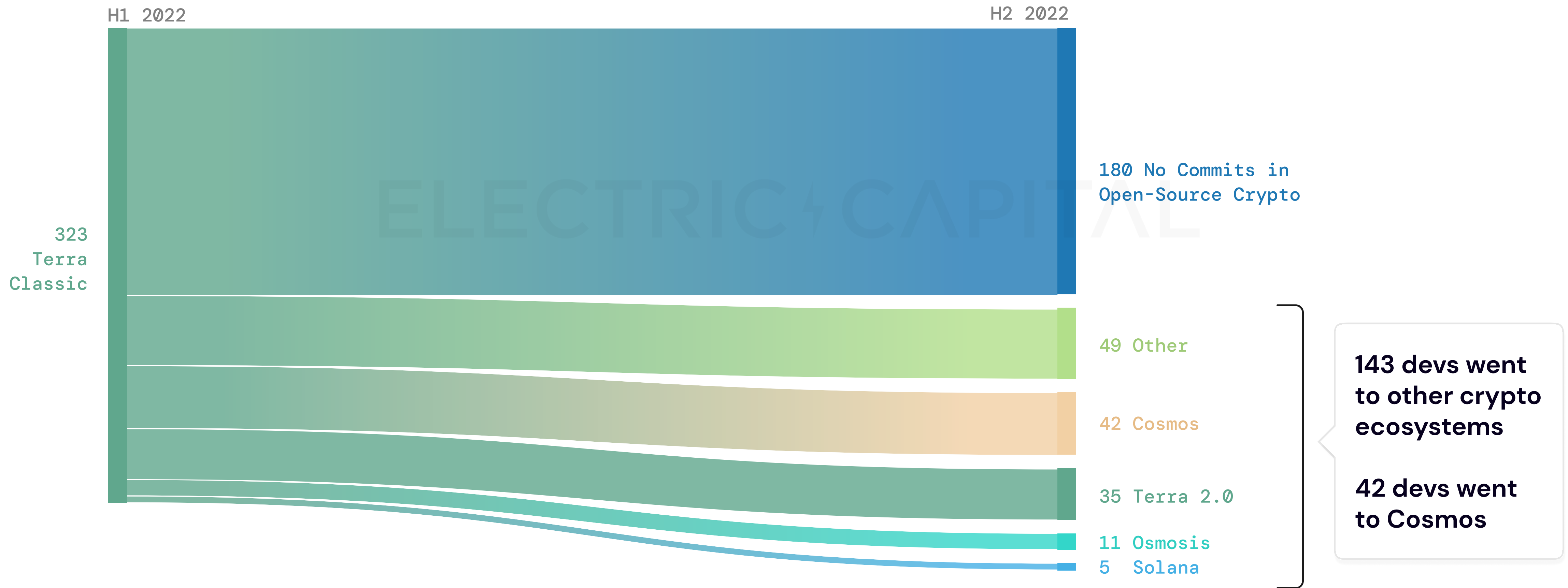
9% OF TERRA DEVS BEGAN CONTRIBUTING TO TERRA 2.0

H1 2022

H2 2022

323 Terra Classic

180 No Commits in Open-Source Crypto

49 Other

42 Cosmos

35 Terra 2.0

11 Osmosis

5 Solana

28 devs from the original Terra project went on to contribute to Terra 2.0

ELECTRIC CAPITAL
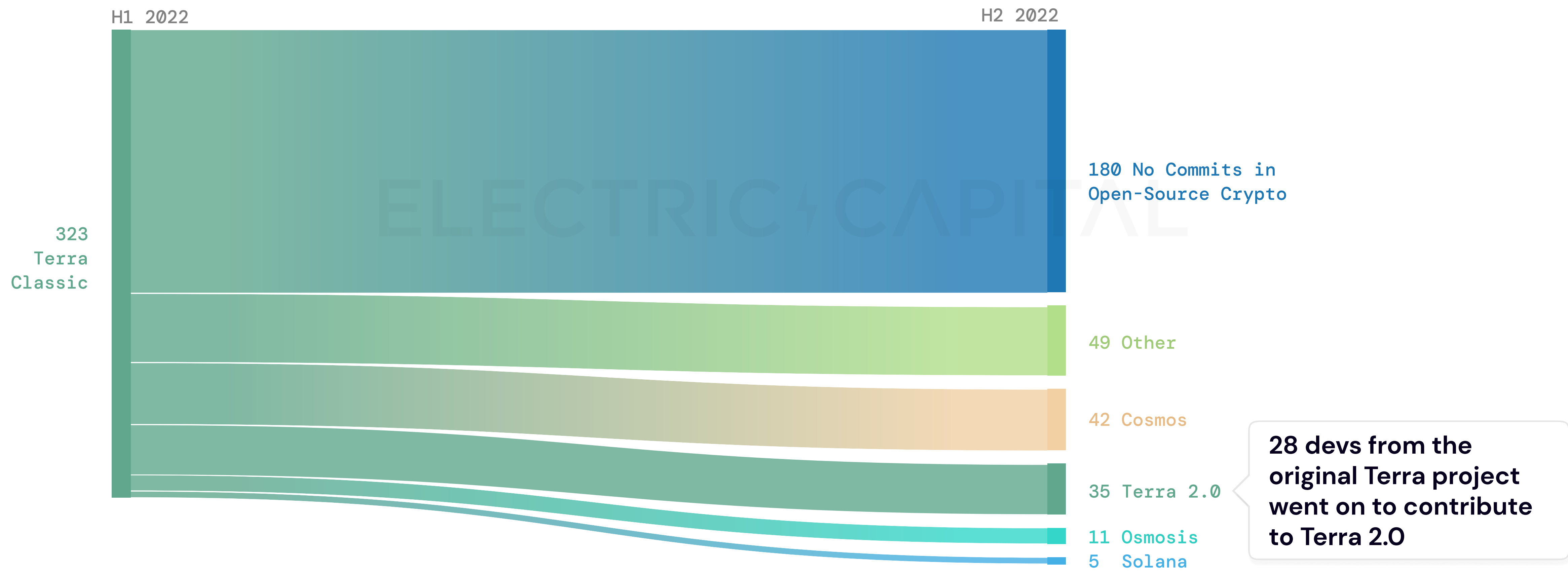
ZOOMING OUT, LET'S COMPARE TODAY'S BEAR MARKET TO THE PRIOR ONE IN 2018...

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations.

IN 2018, THE TOP 200 ECOSYSTEMS HAD FEWER THAN 25% OF TOTAL MONTHLY ACTIVE DEVELOPERS...

Normalized Monthly Active Developers - Top 200 from 2022 vs Ethereum vs Bitcoin vs Other
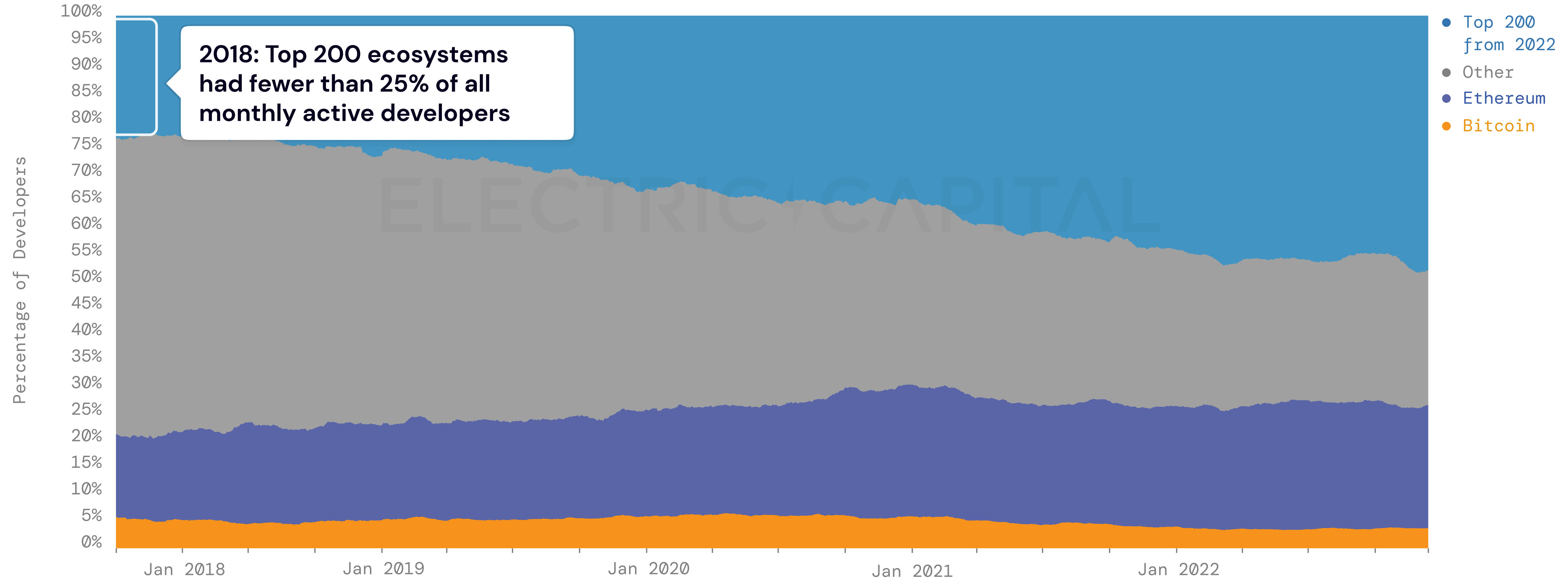
BUT THE TOP 200 ECOSYSTEMS HAVE GROWN TO 50% OF ALL ACTIVE DEVS

Normalized Monthly Active Developers - Top 200 from 2022 vs Ethereum vs Bitcoin vs Other

Top 200 ecosystems has grown its share of developers since 2018

25% in 2018

50% of developers work in the Top 200 in 2022

Legend:
- Top 200 from 2022
- Other
- Ethereum
- Bitcoin

Y-axis: Percentage of Developers

X-axis: Jan 2018, Jan 2019, Jan 2020, Jan 2021, Jan 2022
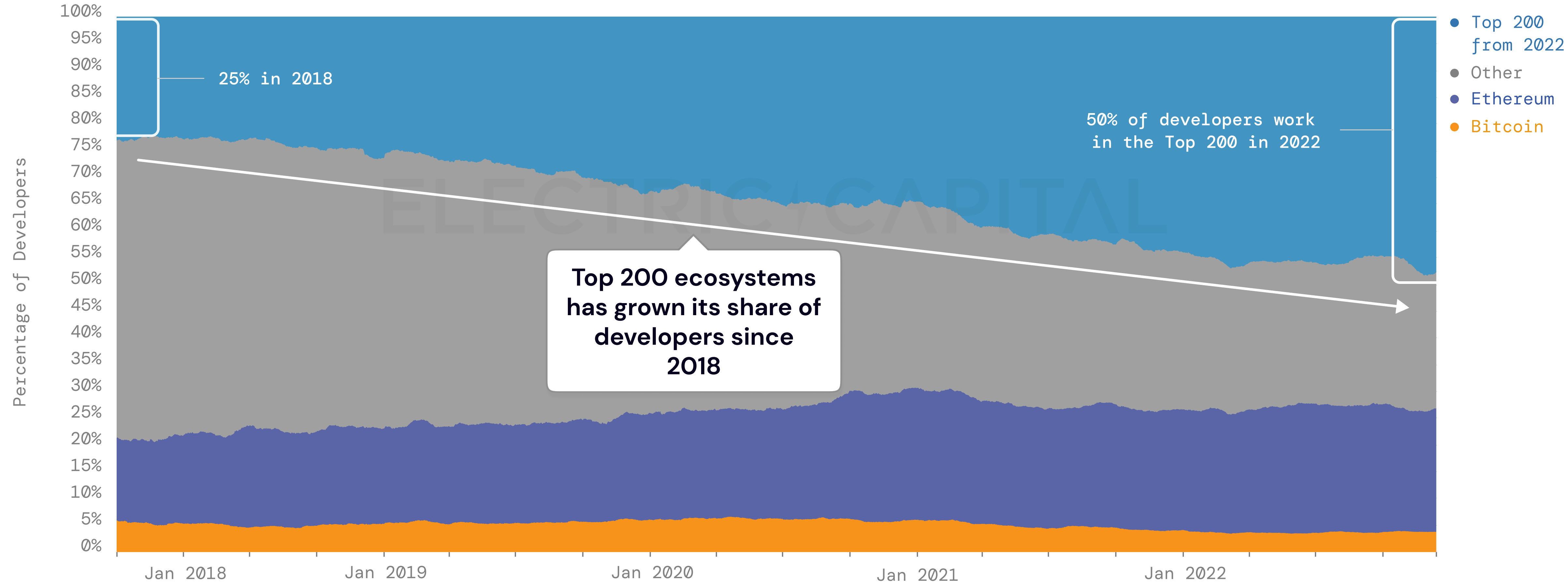
WHICH ECOSYSTEMS ACCOUNT FOR MOST OF THE DEVELOPER GROWTH?

LET'S COMPARE
JANUARY 2018 VS DECEMBER 2022

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations.

ELECTRIC CAPITAL

LET'S START WITH THE MOST IMPORTANT DEVELOPER SEGMENT: FULL-TIME DEVELOPERS
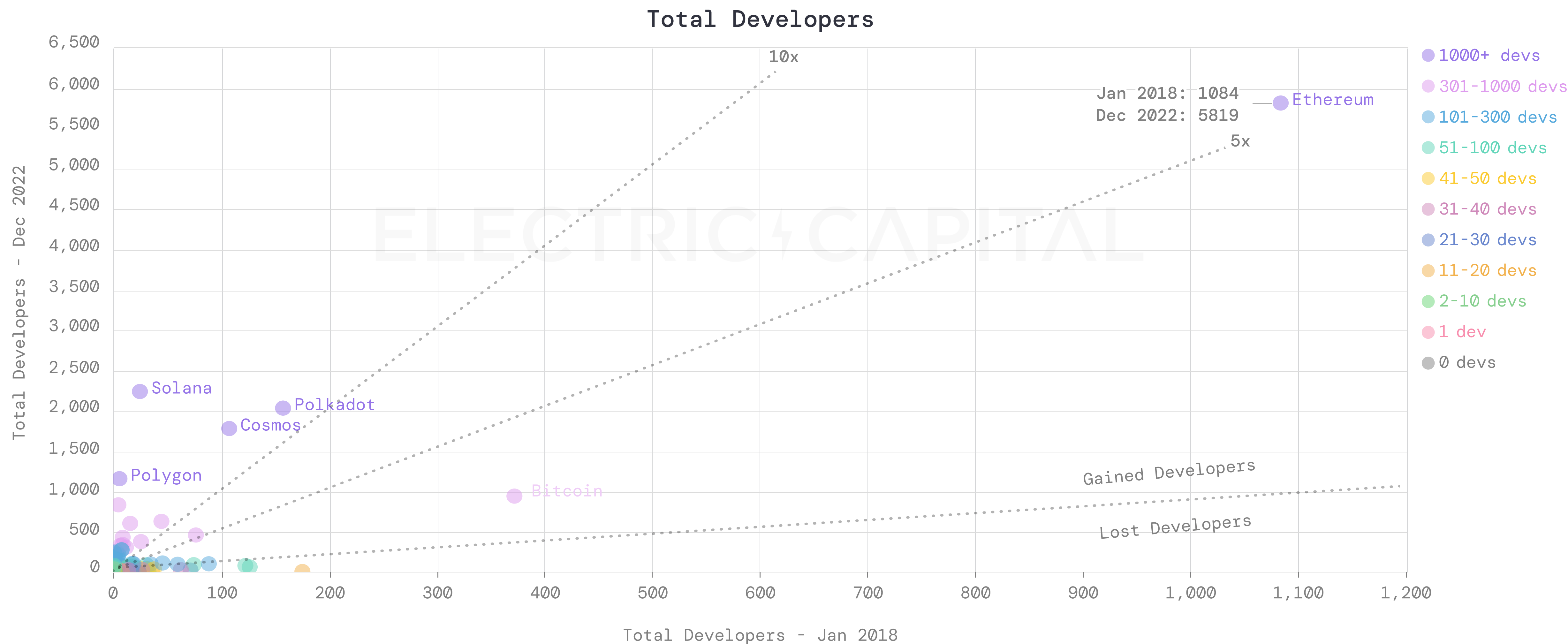
SINCE 2018: BITCOIN +4X GROWTH IN <u>FULL-TIME</u> DEVELOPERS
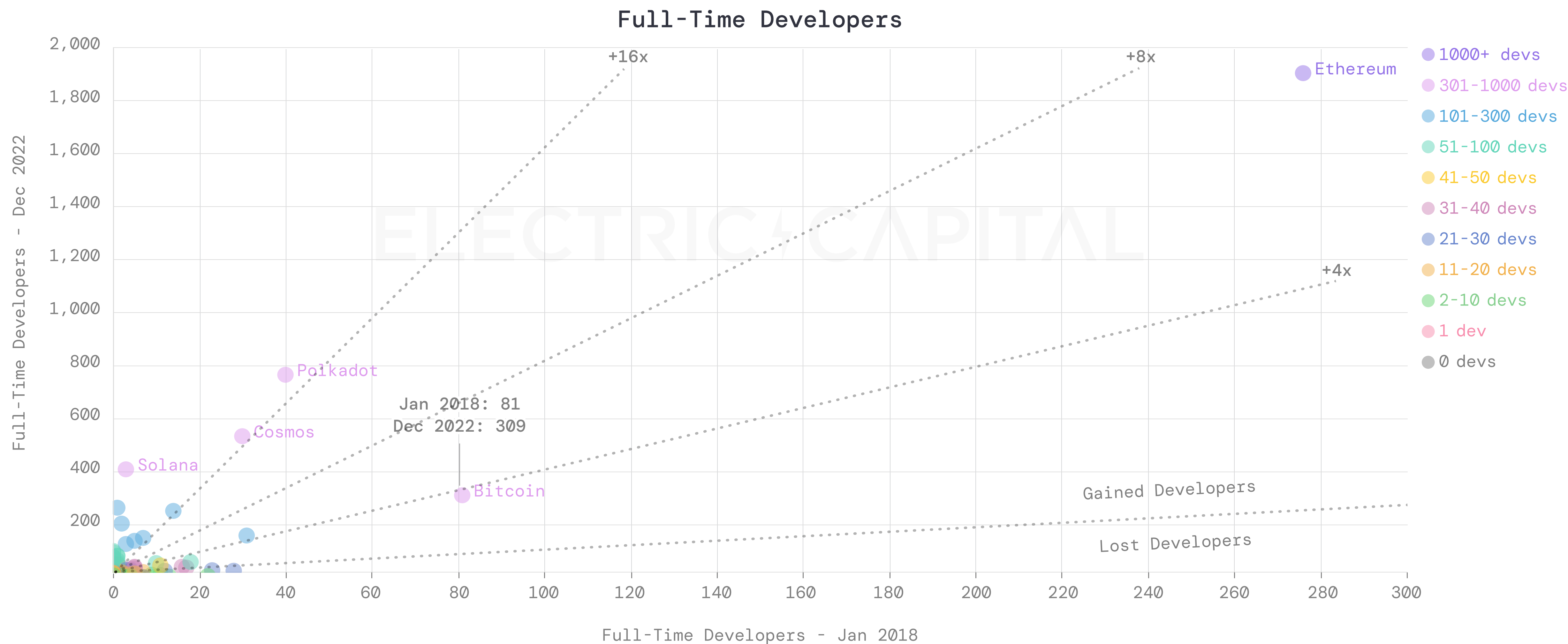
Full-Time Developers

Legend:
- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Y-axis: Full-Time Developers - Dec 2022
X-axis: Full-Time Developers - Jan 2018

Labeled points: Ethereum, Polkadot, Cosmos, Solana, Bitcoin

Jan 2018: 81
Dec 2022: 309

+16x, +8x, +4x

Gained Developers
Lost Developers

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

SINCE 2018: POLKADOT, COSMOS, & SOLANA GREW 16X+ TO 400+ FULL-TIME DEVS
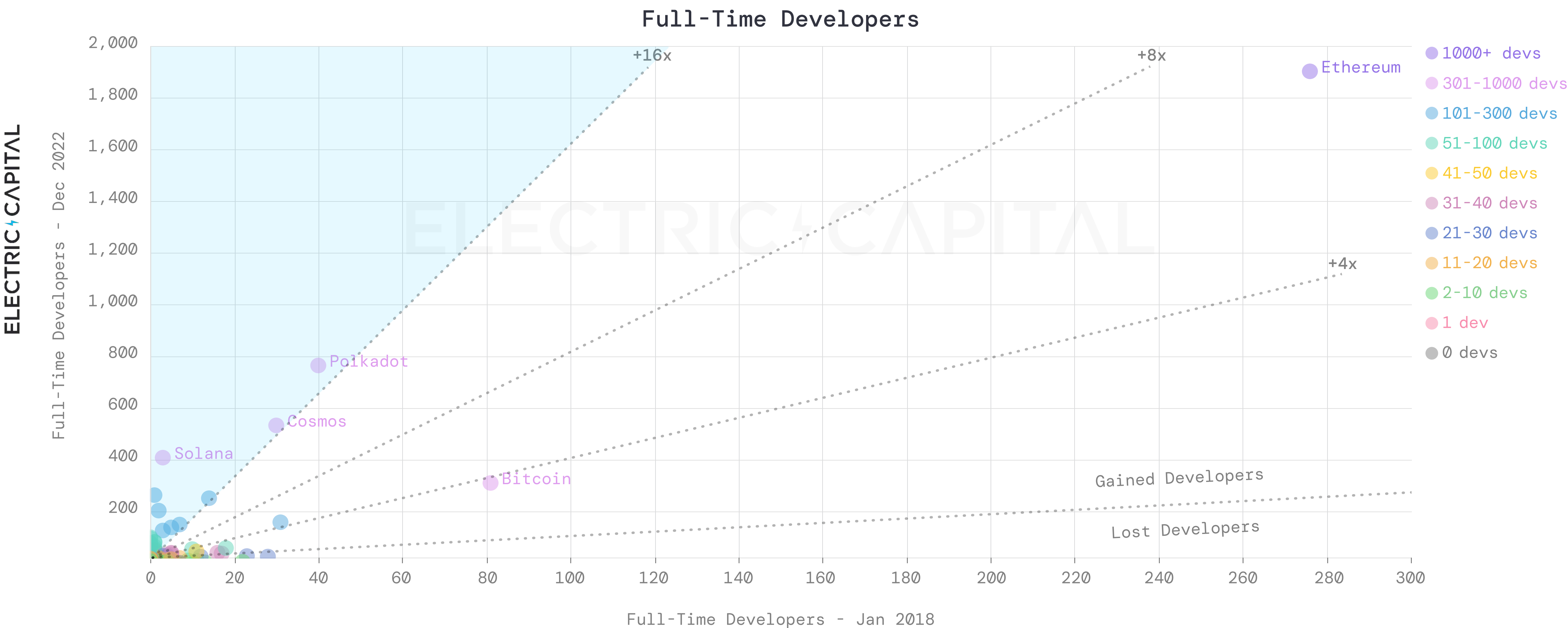
Full-Time Developers

Full-Time Developers – Dec 2022

Full-Time Developers – Jan 2018

+16x
+8x
+4x

Ethereum
Polkadot
Cosmos
Solana
Bitcoin

Gained Developers
Lost Developers

ELECTRIC CAPITAL

- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.
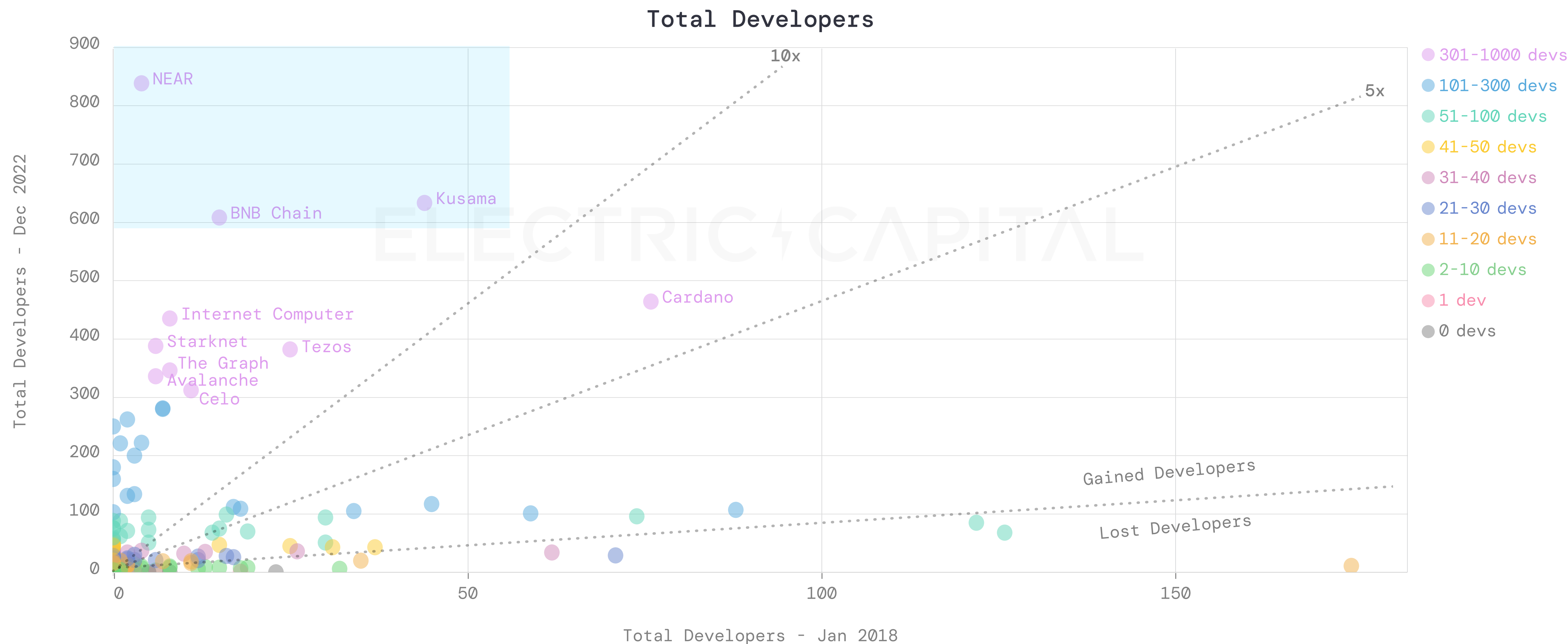
SINCE 2018: POLYGON, NEAR, TEZOS, BNB, INTERNET COMPUTER, & STARKNET GREW 20X+ TO 120+ FULL-TIME DEVS
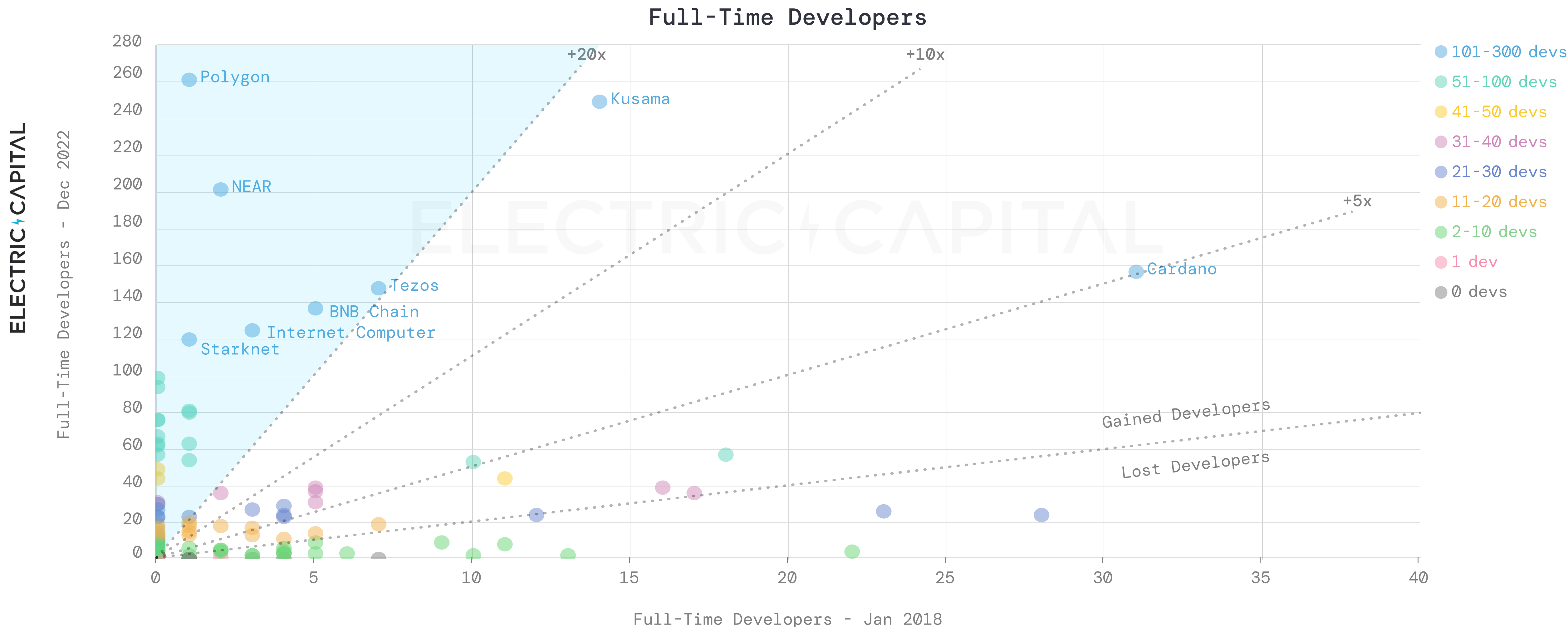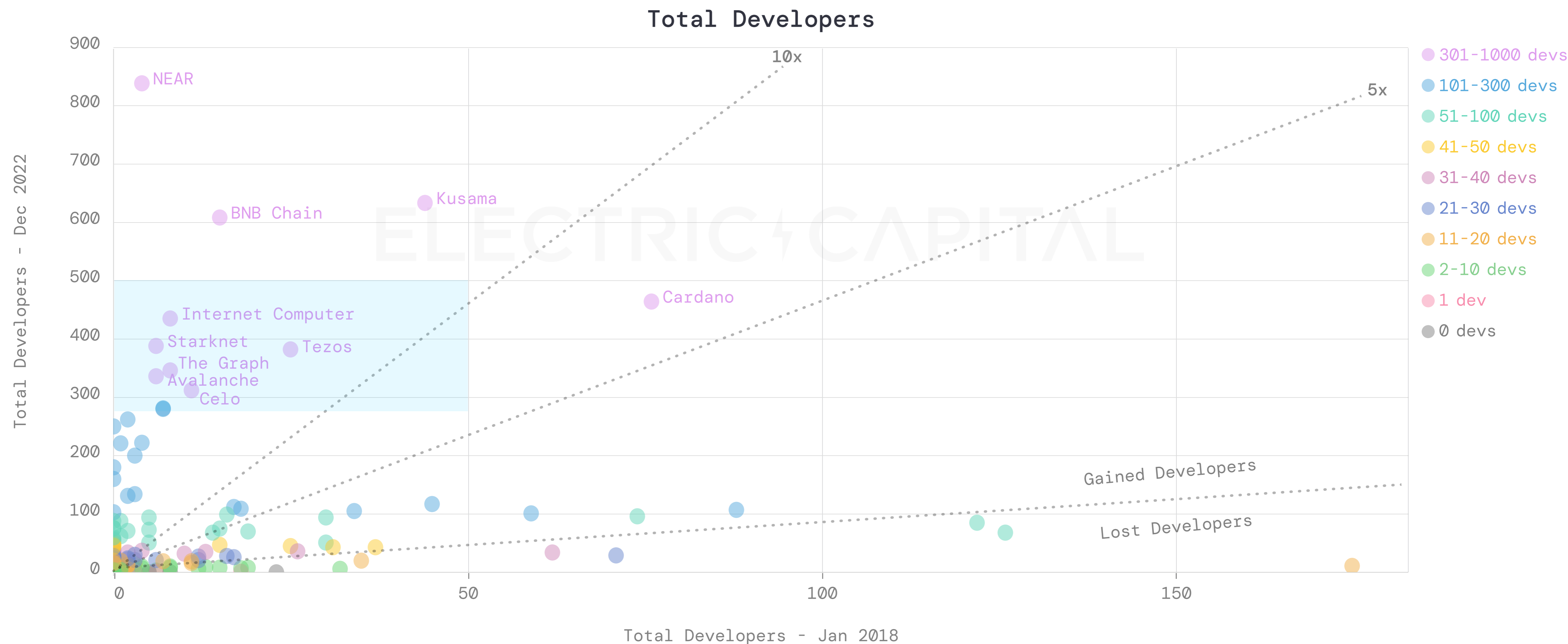

Full-Time Developers

We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

SINCE 2018: AVALANCHE, FILECOIN, CELO, MOONBEAM, APTOS, ARBITRUM, OPTIMISM, FLOW, THE GRAPH, OSMOSIS, SUI, & ALGORAND GREW TO 50+ <u>FULL-TIME</u> DEVS

Full-Time Developers
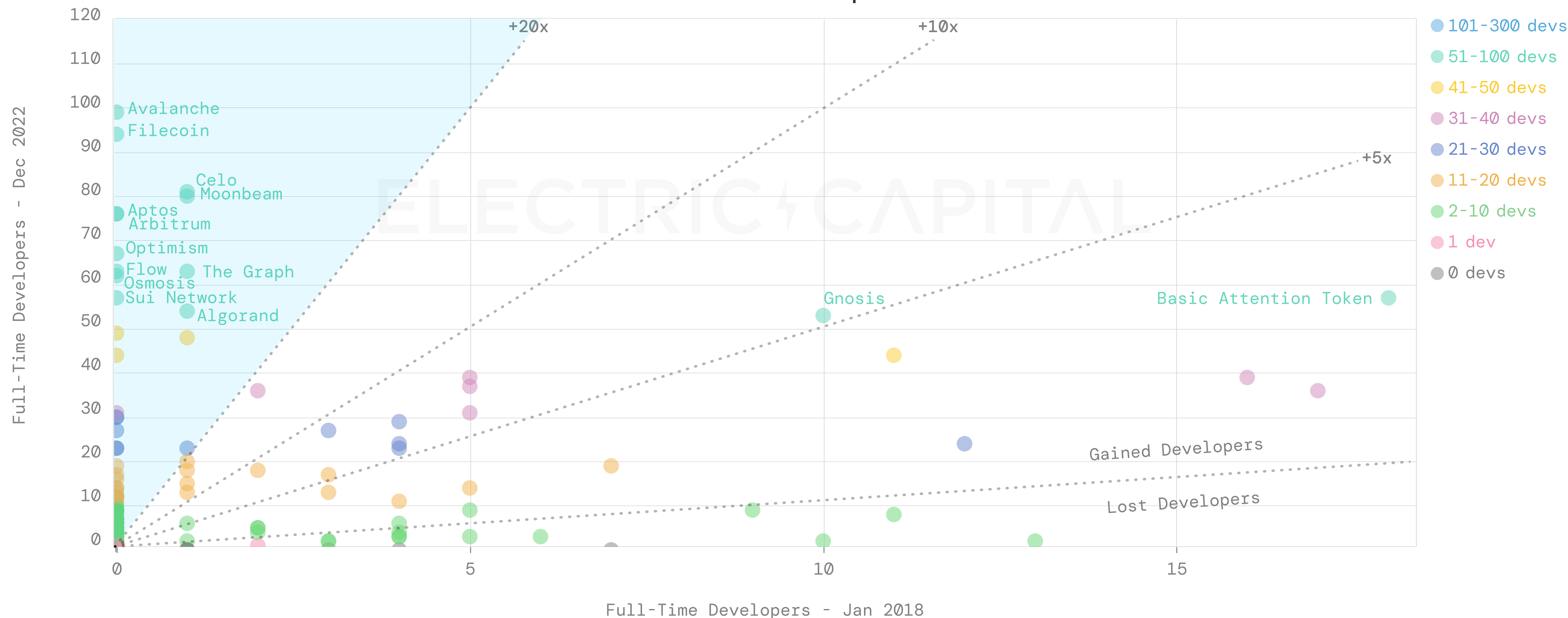
Legend:
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Y-axis: Full-Time Developers - Dec 2022
X-axis: Full-Time Developers - Jan 2018

Labeled points: Avalanche, Filecoin, Celo, Moonbeam, Aptos, Arbitrum, Optimism, Flow, The Graph, Osmosis, Sui Network, Algorand, Gnosis, Basic Attention Token

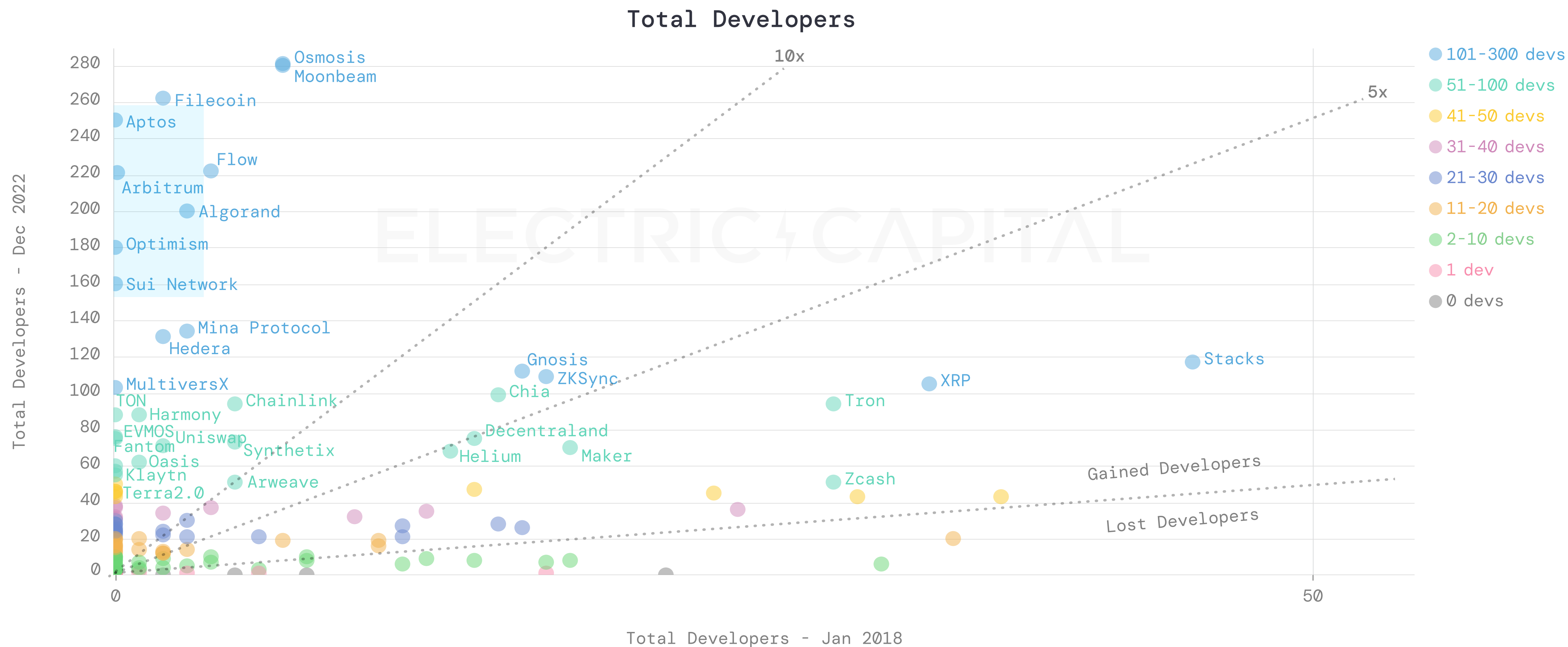Lines: +20x, +10x, +5x, Gained Developers, Lost Developers
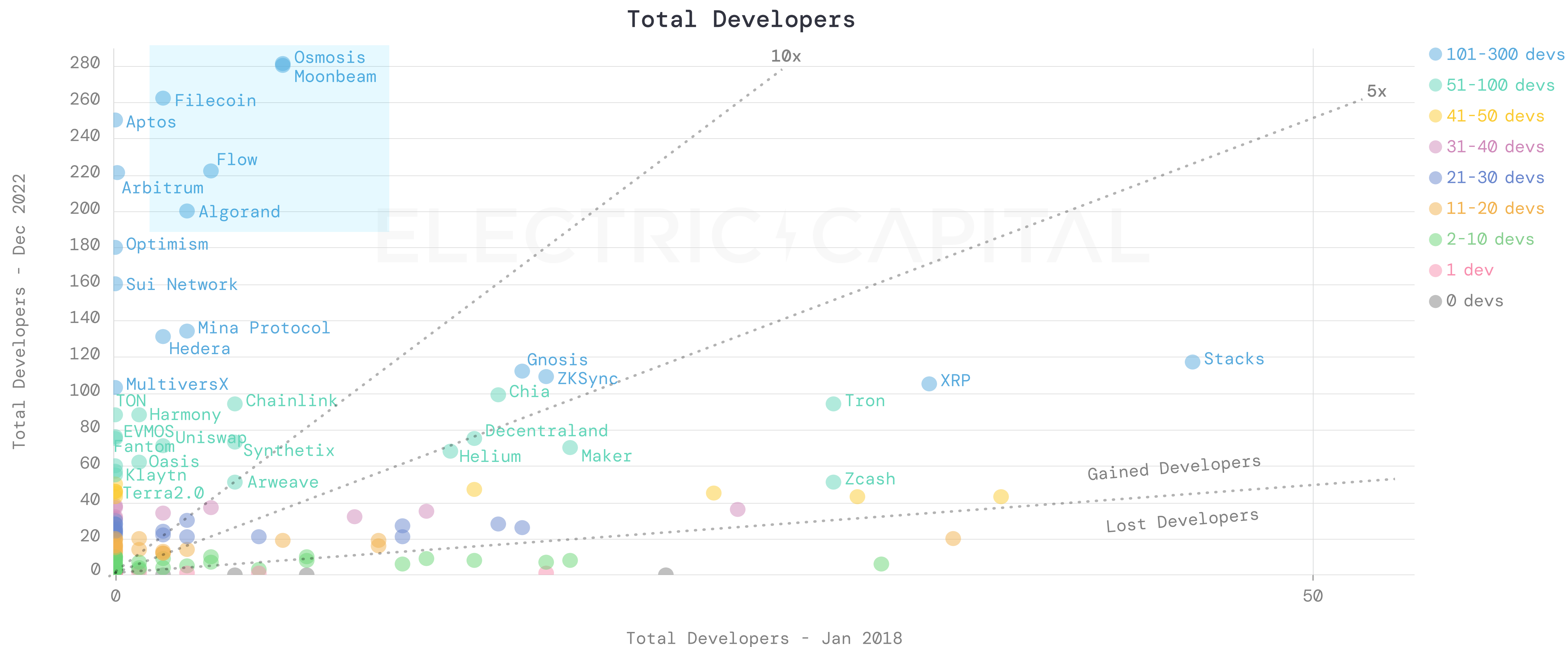
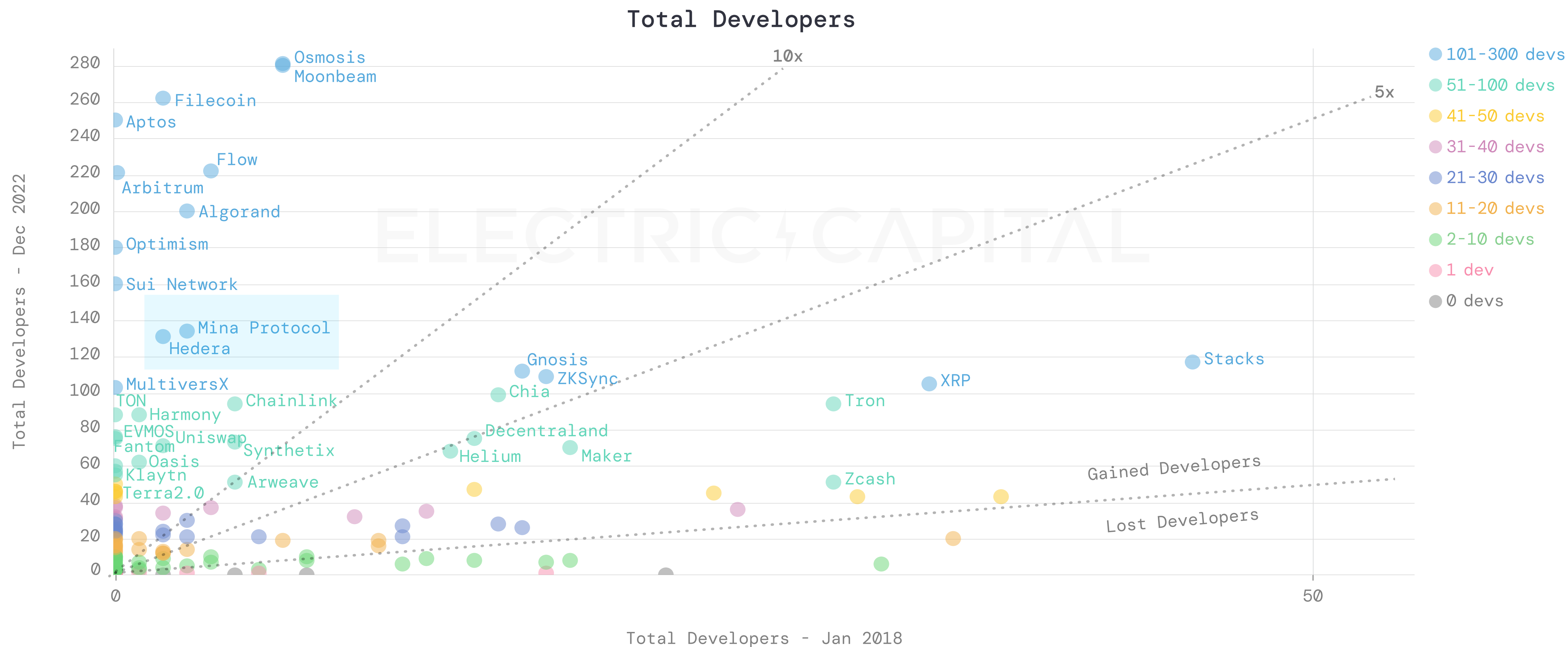We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

ELECTRIC CAPITAL

BY TOTAL DEVELOPERS...

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations.

SINCE JAN 2018: BITCOIN +3X GROWTH IN TOTAL DEVELOPERS

Total Developers

- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Ethereum

Solana
Polkadot
Cosmos
Polygon

Jan 2018: 372
Dec 2022: 946
Bitcoin

Gained Developers
Lost Developers

Total Developers - Dec 2022

Total Developers - Jan 2018

10x
5x
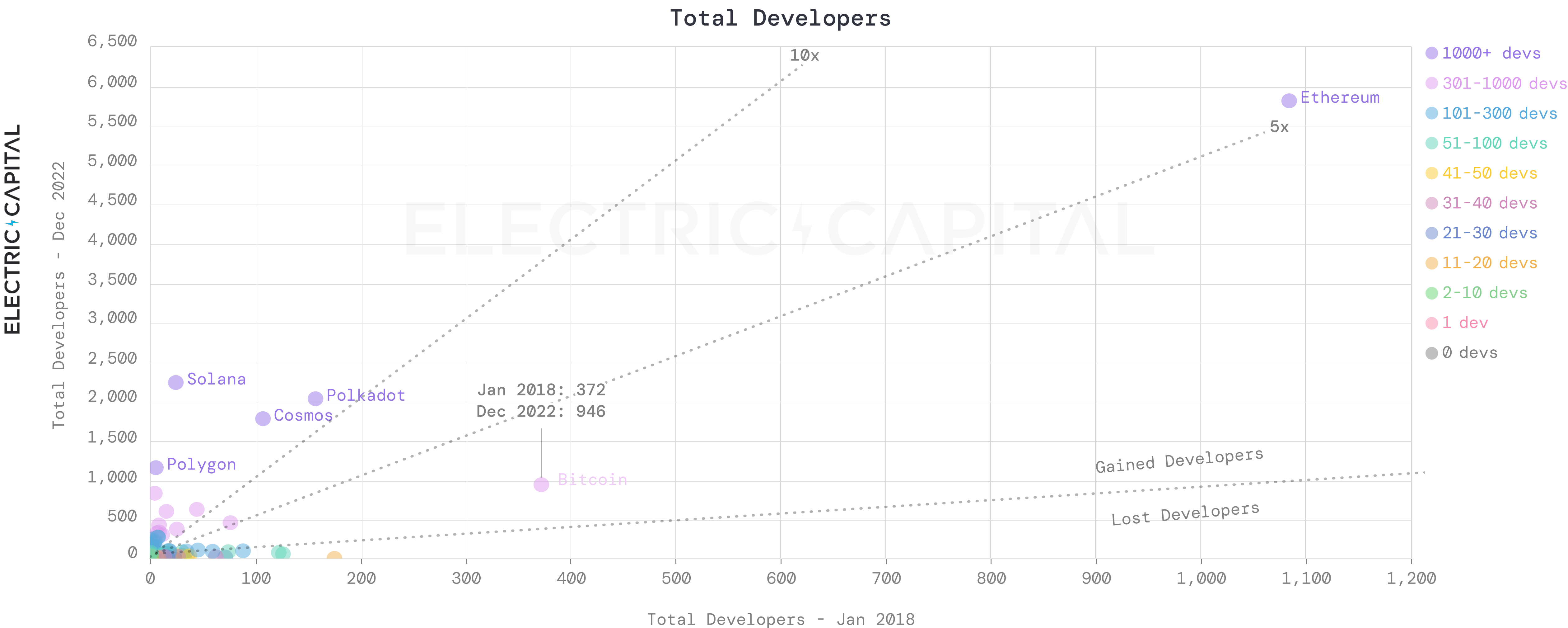
ETHEREUM WAS THE BIGGEST ECOSYSTEM IN 2018 AND GREW <u>TOTAL</u> DEVS +5X

Total Developers

Jan 2018: 1084
Dec 2022: 5819

Legend:
- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Y-axis: Total Developers - Dec 2022
X-axis: Total Developers - Jan 2018

Labeled points: Ethereum, Solana, Polkadot, Cosmos, Polygon, Bitcoin

Lines: 10x, 5x, Gained Developers, Lost Developers
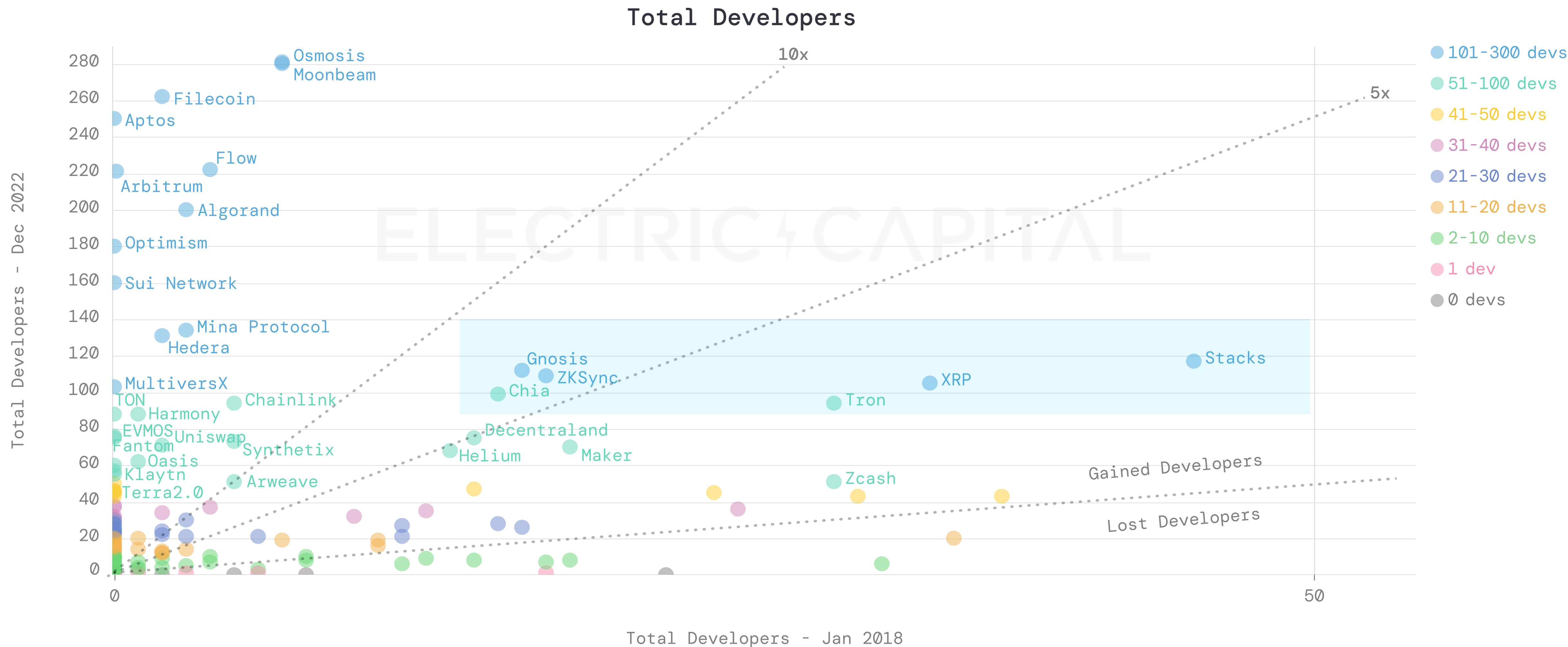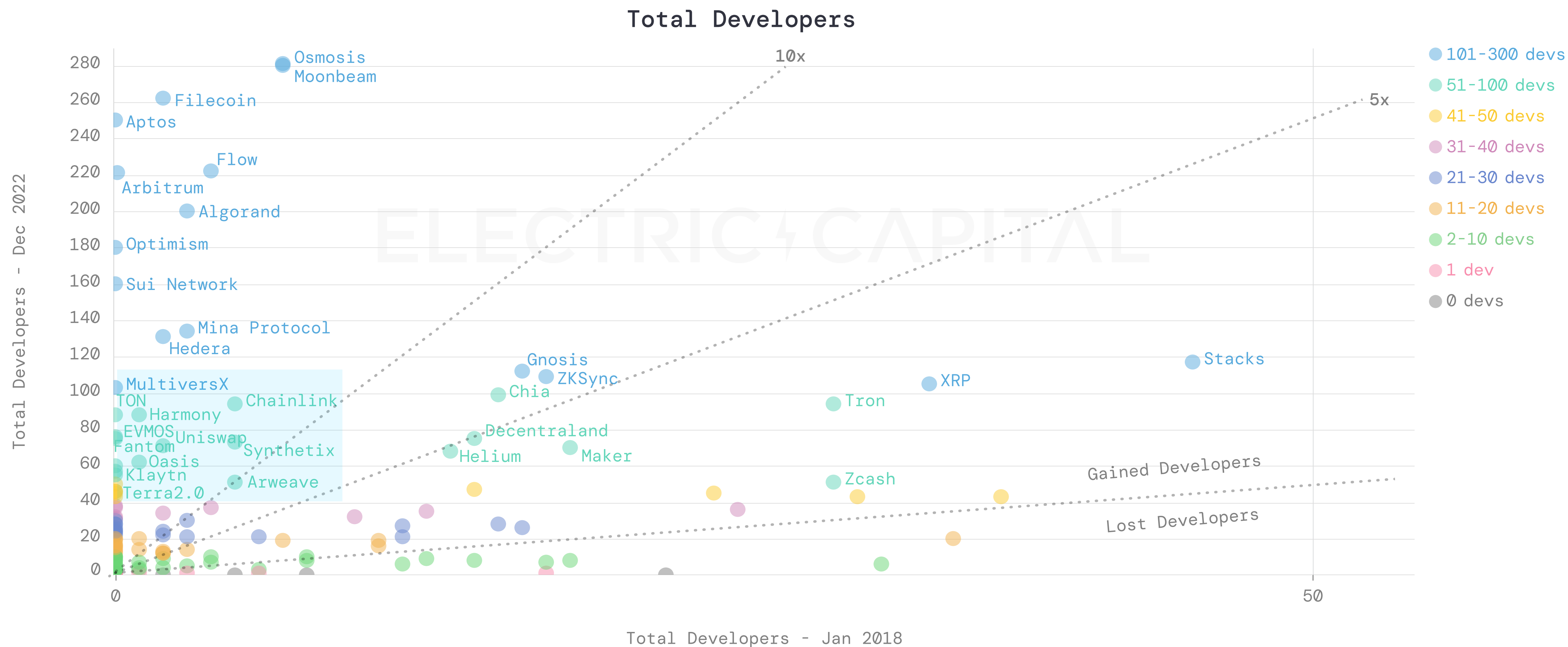
We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

SOLANA, POLKADOT, COSMOS, & POLYGON GREW FROM <200 DEVS IN 2018 TO 1000+ <u>TOTAL</u> DEVS IN 2022
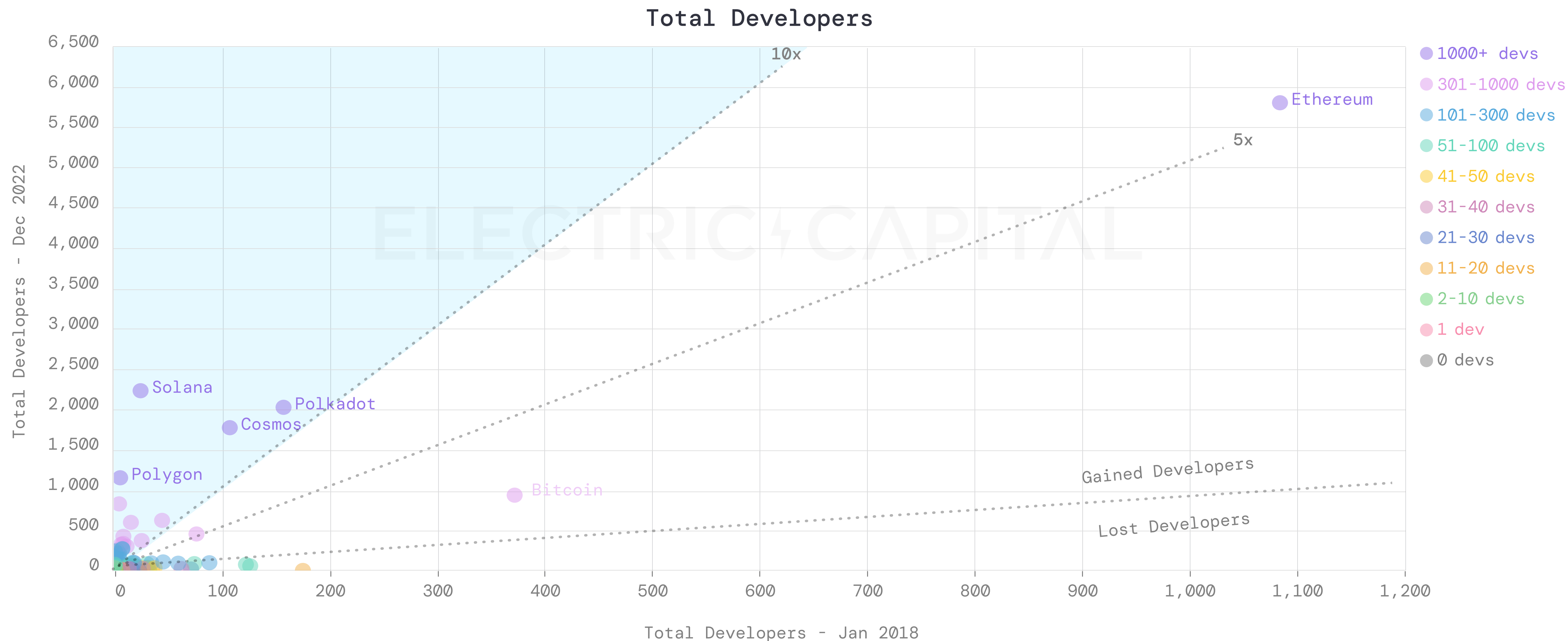
Total Developers

ELECTRIC⚡CAPITAL

Total Developers – Dec 2022

- 1000+ devs
- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

10x
5x
Gained Developers
Lost Developers

Ethereum
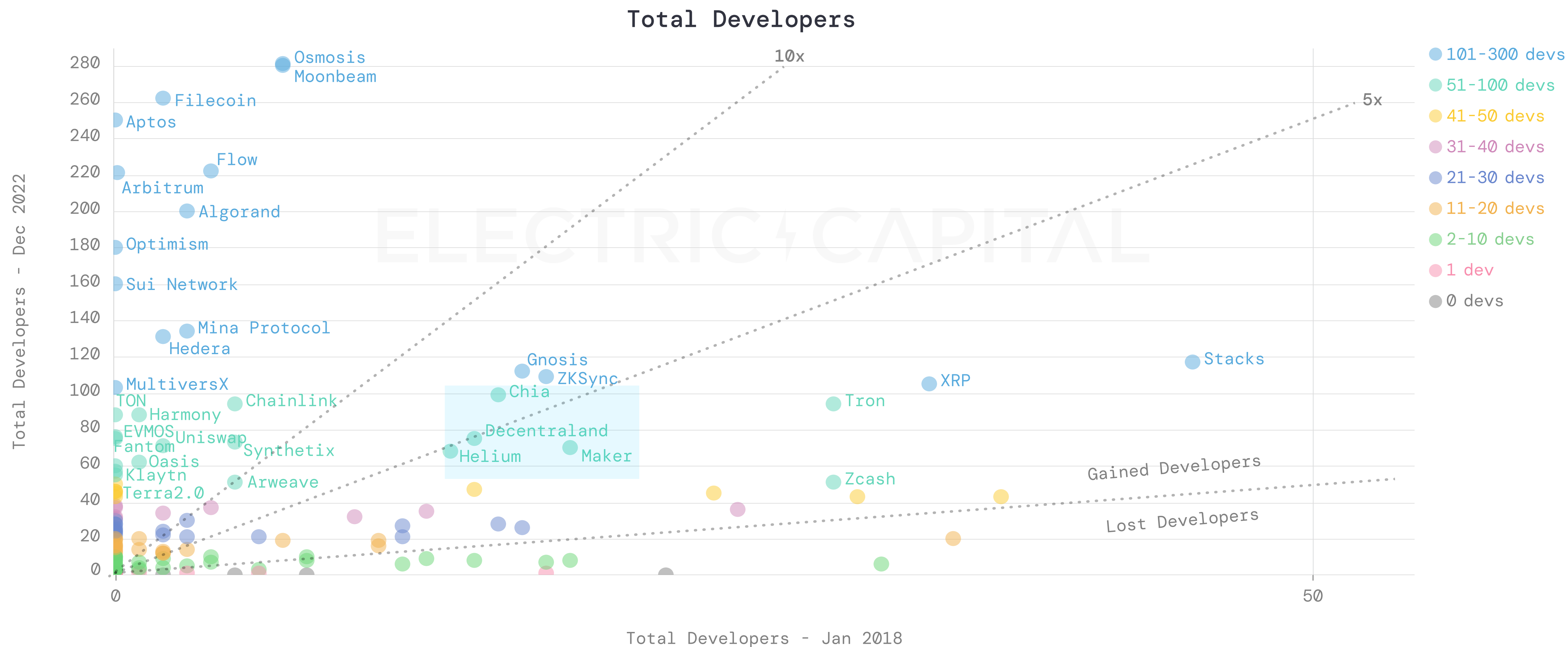Solana
Polkadot
Cosmos
Polygon
Bitcoin

Total Developers – Jan 2018

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

NEAR, KUSAMA & BNB HAD <50 DEVS IN 2018 AND NOW HAVE 600+ TOTAL DEVS

Total Developers

- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

INTERNET COMPUTER, STARKNET, TEZOS, THE GRAPH, AVALANCHE, & CELO HAD <50 DEVS AND NOW HAVE 300+ DEVS

Total Developers

- 301-1000 devs
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Total Developers – Dec 2022

Total Developers – Jan 2018

ELECTRIC CAPITAL

ZOOMING IN ON ECOSYSTEMS WITH 40 TO 200 TOTAL DEVELOPERS...

Top 200 determined based on "Network Value" measurement as of 1/1/23 combining CoinMarketCap, CoinGecko, and private market valuations.

APTOS, ARBITRUM, OPTIMISM, AND SUI ARE ECOSYSTEMS THAT DID NOT EXIST IN 2018 & NOW HAVE 150+ <u>TOTAL</u> DEVS

Total Developers

Total Developers – Dec 2022

Total Developers – Jan 2018

Legend:
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

FILECOIN, ALGORAND, FLOW, OSMOSIS, & MOONBEAM HAVE 200+ TOTAL DEVS FROM FEWER THAN 10 DEVS IN JAN 2018

Total Developers

Total Developers – Dec 2022

Total Developers – Jan 2018

Legend:
- 101-300 devs
- 51-100 devs
- 41-50 devs
- 31-40 devs
- 21-30 devs
- 11-20 devs
- 2-10 devs
- 1 dev
- 0 devs

Labeled points: Osmosis, Moonbeam, Filecoin, Aptos, Arbitrum, Flow, Algorand, Optimism, Sui Network, Mina Protocol, Hedera, MultiversX, TON, Harmony, Chainlink, EVMOS, Fantom, Uniswap, Oasis, Synthetix, Klaytn, Terra2.0, Arweave, Gnosis, ZKSync, Chia, Decentraland, Helium, Maker, Stacks, XRP, Tron, Zcash

10x, 5x, Gained Developers, Lost Developers

We only count open-source developers. The numbers are averages for the first 2 weeks of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

MINA & HEDERA HAVE 130+ <u>TOTAL</u> DEVS FROM FEWER THAN 5 DEVS IN JAN 2018

Total Developers

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

SINCE 2018: GNOSIS +7X, ZKSYNC +6X, XRP +3X, STACKS +3X TO 100+ <u>TOTAL</u> DEVS

Total Developers

Total Developers – Jan 2018

MANY ECOSYSTEMS GREW TO 40+ <u>TOTAL</u> DEVS FROM FEWER THAN 5 DEVS IN 2018

Total Developers

We only count open-source developers. The numbers are averages for the <u>first 2 weeks</u> of December before developers go on holiday at the end of the year and may differ from December numbers from earlier time series.

CHIA, DECENTRALAND, HELIUM, & MAKER GREW 3X+ TO 60+ <u>TOTAL</u> DEVS

Total Developers

Total Developers – Dec 2022 (vertical axis)

Total Developers – Jan 2018 (horizontal axis)

Legend:
- 101–300 devs
- 51–100 devs
- 41–50 devs
- 31–40 devs
- 21–30 devs
- 11–20 devs
- 2–10 devs
- 1 dev
- 0 devs

ELECTRIC CAPITAL

BUT THESE ECOSYSTEMS BEGAN AT DIFFERENT TIMES.
LET'S NORMALIZE BY THE DAY OF THEIR FIRST COMMIT...

ELECTRIC CAPITAL

LET'S FOCUS ON THE MOST IMPORTANT DEVELOPER SEGMENT:
FULL-TIME DEVELOPERS

ETHEREUM, POLKADOT, & COSMOS TOOK DIFFERENT PATHS TO GROW TO 500+ <u>FULL-TIME</u> DEVELOPERS

Full-Time Developers Since Launch | 50+ Avg Developers
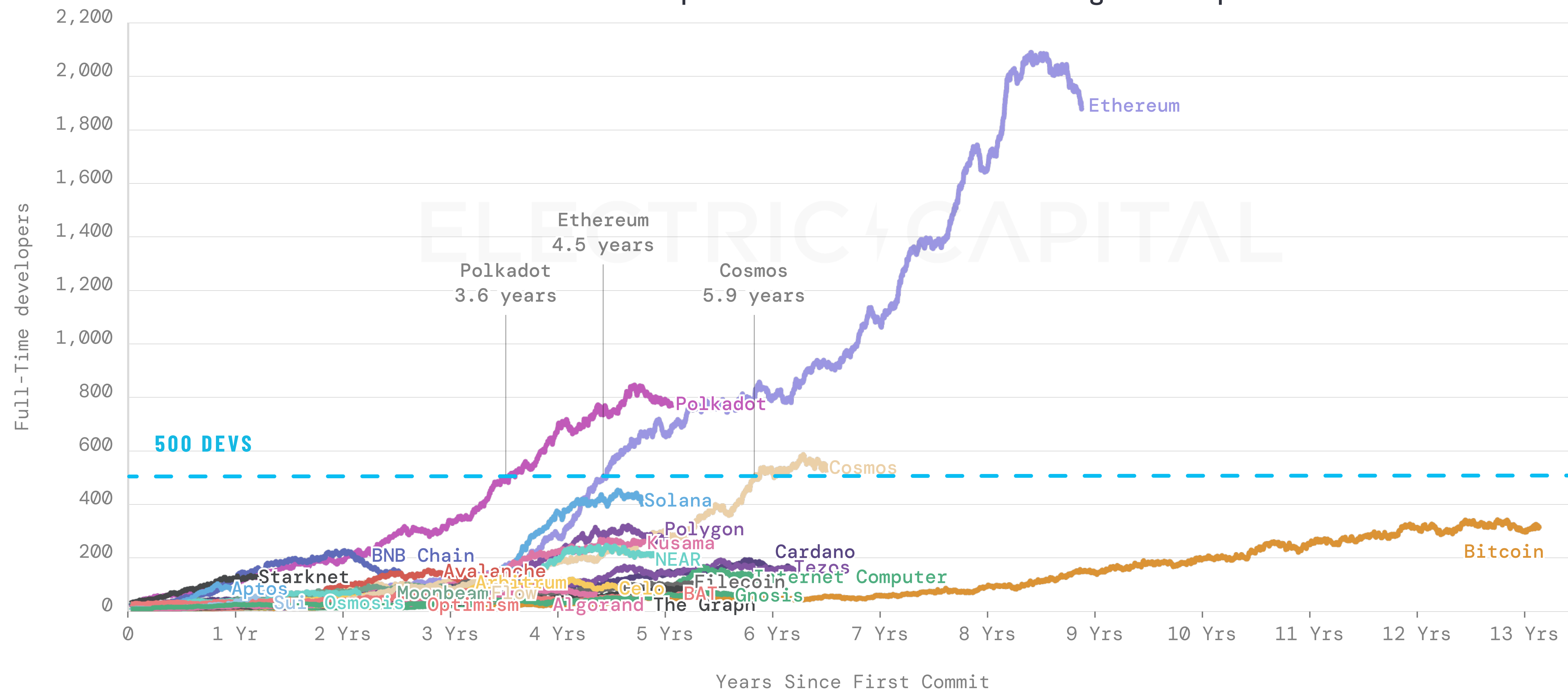
IT USUALLY TAKES 4+ YEARS TO GROW TO 200+ <u>FULL-TIME</u> DEVS

Full-Time Developers Since Launch | 50+ Avg Developers

It takes 4+ years for an ecosystem to get more than 200 Full-Time developers. Exception: Polkadot used 2.2 years to 200 Full-Time devs.

Years Since First Commit
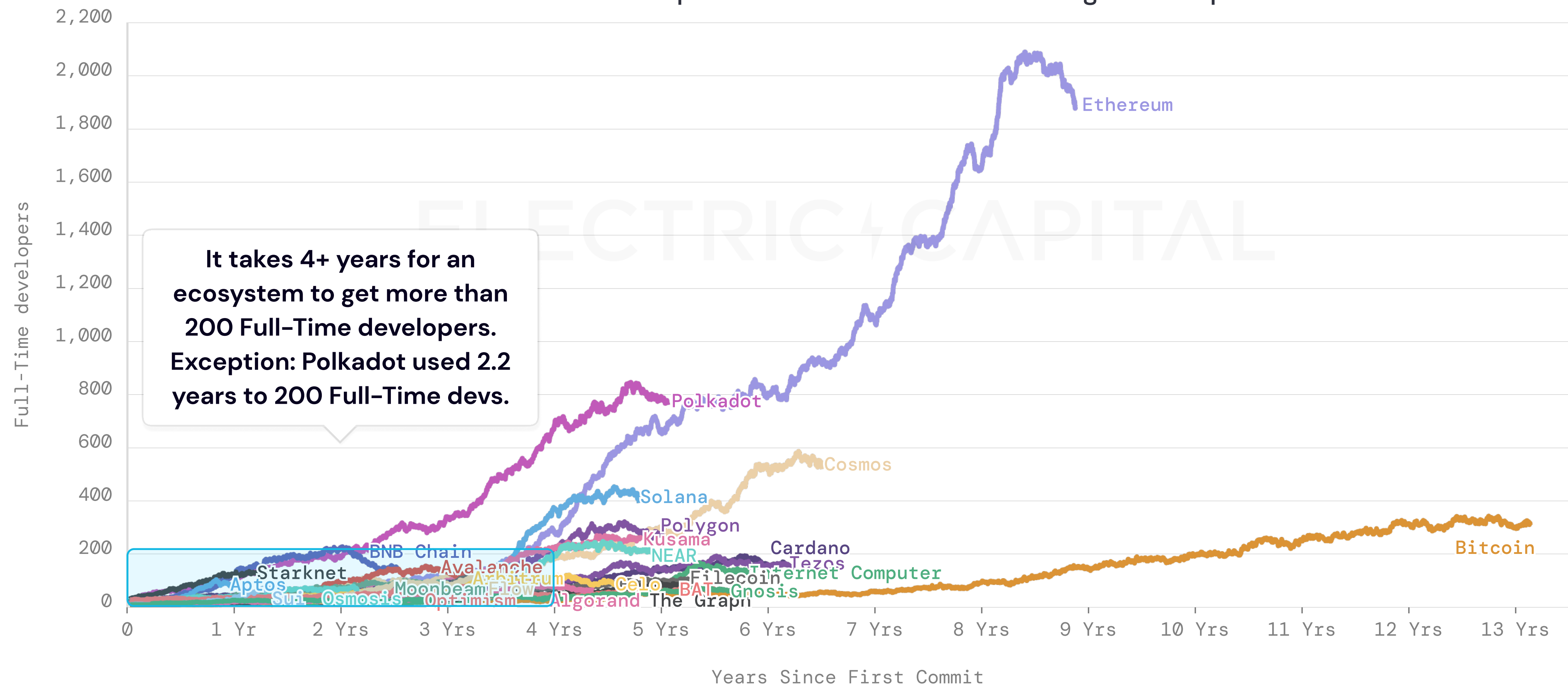
EXCLUDING BTC & ETH, ALL TOP 200 ECOSYSTEMS WITH 50+ <u>FULL-TIME</u> DEVS LAUNCHED UNDER 7 YEARS AGO

Full-Time Developers Since Launch | 50+ Avg Developers
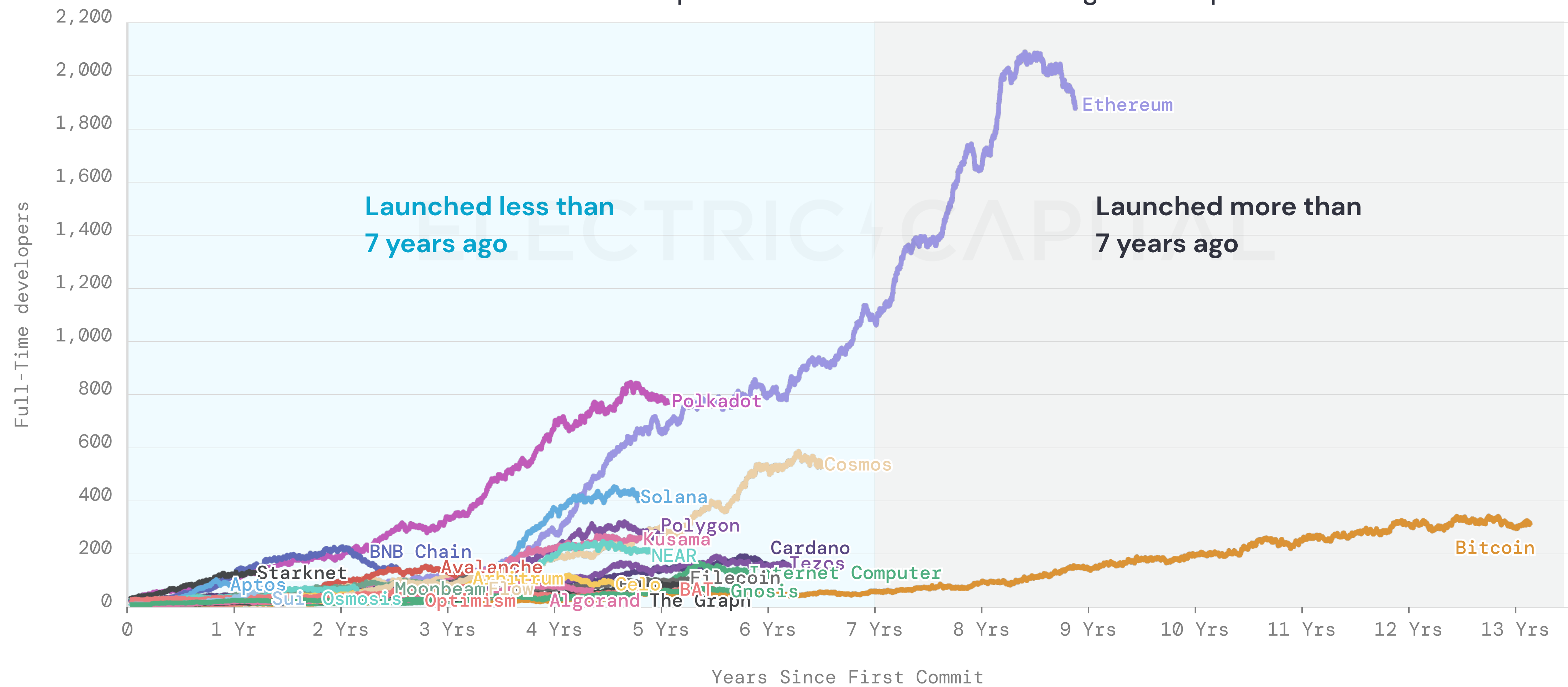
NEXT, LET'S ZOOM IN ON EMERGING ECOSYSTEMS

Full-Time Developers Since Launch | 50+ Avg Developers
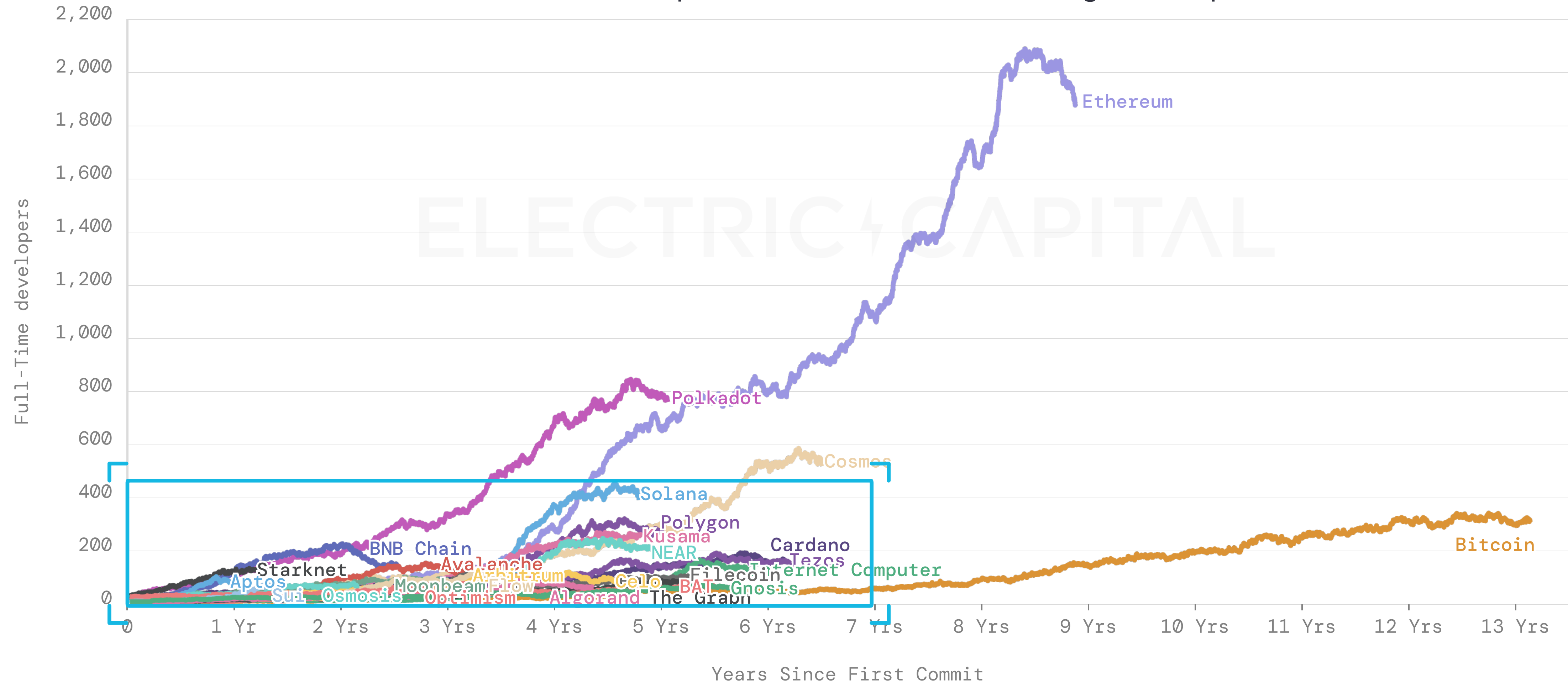
ELECTRIC⚡CAPITAL

ZOOMING IN ON EMERGING ECOSYSTEMS...

SOLANA, POLYGON, KUSAMA, NEAR, & BNB TOOK FEWER THAN 4 YEARS TO GROW TO 150 FULL-TIME DEVS: THE FASTEST OF EMERGING ECOSYSTEMS

Full-Time Developers Since Launch

LET'S FOCUS ON ECOSYSTEMS UNDER 150 <u>FULL-TIME</u> DEVELOPERS

Full-Time Developers Since Launch

Next, let's focus on ecosystems with fewer than 150 Full-Time Developers

Years Since First Commit

ECOSYSTEMS UNDER 2 YEARS OLD: STARKNET, APTOS, & SUI HAVE 60+ <u>FULL-TIME</u> DEVELOPERS; STARKNET HAS THE MOST AT ALMOST 120 <u>FULL-TIME</u> DEVELOPERS

Full-Time Developers Since Launch

Starknet, Aptos, and Sui were started <2 years ago and have 60+ <u>Full-Time</u> developers.

STARKNET, BNB, AVALANCHE, CARDANO, TEZOS, & ICP TOOK DIFFERENT PATHS TO GROW TO 100+ <u>FULL-TIME</u> DEVELOPERS

Full-Time Developers Since Launch
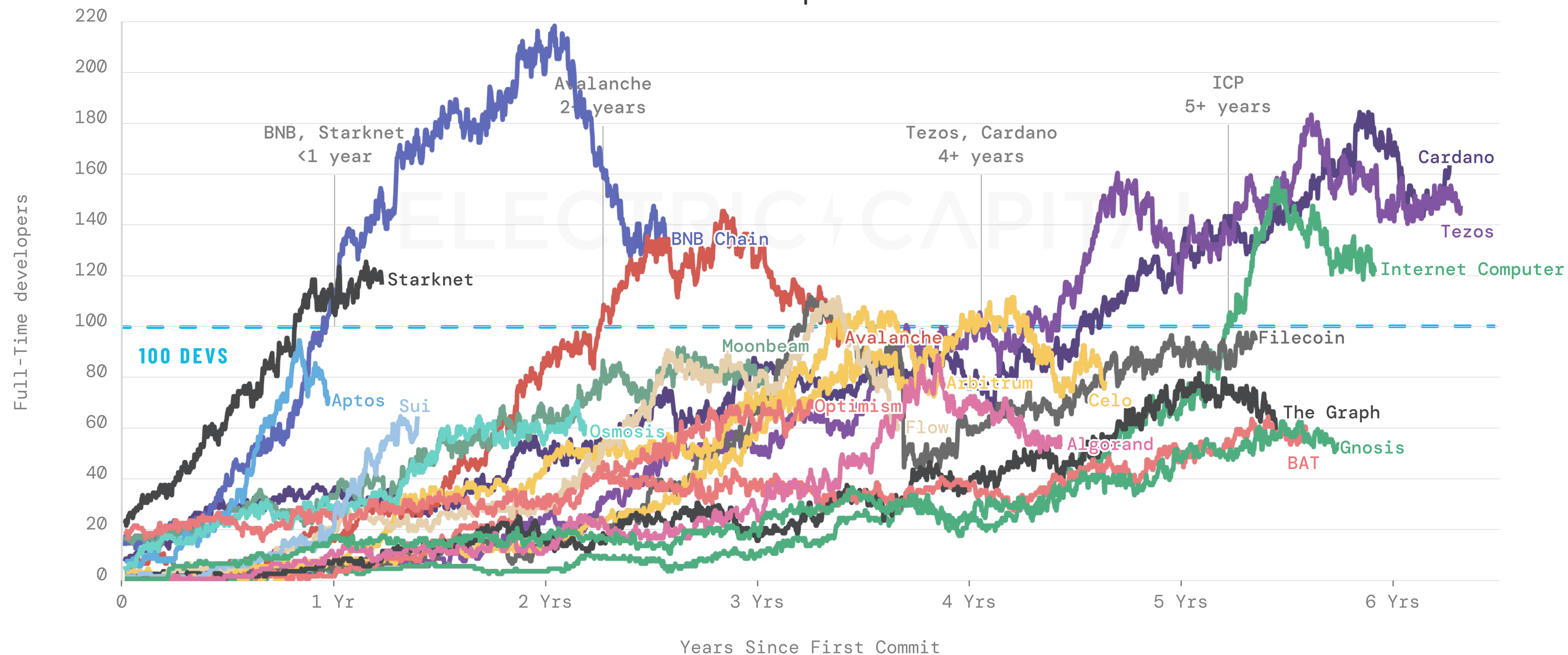
ELECTRIC⚡CAPITAL

WHAT ABOUT TOTAL DEVELOPERS
(FULL-TIME + PART-TIME + ONE-TIME)
ACROSS THESE ECOSYSTEMS?

ETHEREUM, POLKADOT, SOLANA, POLYGON & COSMOS TOOK DIFFERENT PATHS TO GROW TO 1000+ <u>TOTAL</u> DEVELOPERS

Total Developers Since Launch | 50+ Avg Developers
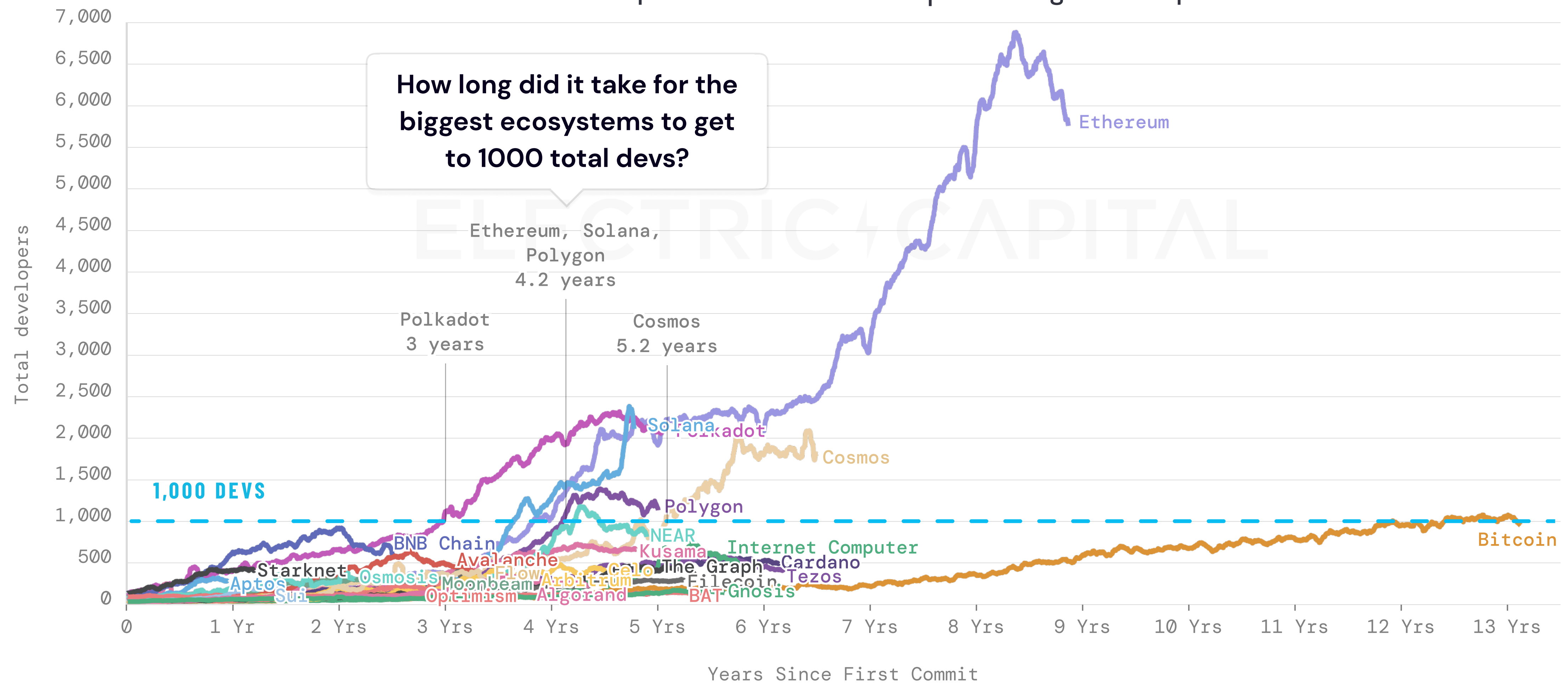
LET'S FOCUS ON EMERGING ECOSYSTEMS

Total Developers Since Launch | 50+ Avg Developers

Next, let's focus on this range

Ethereum

Solana

Polkadot

Cosmos

Polygon

BNB Chain

NEAR

Internet Computer

Avalanche

Kusama

Starknet

Osmosis

Flow

Moonbeam

Arbitrum

Celo

The Graph

Cardano

Aptos

Sui

Optimism

Algorand

BAT Gnosis

Tezos

Filecoin

Bitcoin

Total developers

Years Since First Commit
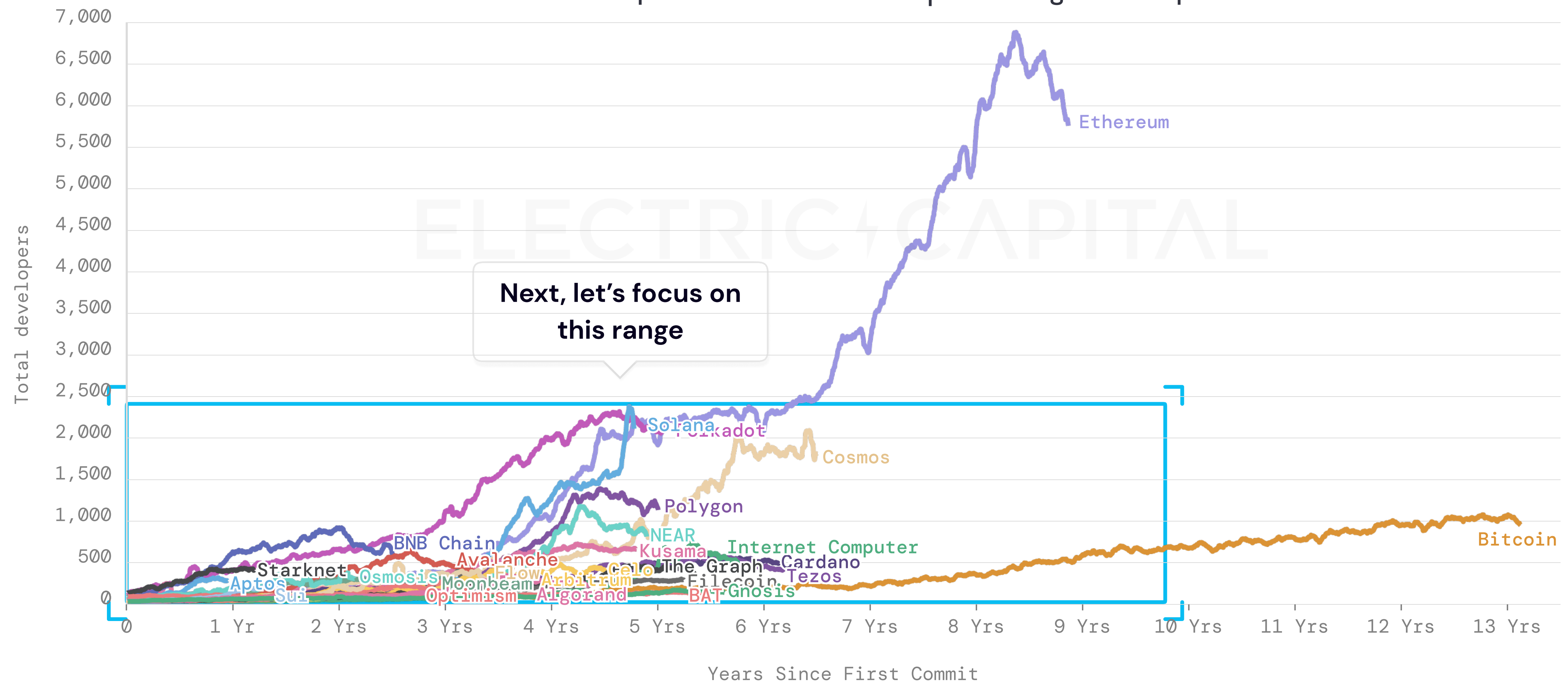
ELECTRIC CAPITAL

SOLANA SPIKED TO 2000+ <u>TOTAL</u> DEVS IN NOV 2022, DURING BREAKPOINT & WITH HACKATHON ACTIVITY. THIS IS WHY <u>FULL-TIME</u> DEVS IS A CRITICAL METRIC

Total Developers Since Launch

Total developer count is sensitive to large developer activation events like conferences & hackathons

SOLANA, POLYGON, NEAR, & KUSAMA HAVE THE MOST <u>TOTAL</u> DEVS (600+)

Total Developers Since Launch

Y-axis: Total developers (0 to 2,400)

X-axis: Years Since First Commit (0 to 6 Yrs)

Series labeled: Solana, Polygon, NEAR, Kusama, BNB Chain, Starknet, Aptos, Sui, Osmosis, Moonbeam, Avalanche, Optimism, Flow, Arbitrum, Celo, Algorand, The Graph, Filecoin, Cardano, Internet Computer, Tezos, Gnosis, BAT
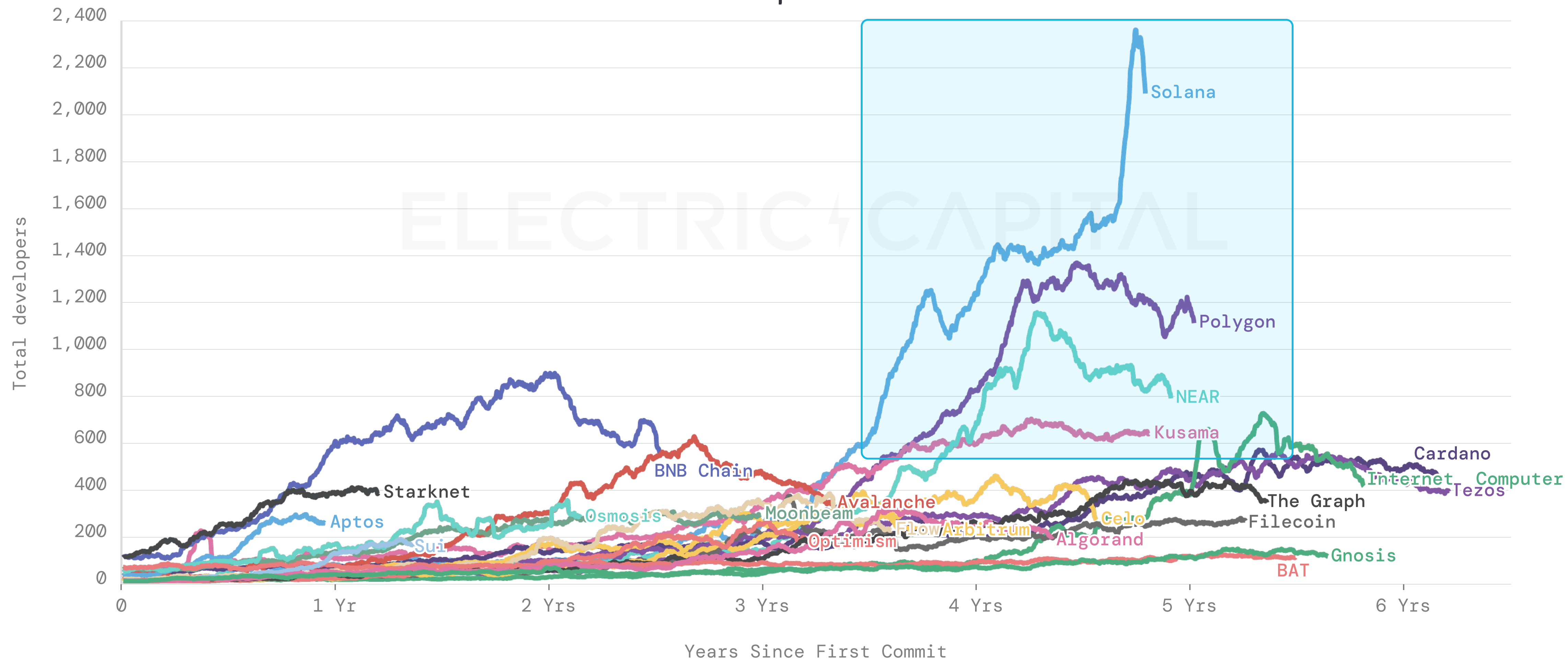
LET'S FOCUS ON EMERGING ECOSYSTEMS WITH UNDER 600 <u>TOTAL</u> DEVELOPERS

Total Developers Since Launch

Next, let's focus on this range

Solana
Polygon
NEAR
Kusama
BNB Chain
Cardano
Internet Computer
Tezos
Starknet
Avalanche
The Graph
Aptos
Osmosis
Moonbeam
Celo
Flow Arbitrum
Filecoin
Optimism
Algorand
Sui
Gnosis
BAT

Total developers

0   1 Yr   2 Yrs   3 Yrs   4 Yrs   5 Yrs   6 Yrs

Years Since First Commit
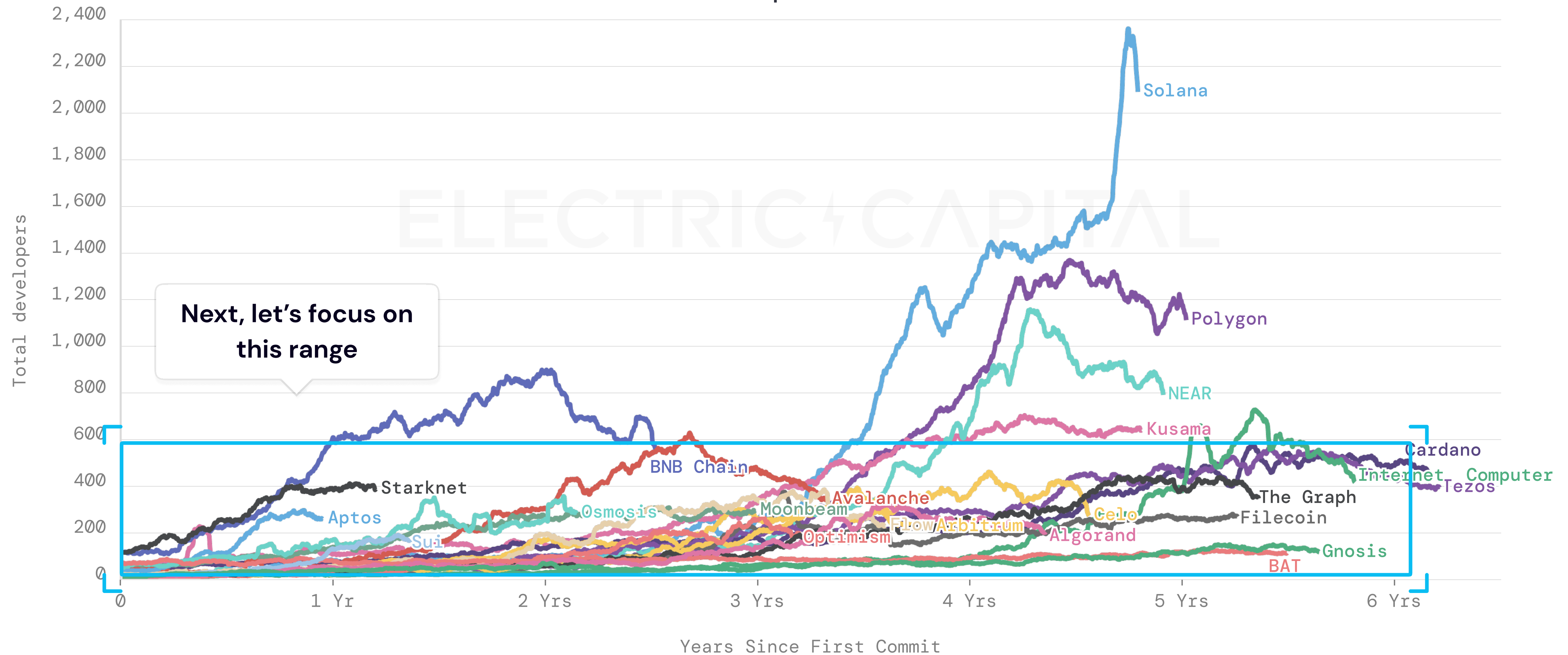
BNB HAS THE MOST <u>TOTAL</u> DEVELOPERS FOR PROJECTS UNDER 3 YEARS OLD, DESPITE ITS RECENT DECLINE IN DEVELOPERS

Total Developers Since Launch

BNB has the highest number of developers out of ecosystems that launched code under 3 years ago.

ECOSYSTEMS UNDER 2 YEARS OLD: STARKNET, APTOS, & SUI HAVE 100+ TOTAL DEVELOPERS; STARKNET HAS THE MOST AT ALMOST 400 TOTAL DEVS

Total Developers Since Launch
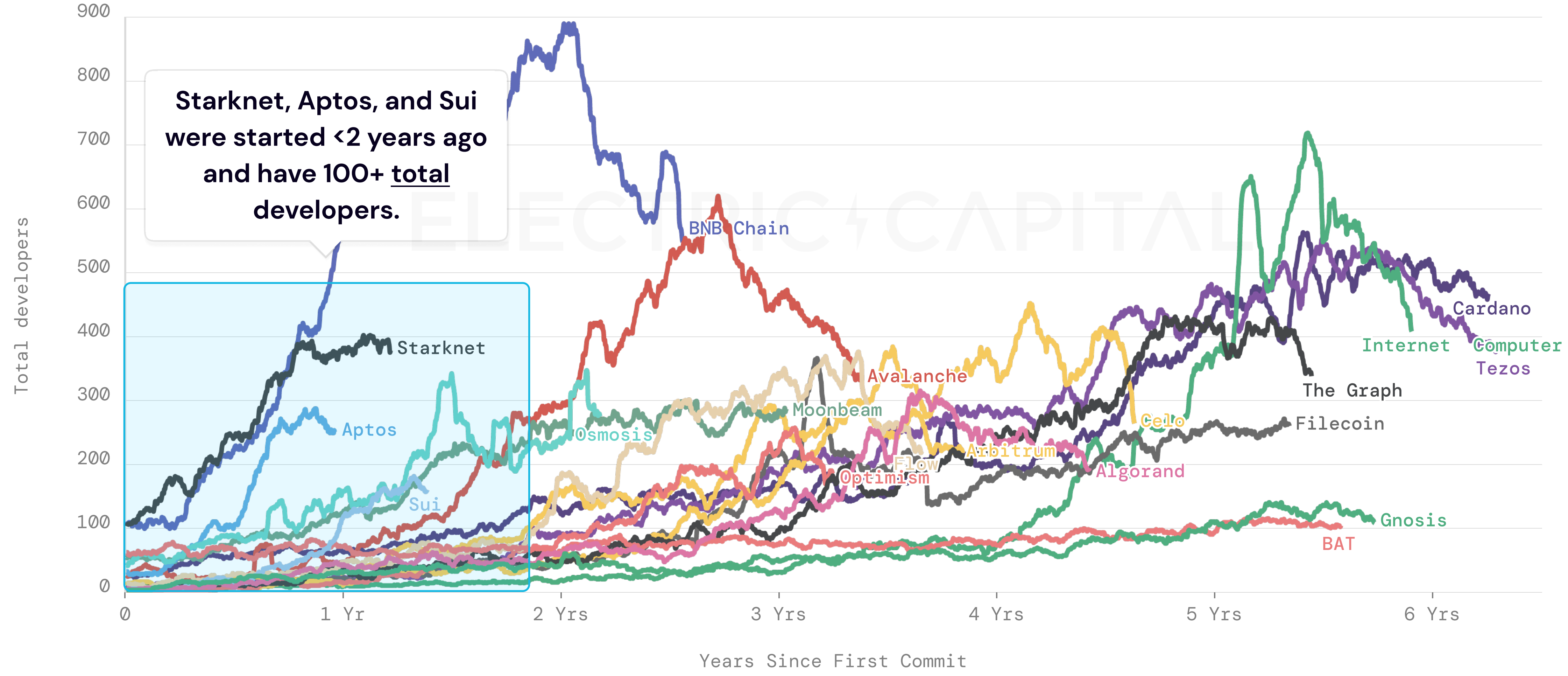
Starknet, Aptos, and Sui were started <2 years ago and have 100+ total developers.

Y-axis: Total developers (0, 100, 200, 300, 400, 500, 600, 700, 800, 900)

X-axis: Years Since First Commit (0, 1 Yr, 2 Yrs, 3 Yrs, 4 Yrs, 5 Yrs, 6 Yrs)

Labels: Starknet, Aptos, Sui, BNB Chain, Avalanche, Moonbeam, Osmosis, Flow, Optimism, Arbitrum, Algorand, Celo, Cardano, Internet Computer, Tezos, The Graph, Filecoin, Gnosis, BAT

MANY OF THE TOP EMERGING ECOSYSTEMS ARE EVM-COMPATIBLE: BNB, AVALANCHE, MOONBEAM, ARBITRUM, OPTIMISM, CELO, & GNOSIS

Total Developers Since Launch
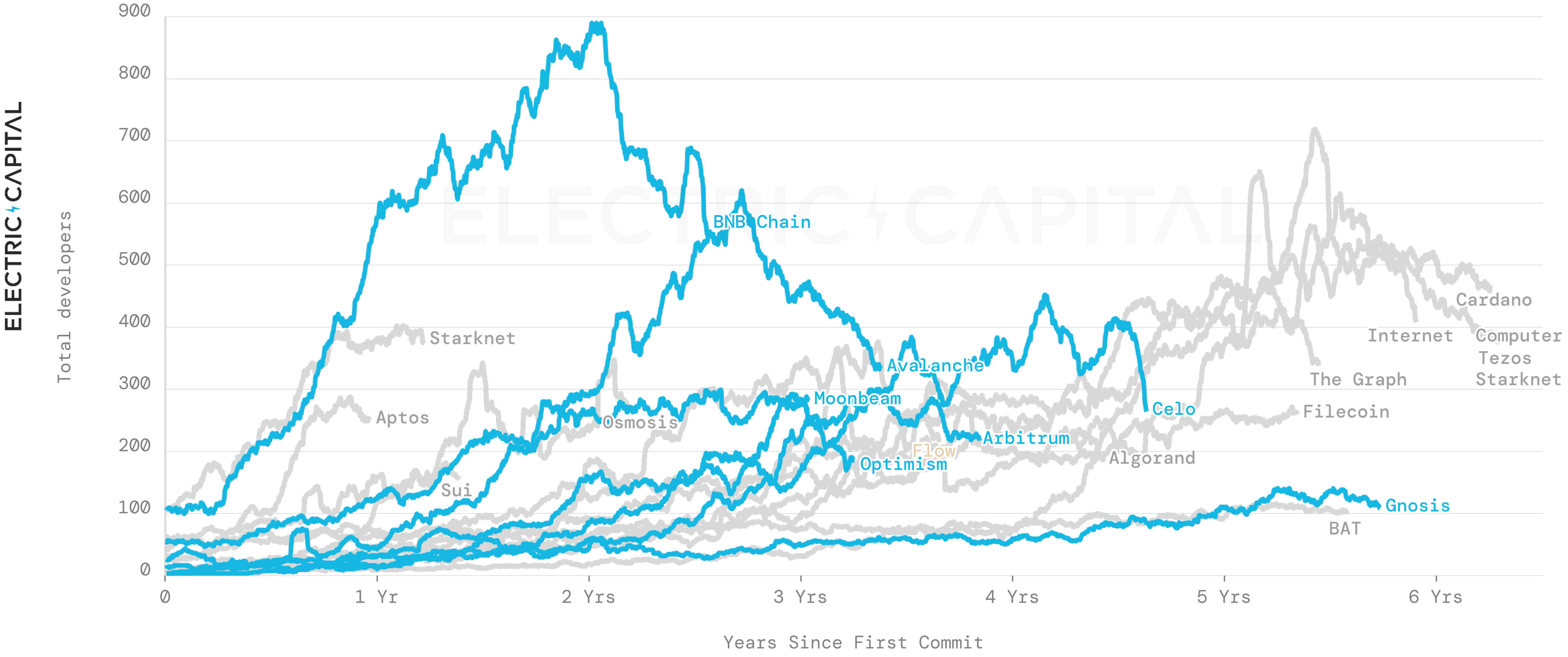
ZOOMING BACK OUT...EMV-COMPATIBLE ECOSYSTEMS ARE 37% OF ALL ECOSYSTEMS WITH 50+ <u>FULL-TIME</u> DEVS

Total Developers Since Launch | 50+ Avg Developers

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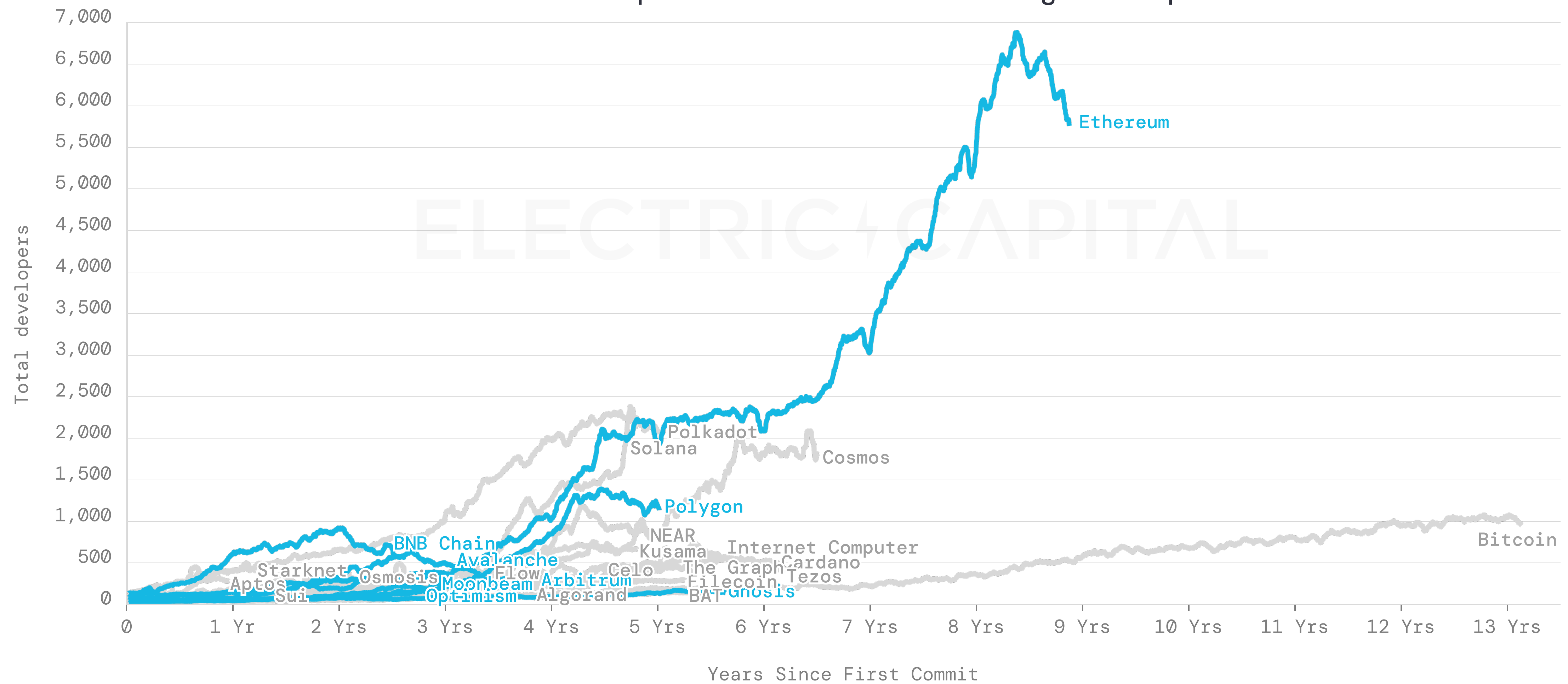
ETHEREUM VIRTUAL MACHINE HAS EMERGED AS A CORE TECHNOLOGY. LET'S LOOK AT EVM-COMPATIBLE LAYER-1 AND LAYER-2 CHAINS...

ACROSS EVM CHAINS: +414 MONTHLY TOTAL DEVELOPERS; +5% YEAR OVER YEAR

EVM Layer 1s and 2s Monthly Active Developers
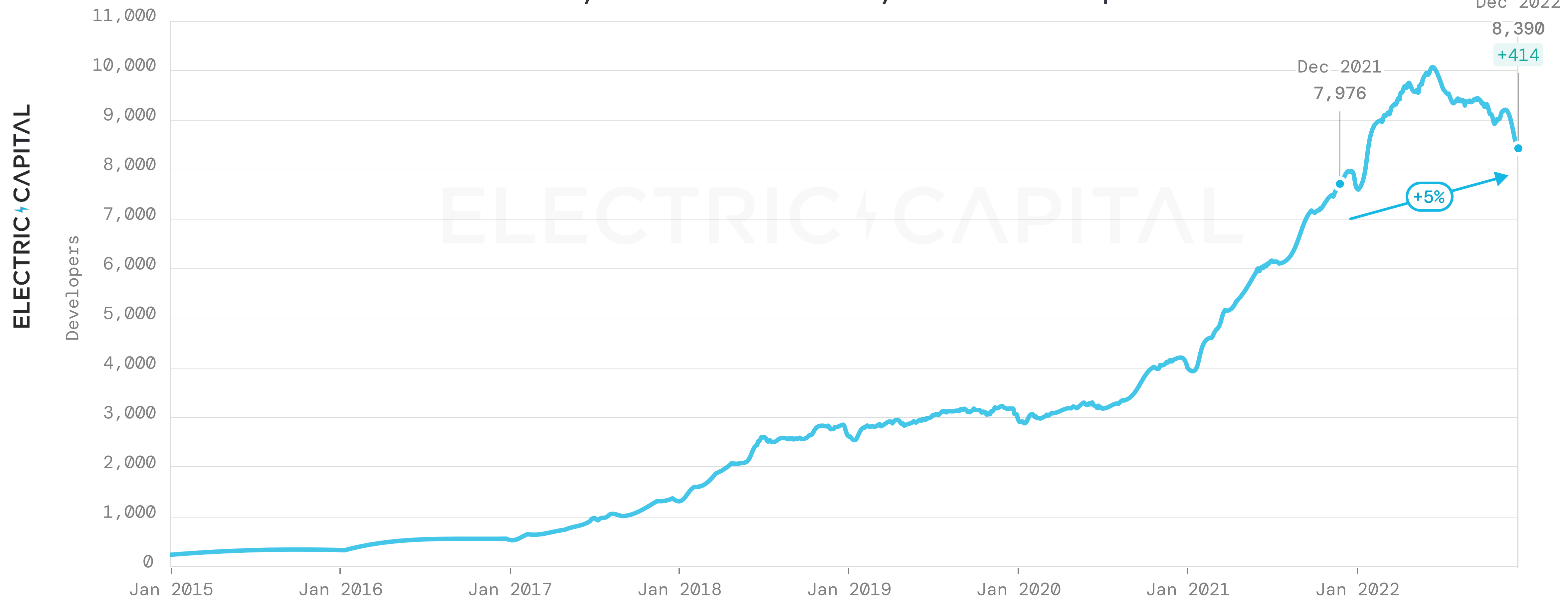
ETHEREUM GREW BY +5% YEAR OVER YEAR; EVM-COMPATIBLE LAYER-1S AND L2S OUTSIDE ETHEREUM GREW BY +2%

Ethereum and Other EVM Layer 1s & 2s since 2015

Dec 2022
5,734
+263

Dec 2021
5,471

Ethereum

+5%

Dec 2021
2,751

Dec 2022
2,817
+66

EVM Layer 1s & 2s

+2%

Developers

7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0

Jan 2015 — Jan 2016 — Jan 2017 — Jan 2018 — Jan 2019 — Jan 2020 — Jan 2021 — Jan 2022

ELECTRIC CAPITAL
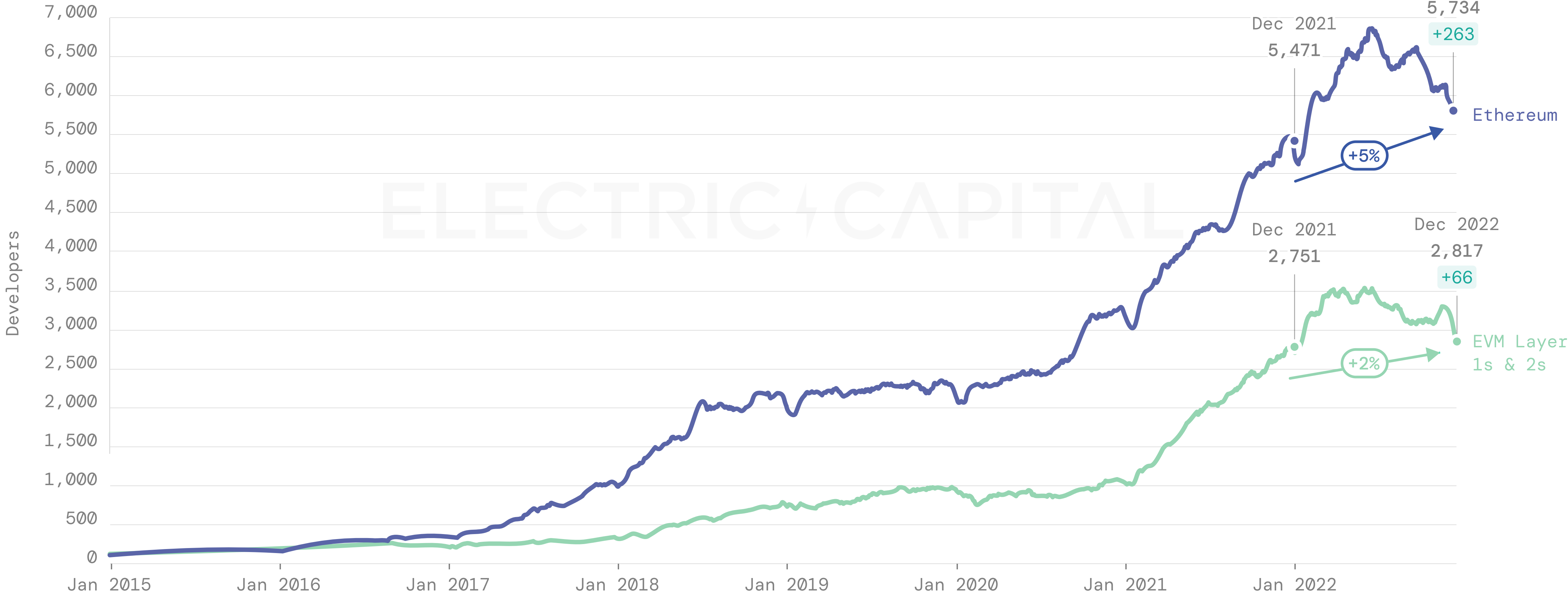
Some Developers work across EVM Layer-1s and Ethereum. The sum of these two lines will be greater than total developers in EVM-compatible chains.

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DO DEVELOPERS IN EVM-COMPATIBLE ECOSYSTEMS
STAY IN ONE ECOSYSTEM OR WORK ACROSS MULTIPLE?

LET'S TAKE A LOOK AT CONTRACT DEPLOYMENTS
ON CHAIN...

ACROSS EVM ECOSYSTEMS: MOST ACCOUNTS ONLY DEPLOY CONTRACTS TO ONE CHAIN...

Multi-Chain Deployers
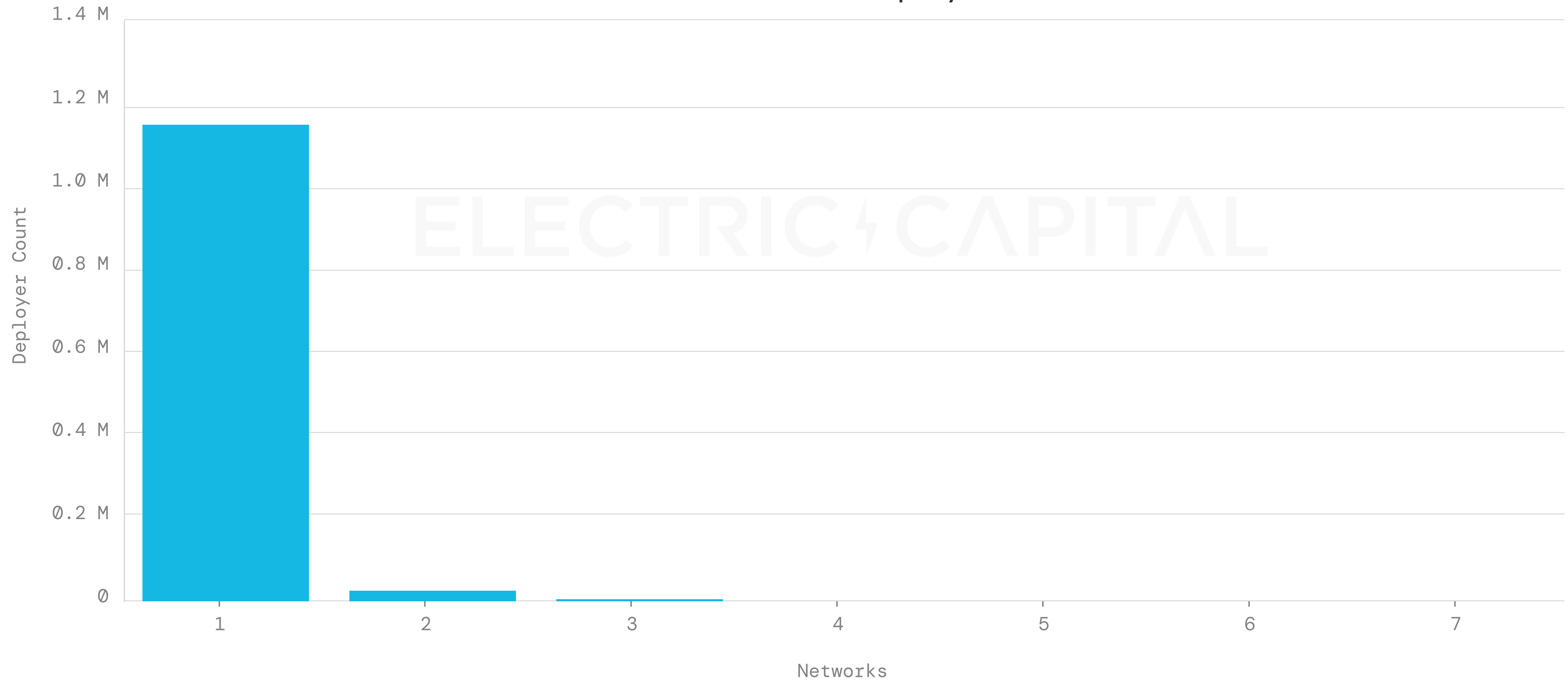
Source: Dune Analytics

...BUT THE AVERAGE NUMBER OF CHAINS THE DEPLOYER HAS DEPLOYED ON HAS INCREASED OVER TIME

Number of Chains Avg Deployer Has Deployed On

Source: Dune Analytics

ELECTRIC CAPITAL
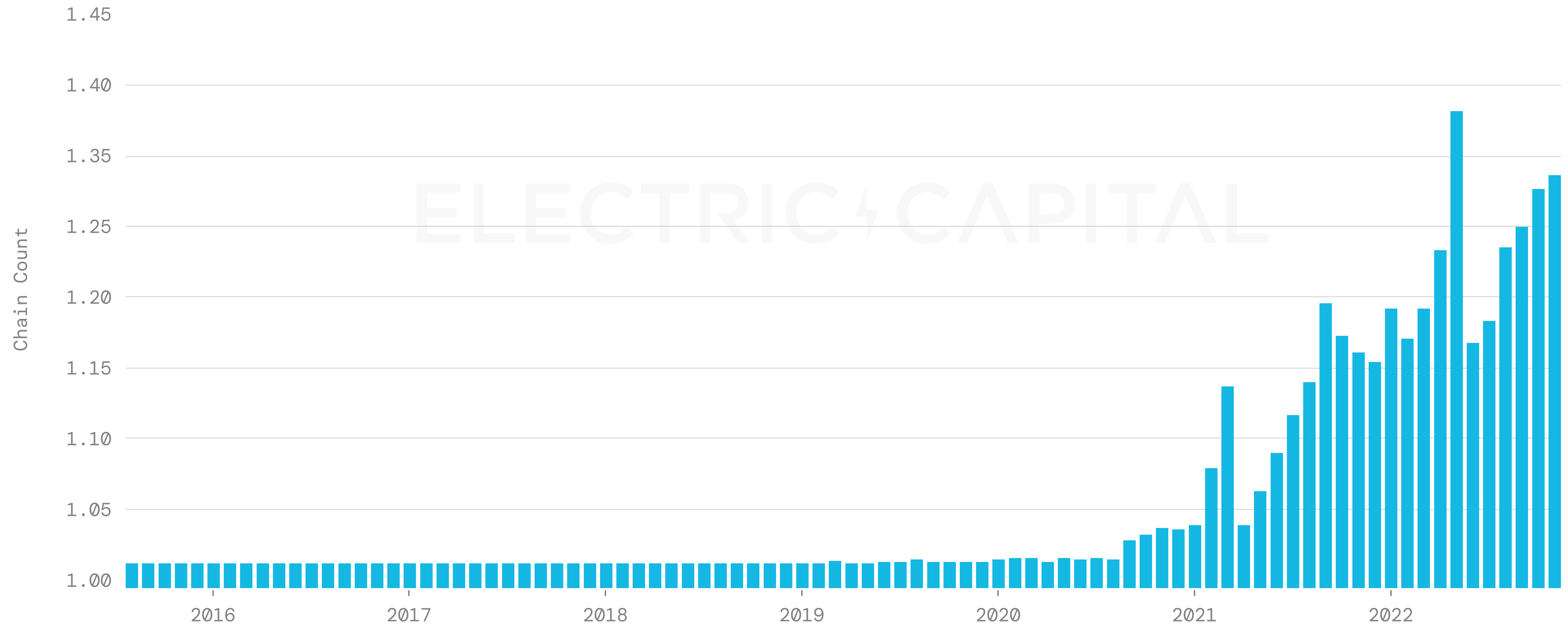
HOW CAN WE ACCOUNT FOR THE DEVELOPERS WORKING ACROSS MULTIPLE CHAINS?

ECOSYSTEMS MAY INCLUDE MULTI-CHAIN DEVELOPERS

Multi–Chain Developers
Developers work on applications that are
deployed across multiple ecosystems

Primary Developers
Developers working exclusively
on an ecosystem
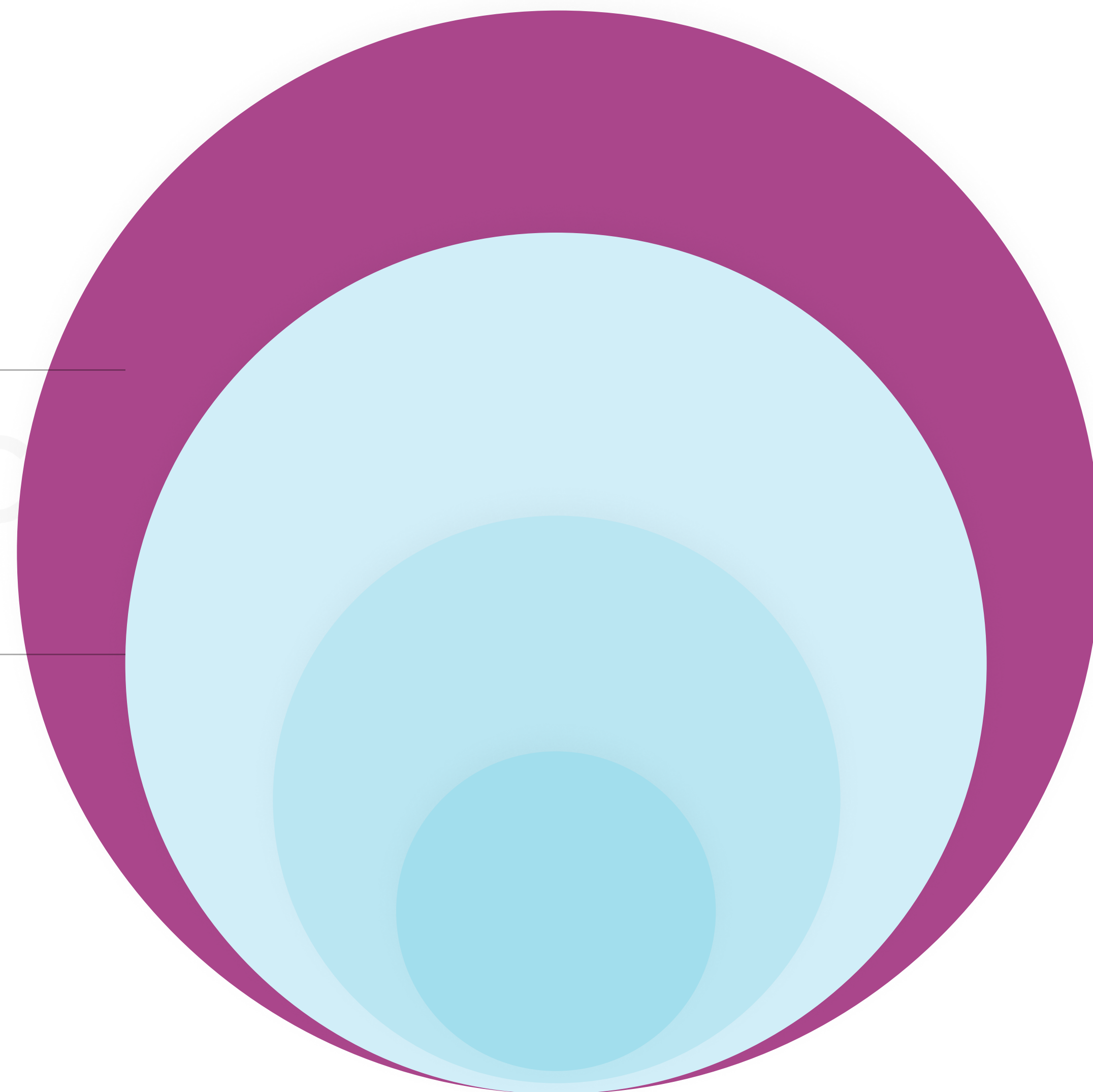
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MULTI-ECOSYSTEM EXAMPLE: SUSHI

Many applications like Sushi build on
Optimism and also build in other ecosystems.
Sushi is part of Optimism's multi–chain community.

Optimism Community

- Velodrome
- Lyra
- Perpetual Protocol
- Sonne Finance

Multi–Chain Community

- Uniswap
- Sushi
- Aave
- Curve

Multi-Chain Developers
Uniswap, Sushi , Aave, etc.

Ecosystem
Optimism

Primary Developers
Velodrome, Lyra, Perpetual, etc.

Optimism Protocol Developers
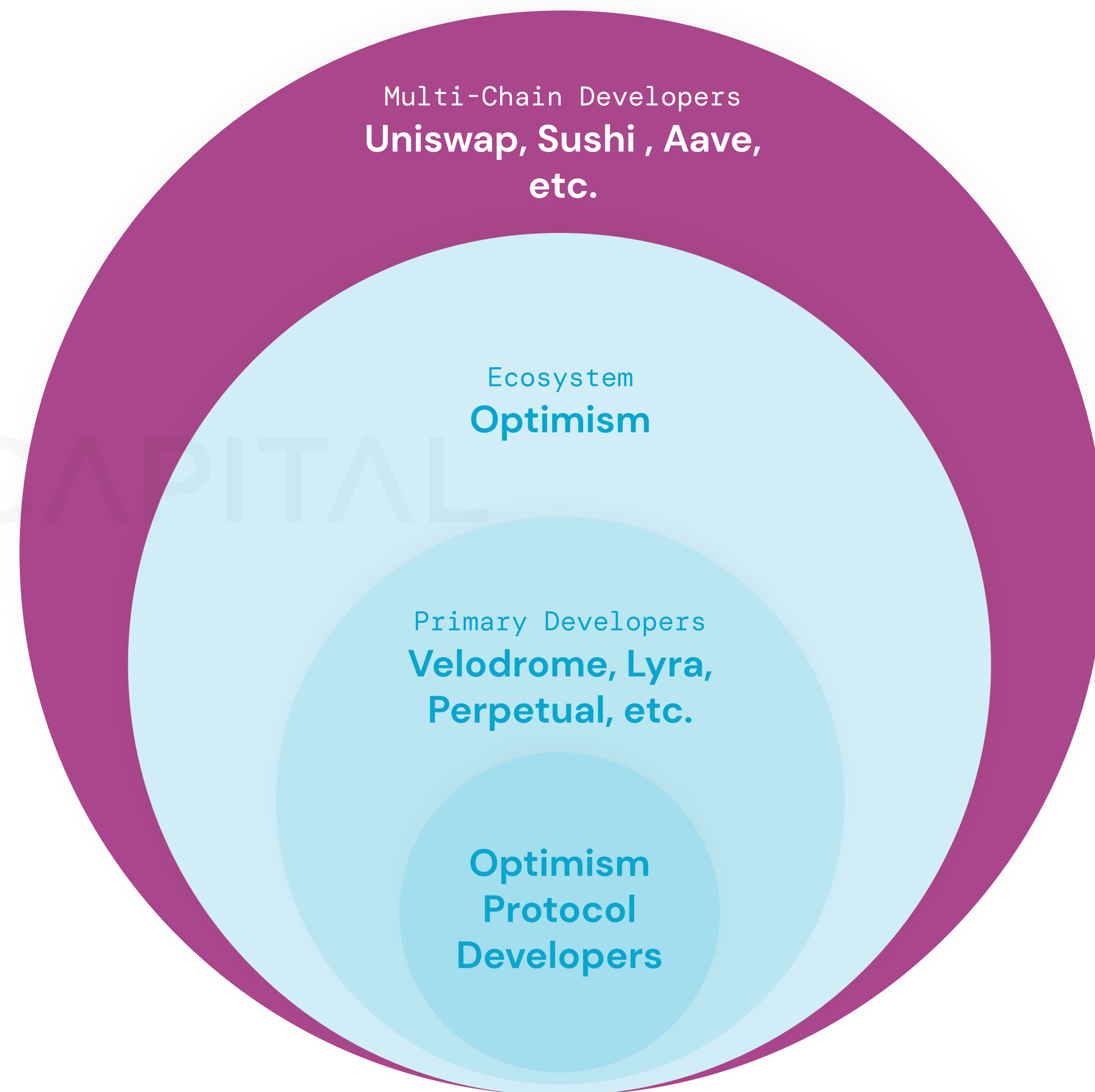
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HOW ARE MULTI-CHAIN DEVS GROWING IN COMPARISON TO PRIMARY DEVS?

POLYGON PRIMARY DEVELOPER GROWTH (+29%) OUTPACES THE GROWTH OF MULTI-CHAIN DEVELOPERS BUILDING ON POLYGON (+1%) YEAR OVER YEAR

Polygon Primary & Multi-chain Developers
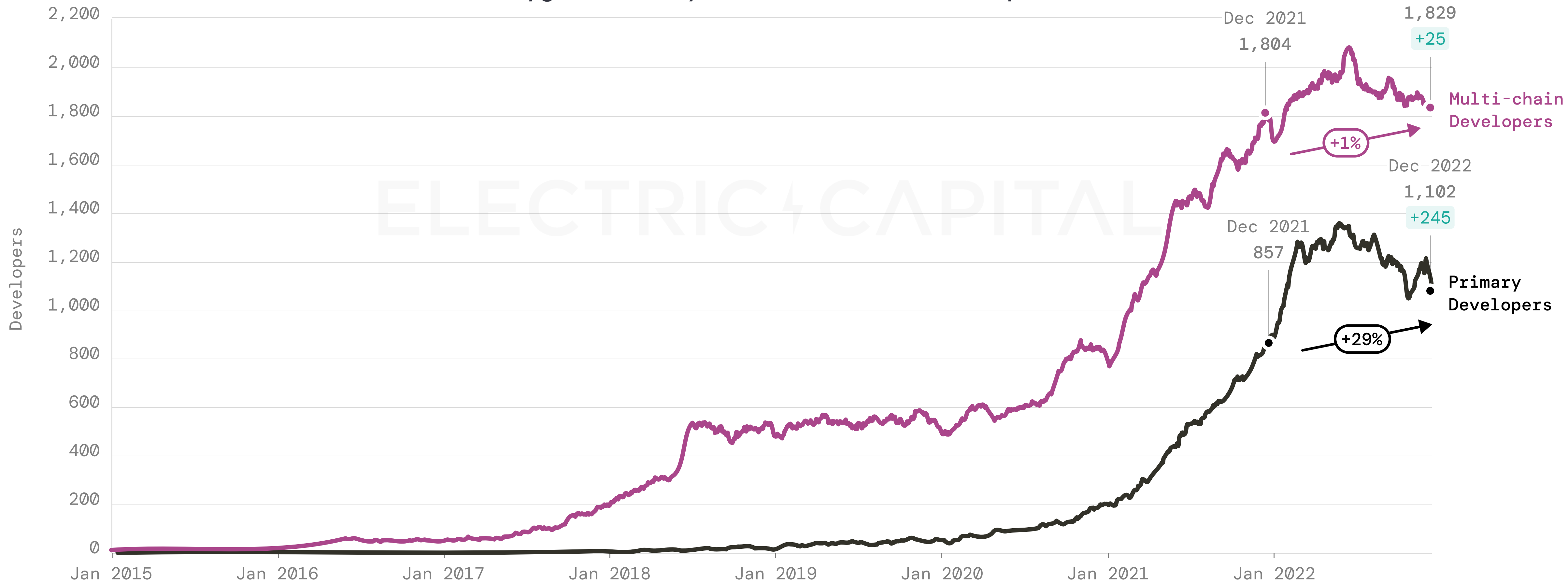
AVALANCHE LOST PRIMARY DEVELOPERS (-28%) WHILE MULTI-CHAIN DEVELOPERS BUILDING ON AVALANCHE GREW (+8%)

Avalanche Primary & Multi-chain Developers
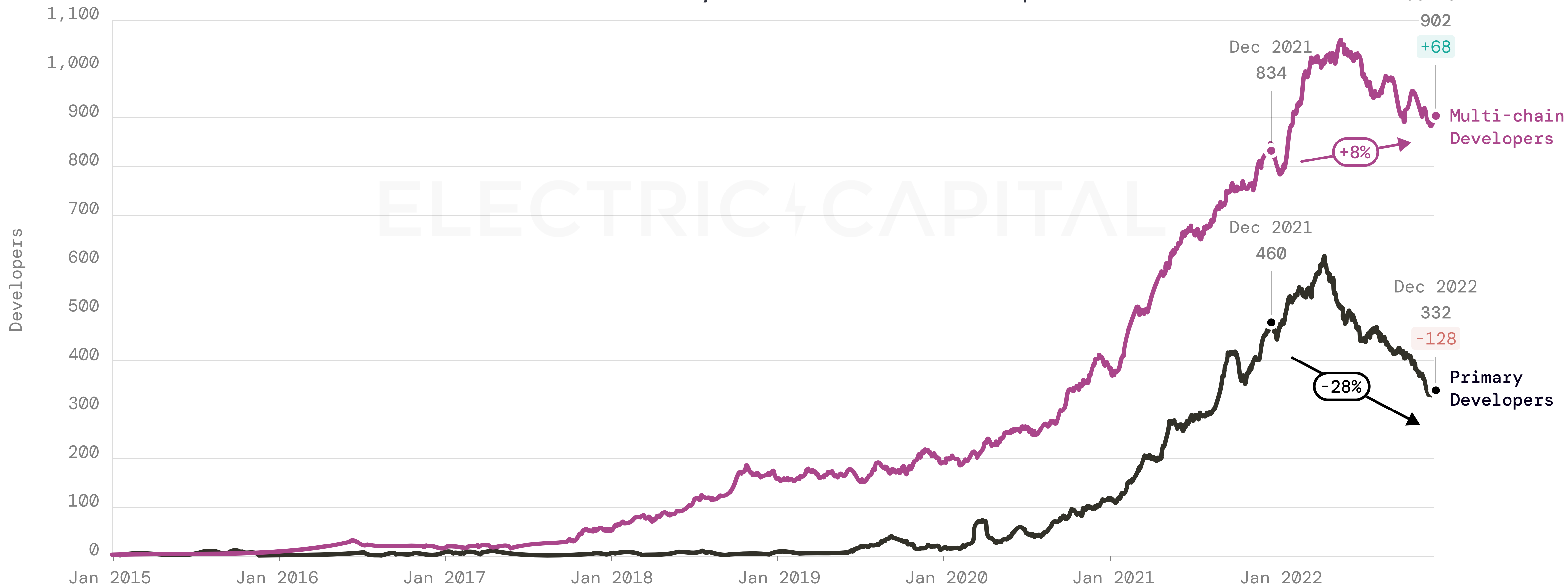
BNB CHAIN HAS STEADY MULTI-CHAIN DEVELOPERS DESPITE -23% DECREASE IN PRIMARY DEVELOPERS

BNB Chain Primary & Multi-chain Developers
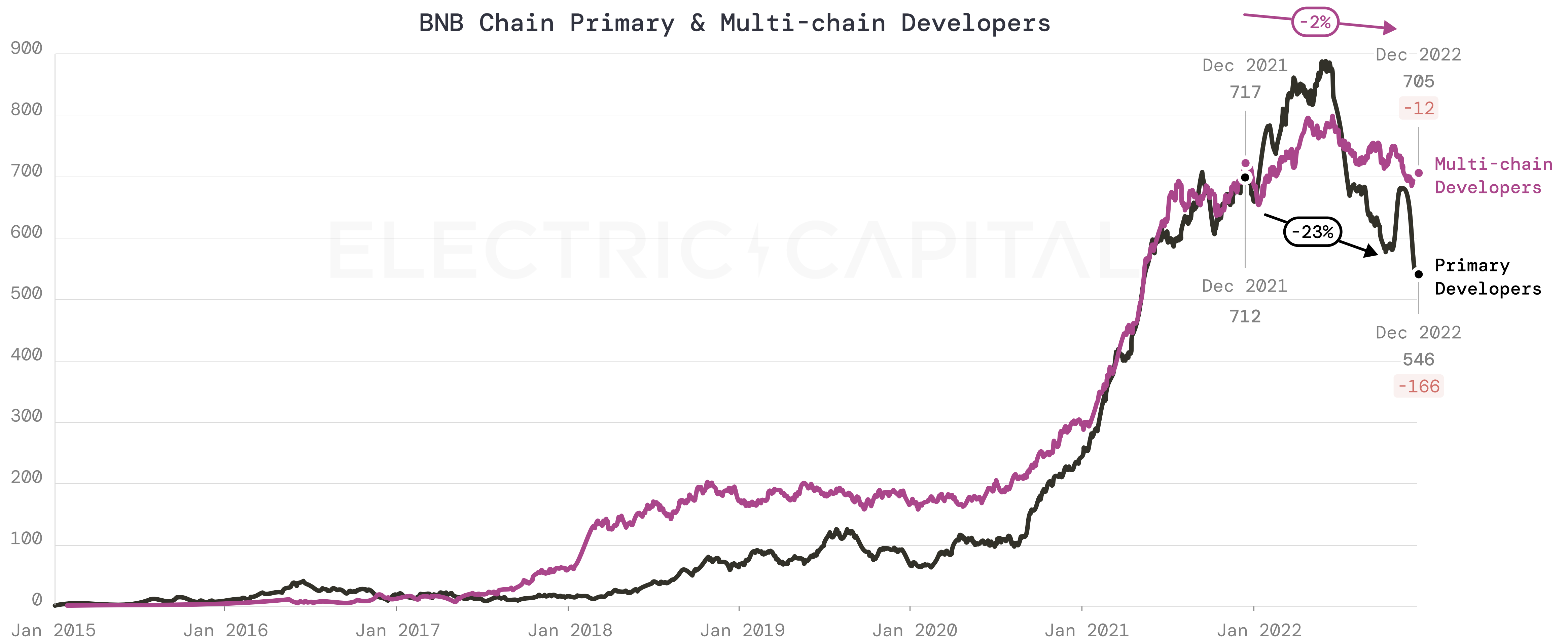
CELO LOST PRIMARY DEVELOPERS (-19%) WHILE MULTI-CHAIN DEVELOPERS BUILDING ON CELO GREW (+7%)

Celo Primary & Multi-chain Developers

Dec 2022
519
+32

Dec 2021
487

Multi-chain
Developers

7%

Dec 2021
324

-19%

Primary
Developers

Dec 2022
262
-62
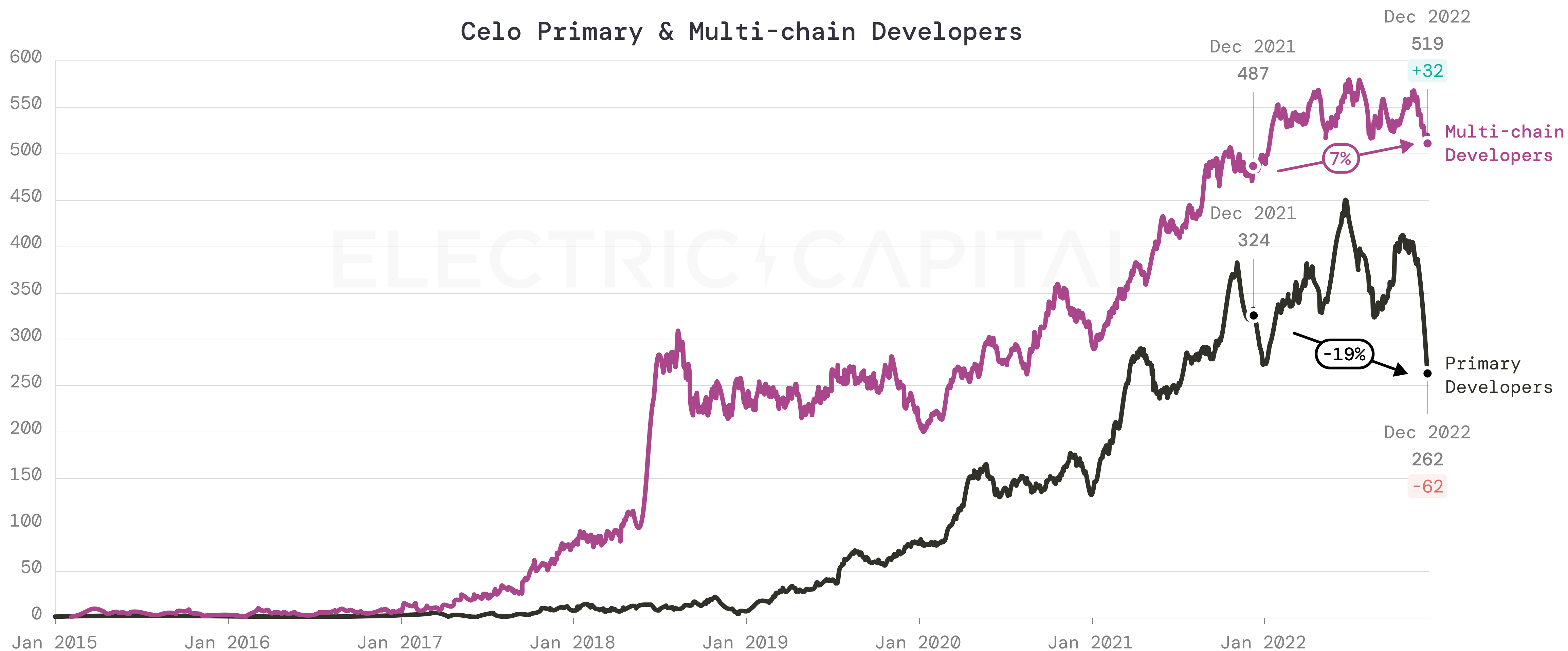
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ARBITRUM HAS 4X MORE MULTI-CHAIN DEVS THAN PRIMARY DEVS; ARBITRUM GAINED PRIMARY DEVELOPERS (+38%) WHILE MULTI-CHAIN FELL (-10%)

Arbitrum Primary & Multi-chain Developers
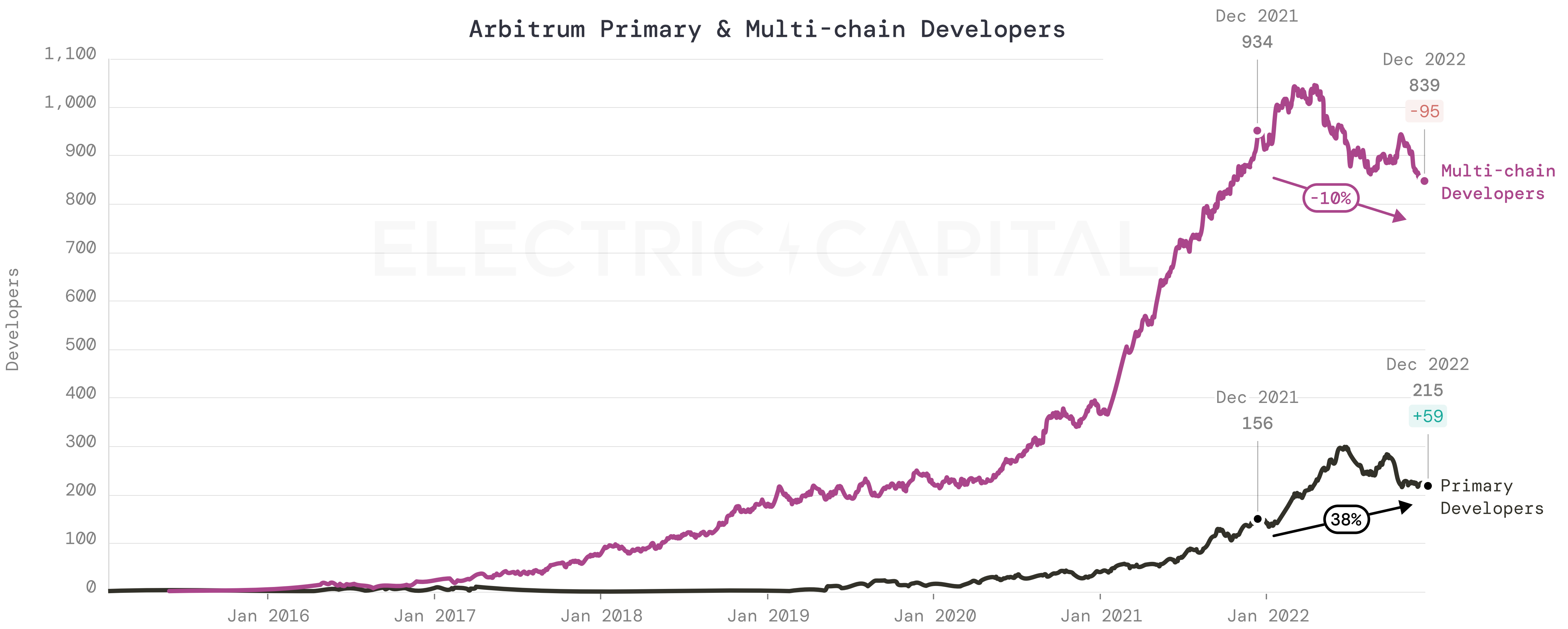
OPTIMISM HAS 5X MORE MULTI-CHAIN DEVELOPERS THAN PRIMARY DEVS; PRIMARY DEVELOPERS GREW (+73%) WHILE MULTI-CHAIN FELL (-8%)

Optimism Primary & Multi-chain Developers
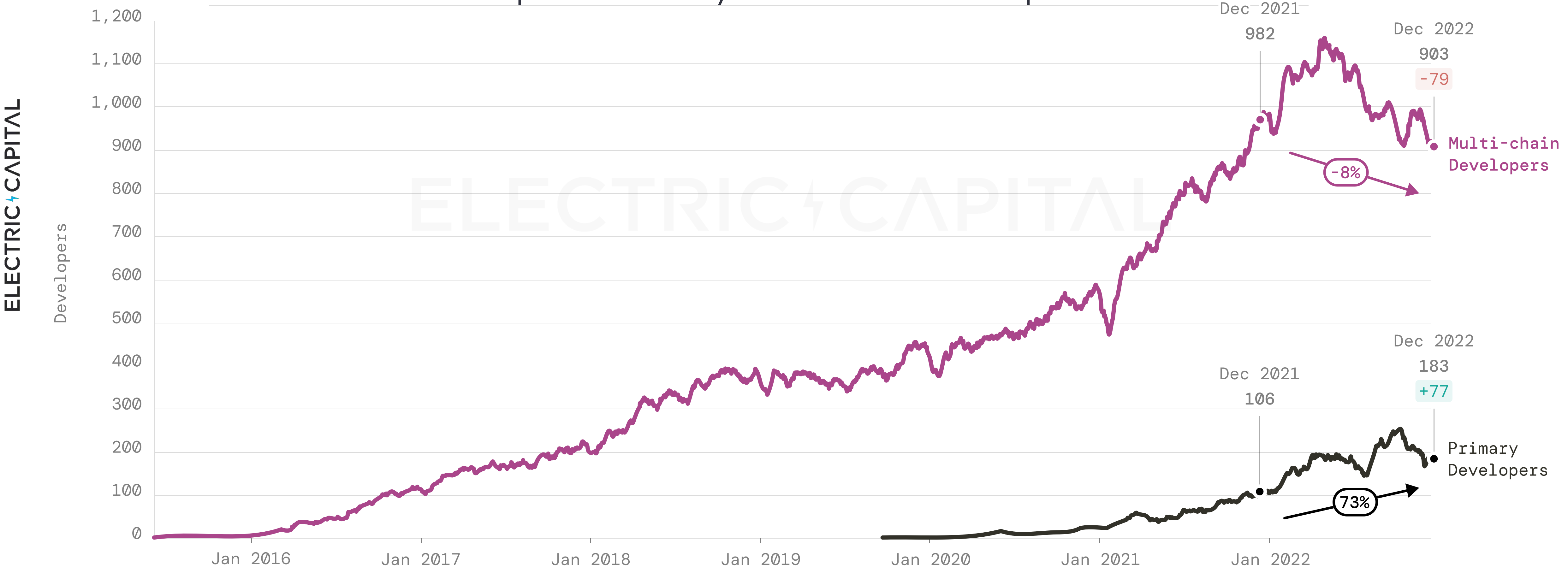
03

CRYPTO USE CASES

ELECTRIC CAPITAL

WHICH TYPES OF CONTRACTS HAVE THE MOST USAGE? WE CAN LOOK AT THE TOP 10 CONTRACTS ON ETHEREUM AS A PROXY

Ethereum Top Gas Spenders 2022

Contract	Total Gas Used
OpenSea	4,334,117,632,808
Uniswap	3,919,697,333,356
Tether USD	1,405,935,751,040
Metamask Swap	609,881,691,496
USD Coin	568,398,116,132
StrongBlock	536,836,567,423
Ethereum Name Service	512,870,655,513
CoinTool: XEN Batch Minter	500,994,713,214
1inch	481,029,227,108
XEN Crypto	406,036,682,483
Gem	388,856,356,641
Wrapped Ether	245,957,059,556
Coinbase	215,425,749,000
Optimism: Canonical Transaction Chain	189,456,150,997

Gas is the amount a user is willing to pay for a service on Ethereum.

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DEFI & NFTS ARE THE MOST POPULAR USE CASES:
DEFI & NFTS CONTRACTS ARE 7 OF THE TOP 10 CONTRACTS BY GAS USAGE ON ETH

Ethereum Top Gas Spenders 2022

Contract	Total Gas Used
OpenSea	4,334,117,632,808
Uniswap	3,919,697,333,356
Tether USD	1,405,935,751,040
Metamask Swap	609,881,691,496
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Coinbase	215,425,749,000
Optimism: Canonical Transaction Chain	189,456,150,997

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HOW IS DEFI DOING?

3,901 MONTHLY ACTIVE DEVELOPERS WORK IN DEFI ACROSS L1 AND L2 ECOSYSTEMS

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Decentralized Finance Monthly Active Developers
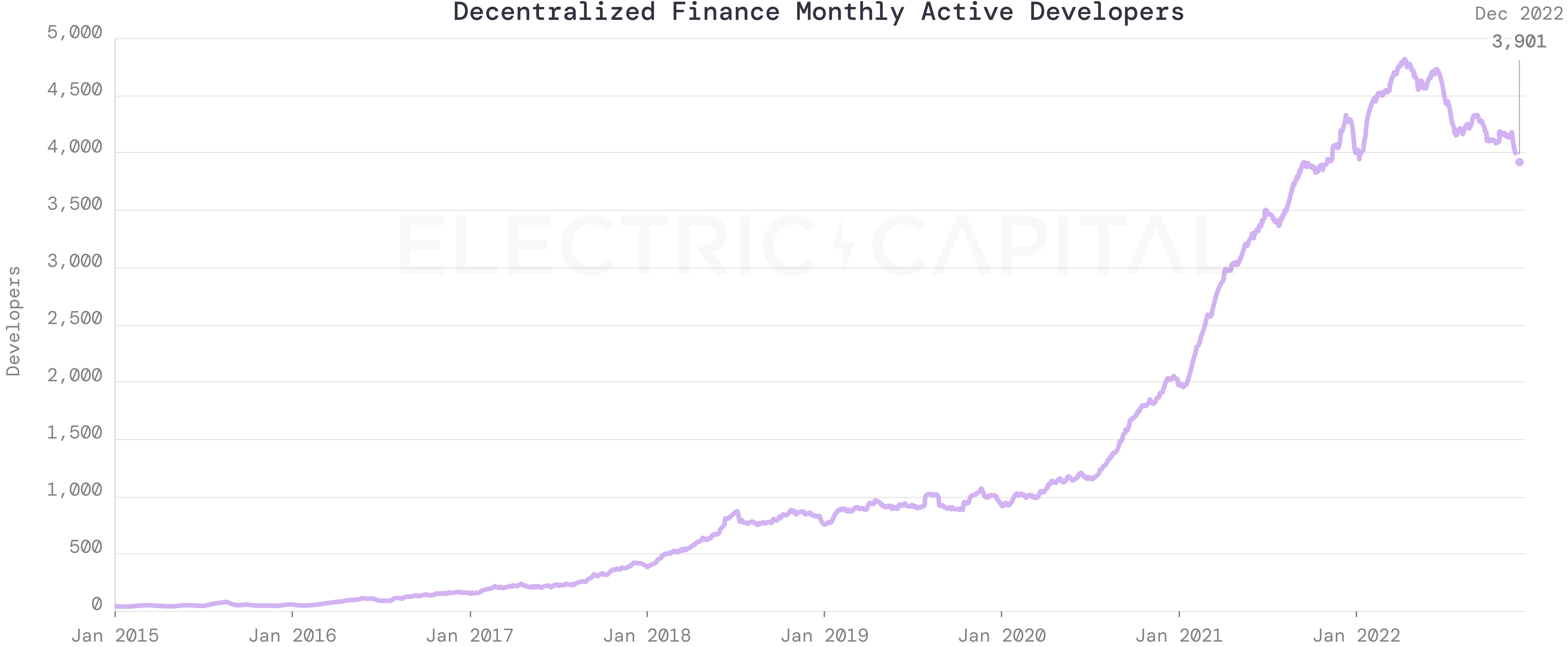
Dec 2022
3,901

+240% MONTHLY DEVELOPERS SINCE DEFI SUMMER 2020

Decentralized Finance Monthly Active Developers

Dec 2022
3,901
+2,754

+2,754

DeFi Summer
Summer 2020
1,147

+240%
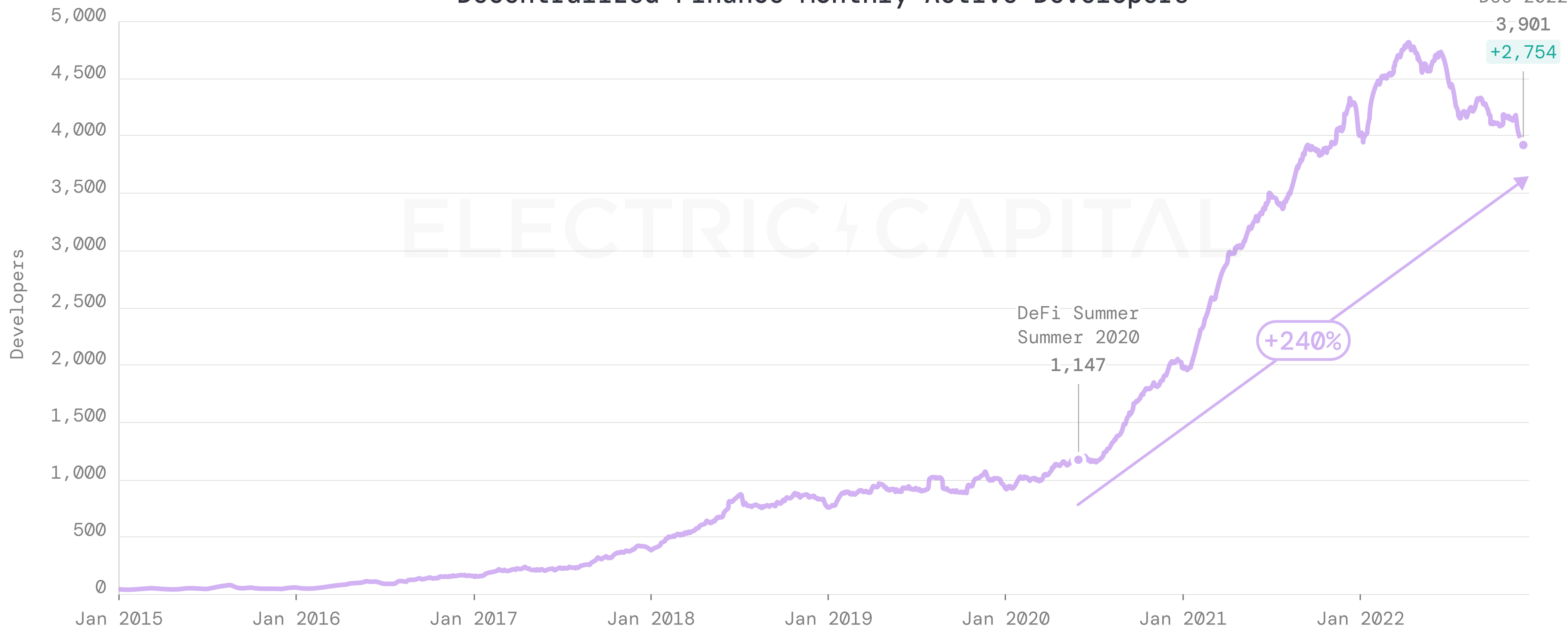
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Developers

-9% DEFI MONTHLY ACTIVE DEVELOPERS FROM DECEMBER 2021 TO DECEMBER 2022

Decentralized Finance Monthly Active Developers
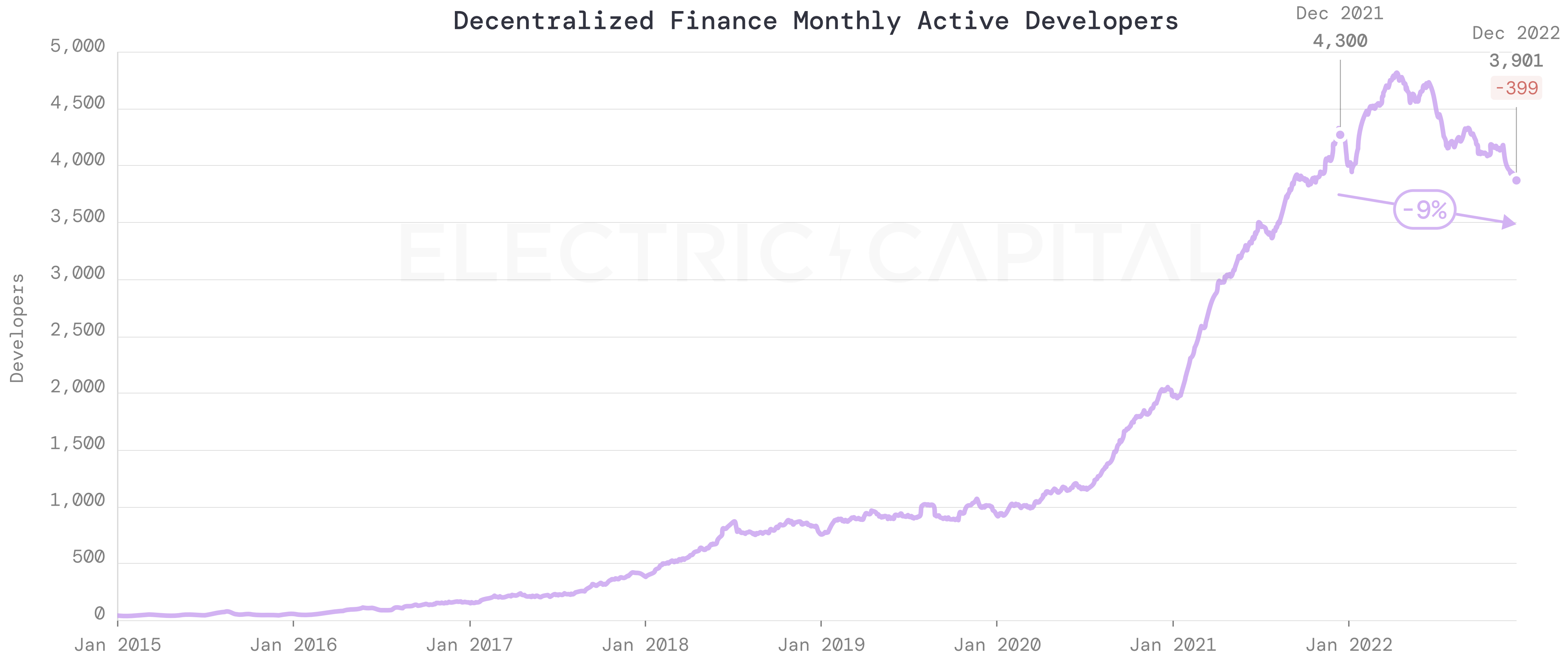
ONE-TIME (-21%), FULL-TIME (-9%), & PART-TIME (-6%) DEVS DOWN ACROSS DEFI

Decentralized Finance Monthly Active Developers
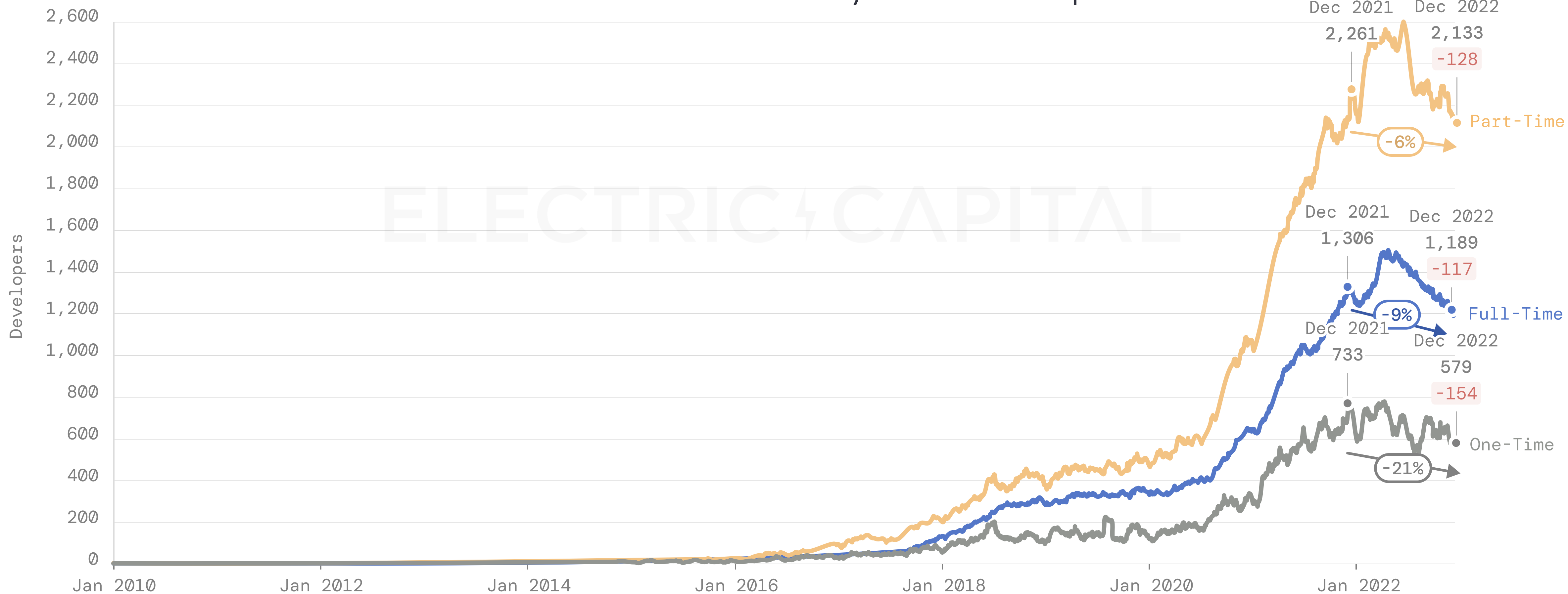
500+ NEW DEVELOPERS PER MONTH CONTINUE TO JOIN DEFI, BUT DOWN FROM PEAK

Number of Developers by Month Joined

500+ new developers join DeFi monthly, but down from March 2022 peak

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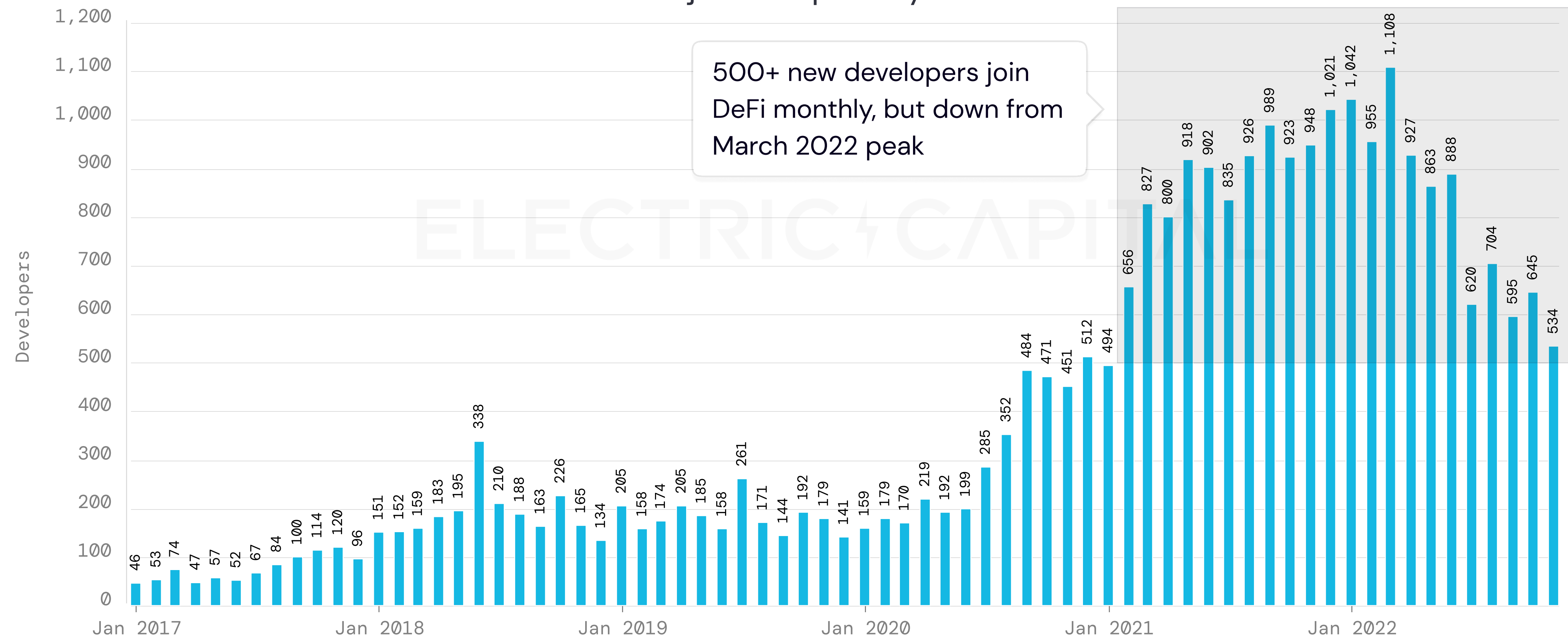
HOW HAS DEFI GROWN ACROSS LAYER 1 CHAINS?

ETHEREUM, COSMOS, SOLANA, POLKADOT, BNB, KUSAMA, POLYGON, & AVALANCHE HAVE THE LARGEST DEFI DEVELOPER ECOSYSTEMS WITH 150+ DEFI DEVELOPERS

Number of developers per L1 in DeFi (150+ devs)
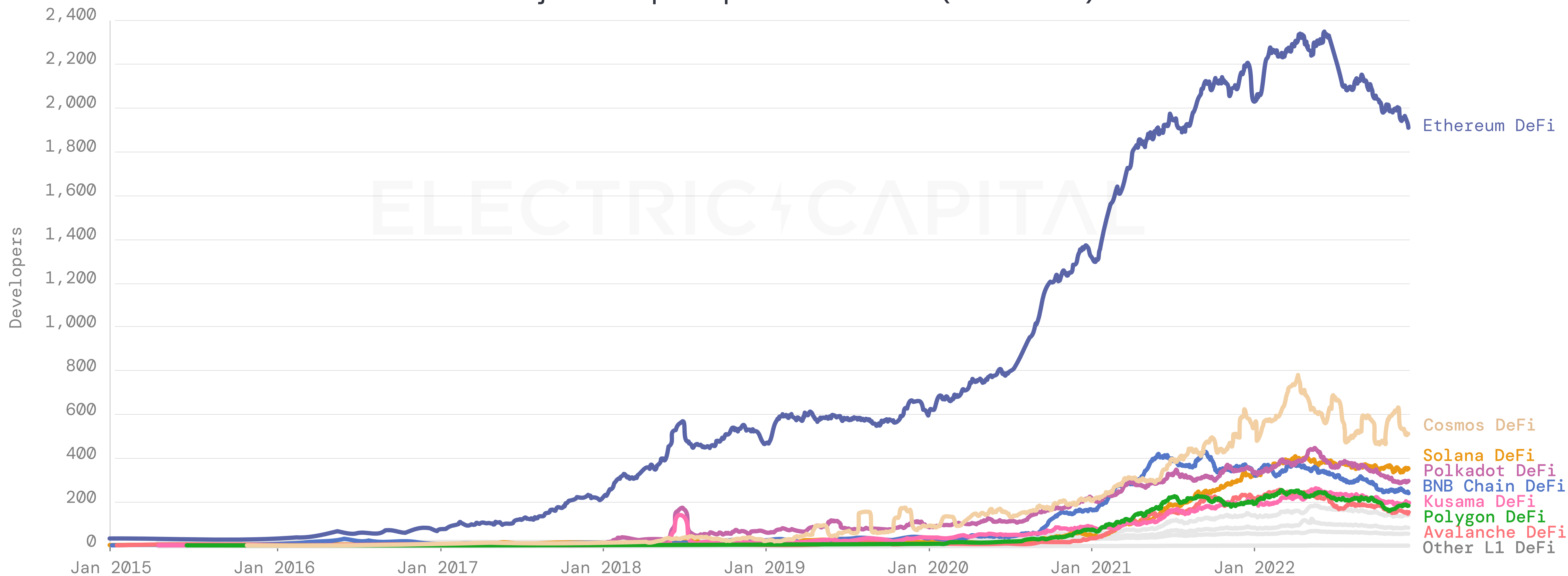
ETHEREUM IS THE BIGGEST DEFI ECOSYSTEM WITH 1,911 MONTHLY DEVS; COSMOS DEFI IS SECOND WITH 512; SOLANA DEFI IS THIRD WITH 348

Number of developers per L1 in DeFi (150+ devs)
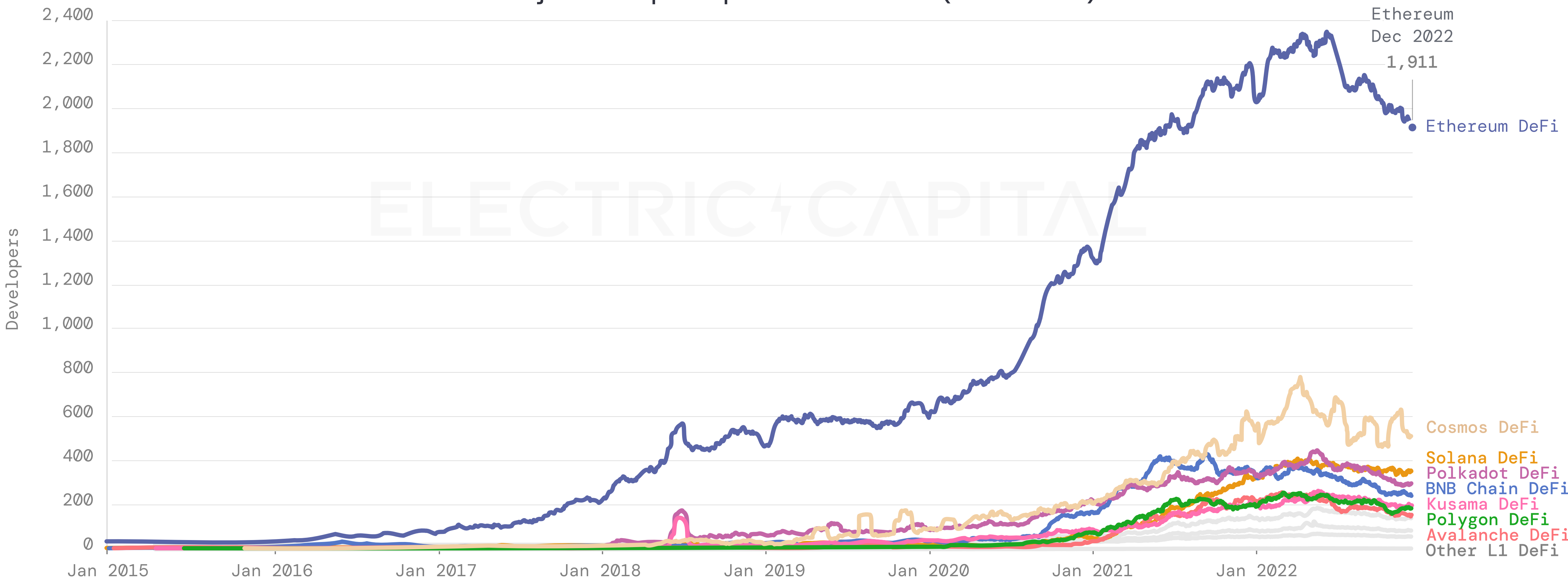
ETHEREUM BEGAN WITH 4X MORE DEFI DEVELOPERS THAN ANY OTHER LAYER 1 ECOSYSTEM DURING DEFI SUMMER

Number of developers per L1 in DeFi (150+ devs)

DeFi Summer
Summer 2020

Ethereum
June 2020
Developers: 800

Ethereum DeFi

Cosmos DeFi

Solana DeFi
Polkadot DeFi
BNB Chain DeFi
Kusama DeFi
Polygon DeFi
Avalanche DeFi
Other L1 DeFi
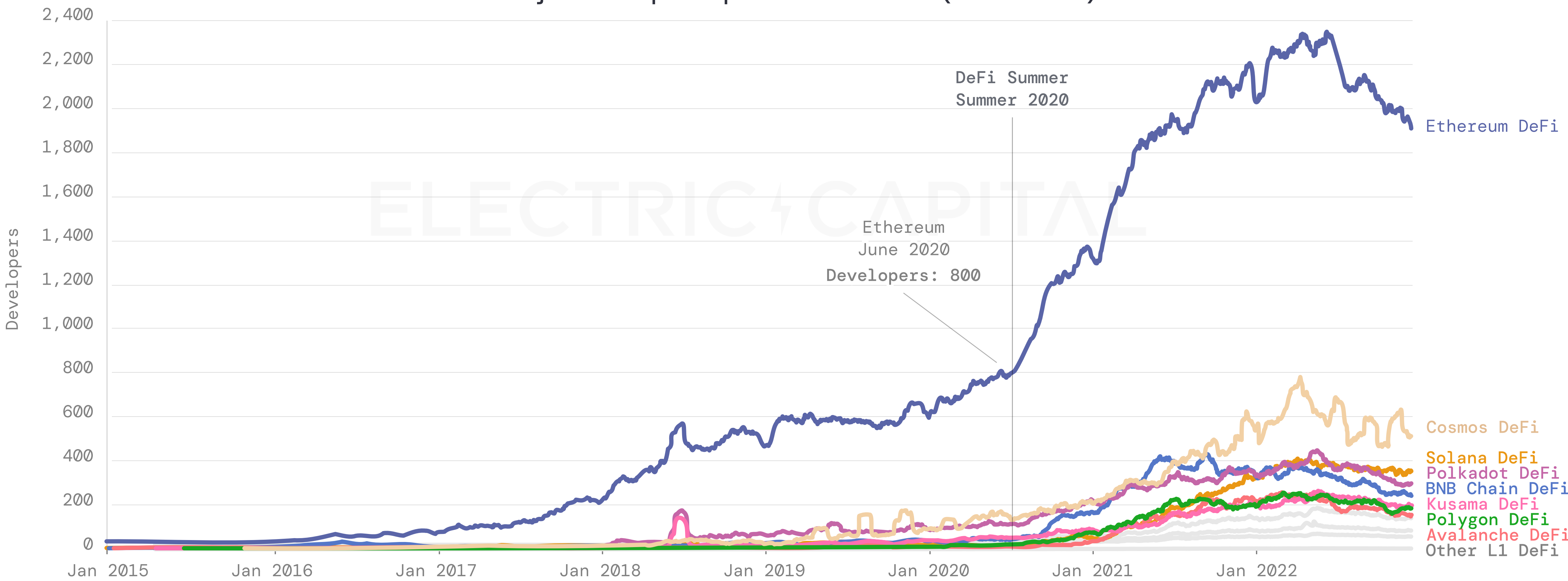
TODAY, 50% OF DEFI DEVELOPERS CONTRIBUTE TO ECOSYSTEMS OUTSIDE OF ETHEREUM, UP FROM 30% DURING DEFI SUMMER

Percentage of Developers per L1 in DeFi (150+ devs)

Ethereum began with close to 70% of all DeFi developers in DeFi summer.

DeFi Summer
Summer 2020

Ethereum is down to 50% of DeFi developers

Kusama
Avalanche
Polygon
Polkadot
Solana
BNB Chain
Cosmos
Ethereum
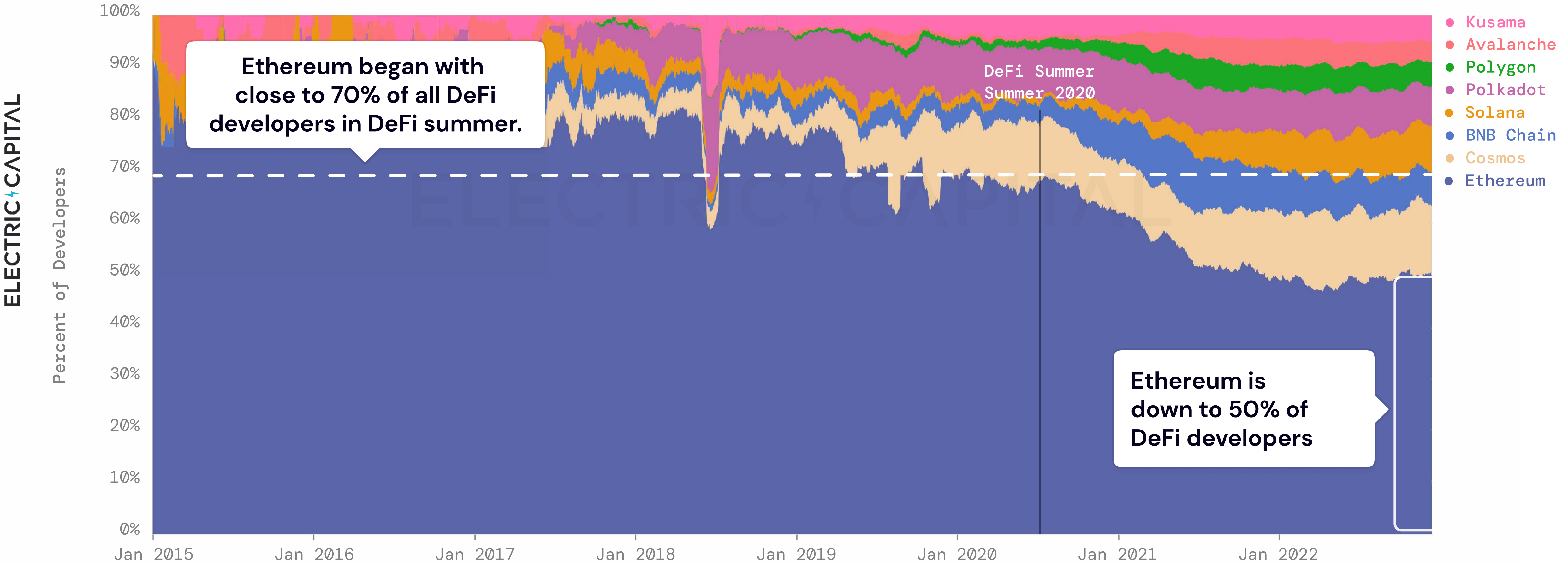
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HOW MANY DEVELOPERS WORK IN NFTS?

929 MONTHLY ACTIVE OPEN-SOURCE DEVELOPERS WORK IN NFTS

NFTs Monthly Active Developers
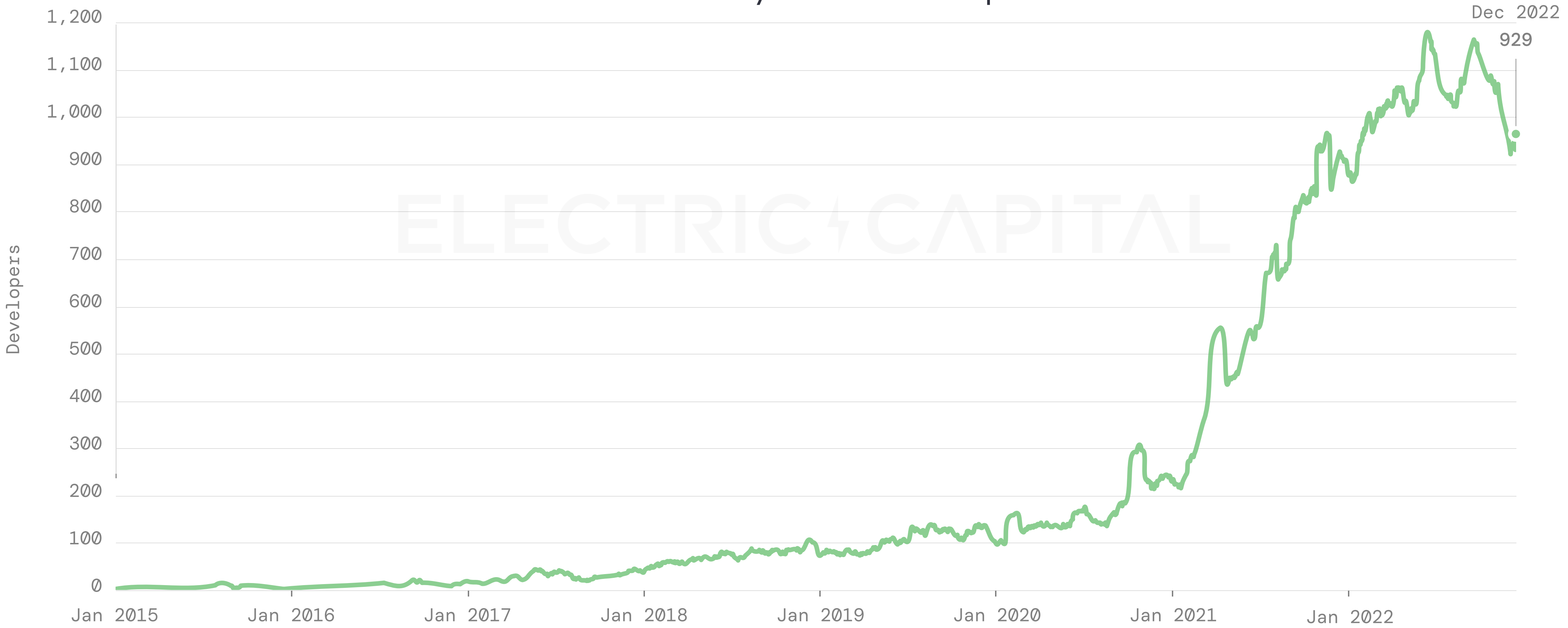
+299% MONTHLY NFT DEVELOPERS SINCE JAN 2021

NFTs Monthly Active Developers
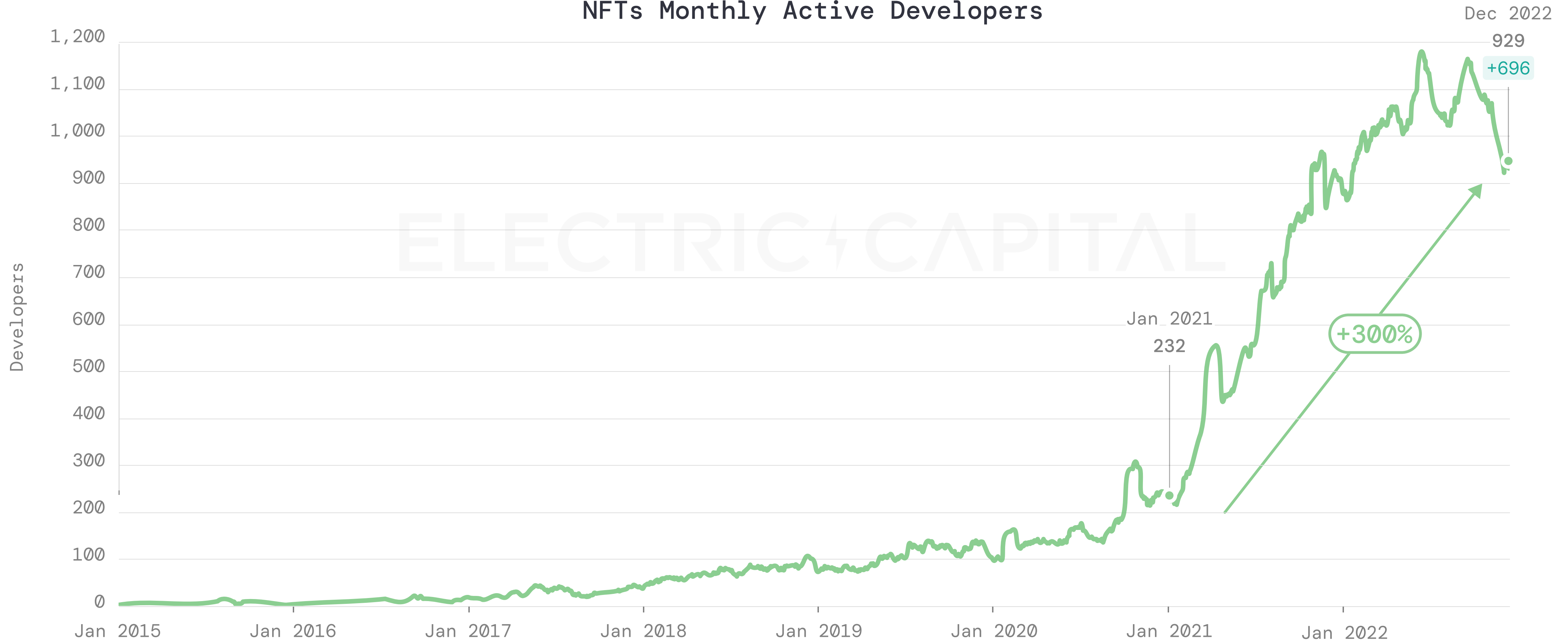
THE NUMBER OF NFT MONTHLY DEVELOPERS IS FLAT YOY
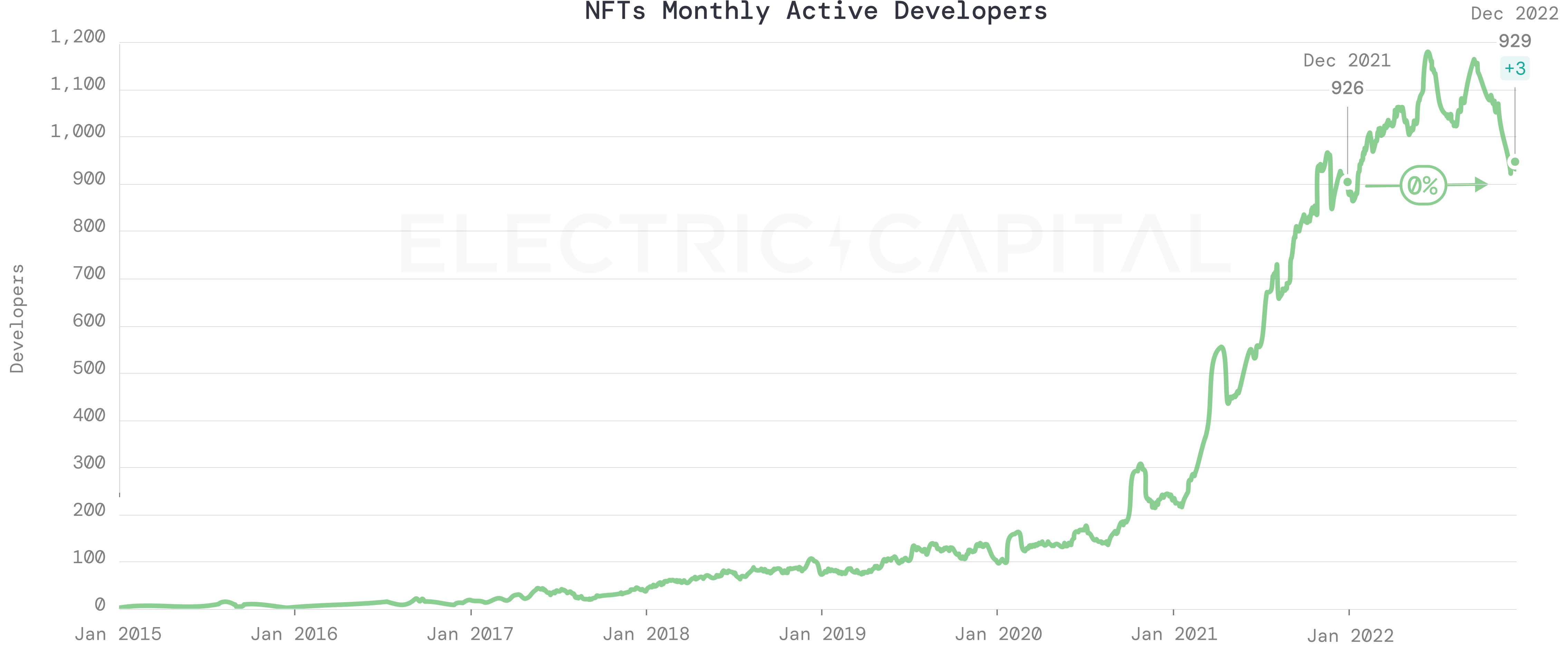

NFTs Monthly Active Developers

NFT'S YOY GROWTH COMES FROM <u>FULL-TIME</u> (+30%), LOSSES COME FROM <u>ONE-TIME</u> (-27%) AND <u>PART-TIME</u> (-5%) DEVELOPERS

Non-Fungible Tokens Monthly Active Developers
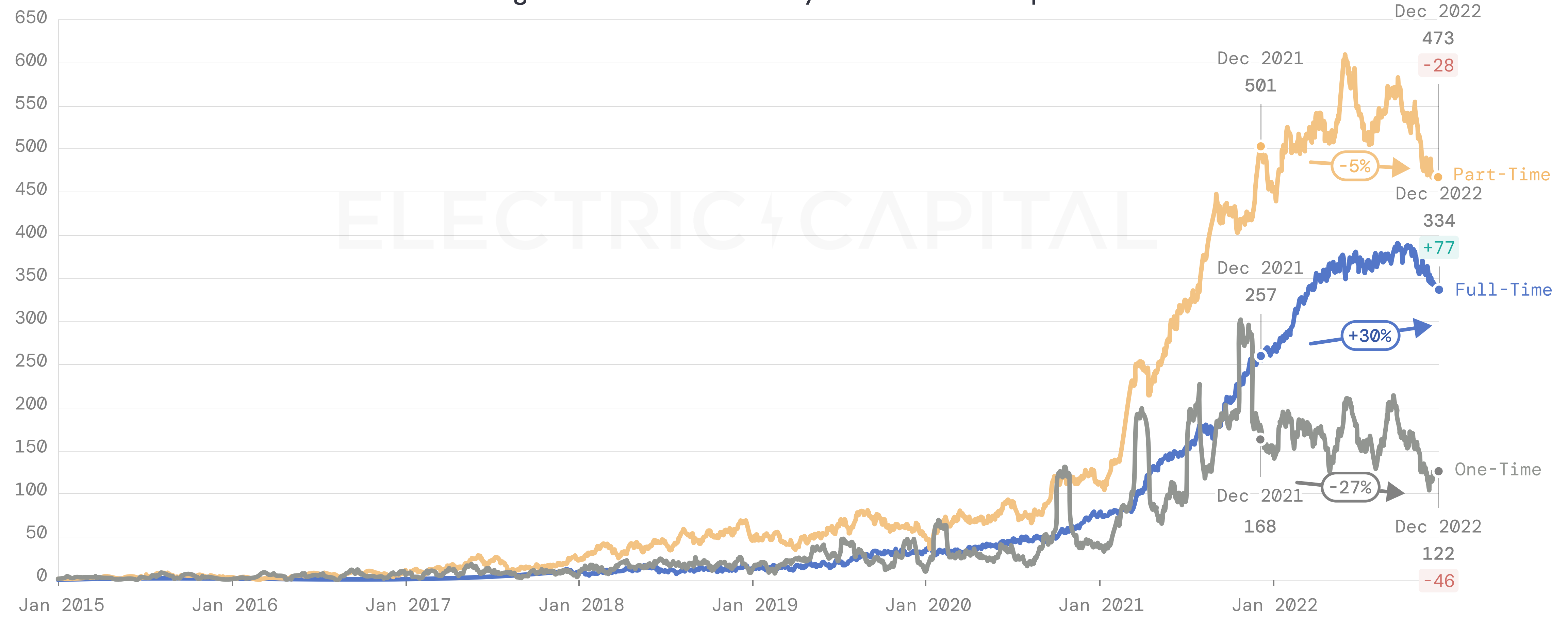
INCREASINGLY, A NEW WALLET'S FIRST ACTION IS IN NFTS: 80% WALLETS' FIRST TRANSACTION WAS RELATED TO NFTS IN 2022

First transaction per wallet - DeFi vs NFT (28-day mean)

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Percentage of first txs

DEFI
NFT
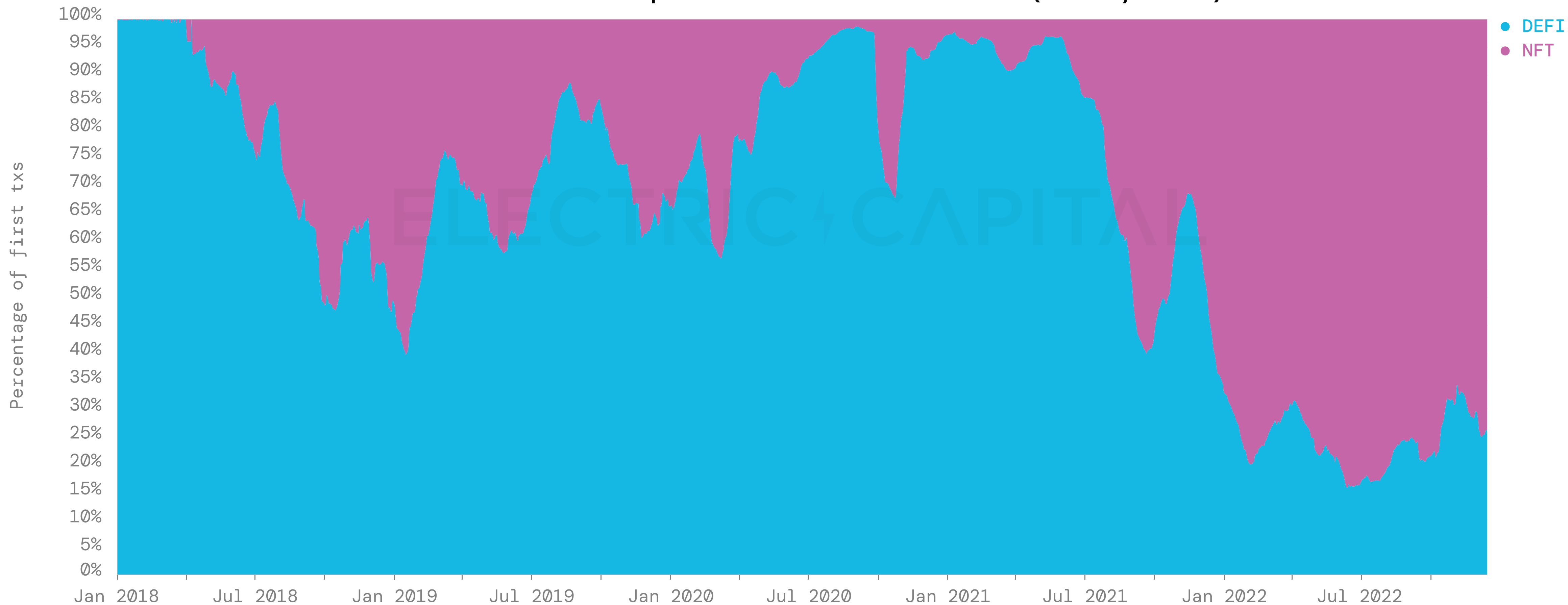
DEVELOPER ENGAGEMENT IS NOT THE BEST LENS FOR ALL ECOSYSTEMS

NFTs, Gaming, and DAOs

Aggregate developer metrics alone may be misleading and may not be the correct leading indicator to consider for NFTs, Gaming, and DAOs.

In these use cases, a relatively small number of developers can build reusable components and the amount of smart contract code written will be small relative to community engagement. For example, a very small amount of code written by just one developer might drive a large PFP (Profile Picture) NFT community. Or in the case of games, the majority of code may be off chain and closed-source, thereby making extrapolation from on-chain and open-source data very noisy.

We believe community engagement signals are an important and complementary leading indicator for the NFT, Gaming, and DAO markets. We are working on several novel ways to gather community data and signals and will share our results as they become available.
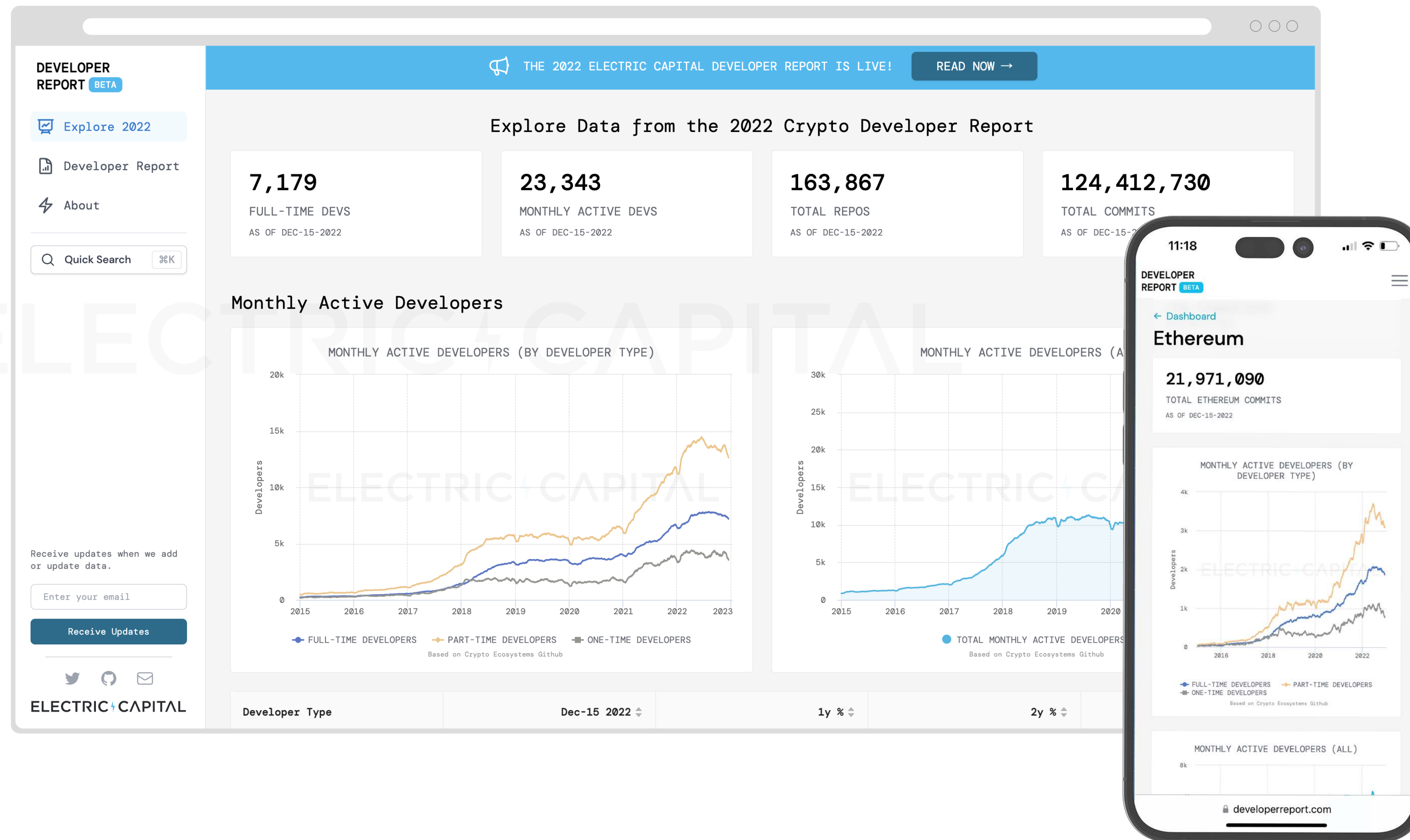
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04

DEVELOPERREPORT.COM

DIVE INTO DATA: DEVELOPERREPORT.COM

We are excited to launch DeveloperReport.com to showcase the data that goes into creating our annual Developer Report. Our aim is to provide a transparent, open, data source for the community.

We will be adding more visualizations, more data, and moving towards more real-time updates at DeveloperReport.com. We will continue to publish an annual Developer Report with detailed analysis on an annual basis as well.

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THANK YOU

HELP MAP THE CRYPTO ECOSYSTEM

Our ecosystem map on GitHub continues to be open so that anyone can contribute.

Submit a pull request in our Github:
github.com/electric-capital/crypto-ecosystems

We will use this data for our reports going forward and for DeveloperReport.com!

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themacexpert

thenic95

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waterrecreation

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wyn
@karoshibee

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05

APPENDIX

COMMIT COUNTING METHODOLOGY: NOT ALL CODE COMMITS ARE CREATED EQUAL

Forks

Only new code counts towards developer activity. We omit code and developer activity from merging changes from the upstream codebase.

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. This eliminates copy/pasted code from counting towards an ecosystem.

Commits from Integrating Open Source Libraries

Integrating common libraries does not count toward code activity.

Branches

We look at commits from all branches (master/ development, etc.) and tags. We look beyond Github's default view, which can be incomplete.

Limitations

We only look at open-source repositories. There are many repositories that are not yet open-source. However, we are planning to enrich the open-source code data with deployed on-chain smart contract code.

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HOW ARE DEVELOPERS COUNTED?

Developers

We count original code authors as developers. This means that a developer who merges a pull request is not an active developer on the project, but the original authors of the commits are.

Full-Time Contributors

Contributed code 10+ days out of a month

Part-Time Contributors

Contributed code fewer than 10 days out of a month

One-Time Contributors

Contributed code once in a rolling 3-month window

Monthly Developer

We count commits during the next 28 days of the commit happening to generate more stability in the data

Top-200 category

Any ecosystem that has been in the Top 200 rank by network valuation for at least 90 days in the corresponding year

DISCLAIMER & DISCLOSURE

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