ION

2019 State of the Lightning Network Report

The Bitcoin Lightning Network has seen tremendous growth in 2019, beginning in January with a worldwide invoice experiment and ending the year having more than doubled the number of Lightning nodes and channels opened. Growth has also manifested in the form of many more companies building on the network, products released, new use cases, and Lightning events.

To gain more insight into Lightning's 2019 progress and anticipated direction in the new decade, RADAR ION conducted a quantitative and qualitative survey of more than 25 Lightning companies and compiled existing statistics on the Lightning Network. We also asked company founders and industry thought leaders about their views on 2019's biggest advances and 2020's greatest promises and challenges.

Special thanks to all survey participants, along with 1ml.com for granting permission to share their analytics, and Fulgur Ventures for gathering additional data.

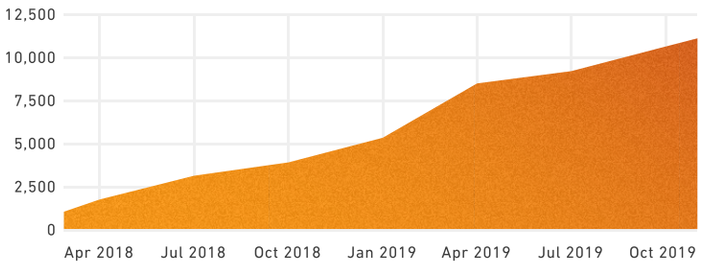
Today we're excited to share these results with you in this 2019 State of the Lightning Network report. We look forward to seeing continued growth as we enter into a new decade and a new era of payment systems.

⚡ The RADAR ION Team

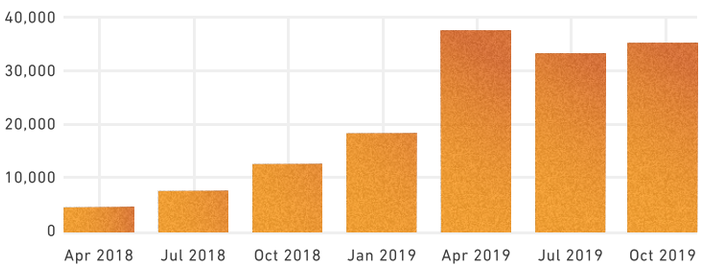
Lightning by the Numbers

According to public network analysis engine 1ml.com, the Lightning Network has seen a **123% increase in nodes**, **120% increase in channels**, and a **67% increase in network capacity** since March 2018. While this public analysis demonstrates significant growth in 2019, it only represents a portion of the total network state. Node owners can also create private channels that are not shared with the rest of the network. Many mobile and custodial wallets operate on private channels by default, and thus aren't represented on public Lightning stats trackers.

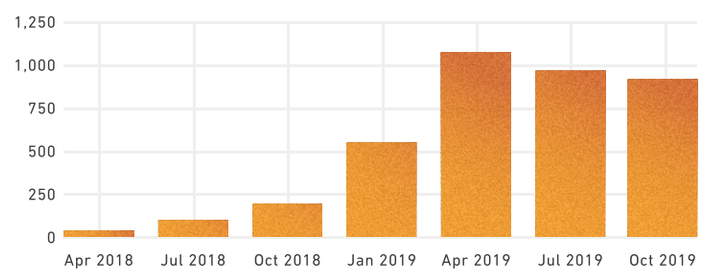
Number of Public Nodes



Number of Public Channels



BTC in Network Capacity



Wallets

Wallets are unique within the Lightning Network in that they are crucial to the workings of a payment channel mechanism; without a wallet, no user could interface with a Lightning app*. Wallets, both custodial and noncustodial, have seen a major uptick in development in 2019, with 11+ wallets launched on mainnet.

One of the major themes that wallets are focused on this year is simplified user experience. For instance, Breez came online this year in June as the first-of-its-kind Lightning-only wallet, followed by Acinq's Phoenix. The rise of Lightning-only wallets mirrors the trend of services that onboard users directly into Lightning via fiat (such as Zap's Olympus). *

There are 20+ Lightning and Lightning-Bitcoin wallets available to users in 2019. The eight wallets surveyed reported 31,029+ users and 260,000+ payments routed or transferred to date (Dec 2019).**

*Note: there are services that will pay Lightning invoices on a user's behalf, such as REDSHIFT, without requiring the user to have a Lightning wallet.

**Note: some companies that categorized themselves as wallets (both custodial and noncustodial) did not disclose their number of users, nor amount of payments transferred to date.

31,029+

Collective users to date

260,000+

Payments routed to date

Funding

Venture capitalists are also allocating capital towards this rapidly growing technology. Fulgur Ventures notably launched in 2019, investing in early-stage startups focused on Bitcoin and the Lightning Network. To date, they've invested in over 12 companies such as ZigZag, Fold, Breez, and SatoshisGames.

Among the 25 surveyed teams building Lightning Network products, $29.3M+ has been raised to date.

*Note: not all companies who participated in the survey raised venture funding nor did all companies disclose the total raised. Some companies are also working on other products in addition to their Lightning offerings.

$29.3M+

Funding raised to date

Adoption and Interest

The Lightning Torch

The Lightning Network has carved out a section of "CryptoTwitter" to itself, the most notable manifestation of which was January 2019's #lntrustchain. Also known as "the Lightning torch" that was passed around the Lightning Twitter community through invoice payments, this proof of concept to showcase the usability of the still-in-beta Lightning Network took off, exceeding the originator's expectations. What started as a 100,000 sat invoice grew into an invoice of over 4,000,000 sats traveling over 40 countries.

In-Person Events

Getting the privacy-focused Bitcoin crew to venture out to an event is no easy feat, but interest around the Lightning Network has brought many community members together this year, all across the world.

In May, the Lightning Developers meetup in San Francisco kicked off their group, now with over 290 members exchanging insight and discussing topics such as new releases, app launches, network fees, and more.

Bitcoin2019 gathered over 2,000 Bitcoiners, 100 speakers, and 70 companies together to explore development in Bitcoin. The conference also featured a Lightning Arcade, where attendees could play classic games for 100 sats, and a half-day program dedicated to exploring layer2 technology. Bitcoin2020 Conference will be returning to San Francisco in March 2020.

#LightningHackdayMUC in June was both a hackathon and a showcase of novelty Lightning technology. The community got together to truly experience the Lightning Network, and what better way to do that than with a Lightning payment-enabled beer tap?

The Lightning Conference, held in October, was the first of its kind in-person Lightning-centric event. With over 500 attendees, from enthusiasts to those working on the protocol on a day-to-day basis, this Berlin conference got a community of developers and business operators together to discuss innovations on implementations, applications, and more. Bitcoin Magazine has a full recap of the conference here.

Photo Credit: Enid Valu

Hackathons

Boltathon Apr 2019	58 participants
BitcoinGames Jun 2019	217 participants
#LightningHackdayMUC Jun 2019	200 participants
STRIKE by RADAR ION Oct 2019	85 participants
Boltathon 2 Dec 2019	48 participants

Rise of Education and Development Resources

Onboarding material and educational resources are crucial to the adoption of Lightning Network as new users and developers discover the network.

Andreas Antonopoulos, author of *Mastering Bitcoin* and *Mastering Ethereum*, announced a new book this August—*Mastering the Lightning Network*— in collaboration with Lightning Labs CTO Olaoluwa Osuntokun, Rene Pickhardt, and the greater Lightning community to be published in 2020.

Chaincode Labs launched the Chaincode Lightning Applications Residency in 2018 and continued their efforts in fostering Lightning development through education this year with their Lightning Protocol Development seminar and curriculum.

There has also been an uptick in development tools and open-source APIs this year as developers are sharing knowledge in how to build on Lightning and integrate tools within their applications:

Polar: a development tool built to help Lightning Network application developers quickly spin up one or more networks locally on their computers.

Lightning App Tutorial: a step-by-step tutorial project for learning to build Lightning applications.

Lightning on Mobile: LND v0.8 beta with Neutrino with full support for integrating lnd within iOS and Android apps.

ION App Store API: Lightning app dataset to build an app discovery experience and retrieve a wide range of application data, from ready-to-use images and social media contacts to node pubkeys.

"Development has been outpacing interest and adoption for a while now. I think Lightning is in pretty great shape at the moment; it's just in need of more users to drive demand for it."

William O'Beirne, *Joule*

Headlines of 2019

Many products and projects built on the Lightning Network launched in 2019. Here are some of the year's major headlines and announcements.

March

Lightning Labs releases alpha version of a new protocol called Lightning Loop

June

Announcing Loop In, the second half of Lightning Loop

September

Sparkswap adds USD support to its Bitcoin Lightning Network exchange

Zap announces Olympus, a Lightning-enabled fiat onramp

Fold app announces the integrations of Bitcoin's Lightning Network

October

Fortnite meets Bitcoin Lightning Network in new 'Lightnite' video game

November

RADAR launches REDSHIFT: Trustless cross-chain cryptocurrency payments

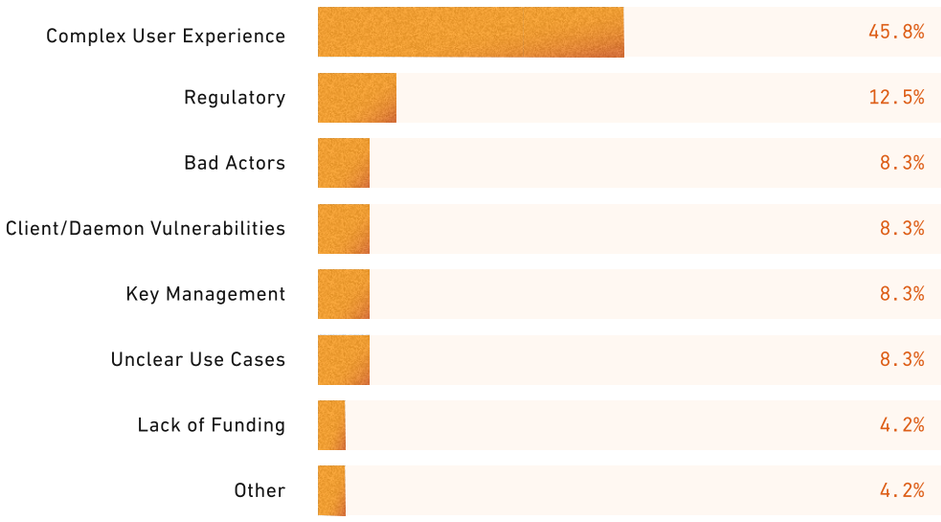
December

Bitfinex is the first exchange to launch support for the Lightning Network

River Financial (previously Alto Financial) launched as "The best place to buy, sell, and use bitcoin for the long term investor."

Network Challenges

While the network has gained traction this year, many company founders noted that Lightning is still in the early stages and there's much more work to be done. We asked what they consider the biggest threat to Lightning Network adoption:



Better user experience is predicted to remain a primary focus of Lightning apps in 2020, as indicated by our survey results and the influx of simpler wallets to the market.

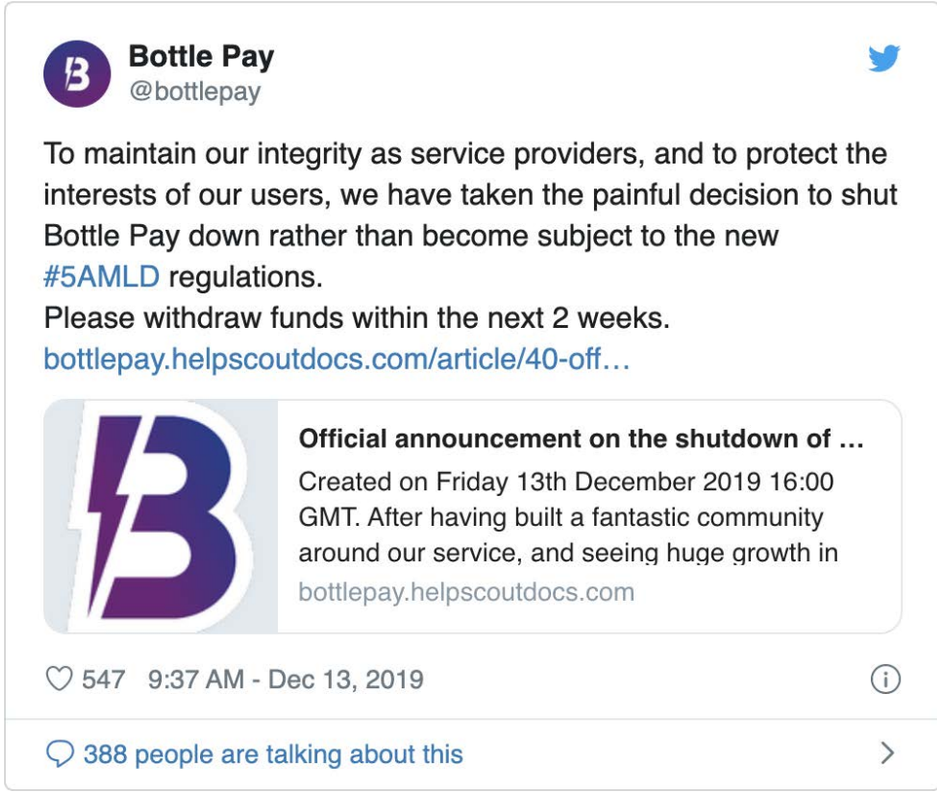
"The Lightning Network is currently serving only a subset of Bitcoin users. If a wider adoption is the goal, new use cases that target a different demographic need to be addressed."

Jeff Gallas, *Fulmo*

"The largest challenge the Lightning Network currently faces is how difficult it is to use. Too many people still store their BTC on an exchange, let alone move it to a wallet, move it to a lightning wallet, and open a channel—wait, why can't I receive funds? This challenge is being tackled by numerous projects… so it should improve throughout 2020."

Taylor Helsper, *myNode*

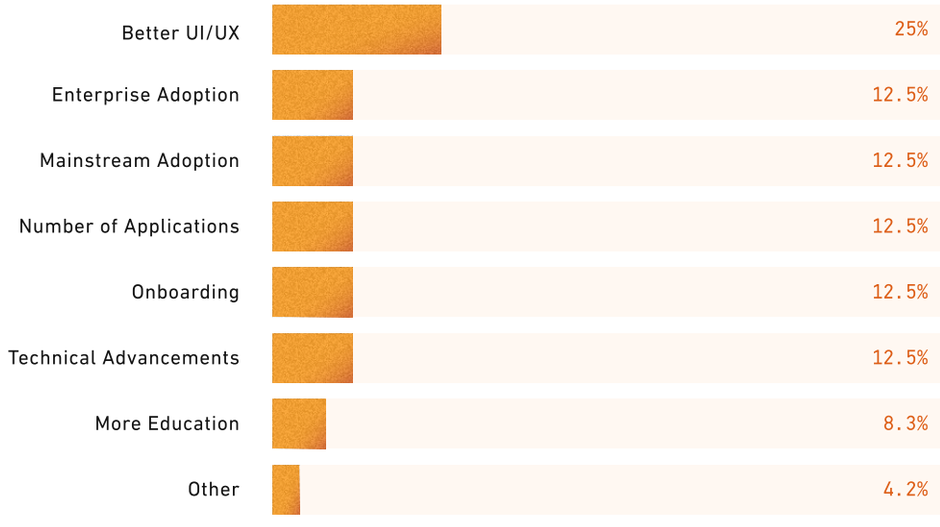
Another area of concern is around regulation. BottlePay, a popular lightning wallet that recently shut down due to regulatory concerns.



"The current regulatory classification of bitcoin as property vs. currency is severely limiting the use cases and adoption of lightning. Increased regulatory complexity could limit it further, or if done well could unleash new growth."

Will Reeves, *Fold and Lightning Pizza*

Looking into the new year, we asked companies what they thought needed to advance in order for the Lightning Network to succeed:



"Security, scalability, and stability of the software are prerequisites to the success of the network, and those are still in the early stages."

Trey Griffith, *Sparkswap*

"Friction in the Lightning UX is cumulative. While solutions for certain frictions exist, crafting the right combination of solutions is a challenging prospect for any Lightning business."

@CapitalistDog1, *ShockWallet*

The novelty of the Lightning Network also creates common misconceptions that could hinder greater adoption. Companies felt that the lack of clarity in the differences between Bitcoin and the Lightning Network, along with confusion surrounding the mechanics of the protocol, were topics that need to be better explained to users.

"The biggest misconception about the Lightning Network is that it's harder to use than Bitcoin. Bitcoin addresses are terrible, and Bitcoin UTXO management is complex. Receiving Bitcoin in apps is hard. Lightning is actually much easier for everybody."

fiatjaf, *Intxtbot*

Playing with Lightning

Implementations

In 2018 the Lightning Network Daemon (LND) and Blockstream's C-Lightning were both released in beta. Now the protocols have advanced to allow for developers to build on top of the network. This year we've seen projects turn into companies and enthusiasts forming into teams. Amongst the 25 companies surveyed, six of them had 10+ full-time team members working on Lightning Network applications. There are also now 259 repositories in Github with the topic Lightning-Network.

There are currently four Lightning implementations that follow BOLT specifications and are widely used for app development.

Implementation	Language

C-Lightning	C
Eclair by Acinq	Scala
LND	Golang
Ptarmigan	C++
Rust-Lightning (WiP)	Rust

Since releasing in beta, each of the implementations is working to ship features that will enable faster, easier, and more intuitive development on the network.

LND

The Lightning Network Daemon by Lightning Labs, a Lightning implementation written in Golang, has published three major releases in 2019. In April, v0.6 beta was launched with Static Channel backup and recovery, improved performance for large nodes, routing optimizations, and lightning loop support out of the box. In July, v0.7 beta launched with Watchtowers, more reliable payment tracking, and better fee control with CPFP (Carve-Out for Fee-Prediction). And the most recent v0.8 beta release is the first to enable mainnet neutrino.

"I'm particularly excited about the rise of non-custodial financial products built on Lightning. At LL, our first related product is Lightning Loop, which enables people to swap funds into and out of Lightning and gain the ability to send and receive funds on the network. Liquidity is a big theme for us, and we'll see numerous more products on the horizon for 2020 and beyond."

Elizabeth Stark, *Lightning Labs*

C-Lightning

C-Lightning by Blockstream, a Lightning implementation written in C, has published two major releases in 2019. In March v0.7 was released featuring plugins with frameworks for C, Python, and Go for users to write their own extensions, and reproducible builds for Ubuntu. In December, v0.8 was released with Bitcoin mainnet first, multi-part payments support, and extending plugin capabilities. C-Lightning has dedicated efforts to supporting plugins and released a series of them this year.

v0.7 — Mar 1

v0.8 — Dec 17

"I think C-Lightning in 2020 is going to continue to lead the way in terms of spec development and being an extensible, customizable platform for Lightning nodes. v0.8.0 started hinting at this direction with cdecker's APIs for sending custom messages and onion packets -- this will really make it easier for researchers and devs to prototype with C-Lightning. Personally, I'm looking forward to getting our dual-funding implementation included, as well as work on splicing, etc. to help with liquidity management and channel opens. I'm also looking forward to PSBT integration, which should make interop between external wallets and C-Lightning a bit simpler. PSBT and external wallet/hsmd interop with lightning nodes will be a big trend for 2020."

Lisa Neigut, *C-Lightning*

Looking Ahead to 2020

2019 has been a significant year for Lightning Network growth, with implementations out of beta there has been an uptick in user facing apps, increased capital allocation, and many Lightning related headlines. Looking ahead to 2020 we asked investors, operators, and developers on where they see the momentum taking us.

"I feel the LN hype has died down a bit since summer. First half of the year was wild, LN grew much faster than I had thought. This consolidation is probably healthy, to let services and infrastructure catch up and mature. I think we will see increased use of LN in 2020. Exchanges implementing LN support, and making 'arteries' in the network with big capacity, should make for more use cases and a more robust network."

Hodlonaut

"I was amazed to see the growth of the startup ecosystem building on

Lightning and the speed at which new use cases emerged over the past year. For example, within a matter of weeks, numerous Lightning-to-fiat solutions were announced, including Sparkswap, Zap, Breez, River (formerly Alto), and Escher. We also saw many companies building Lightning use cases get seed funding, and the Lightning Conference in Berlin was a massive success in bringing together people from all over the world working on all areas of Lightning."

Elizabeth Stark, *Lightning Labs*

"Going into 2019, I expected the Lightning Network to continue expanding through devout hobbyists spinning up more nodes and locking up more BTC. What surprised me was that the hobbyists were joined by entrepreneurs. 2019 was the year of the Lapp. These companies are using the Lightning Network to express Bitcoin's potential as a global currency. I suspect 2020 will be defined generally by more Lapps, and specifically by fiat-to-Lightning on-ramps, exchanges and custodians integrating lightning, and clever uses of LN as a general-purpose data network."

Brian Murray, *Craft Ventures*

"In 2019 we had a big wave of investment in the platform, people starting up businesses and raising funds, growing out teams. Growth wasn't as dramatic in 2019 as when we were going from zero in 2018, we hit a saturation point for a certain segment of enthusiasts and saw a lot more work targeting the next segment to grow into and in 2020 we'll see that groundwork turn into releases that expand what LN can do and who can benefit from it. I'm really looking forward to Wumbo, ie., uncapping the payment safety rails to allow for more high value transfers to start taking place on the Lightning Network. More ways to buy Bitcoin using Lightning will also start to appear and that should make everything a lot more accessible. The Lightning liquidity market should get more sophisticated, more reliable routing nodes, more efficient swap services like what we are working on with Lightning Loop to batch submarine swaps."

Alex Bosworth, *Yalls.org*

"2019 was my immersive introduction to the world of the Bitcoin Lightning Network and it did not disappoint. I've been amazed by the rapid development in LND and C-lightning, which has enabled the expansion of new wallets and Lightning applications. In 2020 I hope that we continue this momentum with more community engagement and product development that will foster network adoption. I also look forward to bringing more users to the Lightning Network through cross-chain tools such as REDSHIFT."

Beatrice Leung, *RADAR*

Thank You

Thank you again to all the companies that participated in the survey, 1ml.com for sharing their snapshot of the network, Fulgur Ventures for their participation, and all those who took the time to comment for this report. We look forward to seeing what 2020 holds for the Lightning community. See you at the moon.

This report was brought to you by RADAR ION — home of the Lightning Network.

Get an overview of the Lightning Network with an onboarding guide and Lightning wiki. Start using the Network today with our developer tools, play with Lightning in the App Store, and make Lightning payments with BTC and ETH via REDSHIFT.

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