



A LOOK AT STELLAR (XLM)

A PRIMER BY



STELLAR (XLM) HIGHLIGHTS

- **Top-10 cryptoasset:** Stellar (XLM) has consistently ranked as one of the leading cryptoassets in terms of market value and ecosystem support (e.g., exchange listings, etc.) since its creation in 2014
- **Payments focused:** Stellar is focused on a specific use case – international payments and cross-asset exchange – with potentially broad applications (e.g., micropayments for decentralized applications (dApps) that require high throughput)
- **Diversified user base and support:** the platform has attracted the interest of traditional corporate partners (e.g., IBM), successful non-crypto payments startups (e.g., Stripe), well-funded crypto networks (e.g., Kik, which previously announced it was partially moving from Ethereum to a fork of Stellar), and individual users through its long-running XLM giveaway program

REASONS TO USE OR BUY XLM

Lower cost and greater capacity: superior on-chain transaction capacity and lower transaction fees than competing platforms like Ethereum and Bitcoin

Native digital exchange: in contrast with most crypto exchanges, which are wholly centralised, the Stellar protocol facilitates trust-minimized asset exchange

Backing support: support from a number of notable tech influencers; significant development resources

Demonstrated traction: unlike the vast majority of crypto networks, Stellar has already attracted real use as a payments network and fundraising platform

Significant growth potential & positive mission: Stellar is targeting large market segments (e.g., unbanked, remittances) and people in some of the fastest growing countries (e.g., India, Nigeria, Philippines, Indonesia, China), many of whom cannot currently access or afford basic financial services

Widely accepted and supported: large number of exchange listings (including 10 large Tier-1 exchanges)

- **Enterprise adoption:** Stellar has had success attracting enterprise partner integrations (e.g., IBM payments channel partnership, integration of distributed ledger startup Chain)
- **Alternative token sale platform:** Stellar has established itself as one of the most popular alternatives to Ethereum as a platform for blockchain startups seeking financing through token sales

XLM TOKEN OVERVIEW

LAUNCH DATE	1 August, 2014
TICKER SYMBOL	XLM
RANK - MARKET VALUE	8
RANK - MARKET LIQUIDITY (LAST 30-DAYS)*	14
TOKEN PRICE	\$0.1307
CIRCULATING COIN SUPPLY	19,269,672,226
TOTAL COIN SUPPLY	104,802,391,119
TOTAL MARKET VALUE (CIRCULATING)	\$2,517,155,906
TOTAL MARKET VALUE (YEAR 2050 ESTIMATE)	\$18,552,736,202
ADJ. DAILY TRADING VOLUME (24-HOURS)**	\$25,680,606
MOST SIMILAR TO:	Ripple, Ethereum

Note: data as of 8 April, 2019

RATINGS

ADOPTION	Tier-1
ECOSYSTEM SUPPORT	Tier-1
BACKERS AND RESOURCES	Tier-1
SCALABILITY	Tier-1
LINDY EFFECT	Tier-1
COMMUNITY STRENGTH	Tier-1
PROJECT MATURITY	Tier-1
USER EXPERIENCE	Tier-1
DECENTRALIZATION	Average
OVERALL	Tier-1 Cryptoasset

RATING SCALE LEGEND

- Tier-1 - among the top cryptoassets
- Excellent - a point of distinction
- Above average
- Average
- Below average

* This data has been pulled from <https://coinmarketcap.com/>

**Note: it is important to recognize a growing body of research that has shown a significant share of crypto trading volume that is self-reported by exchanges is inaccurate (e.g., a recent analysis of this issue by Bitwise can be found [here](#)). We have therefore utilized 'adjusted trading volume' from the Blockchain Transparency Institute's (BTI), which only includes trading volumes from exchanges that have less than 10% wash trading volumes (identified through BTI's [algorithms](#)).

Overview

Stellar was founded in 2014 by cryptocurrency pioneer Jed McCaleb and Joyce Kim. It is designed to be a “world-wide payment network” that facilitates the exchange of any currency, asset or token. Its native token is the lumen, which trades under the ticker symbol XLM.¹ Stellar’s token details are summarized in Table 1.

Table 1: Stellar Lumens (XLM) Token Data

CRYPTOASSET NAME	Lumens
TICKER SYMBOL	XLM
XLM CURRENT TOTAL SUPPLY	104.9 billion XLM
XLM CIRCULATING SUPPLY	19.3 billion XLM (18.4% of total existing supply)
SUPPLY CURVE DYNAMICS	100 billion XLM were pre-mined and XLM supply grows by 1% per year into perpetuity
SUPPLY DISTRIBUTION	The initial 100 billion XLM pre-mine was scheduled to be allocated as follows: <ul style="list-style-type: none">• 5% reserved for Stellar Development Foundation operational expenses• 20% to Bitcoin (19%) and Ripple (1%) token holders (completed in 2016-17)• 50% to individuals through grass roots channels (ongoing, 5.3 billion XLM distributed to date)• 25% to integration/growth partner organizations (ongoing, 1.1 billion XLM distributed to date)
XLM DISTRIBUTED TO DATE²	8.7 billion (8.3% of total existing supply)
CURRENT XLM HELD BY STELLAR DEVELOPMENT FOUNDATION	85.6 billion (81.6% of total existing supply)
CURRENT USE (TRANSACTION VOLUME, USERS ETC.)	24hrs vol : \$227k Active Addresses: 591

At inception, Stellar was based on a fork of the Ripple consensus protocol, which McCaleb developed prior to departing in June 2013 to work on Stellar.³ Stellar radically differentiated itself from Ripple early on by establishing a foundation (the [Stellar Development Foundation](#)) and endowing it with ‘pre-mined’ tokens (both now common practices by cryptocurrency projects). The focus of the foundation is to develop the Stellar protocol technology, and to advance the use of the Stellar platform and XLM.⁴

The Stellar Development Foundation remains the largest holder of XLM, although it has committed to retain only 5% of the overall supply of XLM and is actively in the process of giving away the remaining balance. In November 2018 the Stellar Foundation announced a partnership with Blockchain to [airdrop \\$125 million dollars worth of XLM to Blockchain wallet users](#), and an approximately \$100 million dollar XLM airdrop and [learning partnership](#) with Coinbase was also recently announced.

¹The native assets were originally referred to as “stellars” (STR) before later being renamed lumens (XLM)

²<https://dashboard.stellar.org/>

³<https://blog.bitmex.com/the-ripple-story/>

⁴The Stellar Development Foundation is technically a non-stock nonprofit corporation in the U.S. State of Delaware” <https://www.stellar.org/wp-content/uploads/2014/07/FILED-STEELAR-DEVELOPMENT-FOUNDATION-00594674.pdf>

The Stellar Development Foundation remains the largest holder of XLM

has focused on enterprise and partner integrations. In Sept. 2018, Lightyear purchased distributed ledger technology startup Chain. The transaction was characterized as a “merger”, with the new combined entity named [Interstellar](#). As part of the merger, Chain CEO Adam Ludwin joined Interstellar as CEO, and Chain migrated its products and some of its customers onto Stellar’s global public ledger. McCaleb currently serves as CTO of Interstellar.

In addition to its growing use in payments, Stellar has had success in attracting enterprise adoption. In May 2017, Stellar teamed with Brit Yunge (former head of Asia for Palantir) to create a commercialization vehicle named Lightyear, which

Technology network overview

A key feature of Stellar’s design is its superior transaction throughput/capacity at the main protocol layer: Stellar can accommodate over 1,000 transactions/second, which compares favorably to the single and double digit base layer transaction capacity of Bitcoin and Ethereum, respectively.

Kik, a large social network that launched one of the most high profile token sales in recent years, publicly decried Ethereum’s poor speed and high transaction fees as representing the “dial-up era of blockchain” as it explained its decision to partially migrate its kin token network to a fork of Stellar.⁵ The problems experienced by Kik with Ethereum illustrate the comparative advantage offered by Stellar to larger user communities that are evaluating different blockchain platform to utilize.

Table 2: Stellar Technology Overview

CONSENSUS TECHNOLOGY	Stellar Consensus Protocol (SCP), which is a implementation of the Federated Byzantine Agreement consensus algorithm ⁶
THROUGHPUT	>1,000 transactions/second
SETTLEMENT SPEED	2-5 secs
FEES	Negligible. Fees are not earned by miners but redistributed through the emission of new XLM

While Stellar is substantially smaller than Bitcoin in terms of its use, the platform is showing faster year-over-year growth in transactions per day (~40%) than bitcoin (~20%) (Table 3). In contrast with the Bitcoin and Ethereum networks and their thousands of nodes, there are approximately 50 nodes taking part in the Stellar consensus protocol, making Stellar more centralized in practice. However, there is nothing preventing the addition of many more Stellar nodes, which are also relatively lightweight to operate as compared to a full bitcoin node.

⁵ <https://www.coindesk.com/ethereum-and-stellar-mobile-messenger-kik-embraces-two-blockchains>

⁶ For a brief overview of the strengths/tradeoffs of the Stellar Consensus Protocol (SCP) and how it compares with other consensus protocols see <https://hackernoon.com/a-hitchhikers-guide-to-consensus-algorithms-d81aae3eb0e3> <https://www.coindesk.com/chain-mobile-app-kik-fork-stellar-fee-free-blockchain>

Table 3: Network Activity: Stellar vs. Bitcoin

DATA CATEGORY	BITCOIN	STELLAR
Transactions per day	500,000 (~200,000 from CWs)	~1,000
Year-over-Year growth in transactions per day	+20%	+40%
Projected coin supply (year 2050)	~21M	143bn (assuming 1% inflation)
Mining	720 MW of ASIC miners	Not Applicable
Estimated number of owners	30M+	<5M
Estimated number of active users	Millions	Tens of thousands
Market Liquidity (daily volumes)	\$17B	\$366M
Active addresses used per day	704,548	8,914
Average fee for wallet transaction	\$1.50 (at present)	Negligible
Blockchain size (growth/month)	151 GB (7GB)	30GB

Stellar vs. Ripple

Stellar and Ripple look similar in many ways, with the two sharing the following elements:

At first glance, Stellar and Ripple look similar

- Top-10 cryptoassets by market value
- Jed McCaleb as a founder⁷
- Primary focus is operating ultra-fast, low cost payment solutions targeting cross-border payments
- Platforms can be used with non-native assets
- Relatively “mature” with working platforms and meaningful partnerships (IBM and its partner banks for Stellar; 100+ individually contracted banks for Ripple)
- Headquartered in San Francisco

While Stellar and Ripple are based on the same Federated Byzantine Agreement (FBA) consensus algorithm, technical differences between the two protocols exist (e.g., the Ripple protocol utilizes probabilistic voting). The Stellar Consensus Protocol (SCP) was jointly developed by McCaleb and professor David Mazières while he was on leave from Stanford in 2014. Stellar was first to implement a provably safe FBA⁸.

Outside of technical differences, the main points of distinction between Stellar and Ripple are their respective operating structures and cultures:

- Structure: For-profit (Ripple) vs non-profit (Stellar)
- Use case focus: Ripple is focused on inter-bank payments, and Stellar is focused on remittance

⁷ Ripple (“Ripplepay”) was actually created prior to bitcoin in 2004, but it struggled to gain significant momentum. Today’s modern Ripple era is typically marked as beginning with McCaleb’s joining Ripple in May 2011

⁸ More detail on technical differences between Stellar and Ripple can be found in their respective whitepapers (hyperlinks to both can be found in the Resources section of this primer) and here:

<https://www.quora.com/What-is-the-main-difference-between-Stellar-and-Ripple-protocols>

- markets, micro-payments, developing countries, and enterprise
- Transparency: questions continue to be raised over the actual circulating supply of XRP⁹

Below is a table comparing Ripple and Stellar (Table 4).

Table 4: Stellar vs. Ripple

	NAME	STELLAR LUMEN	RIPPLE	XLM VS XRP
	Ticker	XLM	XRP	
	Launch date	1 August 2014	8 April 2013	
	Key differentiator(s)	Non-profit structure, uncapped supply	Inter-bank market focus, capped supply	
Valuation & Use	Price	\$0.13	\$0.35	
	Total Issued Coin Supply	19,269,672,226	41,743,765,071	-53.8%
	Market Value	\$2,515,827,503	\$14,878,415,542	-83.1%
	Supply % issued	13.45%	21.82%	-8.4%
	Network Value to Transactions (NVT) Ratio (30d)	3,507	126	2683.6%
	Volatility of daily returns (30d)	3.6%	3.2%	0.4%
	Adj. Daily Volume (24-hour)	\$25,680,606	\$281,605,783	-90.1%
	Avg. Transaction value / day (30d)	\$559	\$393	64.9%
	Avg. Transaction fee	\$0.000462	\$0.007556	-93.9%
	Avg. Active address (30d)	8,914	5,544	60.8%
	Transaction confirmation time	3-5 seconds	3-5 seconds	
Ecosystem Adoption	Number of fiat pairs	19	23	-4
	Number of crypto pairs (non-duplicate only)	39	67	-28
	Number of exchange listings	73	113	-40
	Number of Tier-1 exchange listings	10	11	-1
	Tier 1 exchanges	UPbit, Kraken, Bitfinex, HitBTC, Binance, Bithumb, Bittrex, Poloniex, Huobi, Okex	HitBTC, Binance, Bitfinex, Bithumb, Bitstamp, Bittrex, Kraken, Bitstamp, Poloniex, UPbit, Coinbase	
	Distribution	70% owned by the foundation	52% held in escrow, 40% distributed and 8% owned by Ripple. (Top 100 address owns 79% of the non-escrow balances)	
Community Strength	Reddit - group size	99,200	197,000	-97,800
	Twitter	263,000	912,000	-649,000

⁹ <https://messari.io/article/messari-research-ripple-s-market-cap-is-likely-overstated-by-6-1-billion>

*See Note on p.2 for explanation of Adj. Daily Volume methodology

XLM vs XRP: additional thoughts concerning longer-term valuation

Both the XLM and XRP tokens have similar arguments in their favour: if they are used heavily as a means of payment it is likely that economic agents will store some XLM and XRP, thereby reducing circulating supply and placing upward pressure on their respective token prices. Whereas XRP has a capped supply, XLM will grow its supply into perpetuity at a constant 1% per year. However, a capped supply may incentivize hoarding, thereby undermining Ripple's goal of making XRP widely use for transaction payments.

The targeted markets and philosophical differences observed between Ripple and Stellar could make a meaningful difference over which is more likely to achieve wider long-term adoption. Ripple is a privately owned for-profit organization with most of the non-circulating tokens in the hands of the Ripple Labs and its founders. A successful monetary store of value will likely not be as privately owned as XRP is today, in our view.

Stellar seems to some extent less centralized and more transparent than Ripple, and this could inspire more confidence in XLM and wider adoption. The Stellar Development Foundation is an open source non-profit organization with an already established track record and schedule for distributing XLM tokens that are currently held in reserve. Furthermore, economic agents such as households are arguably more likely to use XLM than banks will use XRP, particularly in the wake of the growing direct competition Ripple faces from competing platforms such as SWIFT, JP Morgan Coin, Utility Settlement Coin, R3, etc. The Stellar platform has also already started garnering traction as a decentralized exchange and token sale platform, which serves to further increase usage of XLM and incentivize storage of some XLM by network participants.

In exuberant environments like the one observed in 2017, XRP may perform better than XLM as the Ripple brand is more established and benefits from wider media coverage. XRP also currently leads XLM across a number of adoption and use metrics (Table 4). However, over the medium-to-longer term, we believe Stellar and XLM exhibit greater potential.

Wrap-up and looking ahead

The cryptoassets ecosystem has grown dramatically over the last two years, and there are now literally hundreds of interesting blockchain networks and applications under development. However, there are still relatively few 'mature' blockchain networks with track records, demonstrated use cases, and significant user bases.

Today, Stellar (XLM) represents one of a small handful of what we consider to be 'high quality' cryptoasset networks. The designation of XLM as a high quality cryptoasset is based on a wide range of factors, including:

- The maturity of Stellar's technology and platform
- The demonstrated usefulness of Stellar to a broad range of users / use cases
- The high quality of the team and advisors involved with Stellar
- The level of ecosystem adoption achieved to date
- A number of other factors

Today, Stellar faces much more competition than when it was launched in 2014 as a 'better Ripple'. While it has shown impressive transaction growth and flexibility in expanding its usefulness into new areas, such as token crowdfunding, a greater level of use and adoption is needed to advance Stellar

from its current status as a Top-10 cryptoasset network into the elite Top-5. Early indications from the massive \$125m airdrop launched in conjunction with Blockchain and its millions of wallet users have been positive and are helping to significantly expands Stellar's user base.

Resources

STELLAR	RIPPLE
Whitepaper	Whitepaper
Website	Website
Github	Github
Twitter	Twitter
Reddit	Reddit
Wikipedia	Wikipedia



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