

Project Overview

*Chainlink would like to present itself as a valuable network of decentralized oracles, aiming to bridge the gap between real-world data feeds and the needs of the ever-growing blockchain applications. Taking a deeper dive, however, concludes that **the project is yet another intermediary, ultimately converging to a centralized and prohibitively expensive service, targeting an extremely narrow market, with little to no traction and essentially relying on PR stunts and price manipulation to maintain an unreasonably high market cap in the hopes of financial gains for the founding team under the motto “fake it, till you make it”.***

Understanding and evaluating Chainlink's value proposition (or lack of it) requires examining the problem the company is trying to tackle, the size and structure of the supply chain it operates in, and the project's competitive position to capture the value it eventually creates.

What problems does Chainlink aim to solve?

While some smart contracts rely solely on information available on the blockchain, the vast majority of these applications are triggered by externally generated and stored data feeds. If two parties are making a bet on a basketball game via a smart contract on a blockchain, a third party must let the smart contract know the outcome of the game by publishing the associated data to the blockchain. As a result, a core bottleneck for the widespread adoption of the technology is the inability of smart contracts to interact with any real-world data or other resources outside the blockchain network.

Financial derivatives are actionable once predefined market conditions are satisfied; bond price and payments are subject to prevailing interest rates; insurance and gambling payouts are triggered by the outcome of real-world events. These and many more [applications](#) could be automated through smart contracts as long as the external data is fed in a reliable, timely and trustworthy manner.

The Oracle Problem

One proposed solution to the data bridging problem is [via an oracle](#). An oracle, simply put, is a trusted person or entity that brings real-world data into the blockchain world. If two parties are

making a bet on a football match via a smart contract on a blockchain, the third party oracle lets the smart contract know the outcome of the game by publishing the associated data to the blockchain.

The key problem of the oracles is their incentive to take bribes from users or become a user themselves and rig the outcome of a bet in their favor. Relying on malicious or incompetent oracles results in the outcome of a smart contract being compromised, rendering the whole smart contract concept pointless. For instance, a hacker might take control of an oracle to influence the payout of a smart contract. Or if two parties bet on a sporting event, the loser might be able to simply bribe the oracle to report the wrong winner, which would result in the smart contract sending the funds to the losing bettor. Because the blockchain itself has no way of verifying the authenticity of the off-chain data provided to it by the oracle, this kind of fraud is possible. And while the winning bettor would certainly protest, blockchain transactions tend to be irreversible.

The only thing the blockchain can do is compare answers from different oracles weighted by the amount of collateral each one provides or some alternative selection methodology. In other words, successfully cheating would require what effectively amounts to a 51% attack on the decentralized oracle network. Depending on the algorithm behind, one should compromise just a few oracles (say 3-4) or stake 51% of the collateral to take control of the smart contract's outcome.

So far, the operational oracle structures have a different degree of centralization, meaning they present a single point of failure. It is clear that oracle-based smart contracts will hardly be able to offer the level of security guarantees found in completely native crypto transactions, so the question is: how secure can oracles get? Perhaps users will be fine with introducing a bit of counterparty risk for their spending wallet on a layer-two payments system like the Lightning Network, but would they store the majority of their savings in a smart contract where an oracle is effectively a custodian of their funds? Knowing about the oracle shortfall - how much of your wealth are you willing to risk on an oracle system? Are you willing to stake your house or entire business on it?

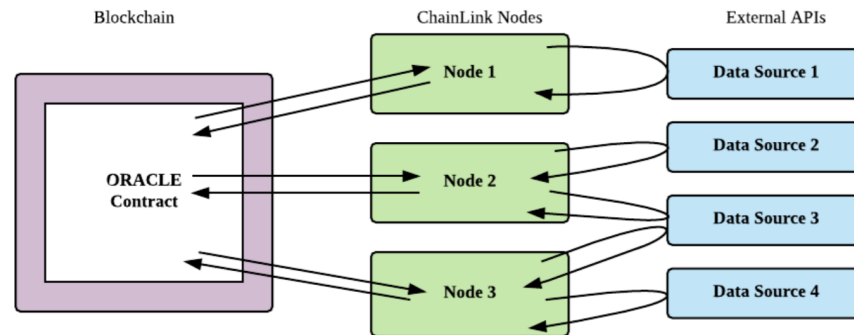
How Is Chainlink Supposed to Work?

This presupposes that it does, which is open for debates and our conclusion is that it does not but let us give them the benefit of the doubt for a minute.

The project is a [blockchain middleware](#), providing a protocol for a network of decentralized oracles, enabling smart contracts to securely access external data feeds like web APIs, real-world events and payment networks. The goal of the project is to create an independent reporting structure that serves two main functions:

1. Pulls and verifies data from multiple independent sources, mitigating the risk of faulty reporting, data accuracy, and system failure, and
2. Acts as a “translator” by importing raw data into a smart contract environment

How is this achieved? Upon request or a predefined trigger, external data (e.g. security prices, weather information, outcomes of sports events etc.) is aggregated from multiple sources by numerous node operators. Based on an algorithm adapted for the particular use case, the oracles form a consensus which is then returned to the smart contract:



The Chainlink network is powered by the project's proprietary cryptocurrency LINK, the sole purpose of which is to reward operators for the work performed and investors for tokens staked (sometimes referred as mining 2.0). And here comes the first caveat - there is an inherent conflict of interest between token holders and the companies utilizing the LINK token. The first group benefits from higher price, the second wants it to be lower as it is directly related to users' operating expenses. We argue the currency adds further friction to an already fragile ecosystem, rendering the LINK existence pointless.

The ecosystem is supposed to work as follows:

1. An end-user requests an oracle service by posting a "job" on a marketplace like market.link. The job specifies the number of oracles needed, the minimum reputation of the oracles delivering the data, and a price (in LINK) the user is willing to pay for the retrievals
2. Chainlink nodes then decide whether or not to bid on the proposal. The smart contract will only accept bids from nodes that meet the requirements outlined by the user. When an oracle service provider bids for a job, it commits a certain amount of LINK that will be forfeited via a penalty payment in case of misconduct
3. Nodes that win the bidding process are entitled to run the job, and rewarded with LINK upon successful completion of each iteration (namely, each data retrieval)

Node selection is based on a reputation system, taking into account uptime, response time, track record, size of the penalty payment put as collateral, and total amount of LINK held by the node. And here comes the next catch — **the weights of these factors are not publicly disclosed by Chainlink yet, raising red flags about the integrity of the process and the overall transparency of the project**, not to mention conflicting with the core values of blockchain technology. Nodes that provide bad or inaccurate data are penalized by a decreased reputation score and a loss of the collateral. By having "skin in the game", operators are also

incentivised to run throughout the whole task. One byproduct of this arrangement is decreased velocity of the LINK in circulation.

In theory, the proposal sounds appealing. There is yet another caveat, however. **The staking mechanism is not working as of the time of this report. It is expected to become live with the launch of Chainlink's mainnet.** The topic is widely discussed by the community. Chainlink's team, however, [has not set any specific time frame](#) for the implementation of this feature. **Since [May 2019](#), Chainlink has been running on Ethereum, exposing the project to fluctuations in the gas price and malfunctioning of Ethereum (as it [happened during the last crypto market crash](#)).** Additionally, the loudly proclaimed [acquisition of Town Crier](#), aiming to boost the security of the network (through Intel SGX) has not been implemented for nearly 2 years now.

How about the oracle problem? Does Chainlink adequately tackle it? The reputation system will most likely result in a handful of nodes performing the vast majority of work as they will have a strong competitive advantage against newcomers. Is this observed at the moment? Since August 2019, there is an [active marketplace](#) for node operators and job postings. Currently, [74 approved node operators](#) are offering [725 unique jobs](#). However, the top 16 nodes (or ~20% of the total) are running pretty much all of the work in the network. Furthermore, SmartContract and LinkPool are in full control of the nodes operating on the network as each addition undergoes a [KYC / verification process](#). **The result is a highly centralized network which could be compromised by the node selection process, the primary sources used, the consensus algorithm, and the oracle operators themselves.**

Subsidies

In an attempt to stimulate adoption and achieve a dominant market position, Chainlink is granting hefty subsidies to the node operators participating in the network. The project has reserved 35% of the LINK outstanding (or 350 million tokens, the equivalent of almost USD 1.3 billion) for nurturing the Chainlink community. Pouring money into the ecosystem to foster adoption and build a leading market position is a standard procedure for most high-flying unicorns these days. However, one should carefully examine the discrepancy between subsidized and unsubsidized price, cost of replication and impact of the influx of new tokens on the supply / demand equilibrium when evaluating the long-term sustainability of the ecosystem and valuing the token itself.

How does the process work right now? Suppose a project wants to implement Chainlink's solution. The team could either purchase LINK on the open market or contact SmartContract (the entity behind Chainlink) to get a quote for the service. An actual offer sent by SmartContract's quotes USD 0.05 to USD 0.10 per node operator for each data request. At the same time, the price charged per data request on the testnet is [set at 1 LINK](#). Consistent with this information, by examining [the on-chain activities](#), it becomes evident that individual nodes

are paid between 0.16 and 0.33 LINK per call, which simply is 1 LINK divided by the number of nodes participating in each request.¹

Considering the staggering difference between the current price of a LINK and SmartContracts' offer, the potential user will likely pay between 20 and 70 USD cents per request to SmartContract. The company behind Chainlink, on another hand, will be transferring 1 LINK from the subsidy fund to the operating nodes each time a request is made, constantly inflating the tokens in circulation. Given the current LINK price of USD **3.69**, the discrepancy with the offer results in a subsidy of nearly USD 3 per data request.

Taking into account the [limited number of nodes](#) performing actual work, the [relatively low hardware requirements](#) and respective operating costs, the current model might result in **fictitious work performed in an attempt to privatize the subsidy tokens.**

As outlined in the [Token Allocation](#) section, ~15 million LINK from the reserve have already been paid out, leaving SmartContract with a balance of 335 million LINK for node incentives. At a rate of 1 LINK per call, [229,522](#) data retrieval calls made in March 2020, and 5% monthly growth in these requests implies that **Chainlink's subsidy fund will last until August 2027.** Given the price discrepancy between what SmartContract is offering and the LINK levels on the secondary market, chances are the company behind Chainlink will be selling tokens in the foreseeable future, putting the whole project at risk from regulatory scrutiny. More on this later.

From a user standpoint, the operational costs of replicating an oracle are mostly in the form of electricity expenses for running several average computers. In case of high utilization, the cost of this setup is way below the USD 0.30 to USD 0.70 per call the SmartContract users are charged.

<u>Operational cost of replicating the Chainlink network</u>		
Power consumption of a node (watts per hour)	Watts per Hour	120.0
Number of nodes	Absolute	7.0
Price of electricity	USD per kWh	\$0.055
Operating cost of running the setup for 24 hours	USD	\$1.109

- Assuming we need **7** average computers, consuming **120 watts** per hour each
- An electricity cost of **\$0.055 per kWh** (which is an [approximate average](#) for bitcoin miners)

Based on these assumptions, **the cost of replicating the Chainlink network is \$1.11 per day.**

Tokenomics

¹ there are two types of LINK transfers — large, singular transactions from one address to another, that most likely are transfers between exchanges or investors; and a second type — instant transactions from one to multiple addresses, which are resembling Chainlink's operational model

Examining the long-term supply/demand incentives shows that LINK will exhibit an extremely high velocity combined with excessive number of tokens in active circulation:

- *New nodes will constantly be looking for alternative platforms as Chainlink's network becomes exclusive to a limited number of operators. The main driver of exclusivity is a reputation system that discriminates against newcomers*
- *The open-source nature of Chainlink is driving down the technical entry barrier, giving aspiring networks of decentralized oracles an excellent base to build on*
- *End users will be shopping around for the most competitive price as the service is commoditized. The result will be end users reluctant to hold substantial amounts of LINK as a hedging instrument against adverse price movements*
- *Chainlink existing competitive advantages against alternative networks are limited to treasury reserves that are highly dependent on the price of the token and large community that is turning hostile as time progresses*

Combining these factors should result in an influx of free floating LINK and a game of hot potato between users and nodes, with founders, investors and speculators adding further stress to an already fragile market.

The LINK token has two **core functionalities**:

1. Provides access to the infrastructure by being the only acceptable payment method in the ecosystem, and
2. Acts as a form of insurance derived from the penalty payment in case the agreement outlined in a smart contract is compromised

Both features come at the expense of exposure to LINK price fluctuation and service price premium, compensating stakers and node operators for the cost of their capital, work performed and reputation built.

Focusing on the long-term steady state, **demand** is meant to be driven by end customers who are sourcing tokens to pay for their operational expenses. The **supply**, on the other hand, is provided by node operators, accumulating tokens as a compensation for the work performed and reputation built; and stakers, converting their network rewards into other asset classes. The inherent conflict derives from users' interest in LINK being cheap against other currencies while node operators and investors are benefiting from LINK appreciating with regards to other assets. The price in the long-term will converge towards an equilibrium based on supply and demand of these groups.

The following examines the incentives of each major group involved in the Chainlink ecosystem.

Chainlink's decentralized network services are an operating expense for companies and projects that are running blockchain applications. Most (if not all) of these projects will have a different operating currency, so the exposure to fluctuations in the price of LINK will be considered as an additional business risk. A natural reaction will be to seek a way to hedge the risk, which could be achieved by either locking the price in advance via purchase of sufficient amounts of LINK or financial instruments like futures and options (which are currently quite limited for LINK trading pairs). **As a result of this price uncertainty, everything else being equal, the cost of Chainlink should be lower than an identical network which transacts in a widely acceptable asset like a stablecoin or BTC / ETH.**

The **commoditized nature of Chainlink's service suggests the end users' purchasing decision will solely be driven by the most attractive price offered on the market.** This will lead to competition between node operators and eventually emergence of competing networks (Chainlink and [its equivalents](#)) for the limited amount of work available.

Assuming there are multiple platforms like Chainlink offering the same services and neglectable switching costs, end users will be reluctant to hold large amounts of LINK. The result is an increased velocity of the token, which will lead to depressed prices on the secondary market.

Expanding on the expected velocity of the token, according to one of project's [developers](#), the tokens "staked" (either held by the node or posted as insurance for penalty payments) have diminishing return in the node selection process:

*Having LINK on a node helps get the node started, but there is a point of **diminishing returns for how much LINK to hold**. Nodes that simply have enough reputation may be eligible for the job. From that, **node selection will be random**.*

Combining the bounded number of node operators as a result of the reputation system with diminishing return of the staked tokens will lead to a **relatively flat number of LINK put out of circulation as a result of staking or collateralization**. Moreover, the LINK accumulated as part of nodes' operational activities will most likely be dumped on the secondary market in a

diversification attempt from overexposure to the ecosystem and in order to finance operating expenses (which are presumably denoted in government-issued currencies). Adding to the sell-side pressure, some of the passive stakers might offload their network reward for similar purposes, purchasing other assets. Last but not least, as outlined in the [Token Allocation](#) subsection, SmartContract and the founding team will play a major role on the supply side as they control a staggering amount of LINK.

The implications of the baked-in token economics means that buyers won't hold large amounts of LINK because they will constantly look for cheaper and more predictable alternatives. Meanwhile, sellers will hold relatively constant amounts of LINK to support their reputation score while pouring the excess onto the secondary market. The architecture of the reputation system will result in node operators having a negotiation power over the passive investors as there will be a limited number of highly-rated nodes and an influx of LINK holders looking to enhance the yield on their investment. The result? **LINK's velocity will be extremely high because there is no strong incentive for either party to hold it. At the same time, the staked amounts will stay relatively constant and will have a negligible yield as the transactional fees will mostly be captured by the node operators with the highest reputation score.** Finally, there is no deflationary mechanism in place to reduce the flood of tokens from founders, subsidies and speculants.

Chainlink's Entry Barrier

Currently, Chainlink's competitive advantage is derived from three sources:

- 1) The massive funding available in the form of 300 million LINK, or the equivalent of more than USD 1.1 billion, held for product development and 350 million LINK (USD 1.3 billion) reserve to foster the ecosystem added on top of USD 32 million secured during the 2017 ICO, presuming they liquidated it right away and did not ride the leg down that saw Ether (ETH) lose more than 80% of its dollar value.
- 2) A supposedly large community of true believers who are also passive LINK investors
- 3) Existence of live product (albeit, in testnet) and actual clients

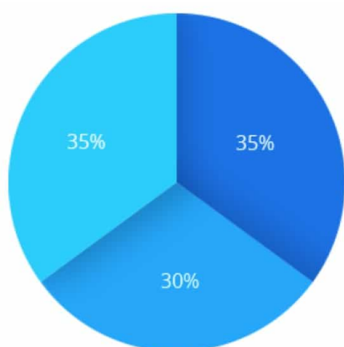
Examining the first two — Chainlink's vault is as deep as the token's valuation. A portion of the community presumably consists of early investors, hailing the project mostly as a byproduct of the capital gains attained. If there is a correction in the LINK price (which seems inevitable due the large divergence between actual operational activities and capitalization of the token), both advantages will evaporate.

Another negative factor the project is facing is the inherent inability to build a technological moat around its offering. The open-source nature of the project makes it vulnerable for replications by competitors.

Despite the small market size (limited to a handful of blockchain projects) for oracle services, the number of [competitors](#) is rapidly growing, which will undoubtedly intensify once/if a strong demand for decentralized oracle services emerges. Stressing on a point discussed earlier, nodes which are unable to lure end users in the Chainlink ecosystem will be quick to switch to alternative networks. **As a result, Chainlink might run into the problem of investing time and resources to educate the market about its products and services, only to lose its users to projects offering better terms and technical capabilities** (much the way MySpace lost its first mover advantage to Facebook).

Token Allocation

Following the 2017 ICO, 65% of the tokens, or 650 million LINK, left with the founding team while the rest are shuffling between investors and speculators:



The Crowdsale is Capped at \$32,000,000

Total Token Supply of 1,000,000,000 LINK to be distributed:

- 35% going to Node Operators to Incentivize the Ecosystem
- 35% will be sold in the Public Token Sale
- 30% will go to the Company for Continued Development

Ethereum ERC20 Token, directly purchasable with ETH

Two years and a half post ICO, the distribution is still highly concentrated, with the largest holdings persistently held by the team behind the project:

No	Address	LINK Held	% of the Total	Transaction Type	Activity	Note
1	0x98c63b7b319dfbdf3d811530f2	350,000,018.87	35.00%	Incoming 19, Outgoing -	Rare	Founders
2	Binance 7	57,240,490.45	5.72%	Incoming 14, Outgoing 1	Rare	Exchange
3	0x75398564ce69b7498da10a11a	50,000,000.78	5.00%	Incoming 2, Outgoing -	Rare	Founders
4	0x5560d001f977df5e49ead7ab0	50,000,000	5.00%	Incoming 1, Outgoing -	Rare	Founders
5	0xe0362f7445e3203a496f6f8b3c	50,000,000	5.00%	Incoming 1, Outgoing -	Rare	Founders
6	0xbe6977e08d4479c0a6777539a	50,000,000	5.00%	Incoming 1, Outgoing -	Rare	Founders
7	0xdad22a85ef8310ef582b70e40	37,400,000	3.74%	Incoming 1, Outgoing 19	Rare	Founders
8	0xf37c348b7d19b17b29cd5cfa64	34,590,421.01	3.46%	Incoming 1, Outgoing 8	Rare	Founders
9	Binance 8	7,500,000	0.75%	Incoming 2, Outgoing 28	Rare	Exchange
10	Aave: Lending Pool Core	5,059,118.48	0.51%	Incoming 2,166, Outgoing 1,318	Active	Use case

Out of the top 10 addresses, the founders control 62% of the tokens outstanding or whopping 620 million LINK (almost USD 2.3 billion).

Tracking down the path of the missing 30 million from the initial allocation, it becomes apparent that some of them have been transferred to secondary addresses to finally arrive at an operational one paying subsidies to nodes (step [1](#) > [2](#) > [3](#) > [subsidizing wallet](#) > [node operator](#)). **Others, however, have been dumped on the market following [fake or grossly overstated project updates](#).** What is the split between the two?

While it is hard to track all the transfers due to numerous intermediary addresses and transactions involved in the process, there are roughly **1.6 million *transferAndCall* requests since inception** of the network. **Assuming that all of these transactions have been facilitated by SmartContract** and a price of a call to the end customer of 0.50 USD, the company behind Chainlink has pocketed nearly 800,000 USD without touching the secondary market. Considering the enormous outstanding balance for subsidies (initially of 350 million LINK and now presumably in excess of 348 million) and price dumping made by SmartContract (as we said, clients are charged 5-10 cents per node retrieval while the current market price of 0.2 LINK is about 74 USD cents), chances are SmartContract will be the sole provider of LINK to operational uses for a very, very long time.

The scheme resembles the sale of XRP by Ripple, where **the company has maintained continuous fundraising mode since its establishment**. Apart from the constant pressure on the supply side as a result of the continuous increase in LINK in circulation, a risk to this model is that **sooner than later regulators will take a closer look at these activities, classifying LINK as a security**. Unlike Ripple, SmartContract is not locking the tokens in an escrow account with a predefined release schedule. The company behind Chainlink could not be less transparent in their LINK purchasing and divestment activities, making us to believe **they are in full control of the spot price action (bidding up the LINK price during periods of weakness; selling upon spikes, mostly caused by PR stunts or outright lies covered later in the report)**.

A byproduct of the model is that the secondary market is fully-controlled by speculators and SmartContract. Or at least until the moment node operators accumulate sufficient amounts of LINK and decide to divest their holdings. Hence, as network operational activities intensify, there will be more and more LINK in circulation putting a down pressure on price. When will that happen? Node operators are not wasting time and quickly transfer their rewards to Binance ([one](#), [two](#)).

Addressing the elephant in the room, however - 30M LINK had left the founders addresses from which at most 1.6M LINK have been paid to node operators. Where are the missing 28.4M LINK? In Binance and other exchanges! Through series of transactions ([one](#), [two](#), [three](#), [four](#), [Binance](#)), **SmartContract has been quietly shifting LINK in small badges to trading venues. The activities have intensified over the past month as [one of SmartContract's primary addresses](#) has sent staggering 1.5M LINK**. At an average price of 3.5 USD per LINK, **SmartContract might have pocketed up to 90M USD from selling redundant tokens to unsophisticated investor base**.

Examining the top 11 to 30 addresses by number of LINK, the thesis that most of the tokens are held by investors (or at least one received during the [ICO distribution](#)) or exchanges holds true:

No	Address	LINK Held	% of the Total	Transaction Type Incoming	Outgoing	Activity	Note
11	0xc6bed363b30df7f35b601a554	4,792,124.66	0.48%	8,084		Active	Exchange
12	0x6262998ced04146fa42253a5cd	4,311,038.43	0.43%	3,773	11	Active	Investor/Exchange
13	Huobi 5	4,291,549.45	0.43%	4,023		Active	Exchange
14	0x56d065849ef9c59c1bc5ba54b	4,000,000	0.40%	40	-	Inactive	Investor/Exchange
15	0x7dff4e2ac3aafc613398ca2d42	4,000,000	0.40%	68	-	Inactive	Investor/Exchange
16	0xdc4252e99397371ada045040e	3,997,863.61	0.40%	72	-	Inactive	Investor/Exchange
17	0x256353bb7db3aa6e33ec0fee3	3,995,188.12	0.40%	70	-	Inactive	Investor/Exchange
18	0xff7d6eead3f2ec8c11ec6d4bb8	3,984,413.99	0.40%	40	-	Inactive	Investor/Exchange
19	0x11e51b2aa387a2e2d13cbcdf9	3,964,868.52	0.40%	72	-	Inactive	Investor/Exchange
20	0x42c7124623bbf2048b20446b6	3,955,268.10	0.40%	72	-	Inactive	Investor/Exchange
21	0xda29e6b9c7236e8d98110a19	3,938,649.90	0.39%	62	-	Inactive	Investor/Exchange
22	0x6a28cdf62ed7ab22fbfed0be8	3,931,206.72	0.39%	65	-	Inactive	Investor/Exchange
23	0xd360c6329215ec4d7d585f1d8	3,923,442.35	0.39%	64	-	Inactive	Investor/Exchange
24	0xd382fc6398d0707f9aeb01c99	3,912,689.23	0.39%	56	-	Inactive	Investor/Exchange
25	0x2c0fa2d84200d14826d72271d	3,902,056.05	0.39%	69	-	Inactive	Investor/Exchange
26	0x7182bdeacab178a1c5a14502c	3,667,927.68	0.37%	59	-	Inactive	Investor/Exchange
27	Binance 1	3,604,871.56	0.36%	124,610		Active	Exchange
28	0x8c0b50e1f6fa5489b5606449bc	3,000,000	0.30%	30	-	Inactive	Investor/Exchange
29	0xd24108a5f9d8ac0052cd627af	3,000,000	0.30%	30	-	Inactive	Investor/Exchange
30	0xd072a5d8f322dd59db173603f	2,365,051.40	0.24%	2	9	Inactive	Investor/Exchange

What is apparent, the number of LINK held by one of [Huobi's addresses](#) alongside two other addresses behaving like exchanges ([one](#), [two](#)) quickly accelerates. As more and more tokens are arriving on the secondary market, it is a matter of time for the supply to grossly outnumber the demand for the tokens, resulting in a substantial downward correction. What could catalyse the process? Cooldown of community's sentiment or a decrease in number of press releases the project is erupting on a weekly basis.

Bottom line: The vast majority of tokens are either vested and held by the founding team or kept by retail and institutional investors. The common ground between these groups is that they have no interest in Chainlink's operational activities. Instead, they are looking for a way to realize their capital gains from the rapid token appreciation. Considering the lack of liquidity or any demand from actual network users (*remember, they can buy LINK directly from SmartContract for a fraction of the current price*), **even a modest divestment from either a large investor or the founding team could have a devastating effect on the current market price.** Analysing recent on chain activities and the behaviour of SmartContract addresses, we believe the house of cards is soon to collapse.