One really interesting and potentially very useful crypto project that doesn't get much attention is Chainlink. Despite that the coin has risen to a market cap over $100 million and is the #59 coin by total market cap (as of September 18, 2018).

I find the project to be potentially very useful because it's goal is to create a decentralized oracle service. If they're successful it could change smart contract usage and effectiveness forever.

In this Chainlink review, we will take a deep dive on the project including the technology, adoption, team members and LINK token prospects. We will also take a look at whether Chainlink can effectively differentiate themselves from their competitors.

Let's jump in.

Need for Oracles

When smart contracts are mentioned nearly everyone thinks of Ethereum. And that's because when Ethereum was launched back in 2015 it contained something that took blockchain technology to the next level.
The smart contracts of Ethereum meant that blockchain technology could be far more than just a means for conducting financial transactions. Ethereum's smart contracts expanded the utility of blockchain massively.

There was one problem with Ethereum smart contracts however, and that's the fact that they only work with data on their own blockchain. While that still leaves them as a very useful tool, they aren't nearly as useful as they could be. Creating a way to include data from outside the chain would give smart contracts an immense boost in the potential use cases.

How chainlink smart contracts will function. Source: Chainlink website

The founders of ChainLink saw this, and they moved to fill the gap. ChainLink is being created as a way to use oracle's to pull data from off-chain sources. ChainLink oracles will be able to use data pools, application program interfaces (APIs) and other real world sources. It opens up the possibility for smart contracts to use any data source at all, no matter what the source is.

ChainLink will be extremely helpful to projects that need offchain data to be really useful. By giving blockchains access to traditional data sets, ChainLink seeks to be the bridge between traditional data and the future of blockchain technology.

With those basics set, let's have a more detailed look at what ChainLink is being developed for, and how it can change the blockchain space.

How ChainLink Works

The main function of ChainLink is to create a bridge between on-chain resources and off-chain resources. This means there are two primary components in the ChainLink architecture – an on-chain infrastructure and an off-chain infrastructure. Let's see how both work.

On-Chain Functions

The on-chain smart contracts are the first part of ChainLink's architecture. Included in the smart contracts are oracles which are created to process user data requests.

These oracles will take any user requests for off-chain data that are submitted to the network using a requesting contract and process them, sending them to the appropriate smart contract to be matched with an oracle that can then provide the needed off-chain data. There are three types of contracts that can help with matching: the reputation contract, the order-matching contract, and the aggregating contract.

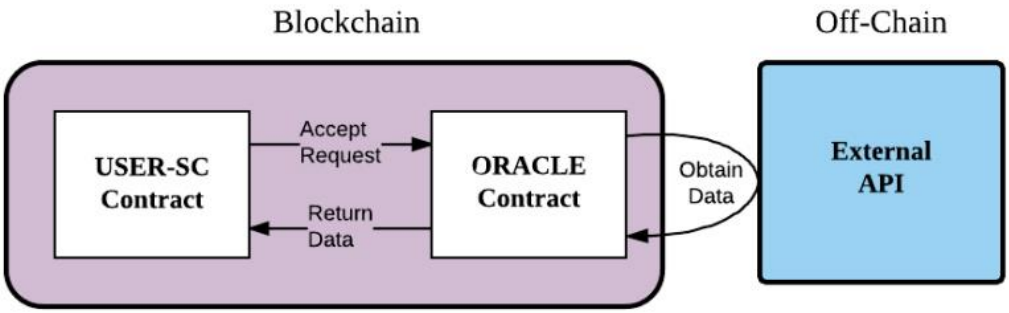


Figure 2: Behavior of an ideal oracle ORACLE is defined by steps: **1)** Accept request; **2)** Obtain data; **3)** Return data.

Behavior of an on-chain Oracle as defined by Chainlink. Source: Chainlink Whitepaper

The reputation contract ensures that the oracle provider is reliable and trustworthy. If it is, the request is passed to the order matching contract, which works to pass the requesting contract to an appropriate oracle based on the service level being requested, and the bids from the oracles. Finally, the aggregating oracle collects data from the selected oracles and delivers the best result to the requesting contract.

Off-Chain Functions

Off-chain components are the other part of the ChainLink architecture. These are oracle nodes that exist off-chain, but are connected to the Ethereum network. I say Ethereum network here because currently ChainLink is only capable of interfacing with Ethereum smart contracts, but in

the future it is planned to work with many different networks and smart contracts. The bulk of the work is done by these off-chain oracles, as they collect most of the data being requested.

All of the data collected is processed through ChainLink Core, which is the software that connects the ChainLink blockchain with off-chain data sources. ChainLink Core is responsible for processing data and passing it to the on-chain oracle.

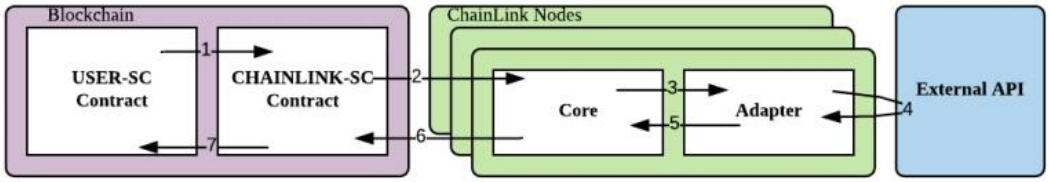


Figure 1: ChainLink workflow: **1)** USER-SC makes an on-chain request; **2)** CHAINLINK-SC logs an event for the oracles; **3)** ChainLink core picks up the event and routes the assignment to an adapter; **4)** ChainLink adapter performs a request to an external API; **5)** ChainLink adapter processes the response and passes it back to the core; **6)** ChainLink core reports the data to CHAINLINK-SC; **7)** CHAINLINK-SC aggregates responses and passes them back as a single response to USER-SC.

Overview of the Chainlink workflow

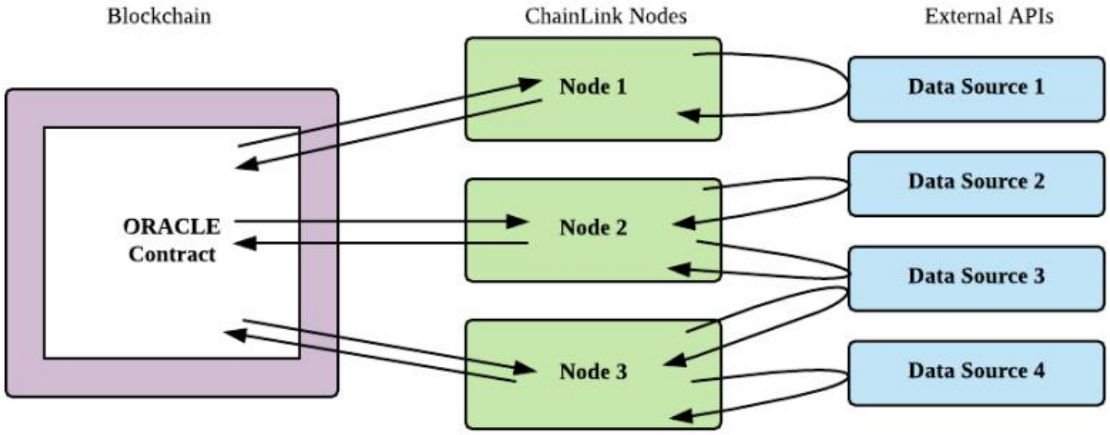
All of this work by the off-chain nodes isn't done as charity. These nodes expect to receive payment for the data collection and transmission. And they are paid, in LINK tokens.

There's a secondary function of off-chain nodes that make them quite useful to developers. The off-chain nodes allow for the integration of external adapters, which are like decentralized applications (dApps) on the Ethereum network. External adapters are written by developers to perform subtasks within the external nodes. This makes data collection and processing more efficient.

Oracle and Source Distribution

ChainLink's decentralized nature and difference from other oracle protocols are shown by the concepts of oracle distribution and source distribution used by ChainLink. This decentralization helps ChainLink avoid centralization and other security issues.

Source distribution and oracle distribution are the keys to the security and decentralization of the oracle network. Source distribution is the concept that causes oracles to pull their data from a variety of sources. This helps them keep a good network reputation. And oracle distribution is the concept that has data requests contracted to several oracles to maintain decentralization.



Requests are distributed across both oracles and data sources

The above figure shows the two level distribution on the Chainlink network. However, it helps to take a look at a practical example.

Weather Application

A company creates a user called the **Sunshine Day Weather App**. The user requires up-to-the minute weather data, and to get it there's a request submitted to ChainLink. The matching oracle locates three different oracles to find and transmit the needed data, following the oracle distribution methodology to maintain a secure network.

Because the network also requires source distribution each of the oracles will draw their data from different sources. We'll call the oracles X,Y and Z. Oracle X gets its data from Accuweather and Wunderground.

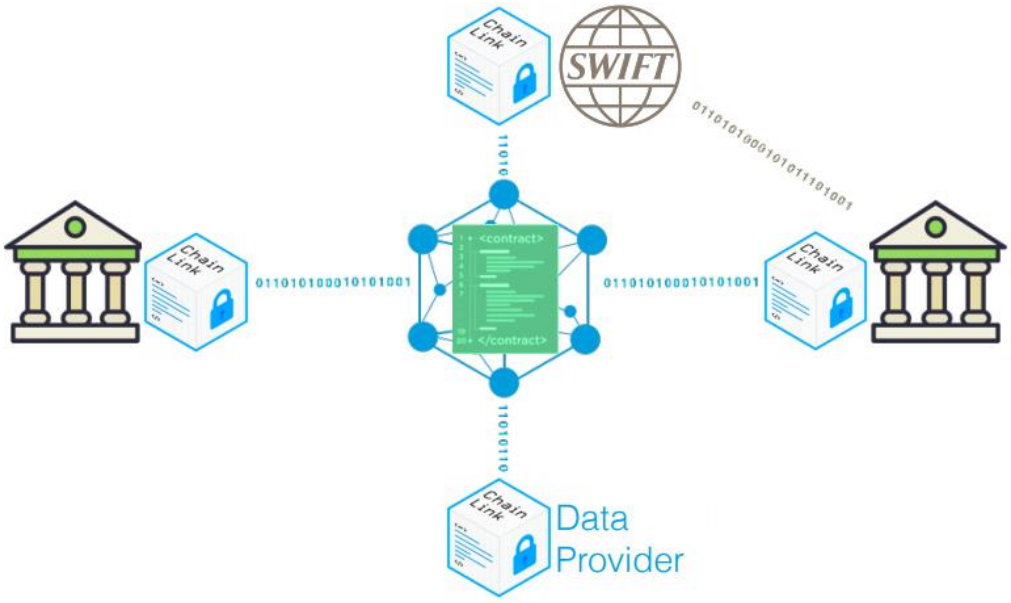
Oracle Y gets its data from the National Climatic Data Center and Open Weather Map, while Oracle Z gets its data from the National Weather Service and the National Oceanic and Atmosphere Administration.

With this oracle and source distribution the network remains totally decentralized, and Sunshine Day Weather receives aggregated data from three reputable oracles who all receive their data from different sources.

One other benefit of this system is that oracles are incentivized to remain honest, since their reported data will be compared with the data from other oracles. If fraudulent data is reported the oracle would see its reputation sink, and could face other network imposed penalties.

ChainLink Use Cases

Quite possibly the biggest positive development so far at ChainLink is its partnership with the SWIFT banking transaction network. Let's face it, SWIFT is one of the largest global financial networks, and success with them could lead to many other partnerships within the finance industry from banks to payment processors to insurance outfits.



SWIFT Smart Oracles acting as "Middleware". Source: smartcontract

While SWIFT isn't flat out using ChainLink, it is developing the *SWIFT Smart Oracle* with the help of ChainLink, and that leaves it possible for integrations between the two.

Another positive is that ChainLink has little competition, and even those that are working on blockchain oracle development are far behind Chainlink.

The LINK token has been under pressure throughout 2018, but that's true of the entire cryptocurrency market, and it does appear that link is already recovering, having hit a bottom in June 2018 and nearly doubling since while most cryptocurrencies remain near their 2018 lows.

ChainLink Partnerships

The partnerships that ChainLink has forged are a part of its strength as well. The SWIFT partnership is the largest, but it isn't the only solid partnership already formed by ChainLink.

Requests are distributed across both oracles and data sources

It's interesting, because it seems the team behind ChainLink has focused on building partnerships rather than on marketing, and that's a large part of the reason the coin goes unnoticed by most cryptocurrency enthusiasts. The following are the largest ChainLink partnerships to date:

- **SWIFT:** The massive interbank communications network;
- **Zeppelin OS:** An operating system that was developed specifically for creating smart contracts;
- **Request Network:** An exchange platform that aims to be the standard for exchanging fiat and cryptocurrencies;
- **Signal Capital:** A London based private asset firm.

LINK Token

The LINK token rallied strongly right after its ICO and by October 2017 it reached $0.47. After dropping from that high it rallied again in December and January along with the rest of the cryptocurrency markets, hitting a high of $1.35 in January 2018.

It dropped in 2018 along with the rest of the market, hitting a low of $0.1647 at the end of June, but by September 18, 2018 it has recovered and is trading at $0.2872 and is the 50th largest coin by market cap, with a market cap of $100,530,182.

If you want to purchase LINK yourself you need to do so with BTC or ETH as there is no fiat purchases available for the token. Binance is the easiest exchange to purchase LINK from as the bulk of the trading volume is on that exchange. You can also buy at Huobi, OKEx and Mercatox as well as a handful of other exchanges, although trade volumes are quite low.
To store LINK tokens you simply need an ERC-20 compatible wallet such as MetaMask or MyEtherWallet.

ChainLink's Future

ChainLink has not released a formal roadmap, so we can't be certain what the next developmemts will be. We do know that work with SWIFT is ongoing, and that the development team is working on releasing the ChainLink main net.

Actually, lack of communication from the development team, along with a lack of marketing for the project, has been one of the biggest frustrations in the ChainLink community. It's well known that ChainLink founder Sergey Nazarov prefers to work behind the scenes, and is not one for public appearances.

He must be better at negotiations however, since he was able to secure a partnership with SWIFT. It's hard to remain confident in the future of ChainLink in the face of such limited communication, but possibly the SWIFT partnership is enough to keep optimism high.

Conclusion

The ChainLink project isn't the easiest to come to grips with, but once you do it's easy to see how it can benefit the blockchain ecosystem massively going forward.

Blockchains by themselves are very limited, and they require oracles to unlock their full potential. Because ChainLink is one of the few projects working on oracle development they could easily become an industry leader for years to come.

The lack of marketing has caused concern among the ChainLink community, but that is offset by the partnerships being forged by the ChainLink team. Honestly, if they are successful with SWIFT they may not need marketing and will become a billion dollar whale within the financial services community regardless.