

# Chainlink Converters

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# Introduction

Linking blockchains is a hard problem, with a great solution – Chainlink. Chainlink is a series of Decentralized Oracle Networks (DONs), which are information systems maintained by a committee of nodes.[2] DONs act as powerful abstraction layers, offering interfaces for smart contracts, and decentralized off-chain computing resources.[3] Building with Chainlink, this Paper provides a new solution to the interoperability problem, which refers to the ability of blockchains to seamlessly integrate with one another.

Focusing narrowly on the interoperability problem between two blockchains, Ethereum and Algorand, this Paper explorers the technical architecture necessary for Ethereum and Algorand interoperability. While the broader problem of interoperability will be ongoing as long as new blockchains evolve, the focus for this Paper is on a precise instance to drive greater impact, adoption, and use.

Our solution, the Chainlink Converter utilizes Chainlink smart contracts and Chainlink data processing to receive data from Algorand and inform smart contract ejections onto the Ethereum blockchain automatically. This White Paper proceeds in three parts. Part I provides an overview of the two blockchains connected via the Chainlink converter. Part II dives deeper into Chainlink and DONs. Part III introduces the Chainlink Converter for interchain interoperability. In short, the Central contribution for this Paper is the Chainlink Converter is an Ethereum-Algorand DON for interoperability.

[2] Lorenz Breidenbach, et al., Chainlink 2.0 and the future of Decentralized Oracle Networks (2021).
[3] Lorenz Breidenbach, et al., Chainlink 2.0 and the future of Decentralized Oracle Networks (2021).

# I. Blockchains

Blockchains are decentralized databases, which are maintained by global computer networks. The design of a blockchain network consists of a series of computers called nodes, which are connected via the Internet and maintain a record of transactions called a ledger.[4] According to scholar, Primavera De Filippi, "blockchain technology constitutes a new infrastructure for the storage of data and the management of software applications, decreasing the need for centralized middlemen."[5] As an active architecture, a blockchain is a distributed ledger which records transactions between parties across the Internet. This White Paper will describe the Chainlink Converter as a mechanism for bilateral smart contracts between Ethereum and Algorand.

The central innovation for the Ethereum[6] blockchain network is a software stack for smart contracts. The Ethereum software is implemented in the new programming language, Solidity – which was constructed with influence from C++, JavaScript, and Python.[7] Ethereum created smart contracts to improve the transaction protocol on the Bitcoin blockchain.[8] A platform for applications development and financial transactions, Ethereum is the second largest blockchain in the world. Indeed, Ethereum is home to more than 400,000 smart contracts for novel tokens assets within its ecosystem.

Algorand is a pure proof-of-stake blockchain, which evolved to improve security and power efficiency across blockchain networks by limiting miners to validating transactions proportional to an ownership share.[9] Algorand offers two central innovations: (1) a democratic consensus protocol and (2) a more efficient block validation mechanism compared to previous blockchain architectures. The consensus mechanism allows the core computer code to evolve to the will of the Network and the validation mechanism allows for faster transaction speeds.[10] For smart contracts, the main type of smart contracts on Algorand are Algogeneous Smart Contracts which allow multiple tasks to be efficiently integrated within one single script executable.

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[4] David Mills et al., Distributed Ledger Technology in Payments, Clearing, and Settlement 10, Fed. Reserve Bd. Fin. & Econ. Discussion Series, Working Paper No. 95 (2016).
[5] PRIMAVERA DE FILIPPI, AARON WRIGHT, BLOCKCHAIN AND THE LAW 33 (2018).
[6] Vitalik Buterin, Ethereum Whitepaper (2013). Created in the year 2013, Ethereum is a blockchain, which uses its own cryptocurrency to reward miners.
[7] Ethereum, Solidity Documentation (March 20, 2021).
[8] Ananda Badari and Archie Chaudhury, An Overview of Bitcoin and Ethereum White-Papers, Forks, and Prices, SSRN Paper No. 3841827 (2021). ("Ethereum's primary focus is to provide a protocol for building decentralized applications (dApps) deployed on the Ethereum Virtual Machine. Ethereum proposes a different protocol than Bitcoin in which the above limitations are addressed. Just to be clear, this is a huge difference to Bitcoin.") *See also* Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System 2 (2008). ("We need a way for the payee to know that the previous owners did not sign any earlier transactions. For our purposes, the earliest transaction is the one that counts, so we don't care about later attempts to double-spend.")
[9] Yossi Gilad, et al., Algorand: Scaling Byzantine Agreements for Cryptocurrencies, 53 (2017).
[10] Jing Chen, Silvio Micali, Algorand, 1 (May 26, 2017).

# II. Chainlink

Chainlink is a generalized framework for decentralized oracle networks.[11] Oracle networks operate in parallel, allowing for off-chain data feeds and computation with smart contracts. Chainlink provides secure oracle networks for smart contracts. Smart contracts are new technologies stemming from the convergence of transactional contracts and peer-to-peer networks. Moreover, the integration of DONs with data processors and smart contracts is facilitating blockchain interoperability in a new way.

The term smart contract finds a cornucopia of variance among blockchain developers and professionals. For example, the Founder of Ethereum, Vitalik Buterin defines smart contract as, "systems which automatically move digital assets according to arbitrary pre-specified rules."[12] Another example, Nick Szabo, who many suspect is a part of the team known as Satoshi Nakamoto, defines, "A set of promises, specified in digital form, including protocols within which the parties perform on these promises."[13] Generally and for the purposes of this Paper, a smart contract is a computer program which transfers data between addresses on blockchains using digital signatures.

Before DONs smart contracts were only capable of running on isolated blockchain networks. Without external connectivity, smart contracts cannot communicate between blockchains to improve cost-efficiency in computational resources.[14] To facilitate automation in the Chainlink Converter the technology includes API endpoints for data processing, which are then validated by a Chainlink node. The endpoints scrape data from two addresses, one on Algorand and one on Ethereum to allow for interchain interoperability.


Figure X

Figure X is a model for the Chainlink Converter, which connects the Ethereum and Algorand blockchains.

[11] Lorenz Breidenbach, et al., Chainlink 2.0 and the future of Decentralized Oracle Networks (2021).
[12] Vitalik Buterin, Ethereum Whitepaper (2013).
[13] Gary Gensler, MIT OpenCourseWare, Smart Contracts and dApps (2018).
[14] Chainlink, What is a Smart Contract (September 14, 2021).

# III. Converter

The Chainlink Converter is an asset converter for Algorand and Ethereum using Chainlink. Token assets on Ethereum are called ERC20 tokens, which refers to the industry security and functional standard. By contrast, token assets on Algorand are called Algorand Standard Assets (ASAs). The Chainlink Converter allows interoperability between the two blockchains – and a keystone for the Converter's interoperable capability is goLink. The goLink asset allows for the converter to read Chainlink data on Algorand and Ethereum simultaneously, enable conversions between ERC20 tokens and ASAs.

The token goLink is collateralized LINK on Algorand. The ASA goLink is available on both the Algorand MainNet and TestNet.

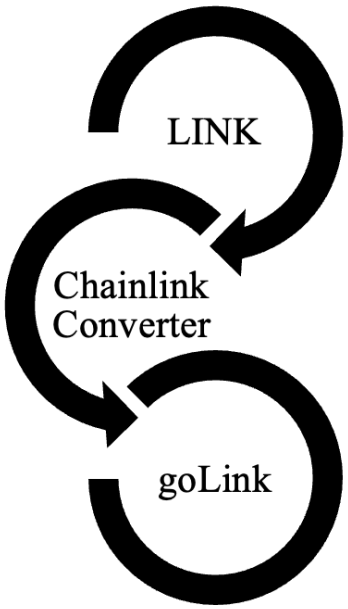


Figure X

The methodology by which LINK is converted to goLink relies on the Chainlink converter to verify ownership between the Algorand and Ethereum blockchains.

The DON for the Chainlink Converter facilitates interchain smart contracts. The DON operates as the nucleus for Ethereum to Algorand transfer's and vice versa. This bilateral smart contract system allows for cross chain capability for ERC20 tokens and ASAs. Thus, the Chainlink Converter utilizes interchain contracts to allow LINK interoperability between Algorand and Ethereum. The interchain contracts utilizes data from both the Ethereum and Algorand blockchains to create an interoperable DON.

# Conclusion

This Paper introduced Chainlink Converter in three parts. Part I provided an overview of the two blockchains connected via the Chainlink converter. Part II dove deeper into Chainlink and DONs. Part III introduced the Chainlink Converter for interchain interoperability. In conclusion, the Chainlink Converter is a new DON enabling cross chain capability between Ethereum and Algorand.