

Compound

An Algorithmic Interest Rate Protocol



What is Compound? (compound.finance)

Built with smart contracts on the Ethereum network, the Compound protocol has been serving as a decentralized lending platform since 2017.

In simple terms, Compound is a marketplace where users can lend and borrow money. The protocol functions like a bank, as it accepts deposits on one end and lends them out with interest to others. However, unlike traditional banks, Compound's algorithmic and autonomous nature allows for lenders to capture almost all of the interest earned by their lent funds. With the Compound protocol, the only external participants are the borrowers and lenders that choose to utilize the platform.

Components at Play



Asset Pools

There is a pool of capital (plus a reserve) for each asset on Compound that the protocol can lend out. Users can deposit and borrow from these pools.

The reserve typically constitutes a small portion of each pool and is used by the protocol as an insurance policy in the event that any issues require users to be compensated.



cTokens

cTokens function as proof of deposits – allowing for users to retrieve their deposited assets at a later time.

If a user deposits assets to a pool, the protocol supplies them with an amount of cTokens subject to the current asset-to-cToken exchange rate.

Entering a Position on Compound

Borrowing on Compound is as simple as **depositing cTokens** to the protocol, which **provides an asset** in exchange. Lending works in a similar fashion – **deposit an asset** to the protocol, which **provides cTokens** in exchange.

Ex. A user can deposit Ether (ETH) to the protocol and will receive Compound Ether (cETH) in return.

Closing a Position on Compound



Borrowers

Borrowers must deposit their borrowed assets to the protocol in order to retrieve their cTokens.

However, depositing the exact amount of borrowed assets will lead to the borrower receiving less cTokens than they originally deposited, as the protocol-governed asset-to-cToken exchange rate is perpetually increasing.

An additional amount of the asset must be deposited in order to fully close a loan and receive all of their cTokens back. This amount is subject to the difference between the current exchange rate and the rate at which the borrower took out the loan. This additional deposit effectively serves as the interest payment that the borrower owes.

Ex. A user deposits 10 Compound Ether (cETH) in exchange for a loan of 10 ETH. Upon closing their position, the user must deposit 11 ETH in order to retrieve their 10 cETH due to the exchange rate increase over the duration of the loan.



Interest Rates

Interest rates for each asset are mathematically determined by the protocol.

When the pool expands (more deposits and / or less borrowing), rates are decreased. When the pool contracts (less deposits and / or more borrowing), rates are increased to attract additional lenders



cToken Exchange Rates

The cToken exchange rate determines the amount of cTokens that can be traded for a particular asset.

This protocol-governed exchange rate is unidirectional and perpetually increasing. Its growth rate is contingent on the interest rate for the asset that it is tied to.



Lenders

Lenders must deposit their cTokens to the protocol in order to retrieve their deposited assets.

Given the increased exchange rate, lenders' cTokens are now worth more than they were at the time of their original asset deposit.

Compound's system of an ever-increasing exchange rate between deposited assets and their cToken collateral counterparts is how the interest from borrowers is forwarded to lenders.

Lenders realize the interest on their deposits in the form of their cTokens appreciating in value relative to their deposited assets. Instead of receiving the interest on a predetermined basis, lenders will find that their earned interest is essentially tacked on to their deposit.