



## **Course III:**

# **DeFi Deep Dive**

## **1. Credit and Lending**

### **(ii) Compound**

#### **(a) What is Compound?**

# Credit/Lending: Compound



## *What is Compound?*

- Compound is a lending market that offers several different ERC-20 assets for borrowing and lending.
- All the tokens in a single market are pooled together so every lender earns the same variable rate and every borrower pays the same variable rate.

# Credit/Lending: Compound

## *Overcollateralization*

- The concept of a credit rating is irrelevant, and because Ethereum accounts are pseudonymous, enforcing repayment in the event of a loan default is virtually impossible.
- For this reason, all loans are overcollateralized in a collateral asset different from the one being borrowed.
- If a borrower falls below their collateralization ratio, their position is liquidated to pay back their debt.
- The debt can be liquidated by a keeper. The keeper receives a bonus.

# Credit/Lending: Compound

## *Collateralization ratios and factors*

- The collateralization ratio is calculated via a *collateral factor*.
- Each ERC-20 asset on the platform has its own collateral factor ranging from zero to 90.
- A collateral factor of zero means an asset cannot be used as collateral.
- The required collateralization ratio for a single collateral type is calculated as 100 divided by the collateral factor.

# Credit/Lending: Compound

## *Collateralization ratios and factors*

- Volatile assets generally have lower collateral factors, which mandate higher collateralization ratios due to increased risk of a price movement that could lead to undercollateralization.
- An account can use multiple collateral types at once, in which case the collateralization ratio is calculated as 100 divided by the weighted average of the collateral types by their relative sizes (denominated in a common currency) in the portfolio.

# Credit/Lending: Compound

*Collateralization ratio is like a reserve multiplier*

- The collateralization ratio is similar to a reserve multiplier in traditional banking, constraining the amount of “borrowed” dollars that can be in the system relative to the “real” supply.
- For instance, there is occasionally more DAI in Compound than is actually supplied by MakerDAO, because users are borrowing and resupplying or selling to others who resupply.
- Importantly, all MakerDAO supply is ultimately backed by real collateral and there is no way to borrow more collateral value than has been supplied.

# Credit/Lending: Compound

## *Example*

- An investor deposits 100 DAI with a collateral factor of 90.
- This transaction alone corresponds to a required collateralization ratio of 111%.
- Assuming 1 DAI = \$1, the investor can borrow up to \$90 worth of any other asset in Compound.

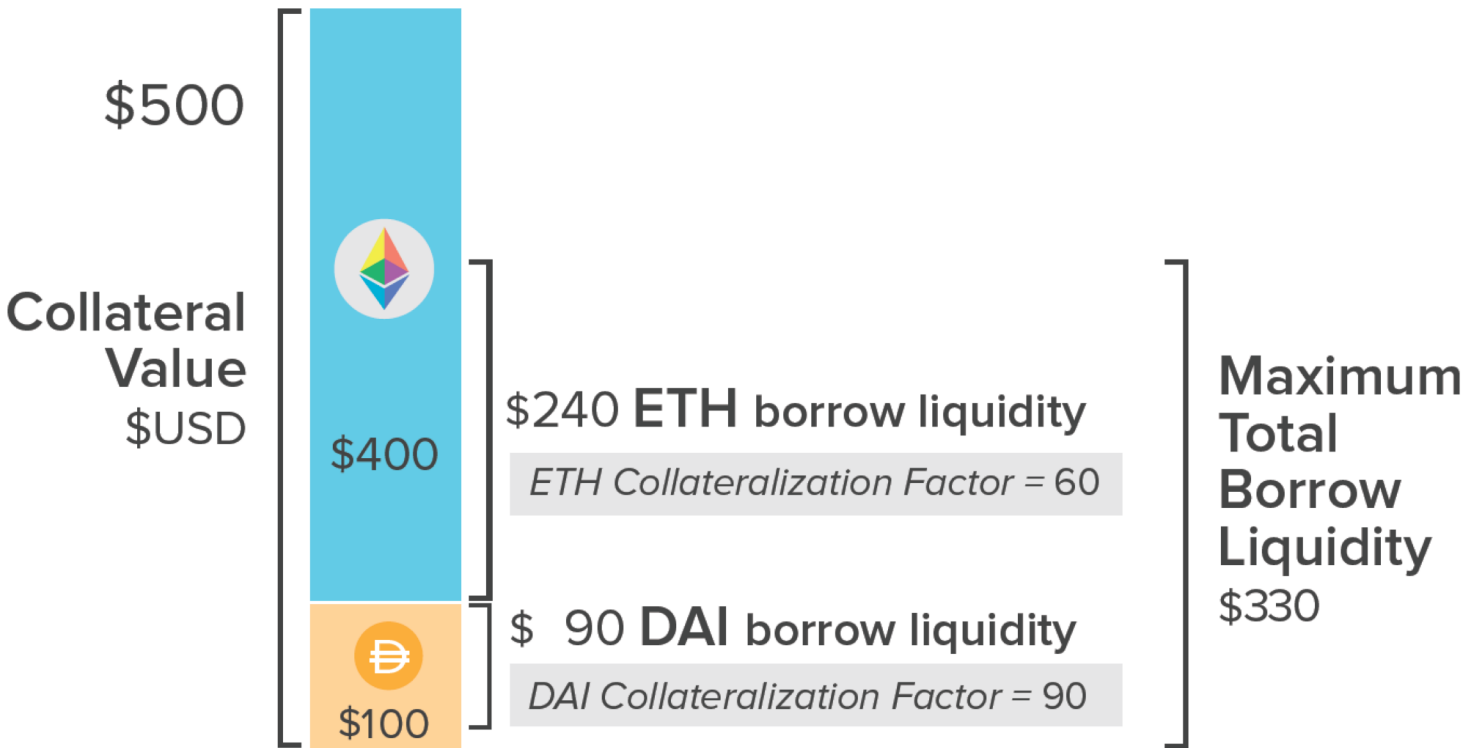
# Credit/Lending: Compound

## *Example*

- If she borrows the maximum, and the price of the borrowed asset increases at all, the position is subject to liquidation.
- Suppose she also deposits two ETH with a collateral factor of 60 and a price of \$200/ETH.
- The total supply balance is now \$500, with 80% being ETH and 20% being DAI. The required collateralization ratio is  $100 / (0.8 * 60 + 0.2 * 90) = 151\%$ .



# Credit/Lending: Compound



## Collateralization Ratio

$$= \frac{\$500 \text{ collateral}}{\$330 \text{ borrow liquidity}} = 151\%$$

Also calculated as  
 $100 / (0.8 \times 60 + 0.2 \times 90)$