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MERc

MERchant Coin System

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Abstract

- Merchant Coin(MERc) is a token using blockchain technique.
- MERc system provides two modes: On-chain mode and Off-chain mode.
  - On-chain mode

    It is a decentralized mechanism. It operates on a blockchain (e. g. Ethereum) so it can guarantee the security. However, this mode is slow and requires an amount of gas fee whenever a transaction is done.

    This mode is useful to store a lot of decentralized currency.
  - Off-chain mode

    It is a centralized mechanism. It runs on a MERc token server system. (the MERc token server system can be a simple server or a group of multiple servers).

    This mode is fast and do not require any gas fee whenever a transaction is done.

    This mode is useful to pay in micro-payment system.

Abstract

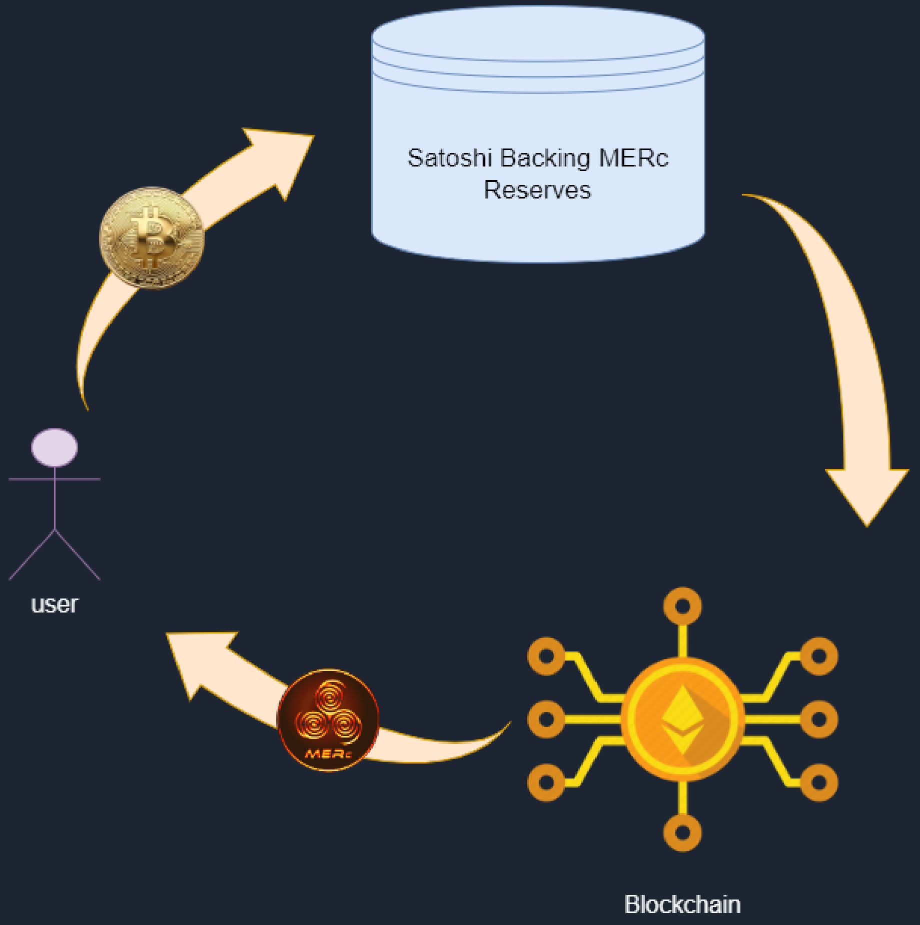
- Merchant Coin(MERc) can be seen as a Satoshi wrapped token.
  - It is minted by using Satoshi.
  - It is burned to get Satoshi.
  - The exchange rate between MERc and Satoshi is 1:1.

    Strictly speaking, the rate is not just 1:1, because exchanging transaction requires an additional cost (i.e. gas fee).

    X Satoshi + gas fee => X MERc

    Y MERc + gas fee => Y Satoshi

Minting MERc



- MERc is minted by using Satoshi.
- To mint MERc, you can send Satoshi to Satoshi Backing MERc Reserves Account.
- Then, Blockchain mints MERc which amount is same as the Satoshi what you sent.
- You can find MERc token in your account on Blockchain.
- **Note**: This exchange activity is carried out from two kinds of transactions: BTC transaction and Ethereum transaction. Also, each transaction requires some gas fees. Please see more details in MERc Minting Step.

Minting Step (Manual Mode)

- Step1: User get a BTC account, which is one of Satoshi Backing MERc Reserves.
- Step2: User transfers some Satoshi to the BTC account. (It requires some BTC gas fee and user pays the gas fee.)
- Step3: MERc server captures the BTC transaction and send a signed document to the user.
- Step4: User mints MERc by using the signed document. (It requires some ETHER gas fee and user pays the gas fee.)
- Step5: User confirms that MERc is minted in the user’s account.

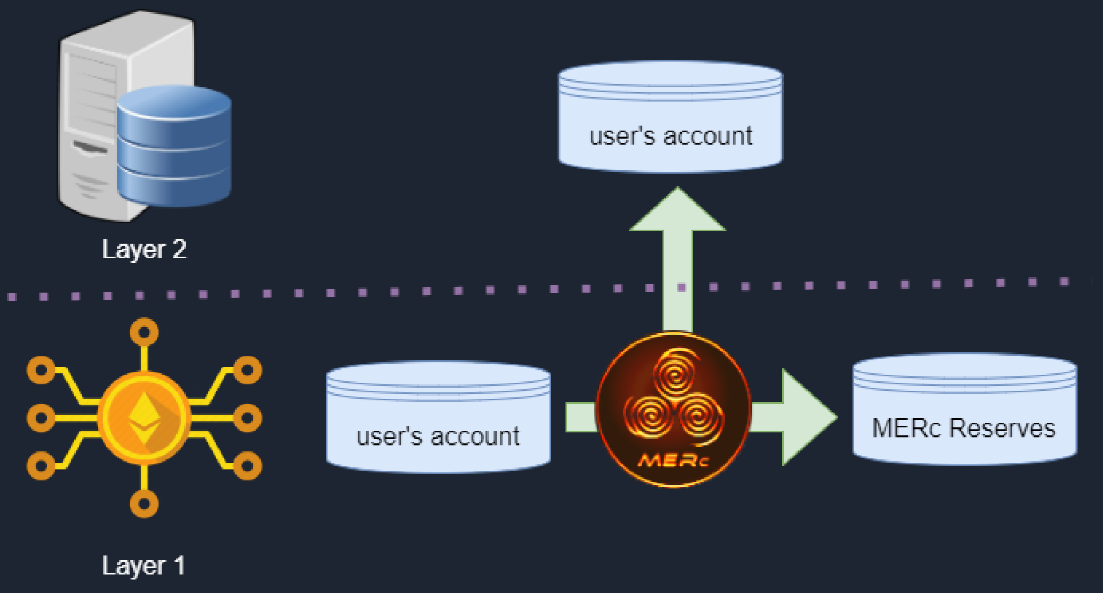
Minting Step (Manual Mode)

- Step 2 and Step 4 requires time to store on Blockchian (respectively Bitcoin and Ethereum).
- Manual mode have an advantage for saving gas fee, because gas fee changes over time. User can select a right time to do Step2 or Step4.
- Even so, some users can may find it too complicated.
- Moreover, they should manage three ledgers: BTC, ETHER, MERc.
- To simplify it, MERc system provides automatic mode.

Minting Step (Automatic Mode)

- Step1: User get a BTC account, which is one of Satoshi Backing MERc Reserves.
- Step2: User transfers some Satoshi to the BTC account. (It requires some BTC gas fee and user pays the gas fee.)
- Step3: MERc server captures the BTC transaction and then mints MERc in the user’s account. (It requires some ETHER gas fee and server pays the gas fee. At this time, user should pay the corresponding MERc for the gas fee.)
- Step4: User confirms that MERc is minted in the user’s account.

Depositing to Layer2



When depositing, total amount of Layer1 is consistent.
MERc Reserve Balance = Total Sum of Layer2 Balances

- Deposit Action is to move some MERc from Layer1(Blockchain) to Layer2.
- Micro-payment system use Layer2 to do payment action, because layer2 is fast and does not require any gas fee.
- When depositing, some MERc are moved from user's account to MERc Reserves account in Layer1 and increasing the MERc balance in Layer2.
- User can access to Layer2 by verifying with Layer1 account, so it is secure.
- **Note**: Layer1 transaction requires ETHER gas fee. User should pay it. Please see more details in MERc Depositing Step.

Depositing Step (Default Mode)

- Step1: User calls Deposit function of MERc Token Contract on Blockchain.
- Step2: MERc Token Contract move the specific amount of MERc from user to MERc Reserve and raise Deposit Event. (It requires some ETHER gas fee and user should pay the gas fee.)
- Step2: Server captures Deposit Event and increases the balance of user’s account in Layer2.

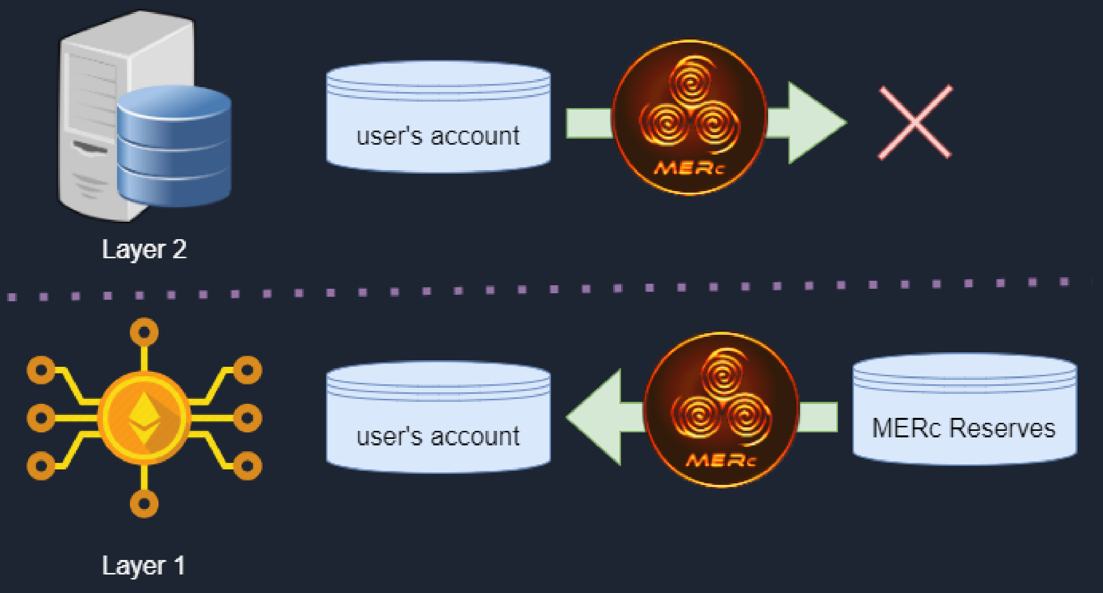
Depositing Step (Default Mode)

- Step 2 carries out and changes the state on Blockchian (i. e. Ethereum) and so it requires some ETHER gas fee.
- However, a certain user may not have ETHER balances. At this time, the user can use an alternative mode to deposit MERc.
- In the alternative mode, user can pay MERc for the gas fee.

Depositing Step (Alternative Mode)

- Step1: User sign the depositing document and send it to MERc Token server.
- Step2: Exchanger (it can be seen as a bot) call depositWithSignature function of MERc Token Contract. And it will move the specific amount of MERc from user to MERc Reserve and raise Deposit Event. (It requires some ETHER gas fee and MERc Token Exchanger pays the gas fee. At this time, the user should pay the corresponding MERc to Exchanger.)
- Step2: Server captures Deposit Event and increases the balance of user’s account in Layer2.

Withdrawing from Layer2



- Withdraw Action is to move some MERc from Layer2 to Layer1(Blockchain).
- Through any services using MERc token, users can gather many MERc. And then, they store it to Layer1. At this time, withdraw is done.
- **Note**: Layer1 transaction requires ETHER gas fee. User should pay it. Please see more details in MERc Withdrawing Step.

When withdrawing, total amount of Layer1 is consistent.
MERc Reserve Balance = Total Sum of Layer2 Balances

Withdrawing Step (Manual Mode)

- Step1: User calls Withdraw function of MERc Token Contract. Then, MERc Token Contract will raise Withdraw Event. (It requires some ETHER gas fee and user should pay the gas fee.)
- Step2: MERc Token Server captures Withdraw Event and then, decreases the balance of user in Layer2.
- Step3: User calls FinalWithdraw function of MERc Token Contract. Then, MERc Contract will transfer the specific MERc from MERc Reserve to user’s account. (It requires some ETHER gas fee and user should pay the gas fee.)

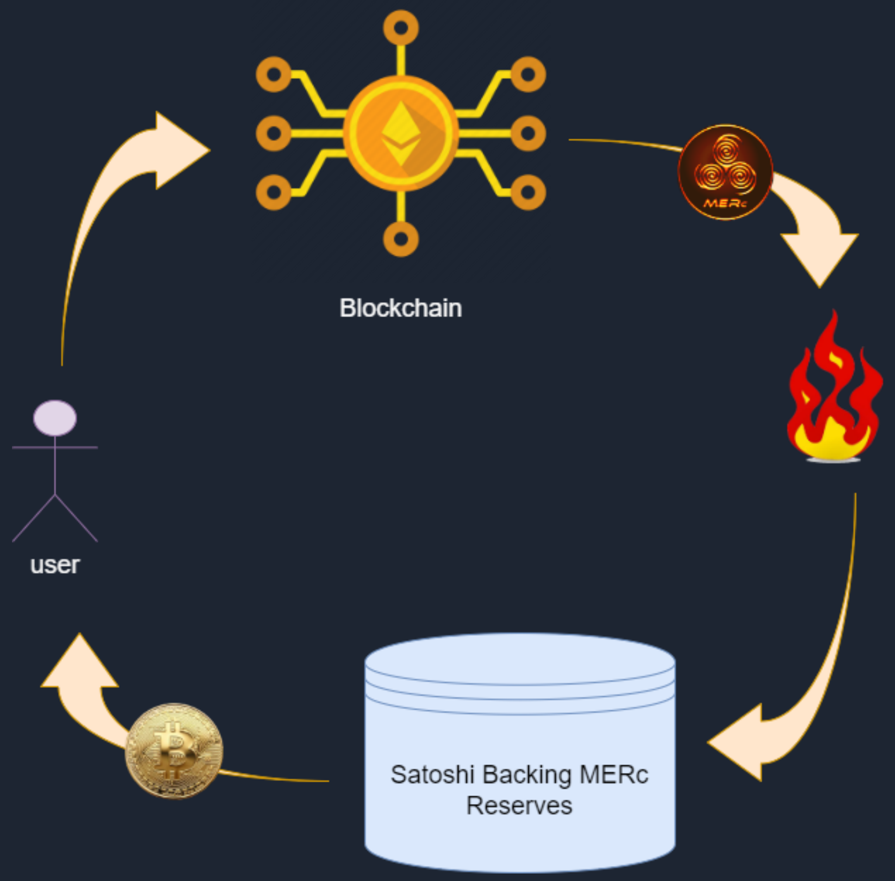
Withdrawing Step (Manual Mode)

- Similar to Deposit action, Withdrawing action is performed in two phases: Withdraw and FinalWithdraw.
- Even though user can select the right time to do it in manual mode, it is rather complicated.
- To simplify it, user can use automatic mode. In automatic mode, Exchanger(it can be seen as a bot) will do FinalWithdraw instead of user. Exchanger will pay ETHER gas fee and user should pay the corresponding MERc to Exchanger.

Withdrawing Step (Automatic Mode)

- Step1: User calls Withdraw function of MERc Token Contract. Then, MERc Token Contract will raise Withdraw Event. (It requires some ETHER gas fee and user should pay the gas fee.)
- Step2: MERc Token Server captures Withdraw Event and then, decreases the balance of user in Layer2.
- Step3: Exchanger(it can be seen as a bot) calls FinalWithdraw function of MERc Token Contract. Then, MERc Contract will transfer the specific MERc from MERc Reserve to user’s account. (It requires some ETHER gas fee and Exchanger pays the gas fee.)
- Step4: Transfer external cost from user to Exchanger in Layer2, where external cost is the corresponding MERc to ETHER gas fee of Step3.

Burning of MERc



- When MERc is burned, user will receive the corresponding Satoshi from Satoshi Backing MERc Reserves.
- The exchange rate is 1:1.
- Burning action is performed by Layer1 transaction and BTC transaction. Two kinds of transaction requires gas fee.
- For ETHER gas fee, user should pay it. For BTC gas fee, Exchanger(a bot) will pay the gas fee. So user should pay the corresponding MERc to Exchanger.

Burning Step (Manual Mode)

- Step1: User calls Burn function of MERc Token Contract. Then, MERc Token Contract will burn the MERc and raise Burn Event. (It requires some ETHER gas fee and user should pay the gas fee.)
- Step2: User request MERc Token Server to get Satoshi, then Exchanger transfer Satoshi from Satoshi Backing MERc Reserve to user.

Exchanger will pay the required BTC gas fee and so user should pay the corresponding MERc to Exchanger.

Burning Step (Automatic Mode)

- Step1: User calls Burn function of MERc Token Contract. Then, MERc Token Contract will burn the MERc and raise a Burn Event. (It requires some ETHER gas fee and user should pay the gas fee.)
- Step2: MERc Token Server captures the Burn Event and then, Exchanger transfer Satoshi from Satoshi Backing MERc Reserve to user.

Exchanger will pay the required BTC gas fee and so user should pay the corresponding MERc to Exchanger.

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Burning Step (Manual vs. Automatic)

- Manual Mode
  - User can select the right time to get Satoshi. It may be useful to save BTC gas fee.
  - It is rather complicated.
- Automatic Mode
  - It is rather simple.
  - The required gas fee may be greater than what user expected.