UDPN Use Case #6

Enabling Gasless Transactions Using Public

Chain-based Stablecoins

User Manual

2023/5/30

Catalog

1. General Introduction

This use case demonstrates how a business can allow its customers to make payments in public chain-based regulated stablecoins, using the UDPN infrastructure, without holding and using the public chains' native cryptocurrencies. The basic process is that the business pays for the gas costs with its own cryptocurrency wallets, adds the costs into its customers' total payments in stablecoins, then processes the payments. The entire process, including calculating the gas costs, signing cryptocurrency transactions, and performing the meta transactions on public chains, goes through the UDPN infrastructure and related APIs on the locally installed and open-source UDPN Business Node.

Please note that this solution only applies to the stablecoins on public chains associated with cryptocurrencies. It is expected that most CBDCs and stablecoins on non-cryptocurrency public chains won't require this solution.

2. Home

You can view detailed description information of PoC6 and the transaction flow architecture diagram of PoC6. In order to better understand the transaction process of PoC6, the transaction process of PoC1 is also displayed.

UDPN Use Case #6: Enabling Gasless Transactions Using Public Chain-based Stablecoins

This use case demonstrates how a business can allow its customers to make payments in public chain-based regulated stablecoins, using the UDPN infrastructure, without holding and using the public chains' native cryptocurrencies. The basic process is that the business pays for the gas costs with its own cryptocurrency wallets, adds the costs into its customers' total payments in stablecoins, then processes the payments. The entire process, including calculating the gas costs, signing cryptocurrency transactions, and performing the meta transactions on public chains, goes through the UDPN infrastructure and related APIs on the locally installed and open-source UDPN Business Node.

Please note that this solution only applies to the stablecoins on public chains associated with cryptocurrencies. It is expected that most CBDCs and stablecoins on non-cryptocurrency public chains won't require this solution.

The following is the specific architecture diagram:
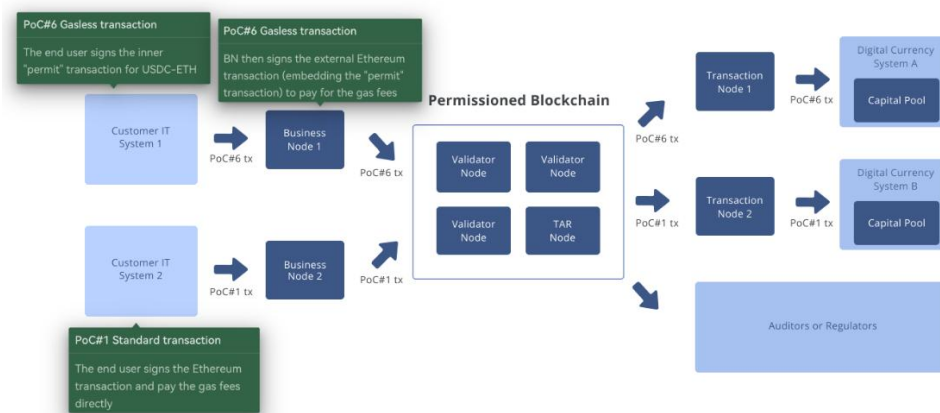
3. Initiate Transfer

Users can initiate a transfer by entering the Send Account, Currency Type, Send Amount of the sender and the Beneficiary Account, Beneficiary Name of the beneficiary.

After clicking the "Next" button, you can select the TN node to execute this transfer transaction and simulate the end user clicking the "Simulate signing" button to sign:

In the pop-up [Simulated Signature] page, the Transfer transaction message will be displayed. After confirming that it is correct, you can simulate the end user using the private key to sign the transaction message.

Click the "Sign and Submit" button, the BN backend will call the smart contract to complete the authorization operation to deduct the gas fee from its e-wallet. The gas fee spent in the subsequent Transfer transaction will be paid by the BN node.

After clicking the "Confirm" button, submit the transfer transaction to the chain for processing. After successful processing, the Transaction Key is returned. Users can use the Transaction Key to query Transfer transactions in the [Transaction Query] module.

4. Transactions Query

You can query Transfer transaction information according to Transaction Key, Send Account, Currency Type, Beneficiary Account, Submission Date, Status and other query conditions.

Query

Transaction Key:		Send Account:		Currency Type:	All ▾	All ▾
Beneficiary Account:		Submission Date:	2021-03-02 To 2021-03-02	Status:	All ▾	

Query Reset

List

Transaction Key	Send Account	Currency Type	Amount	Beneficiary Account	Submission Time	Status	Action
7238490283409923032	0x73927492340928409823404342	USDP-ETH	5	0x73927492340928409823404342	2021-10-29 12:12:10	Pending	Detail
7238490283409923422	0x73927492340928409823403222	USDP-Tron	5	0x73927492340928409823403222	2021-10-29 11:10:10	Permit Processing (TN1)	Detail
7238490283409923132	0x73927492340928409823409090	USDC-ETH	5	0x73927492340928409823409090	2021-10-28 10:10:34	Transfer Processing(TN1)	Detail
7238490283409923032	0x73927492340928409823401111	USDC-Tron	4	0x73927492340928409823401111	2021-10-26 11:34:24	Permit Successfully (TN1)	Detail
7238490283409923432	0x73927492340928409823401234	USDP-ETH	3	0x73927492340928409823401234	2021-10-25 11:34:24	Transfer processed successfully (TN1)	Detail
7238490283409923032	0x73927492340928409823403789	USDP-ETH	2	0x73927492340928409823403789	2021-10-24 11:34:24	Transfer failed (TN1)	Detail

x items found,display x to x   ‹ 1 2 ›

Click the "Detail" button in the list to view the Transfer transaction details:

Basic Information

Transaction Key:	232332202110280004	TN Name:	name1
TN Code:	TN20220407000001	Currency Type:	USDC-ETH
Amount:	5USDC		
Send Account:	0xadddd2342342234324324	Beneficiary Account:	0xadddd234225687234324324
Beneficiary Name:	name1	Received Amount:	5USDC
Submission Time:	2021-10-25 10:34:12	Status:	TN1 processed successfully
IsKYC:	Yes	BN's wallet for gas fees:	0xadddd234225687234324000

Circulation Information

State machine of a normal transfer transaction

Start

BN Init (local init)
(#1)

txn id:	txn-00000000000000000000000001
txn state:	BN Init (local init)
received time:	2022-04-19 12:00:00

txn id:	txn-00000000000000000000000001
txn state:	Submitted VN
received time:	2022-04-19 12:00:00

Submitted VN
(#2)

Pending
(#3)

txn id:	txn-00000000000000000000000001
txn state:	Pending
received time:	2022-04-19 12:00:00

txn id:	txn-00000000000000000000000001
txn state:	Permit processing
received time:	2022-04-19 12:00:00

Permit processing (TN1)
(#4)

Permit processed successfully (TN1)
(#5)

txn id:	txn-00000000000000000000000001
txn state:	Permit processed successfully
received time:	2022-04-19 12:00:00
txn hash on ETH:	0x12345678912345678912345678912345678 9
txn process time on ETH:	2022-04-19 12:03:00
block# for the txn on ETH:	1102022
Gas fee:	0.9 Ether
BN's wallet for gas fees:	0x234234234234234234234234234234234324

txn id:	txn-00000000000000000000000001
txn state:	Transfer processing
received time:	2022-04-19 12:06:01

Transfer processing (TN1)
(#6)

Transfer processd successfully (TN1)
(#7)

txn id:	txn-00000000000000000000000001
txn state:	Transfer processed successfully(TN1 transfer money from capital pool to end-user account)
received time:	2022-04-19 12:05:01
txn hash on ETH:	0x12345678912345678912345678912345678 9
txn detail on ETH:	From 0x1234567891234567891234456 To 0xadddd2342256872343243242
txn process time on ETH:	2022-04-19 12:07:00
block# for the txn on ETH:	1102022
Gas fee:	0.81 Ether
BN's wallet for gas fees:	0x234234234234234234234234234234234324

End

Click the BN paid wallet address, transaction hash, source account address, destination account address and block number in the transfer transaction state machine to jump to the Ethereum browser to query the transaction.

5. VN Node->Transactions Search

The VN administrator can query the Transfer transaction currently being processed by VN on the VN side.

Enter BN Name, Transaction Key, Send Account, Currency Type, Beneficiary Account, Submission Date, Status and other query conditions to query Transfer transaction information.

Txns Query

BN Name:	All		Transaction Key:			Send Account:	
Currency Type:	All	All	Beneficiary Account:			Submission Date:	2021-03-02 To 2021-03-02
Status:	All						Query Reset

List

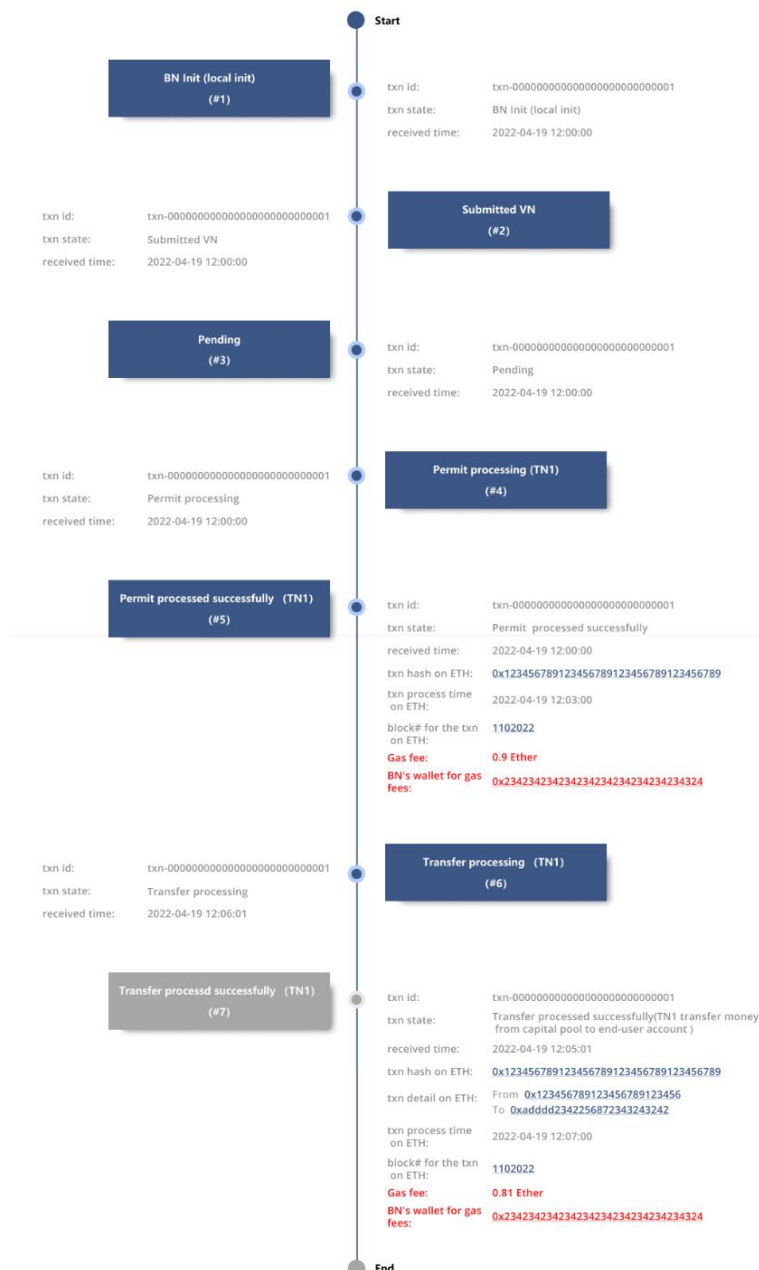| BN Name	Transaction Key	Send Account	Currency Type	Amount	Beneficiary Account	Submission Time	Status	Action
BN1(BN-0001)	7238490028340923032	0x7392749234092840982	USDP-ETH	5	0x739274923409284098234	2021-10-29 12:12:10	Pending	Detail
BN2(BN-0002)	7238490028340923422	0x7392749234092840982	USDP-Tron	5	0x739274923409284098234	2021-10-29 11:10:10	Permit Processing (TN1)	Detail
BN1(BN-0001)	7238490028340923132	0x7392749234092840982	USDC-ETH	5	0x739274923409284098234	2021-10-28 10:10:34	Transfer Processing(TN1)	Detail
BN3(BN-0003)	7238490028340923032	0x7392749234092840982	USDC-Tron	4	0x739274923409284098234	2021-10-26 11:34:24	Permit Successfully (TN1)	Detail
BN2(BN-0002)	7238490028340923432	0x7392749234092840982	USDP-ETH	3	0x739274923409284098234	2021-10-25 11:34:24	Transfer processed successfully (TN1)	Detail
BN3(BN-0003)	7238490028340923032	0x7392749234092840982	USDP-ETH	2	0x739274923409284098234	2021-10-24 11:34:24	Transfer failed (TN1)	Detail

x items found,display x to x   ‹ 1 2 ›

Click the "Detail" button in the list to view the Transfer transaction details:

VN Side Transaction Information Detail

Basic Information

BN Name:	232332202110280004	Transaction Key:	232332202110280004
TN Name:	name1	TN Code:	TN20220407000001
Currency Type:	USDC-ETH	Amount:	5USDC
Send Account:	0xadddd234234234234324324	Beneficiary Account:	0xadddd234225687234324324
Beneficiary Name:	name1	Received Amount:	5USDC
Submission Time:	2021-10-25 10:34:12	Status:	TN1 processed successfully
IsKYC:	Yes	BN's wallet for gas fees:	0xadddd234225687234324000

Circulation Information

State machine of a normal transfer transaction

Start

(Init) Pending (#1)

txn id: txn-00000000000000000000000001
txn state: Pending
received time: 2022-04-19 12:00:00

txn id: txn-00000000000000000000000001
txn state: Permit processing
received time: 2022-04-19 12:00:00

Permit processing (TN1) (#2)

Permit processed successfully (TN1) (#3)

txn id: txn-00000000000000000000000001
txn state: Permit processed successfully
received time: 2022-04-19 12:00:00
txn hash on ETH: 0x12345678912345678912345678912345678912
txn process time on ETH: 2022-04-19 12:03:00
block# for the txn on ETH: 1102022
Gas fee: 0.9 Ether
BN's wallet for gas fees: 0x234234234234234234234234234234324

txn id: txn-00000000000000000000000001
txn state: Transfer processing
received time: 2022-04-19 12:06:01

Transfer processing (TN1) (#4)

Transfer processd successfully (TN1) (#5)

txn id: txn-00000000000000000000000001
txn state: Transfer processed successfully(TN1 transfer money from capital pool to end-user account)
received time: 2022-04-19 12:05:01
txn hash on ETH: 0x12345678912345678912345678912345678912
txn detail on ETH: From 0x12345678912345678912345678912345678912 To 0xadddd23422568723432242
txn process time on ETH: 2022-04-19 12:07:00
block# for the txn on ETH: 1102022
Gas fee: 0.81 Ether
BN's wallet for gas fees: 0x234234234234234234234234234234324

End

Click the BN paid wallet address, transaction hash, source account address, destination account address and block number in the transfer transaction state machine to jump to the Ethereum browser to query the transaction.