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Information Marketplace Solution

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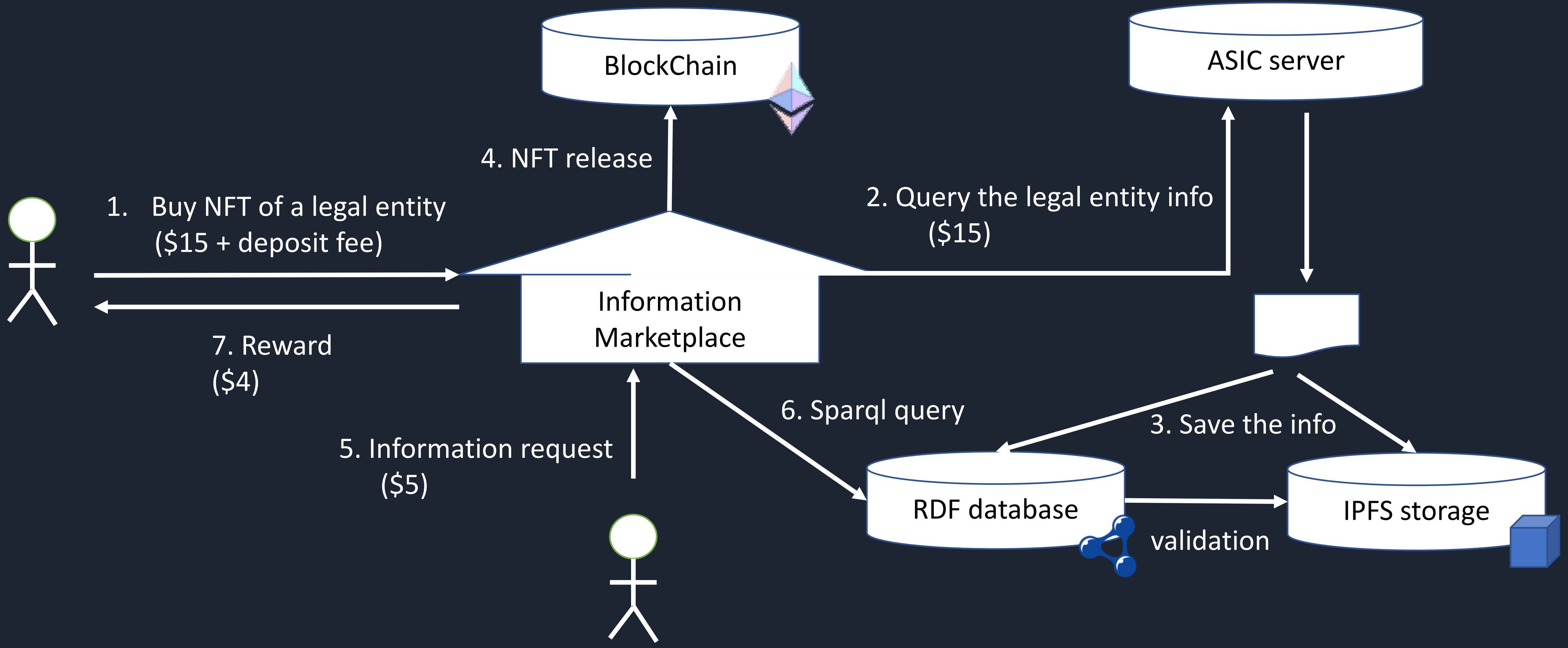
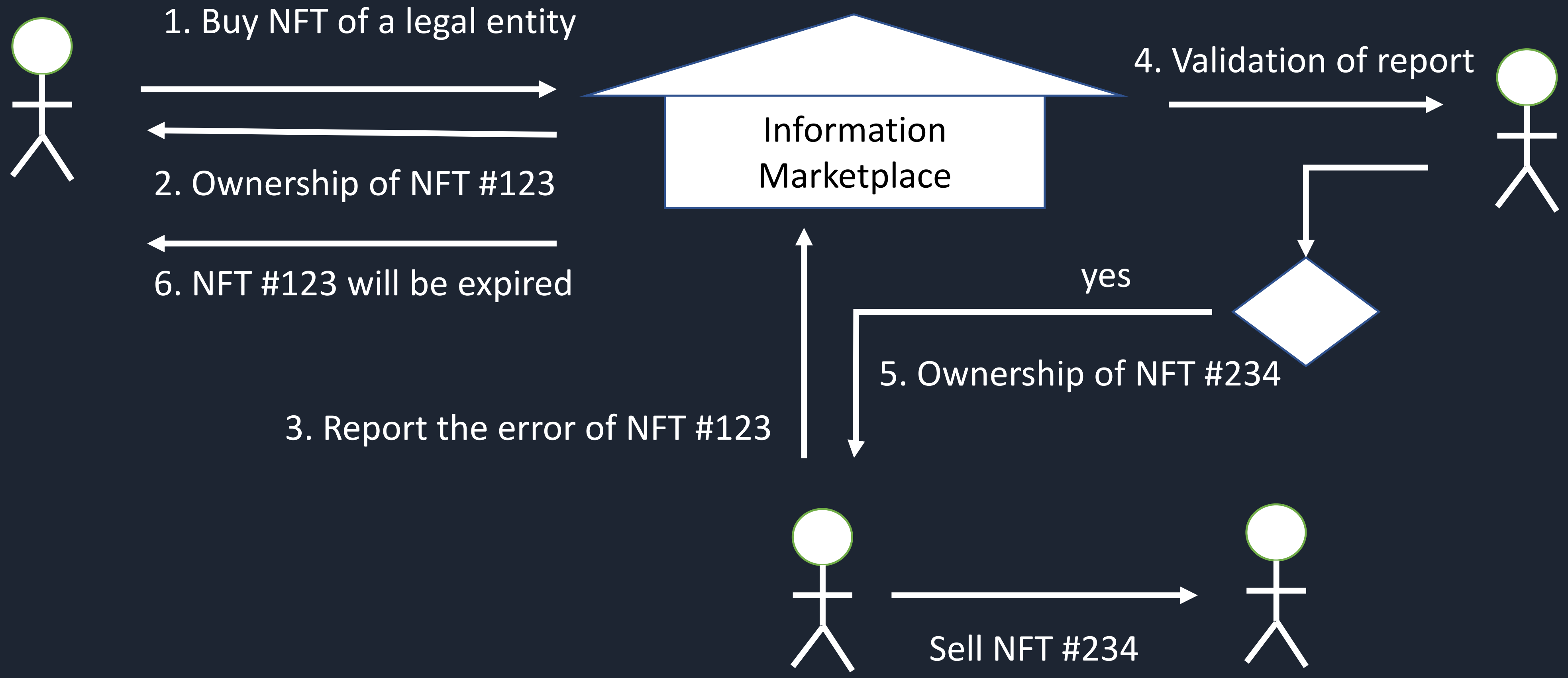
Legal entity Profile NFT System



Lifecycle of NFT



Buy NFT

- User can buy NFT of a legal entity using following method:
    1. Manual filling the legal entity’s profile.
    2. While filling the profile, user can use ASIC database with pay (e.g. $15).
    3. User may pay deposit fee. (it may prevent user’s unreliable submission)
- Once a user buy NFT of a legal entity, the user own the authority of the legal entity information.
    - NFT owner of a legal entity can modify the information of the legal entity.
    - Other user only use the information of the legal entity with few pay (e.g. $5).
- Other user can report an error of information of a legal entity and submit new data to request to buy NFT of the computer.

Lifecycle of NFT

- Unlike ordinary NFT, our released NFT is not permanent and has a life-cycle.
- After a user (Owner) owned NFT of a legal entity, the other user (Challenger) can report the error of the information and submit a new information to request NFT ownership of the legal entity.
- If the new data is verified, our system will release a new NFT and grant the challenger the new NFT. At same time, the old NFT will be expired.
- Like ordinary NFT, our released NFT can be sold. The value of a NFT may be decided by the number of queries of the legal entity in information service system.

Why need for NFT of Legal entity profile?

- Accziom system will pay the fee to NFT owner whenever a user ask the information of the legal entity.
- Accziom will support the market of NFT. With growing the number of the user of Accziom, the earnings of the NFT owner will be increased. As the earnings go up, the value of the NFT increases. Then, the NFT can be sold at a much higher price than the price when it is released.

Available Services for NFT ownership

- Notification of outdated NFT.

  If NFT owner need to maintain the ownership, he/she should maintain the data and update periodically.

  Accziom will send the outdated NFT's owner the notification.

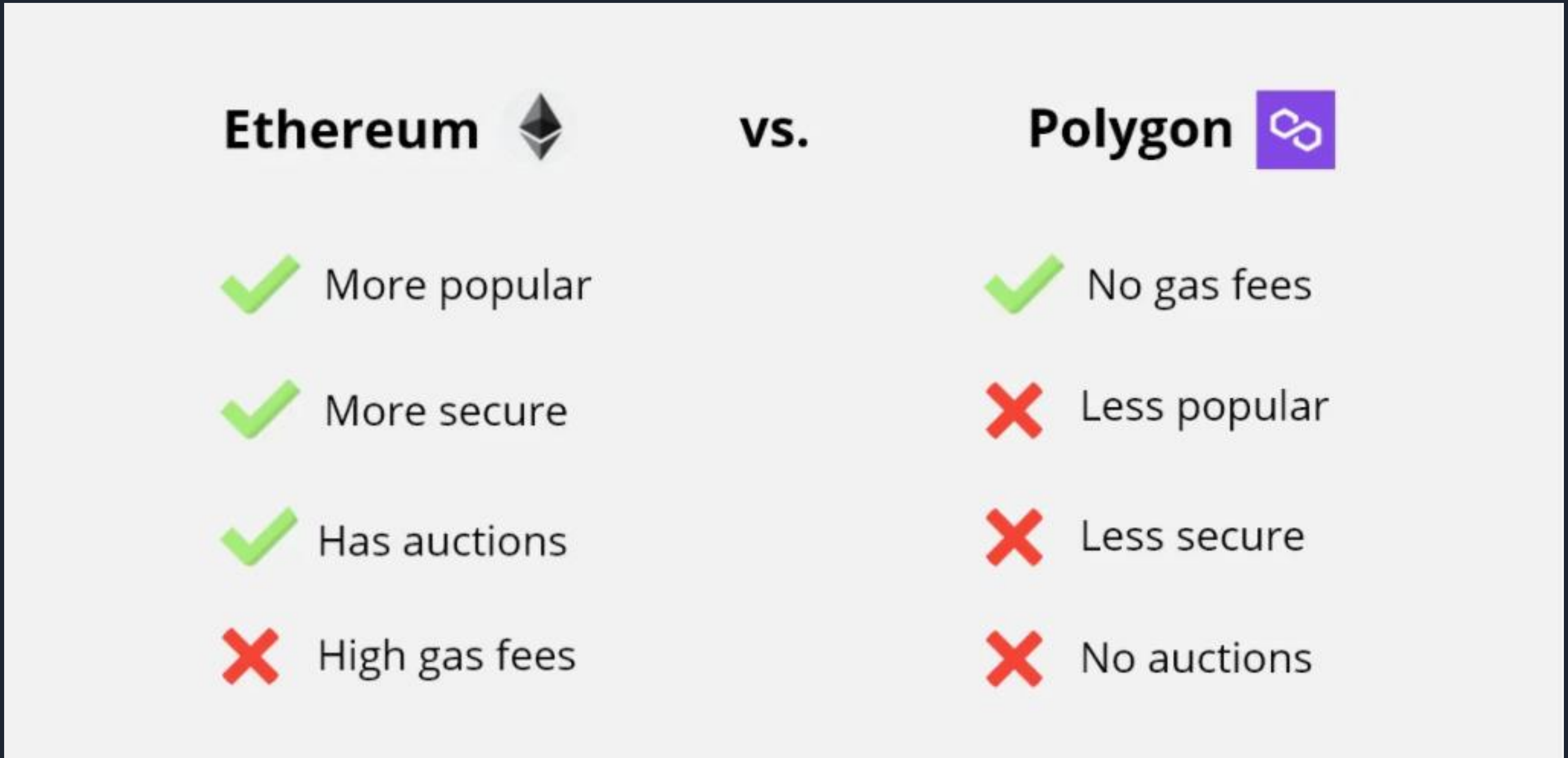
- Automatic update data service.

  If NFT ownership charge some fee (e. g. $15) per a month, Accziom will verify the correctness of the data from ASIC database.

- The State of NFTs.

  A user can own some NFTs. Accziom will provide the detailed information of each NFT, including earn, active/expired, market value etc.

Selection of NFT platform



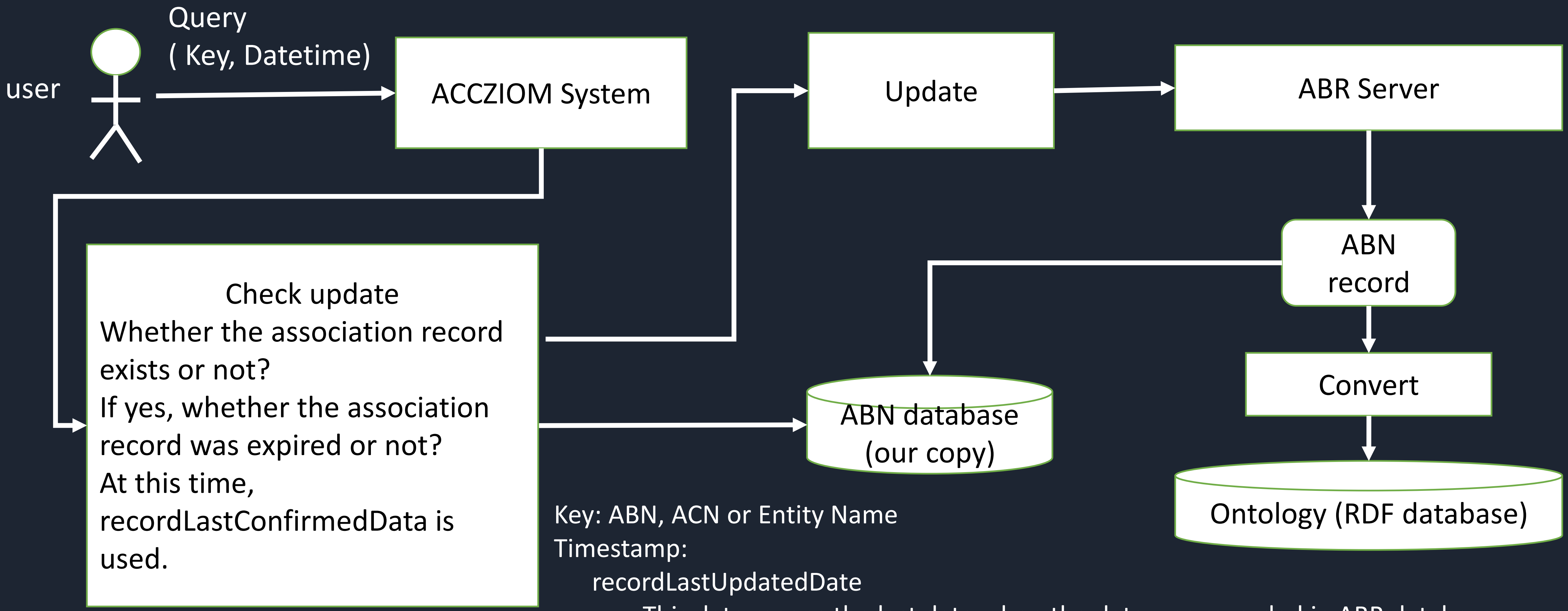
Ethereum	vs.	Polygon
✓ More popular		✓ No gas fees
✓ More secure		✗ Less popular
✓ Has auctions		✗ Less secure
✗ High gas fees		✗ No auctions

from Ethereum vs. Polygon: Which is better for NFTs? - Followchain

NFT Selection

- We can consider Nightfall_3 project to build NFT system, the reasons are follows:
  - **Gas fee is very important**. In general, the ETH gas fee is greater than ASIC or GBG fees ($15). Our service fee ($5) is small, too. So, ETH NFT may be not suitable to our case. Nightfall_3 can perform a private transfer for less than half the cost of a public ERCx transfer whilst maintaining the security and consensus assumptions from the Ethereum Mainnet.
  - Nightfall_3 based NFT system may be not popular, but our NFT has the value only in our Information service system. So, only people that has interest in our project know its value. This means that once our information marketplace become popular, our NFT system also become popular.
  - Due to auction problem, we can develop the auction system based on Nightfall_3 project in future.

Knowledge Base Update Stream



user

Query
(Key, Datetime)

ACCZIOM System

Check update
Whether the association record exists or not?
If yes, whether the association record was expired or not?
At this time, recordLastConfirmedData is used.

Update

ABR Server

ABN record

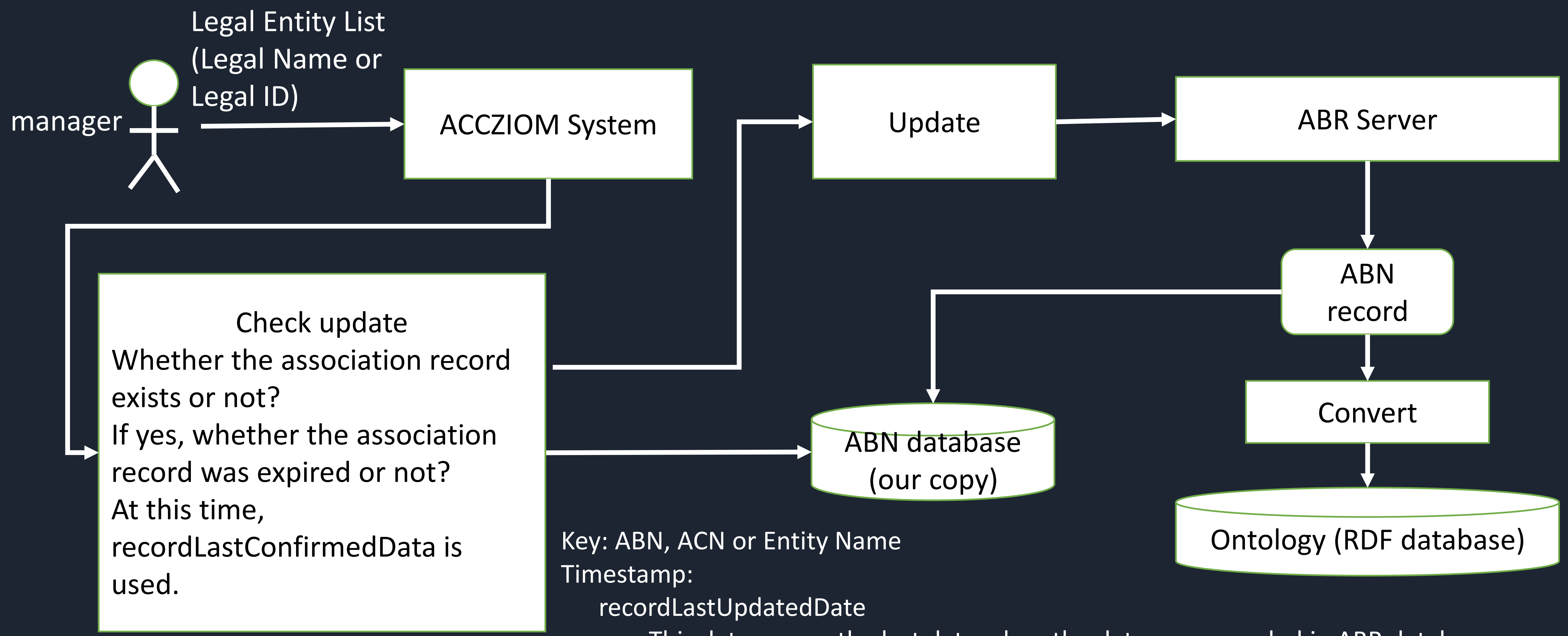
Convert

ABN database
(our copy)

Ontology (RDF database)

Key: ABN, ACN or Entity Name
Timestamp:
- recordLastUpdatedDate
  - This date means the last date when the data was recorded in ABR database.
- recordLastConfirmedDate
  - This date means the last date when our system obtained the data from ABR database.

Knowledge Base Update Stream



manager

Legal Entity List
(Legal Name or
Legal ID)

ACCZIOM System

Update

ABR Server

ABN
record

Convert

ABN database
(our copy)

Ontology (RDF database)

Check update
Whether the association record exists or not?
If yes, whether the association record was expired or not?
At this time, recordLastConfirmedData is used.

Key: ABN, ACN or Entity Name
Timestamp:
- recordLastUpdatedDate
  - This date means the last date when the data was recorded in ABR database.
- recordLastConfirmedDate
  - This date means the last date when our system obtained the data from ABR database.

Ontology Structure

- Namespace
  - Class
  - Property
- Entity
  - Address related Entity (Address, PostalAddress, StreetAddress, FullAddress)
  - Business related Entity
  - Taxonomy related Entity
    - ANZIC classification
    - ABR classification: Entity Type
    - ASIC classification: Entity Type, Class, SubClass
  - Semantic related Entity
  - Person related Entity

Limit of Current Version

- Our ontology should be flexible so that it can be easily updated regularly.
- The data from different database or person may be same. In this case, our ontology should treat these data independently.
- For instance, let’s consider following case:

For a company, first user input the address property as WA, AU.

However, second user input the address property as VIC, AU.

When conflict occurs, in general, system cannot know which is correct. It can be solved by a comment mechanism.

Limit of Current Version

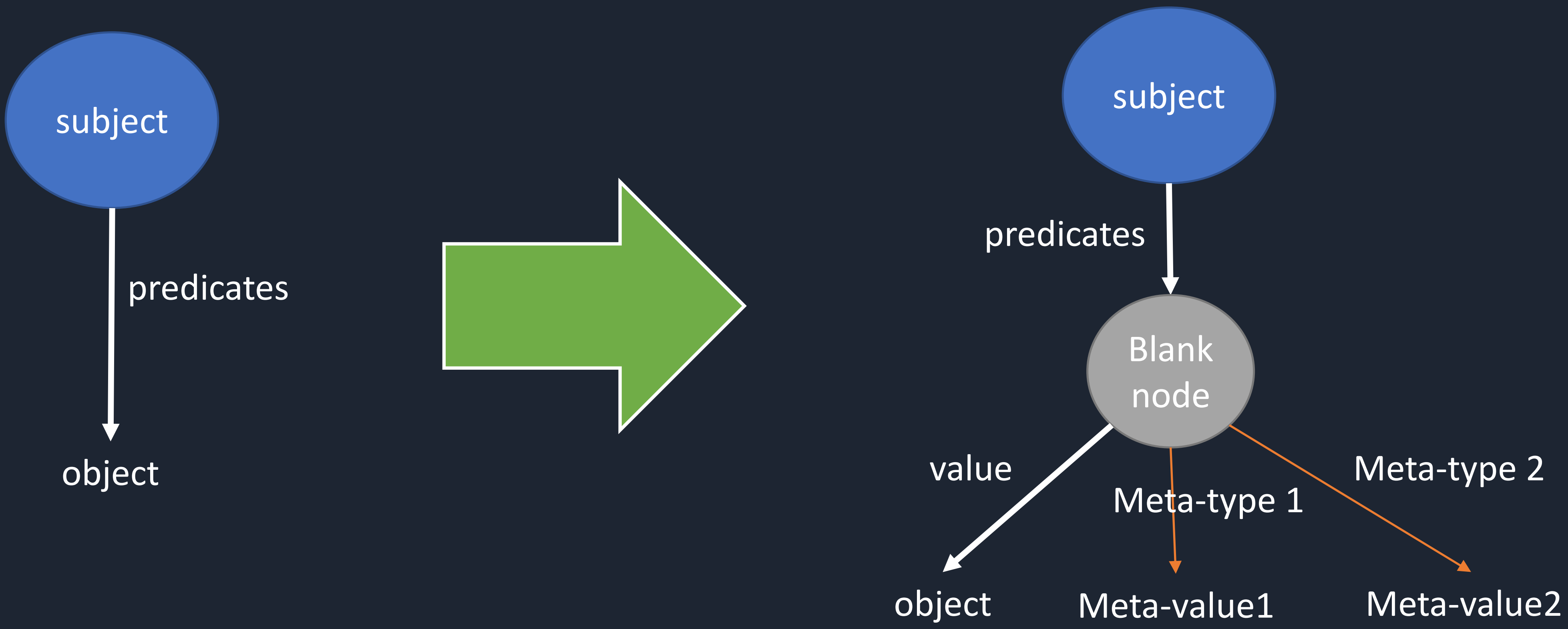
- The data of current version is <subject predicates object>.
- This structure is not suitable for above conditions.
- So, we need a meta data for maintaining rdf data.
- It can be extended as follows:

  <subject predicates object [meta-data]>

- In form, rdf data is triple structure. We can use Blank node to represent this structure.

  subject predicates [object meta-data]

Update of Data Structure

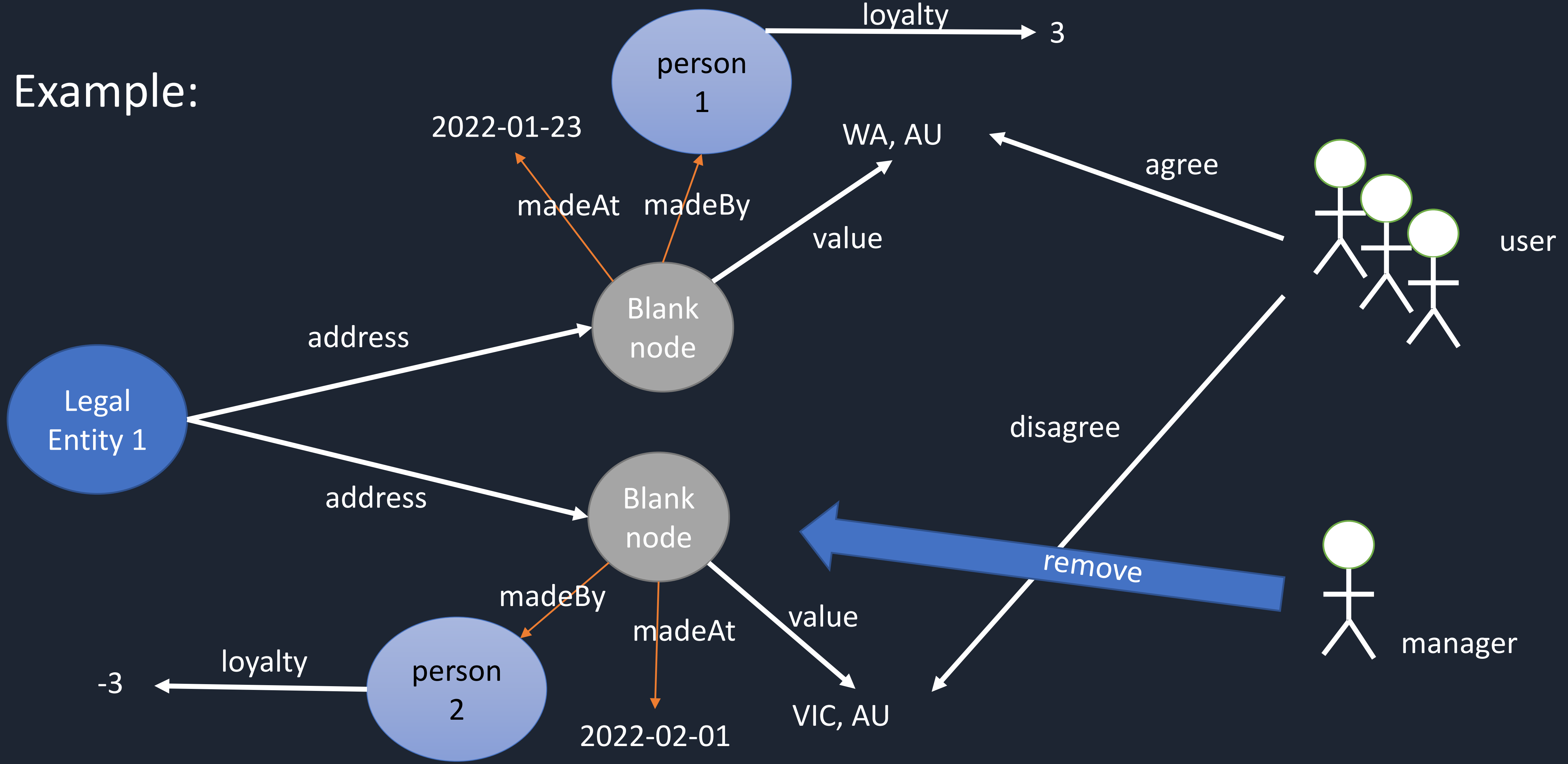


Earlier version (v0.1)

New version (v1.0)

Maintaining in new version

Example:



Property

- Property
    - Scalar Property (owl:DatatypeProperty)

      Only has a value which type is string, integer, date, uri or etc.
    - Vector Property (owl:ObjectProperty)

      e.g. Measurement
        - Value: number
        - Unit: kg, m, sqm, …
        - From: datetime
        - To: datetime
        - At: datetime
- MetaProperty
    - Resource: ABR, ASIC, ASX, GLEI, …
    - Public: Y/N

      Public data can be freely browsed.
      Private data can be browsed only for a fee.
    - Owner

Facilitate for maintaining data and verifying data.

These properties are related to ownership of NFT.

Hierarchy of Property

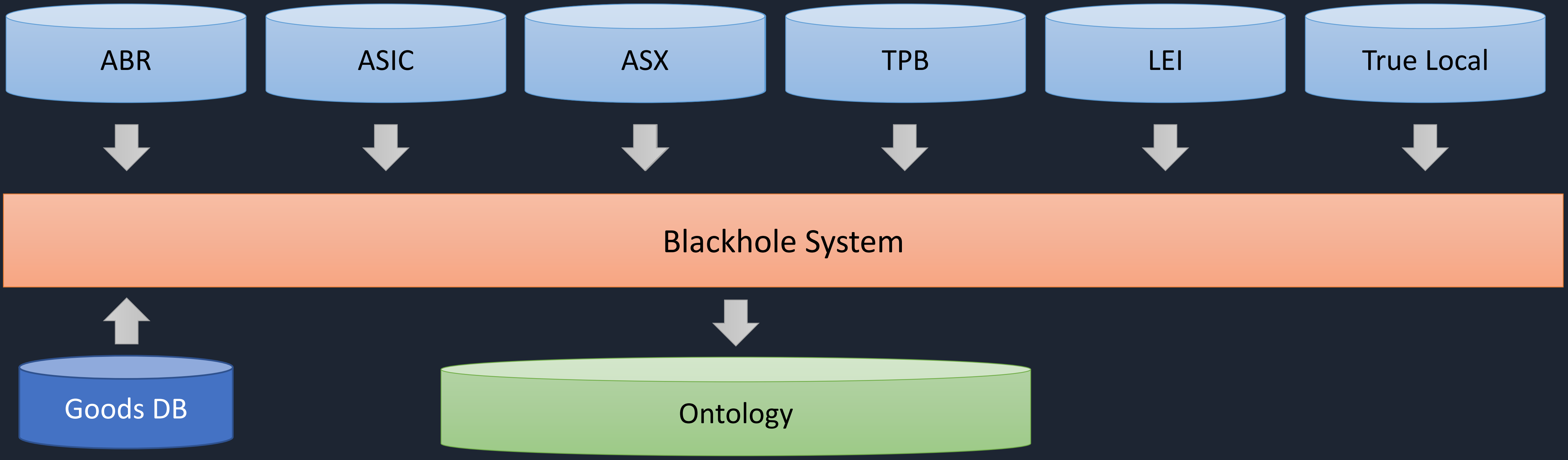
1-level	2-level	3-level	example
Property	Scalar Property	Header	legalName, name, description, label
		Identifier	abn, acn, lei, isin
		Contacts	phone, fax, url, address
		Timestamp	abrUpdateDate, abrConfirmedDate, gstEffectiveDate, asxUpdateDate
		Status	activeStatus
		Person	director, secretary
	Vector Property	Measurement	weight, length, area, …
		Price	priceAsk, priceBid, priceChange, marketCap, …
		Location	geoLocation

Vector Property

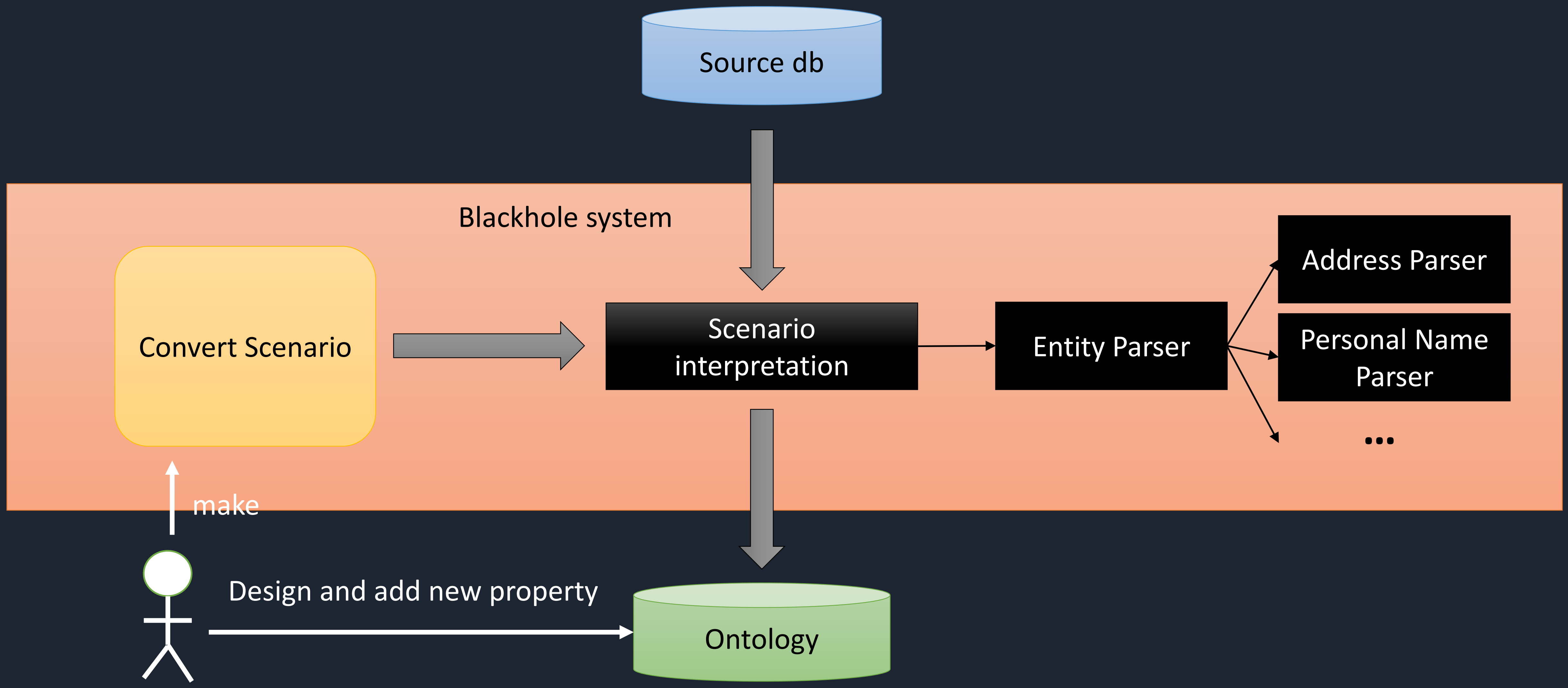
- Measurement
  - All measure property has value and unit subproperty. For instance, 3kg= { value:3, unit: kg }
  - Unit must be represented as uri, so that it can be converted to other unit (e.g. t, mg, etc)
- Price
  - All price property has value, unit and **timeframe** subproperty. For instance, $3 = {value:3, unit: USD, at:2022-03-23}
  - Unit must be represented as uri, so that it can be converted to other currency with exchange rate.
- Location
  - For instance, geolocation property has longitude and latitude subproperty.

Blackhole System

- Blackhole system is a subsystem of Accziom, that incorporates various databases into one large ontology, like as black hole swallows planets.



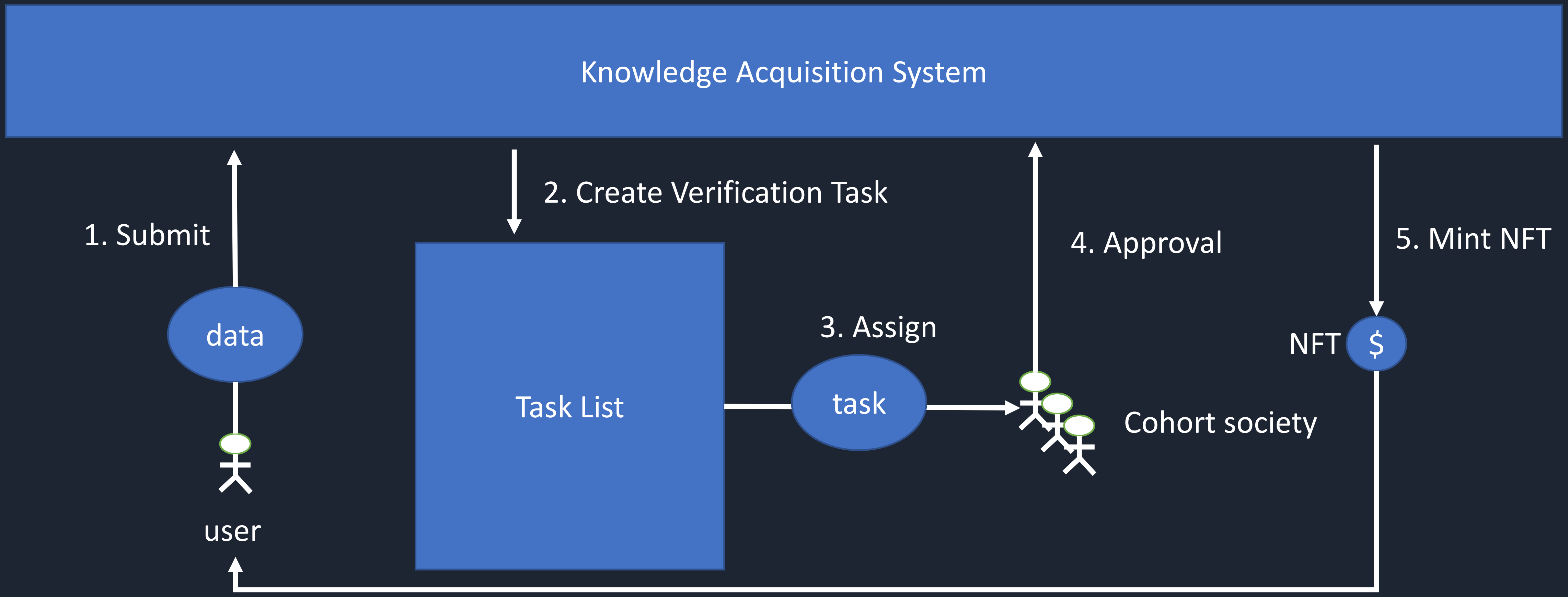
Ontology Building Mechanism



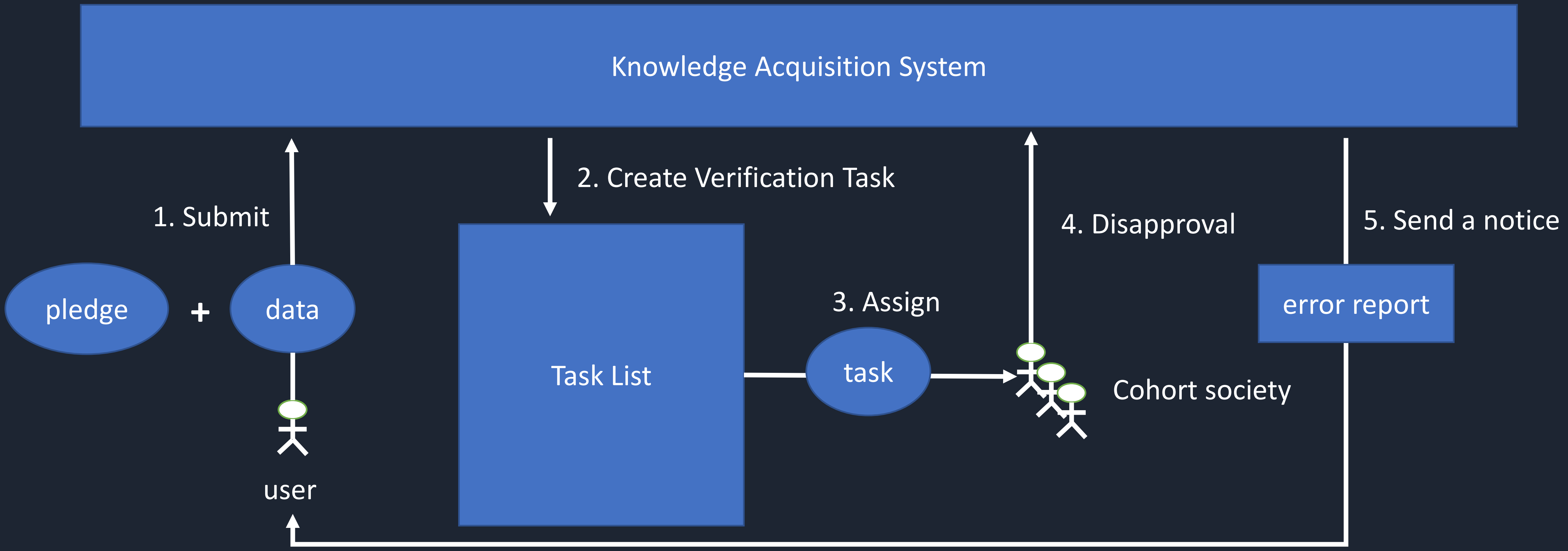
Ontology Building using Blackhole System

- Currently, ontology building is based on manual programming. It lacks flexibility and rapidness for extending database resource.
- Using Blackhole system, ontology building process becomes semi-automatic. i.e. whenever we want to add new database, writing converter scenario is all what we do. The converter scenario is both simple and clear, which is like map table.
- So, it can guarantee the reliability and rapidness.

Knowledge Acquisition Mechanism



Knowledge Acquisition Mechanism



Components of Accziom Marketplace

1. Accziom Token and NFT System based on Sidechain.
   a. Token Smart Contract

      This contract handles all payment processing related to Accziom service. All transaction will be done with Accziom Token.

   b. NFT Smart Contract

      This contract mints and transfers NFT. This contract is different from other common NFT contracts in the point that each NFT includes RDF record id, owner accounts info and share info of owners.

   c. User Interface to look up account info. (dApp)

      User can browse the transaction history including his NFT statistics info.

2. Information Service System.
3. Information Supply System.

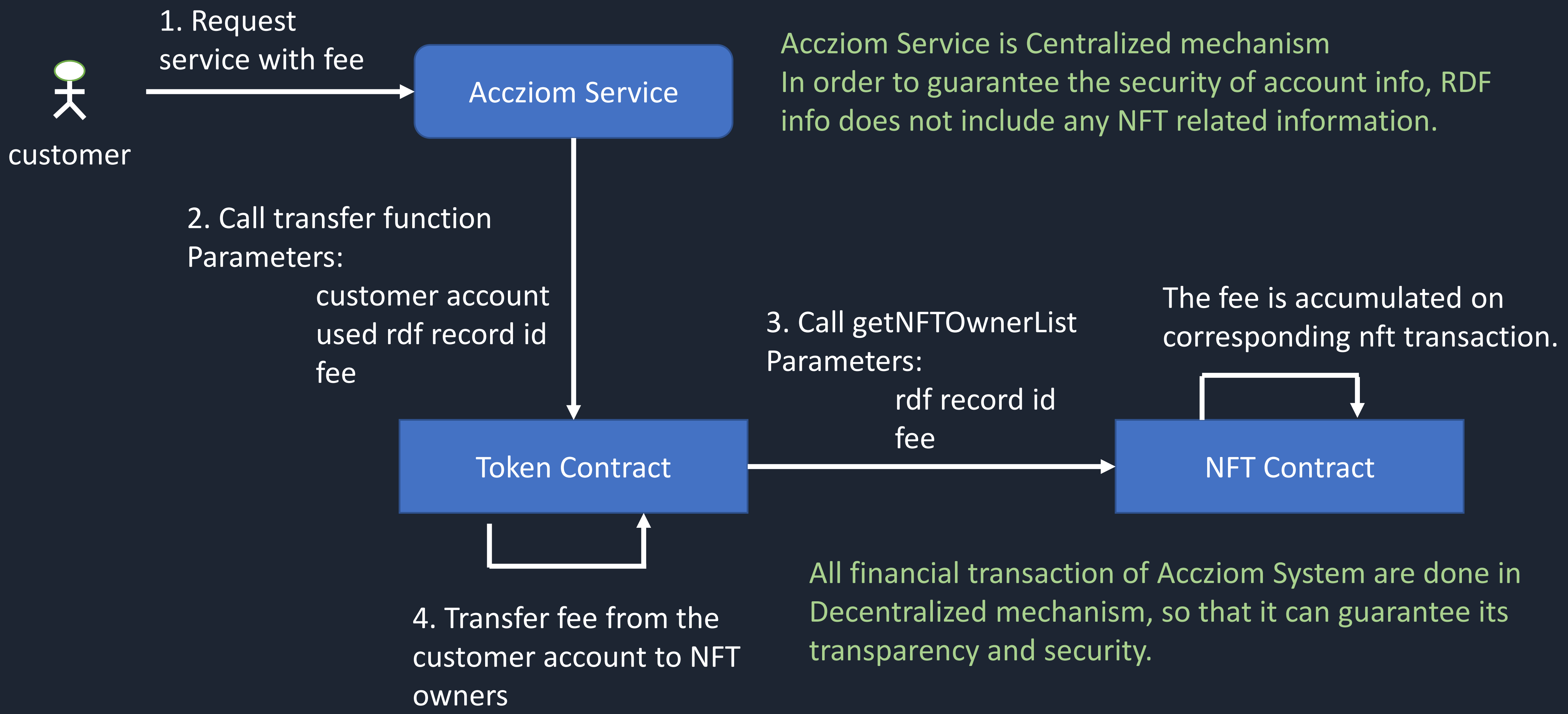
Components of Accziom Marketplace

1. Accziom Token and NFT System based on Sidechain.
2. Information Service System.
   a. Knowledge Graph
   b. Information Search Service (dApp)
3. Information Supply System.
   a. User Information Input Interface (dApp)
   b. Computer-aid tools

      Free tool and non-free tool.

      e. g. GBG verification service is of non-free tool.
   c. Validation Mechanism (dApp)

Acczföre Token and NFT System



customer

1. Request service with fee

Acczиom Service

2. Call transfer function
Parameters:
customer account
used rdf record id
fee

Token Contract

3. Call getNFTOwnerList
Parameters:
rdf record id
fee

NFT Contract

The fee is accumulated on corresponding nft transaction.

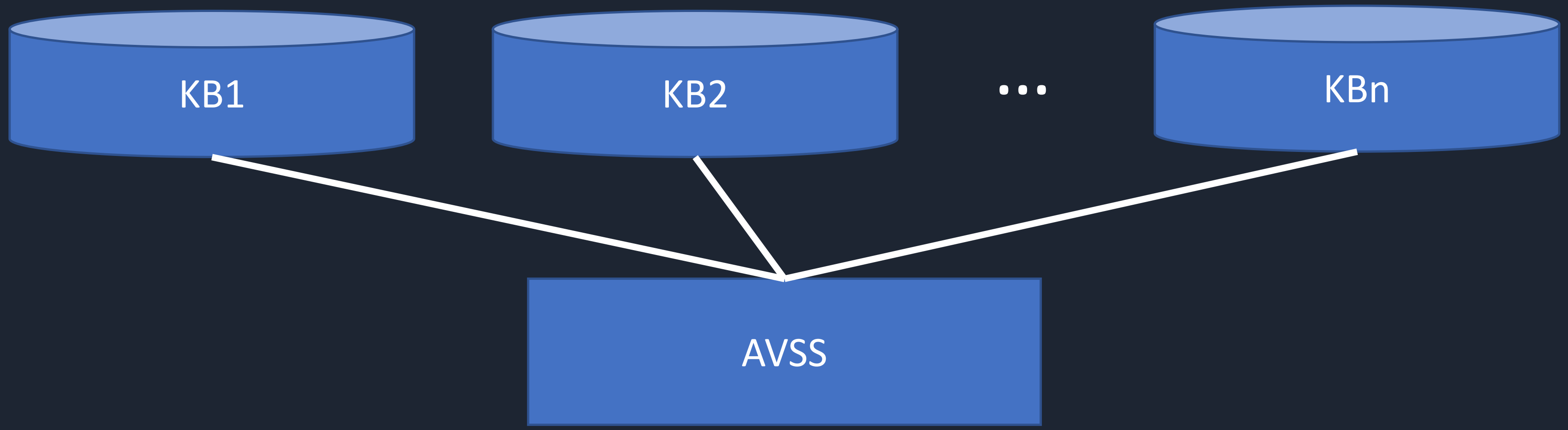
4. Transfer fee from the customer account to NFT owners

Acczиom Service is Centralized mechanism
In order to guarantee the security of account info, RDF info does not include any NFT related information.

All financial transaction of Acczиom System are done in Decentralized mechanism, so that it can guarantee its transparency and security.

Acczіom Value-Shifting Service

- AVSS(Acczіom Value-Shifting Service) encourages each information provider to actively participate in the accumulation and building of Knowledge Base.
- It is completely dependent of Knowledge Base, i.e. it can be used for various Knowledge Base.



Accziom Value-Shifting Service

- AVSS uses Merchant Coin(named as MERC) and Accziom NFT.
- Information provider can be rewarded by his NFT, the reward will be increased in his Accziom account and these transactions are made with MERC Token.
- AVSS has a special smart contract, it is very important, which carry out value-shifting service. I would like to call it Value-Shifting Smart Contract (VSSC).
- VSSC inputs a fee and the list of records which are used in information service, then gets the corresponding NFT holders for the records and finally divides the fee into each NFT holder.

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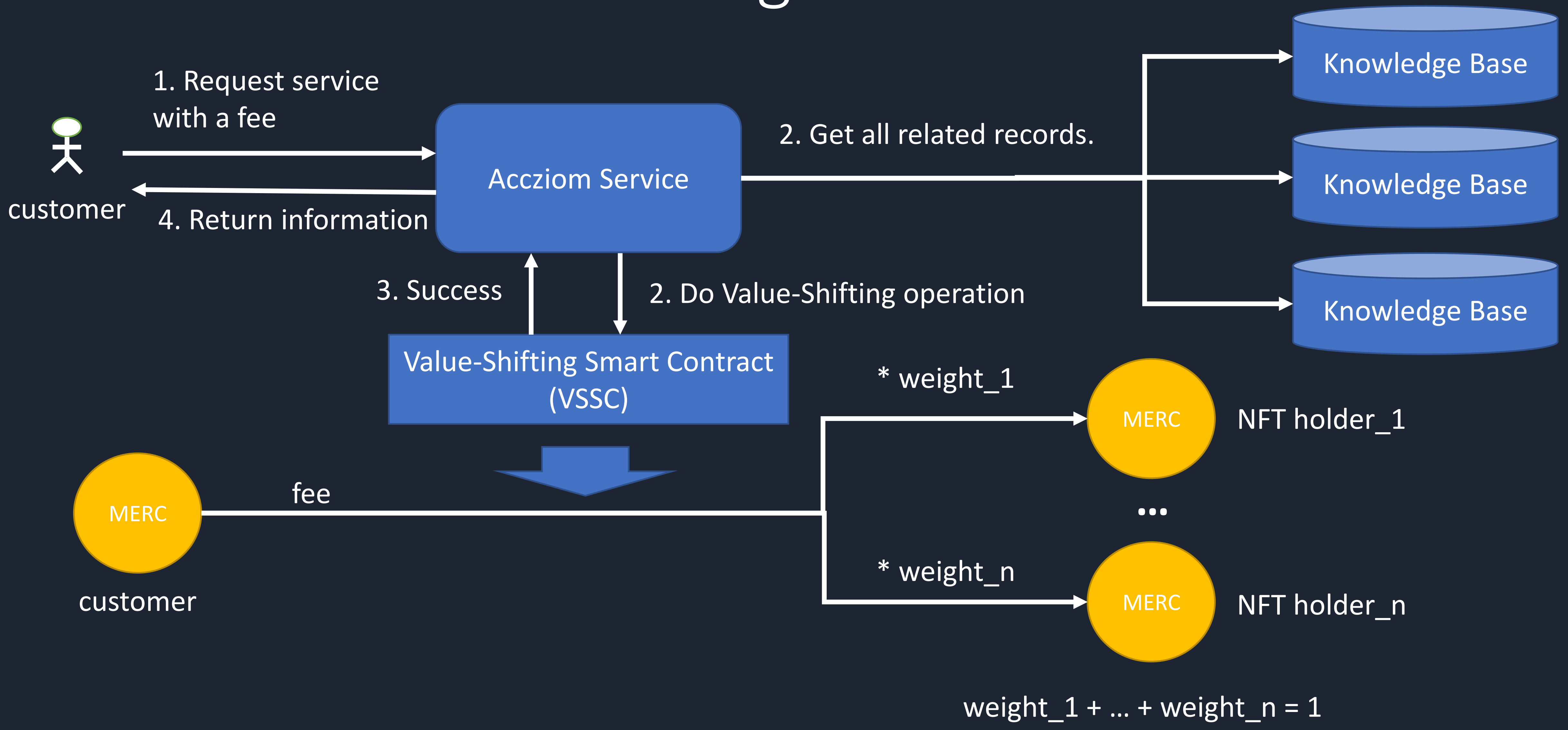
Acczion Value-Shifting Service



Accziom Value-Shifting Service

- AVSS can be seen as general model that implement value-shifting service using NFT. In other words, it can be used for any service which uses any Knowledge Base.
- In Knowledge Base, each payable information should be represented as Blank node. All blank node has a URI and NFT is minted for this URI.

```
e.g. azc:bs_532e2685-1109-4a40-95be-f39f731d0649
                    azp:hasPhone [
                              azp:value “(02) 8405 8866” ;
                              azpr:public “N” ;
                    ] .
```

This is blank node. Its uri is automatically generated when this information is recorded in RDF database.
For instance, the uri of this node is _:b17180657890.

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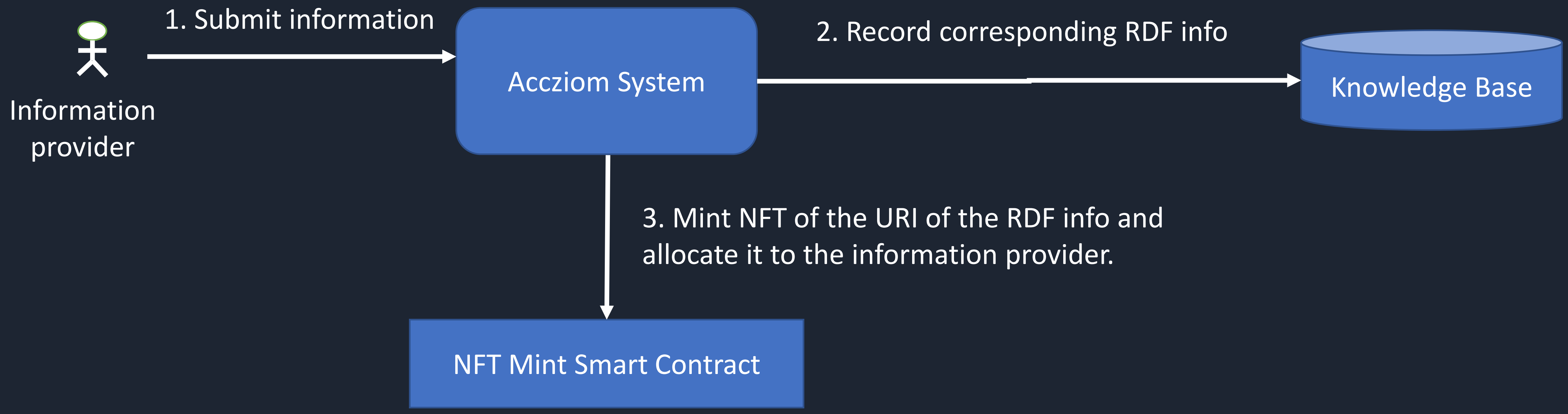
Acczìom Value-Shifting Service


1. Submit information

2. Record corresponding RDF info

3. Mint NFT of the URI of the RDF info and allocate it to the information provider.

Accziom Value-Shifting Service

- AVSS is very safe and the reason may be explained as below:
  - All AVSS transactions are safe, because they work on Blockchain.
  - If a bad actor wants to get profit, he can try following actions:
    - He may try to change the ownership of NFT, but it is very hard because he should change all nodes of blockchain.
    - He may try to change the URI of the information of Knowledge Base to a URI which he already made. It is relatively easy, because all he have to do is to change the Knowledge Base. But it will cause corruption of the data and the quality of whole service. Once the quality of our service become low, the bad actor also can not get any profit. Furthermore, we can periodically check Knowledge Base and promptly find out all bad actors.

Challenge of AVSS Solution

- Blockchain has some weak points:
  - There is no customer protection on the blockchain.
  - Settlement on a blockchain is slow.

  A cost of settling a transaction on the blockchain is that all the nodes in the network need to come to an agreement that the transaction is valid. **This is a far slower process than having a bank verify your transaction in an instant**.
  - Miners can be selfish
  - The growing blockchain size
  - **Eventually settlement on the blockchain will not be cheap.**

Ref: 5 Weak Points Of Blockchain Technology - Blockgeeks

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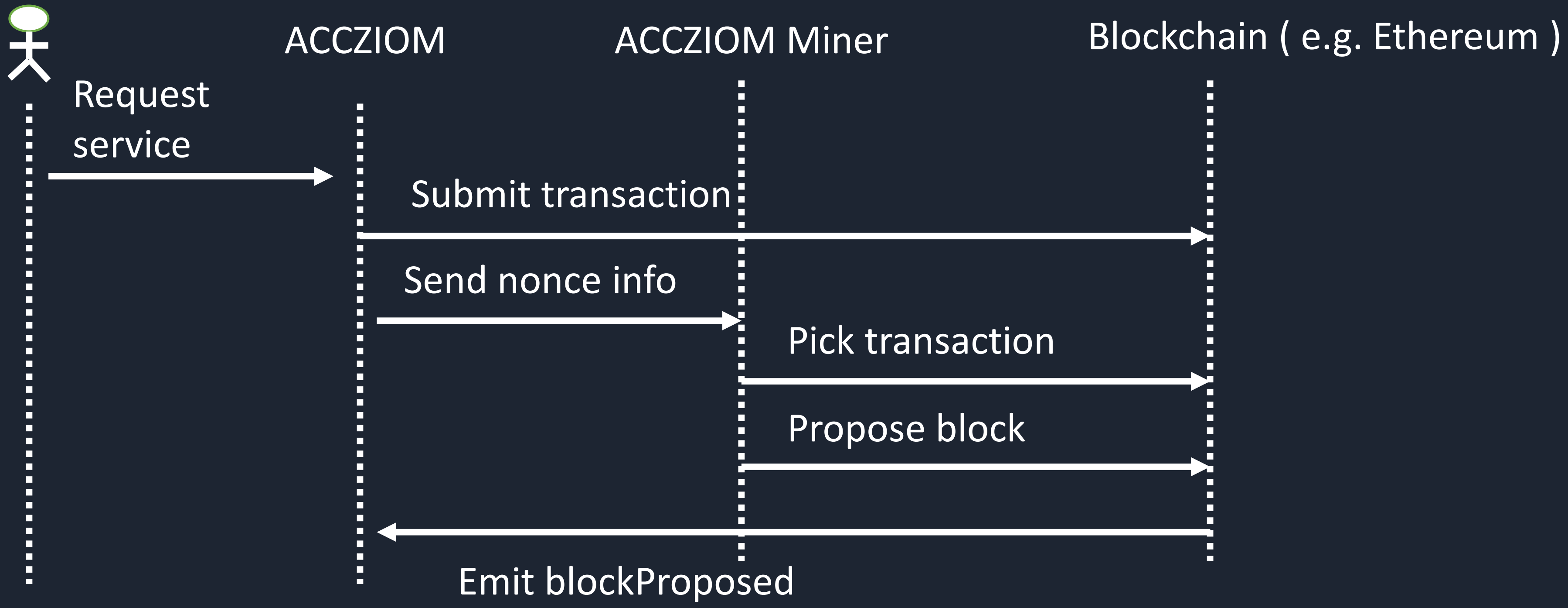
Available Solution

- Solution 1: Our own miner

  If we can develop our own miner, we can save gas fee.



Available Solution

- Solution 2: Our own blockchain

  Our own blockchain may take the burden off existing blockchains.

  Of course, our own miner can be applied to our own blockchain.

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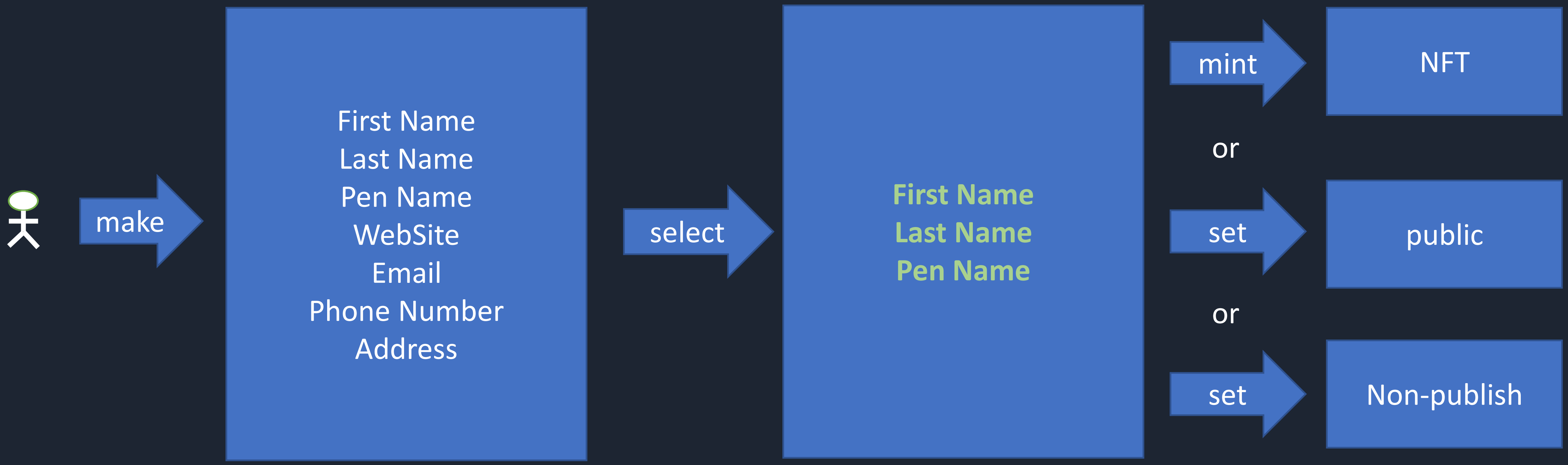
Data Management



Data Management

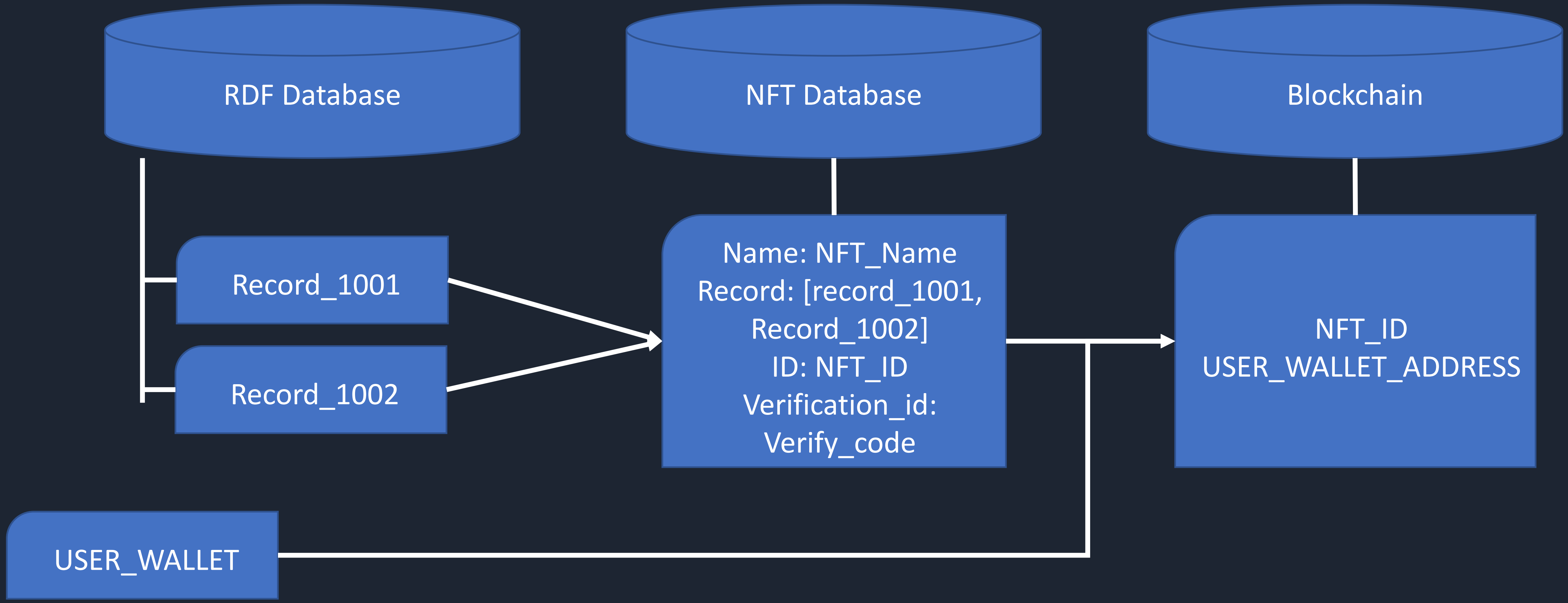
Record	Timestamp	Publish Property
First Name	2022-05-12	Public
Last Name	2022-05-12	Public
Pen Name	2022-05-12	Public
Website	2022-05-12	NFT1
Email Address	**2022-05-12**	**NFT1**
Email Address	**2022-05-16**	**Private**
Region	2022-05-12	Private
Postal Code	2022-05-12	Private
Country	2022-05-12	Private
ABN	2022-05-12	NFT2
CAN	2022-05-12	NFT2

Publish Property	Description
Public	These records will be served in free.
Private	These records will be not served to any user, except maker.
NFT1	Maker's NFT (it will be named by maker.)
NFT2	Maker's NFT (it will be named by maker.)
…	

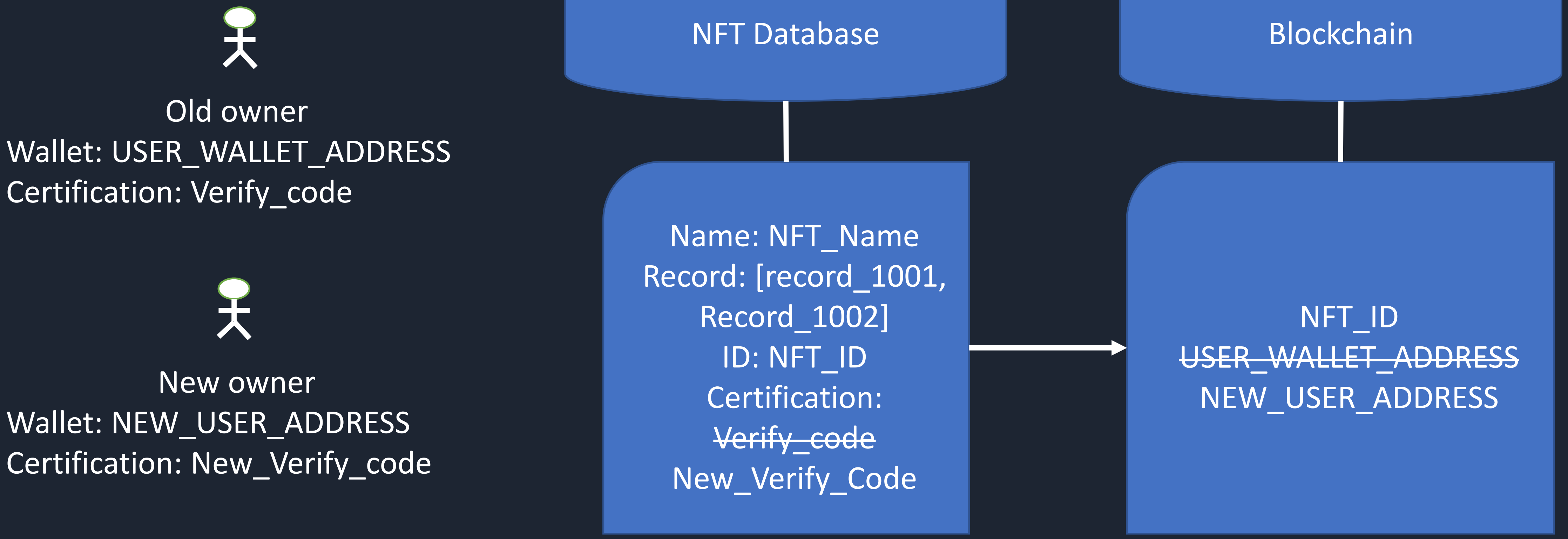
Data Management

- User have some choices:
  - UseCase 1: User can set a record as non-publish data. (default)
  - UseCase 2: User can set a record as public data.
  - UseCase 3: User can publish data and mint NFT.
  - UseCase 4: User can add a record into a NFT.
  - UseCase 5: User can move a record from a NFT to other NFT.
  - UseCase 6: User can remove a record.

NFT System


RDF Database
NFT Database
Blockchain
Record_1001
Record_1002
Name: NFT_Name
Record: [record_1001,
Record_1002]
ID: NFT_ID
Verification_id:
Verify_code
NFT_ID
USER_WALLET_ADDRESS
USER_WALLET

NFT Transfer



Old owner
Wallet: USER_WALLET_ADDRESS
Certification: Verify_code

New owner
Wallet: NEW_USER_ADDRESS
Certification: New_Verify_code

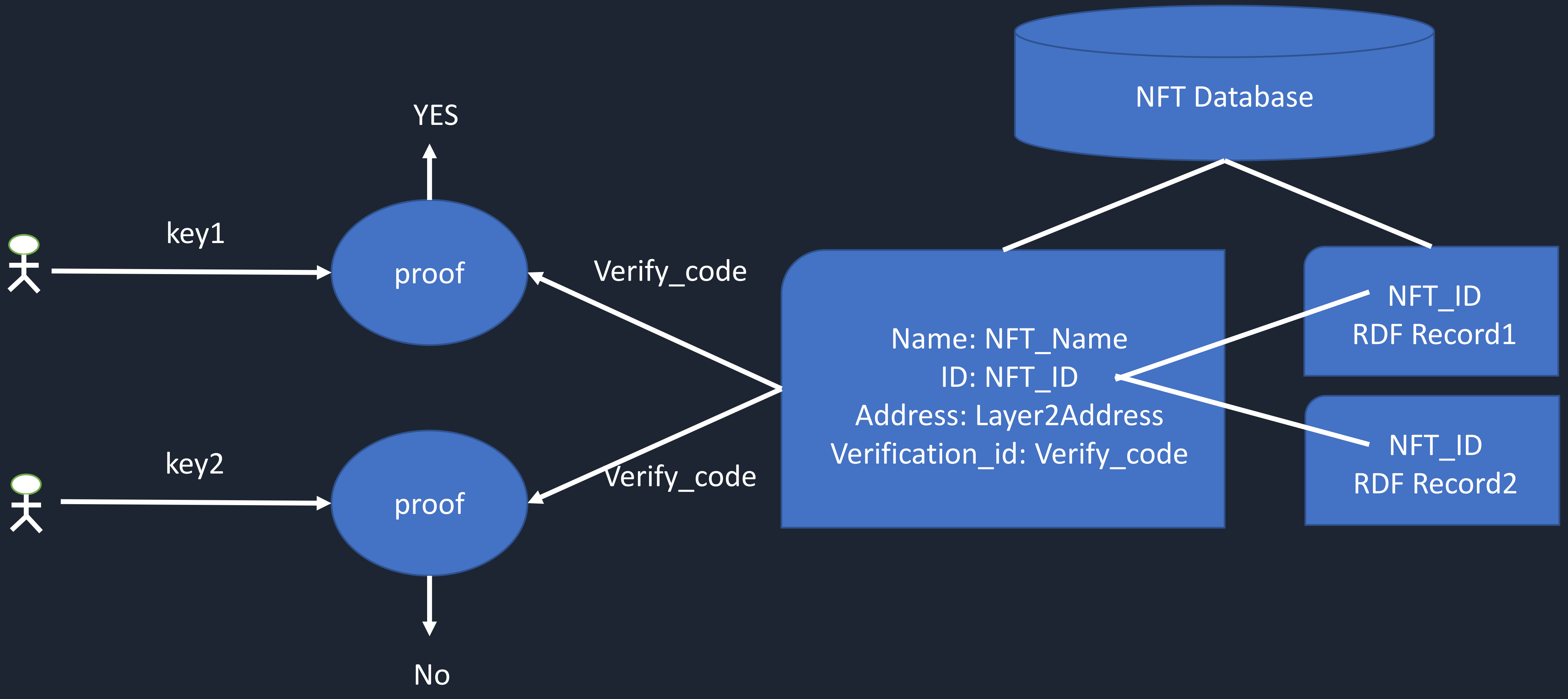
NFT Database

Name: NFT_Name
Record: [record_1001, Record_1002]
ID: NFT_ID
Certification:
~~Verify_code~~
New_Verify_Code

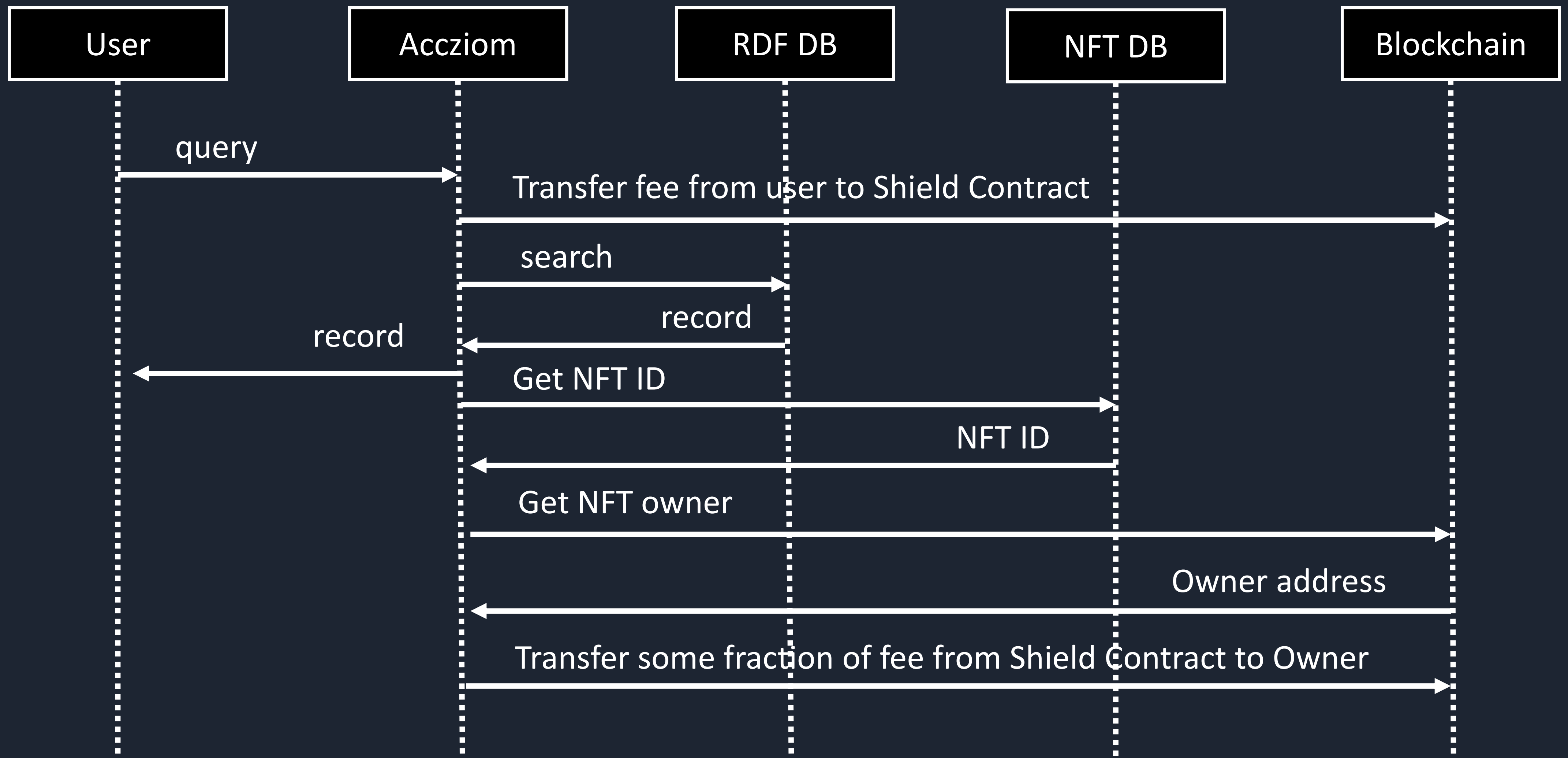
Blockchain

NFT_ID
~~USER_WALLET_ADDRESS~~
NEW_USER_ADDRESS

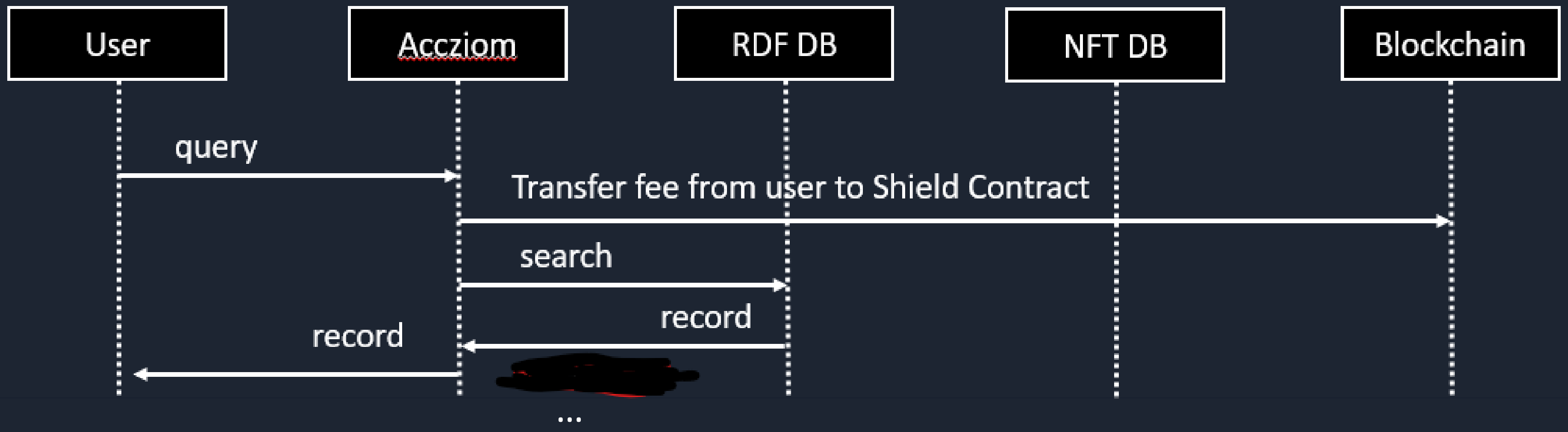
NFT Verify


NFT Database
YES
key1
proof
Verify_code
NFT_ID
RDF Record1
Name: NFT_Name
ID: NFT_ID
Address: Layer2Address
Verification_id: Verify_code
key2
proof
Verify_code
NFT_ID
RDF Record2
No

NFT-based Reward Flow

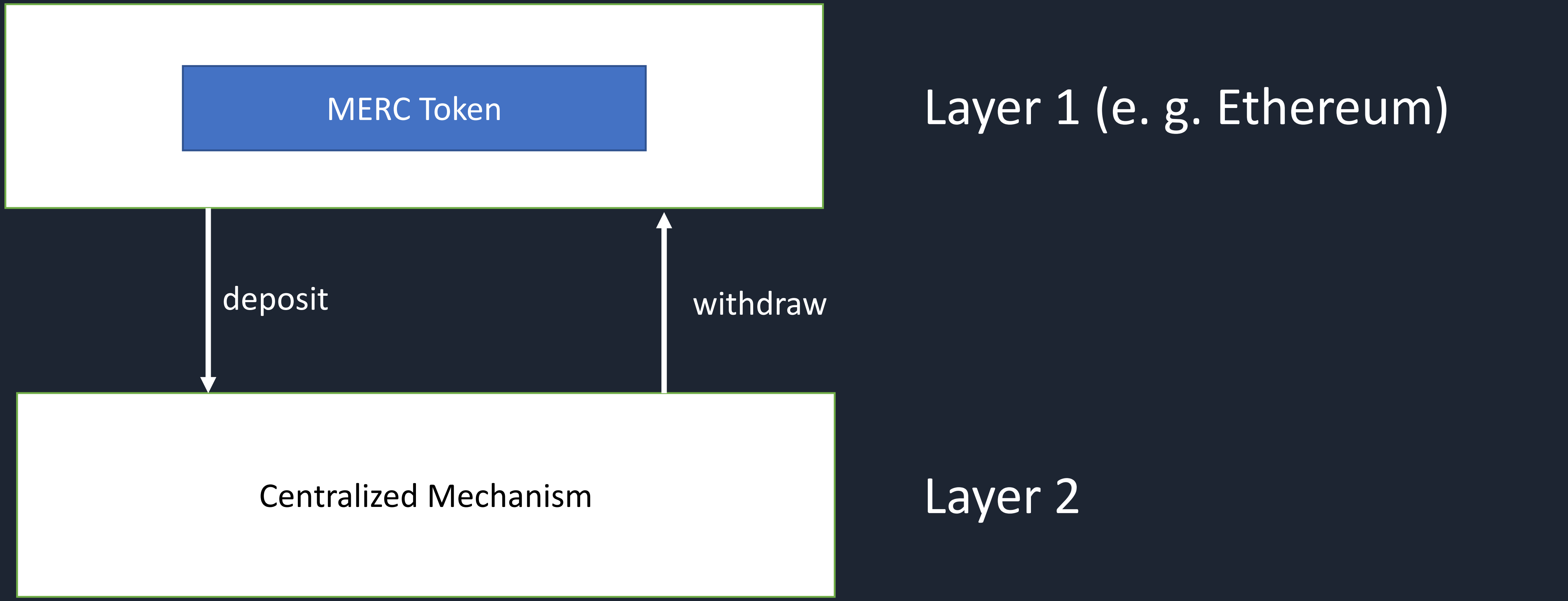

User
Accziom
RDF DB
NFT DB
Blockchain
query
Transfer fee from user to Shield Contract
search
record
record
Get NFT ID
NFT ID
Get NFT owner
Owner address
Transfer some fraction of fee from Shield Contract to Owner

NFT-based Reward Flow

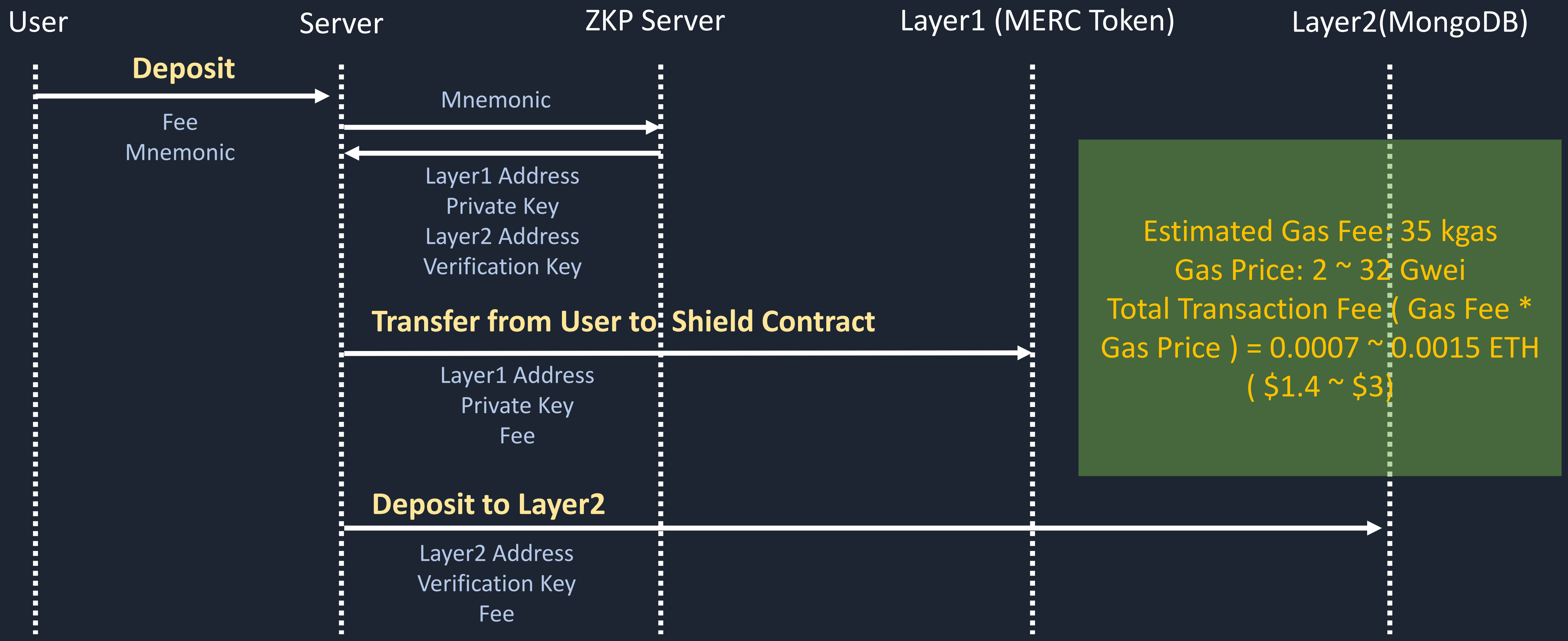


Once user pay a fee to Shield Contract, user can receive the search result, so that user do not need to wait to finish whole NFT-based reward flow.
If the request to Accziom is frequently occurred, it is rather difficult for user to discovery the owner of NFT. The reason is like as Lightening Network

Design of Centralized Layer 2



Design of Centralized Layer 2



User

Server

ZKP Server

Layer1 (MERC Token)

Layer2(MongoDB)

Deposit

Fee
Mnemonic

Mnemonic

Layer1 Address
Private Key
Layer2 Address
Verification Key

Transfer from User to Shield Contract

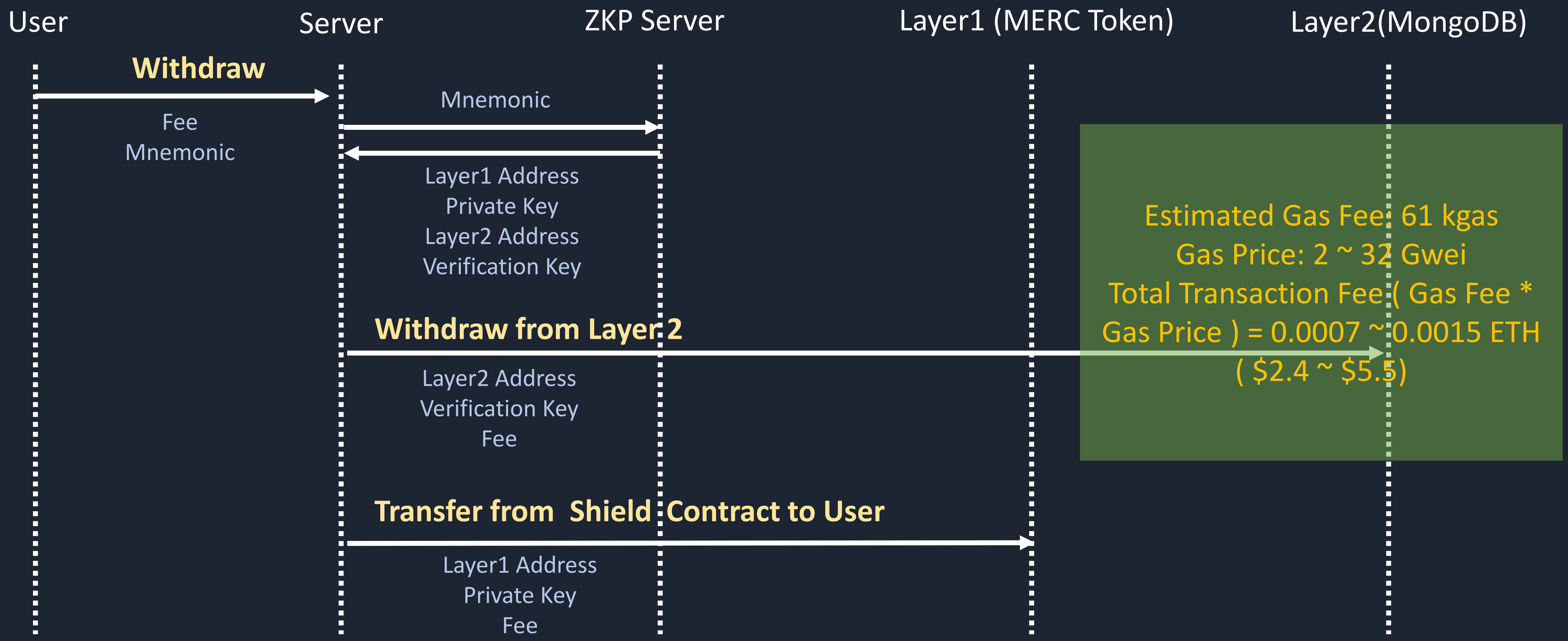
Layer1 Address
Private Key
Fee

Estimated Gas Fee: 35 kgas
Gas Price: 2 ~ 32 Gwei
Total Transaction Fee (Gas Fee * Gas Price) = 0.0007 ~ 0.0015 ETH ($1.4 ~ $3)

Deposit to Layer2

Layer2 Address
Verification Key
Fee

Design of Centralized Layer 2



User

Server

ZKP Server

Layer1 (MERC Token)

Layer2(MongoDB)

Withdraw

Fee
Mnemonic

Mnemonic

Layer1 Address
Private Key
Layer2 Address
Verification Key

Withdraw from Layer 2

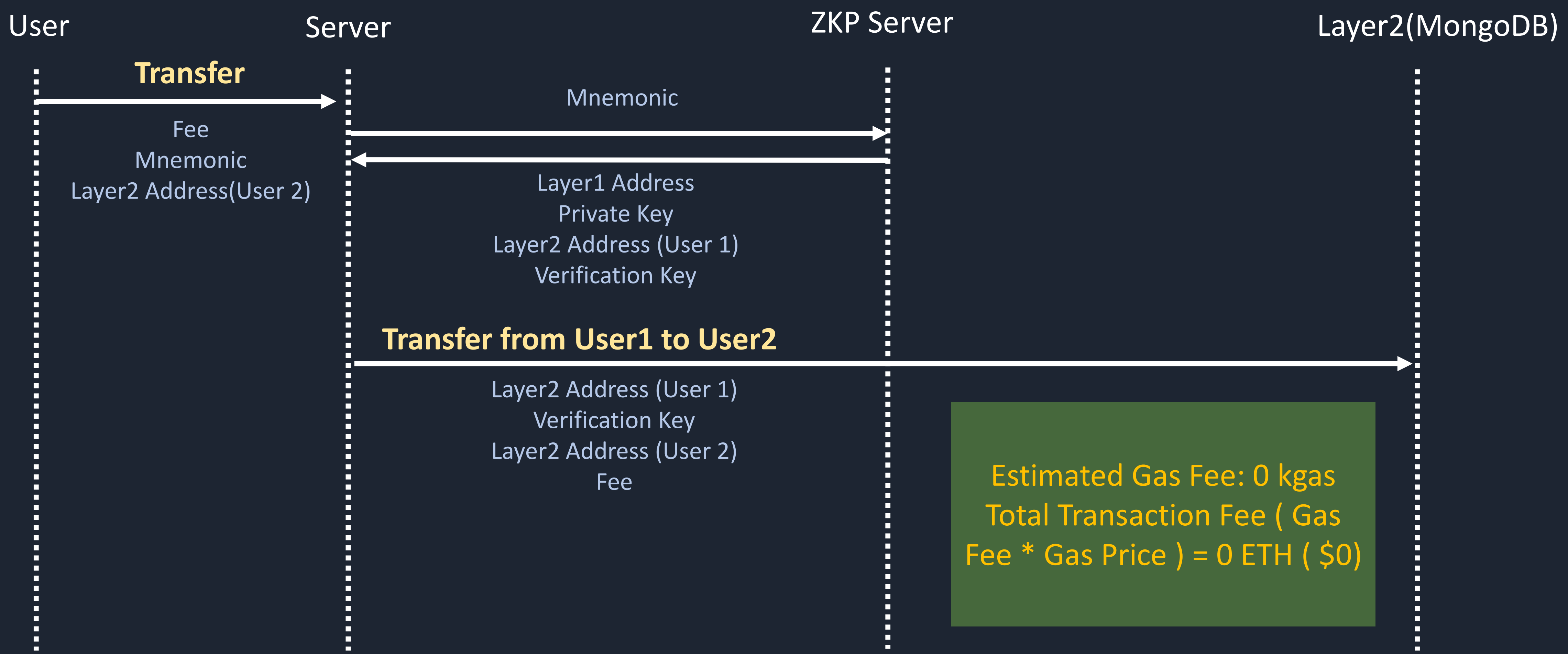
Layer2 Address
Verification Key
Fee

Transfer from Shield Contract to User

Layer1 Address
Private Key
Fee

Estimated Gas Fee: 61 kgas
Gas Price: 2 ~ 32 Gwei
Total Transaction Fee (Gas Fee * Gas Price) = 0.0007 ~ 0.0015 ETH ($2.4 ~ $5.5)

Design of Centralized Layer 2



User

Server

ZKP Server

Layer2(MongoDB)

Transfer

Fee
Mnemonic
Layer2 Address(User 2)

Mnemonic

Layer1 Address
Private Key
Layer2 Address (User 1)
Verification Key

Transfer from User1 to User2

Layer2 Address (User 1)
Verification Key
Layer2 Address (User 2)
Fee

Estimated Gas Fee: 0 kgas
Total Transaction Fee (Gas Fee * Gas Price) = 0 ETH ($0)

Design of Centralized Layer 2

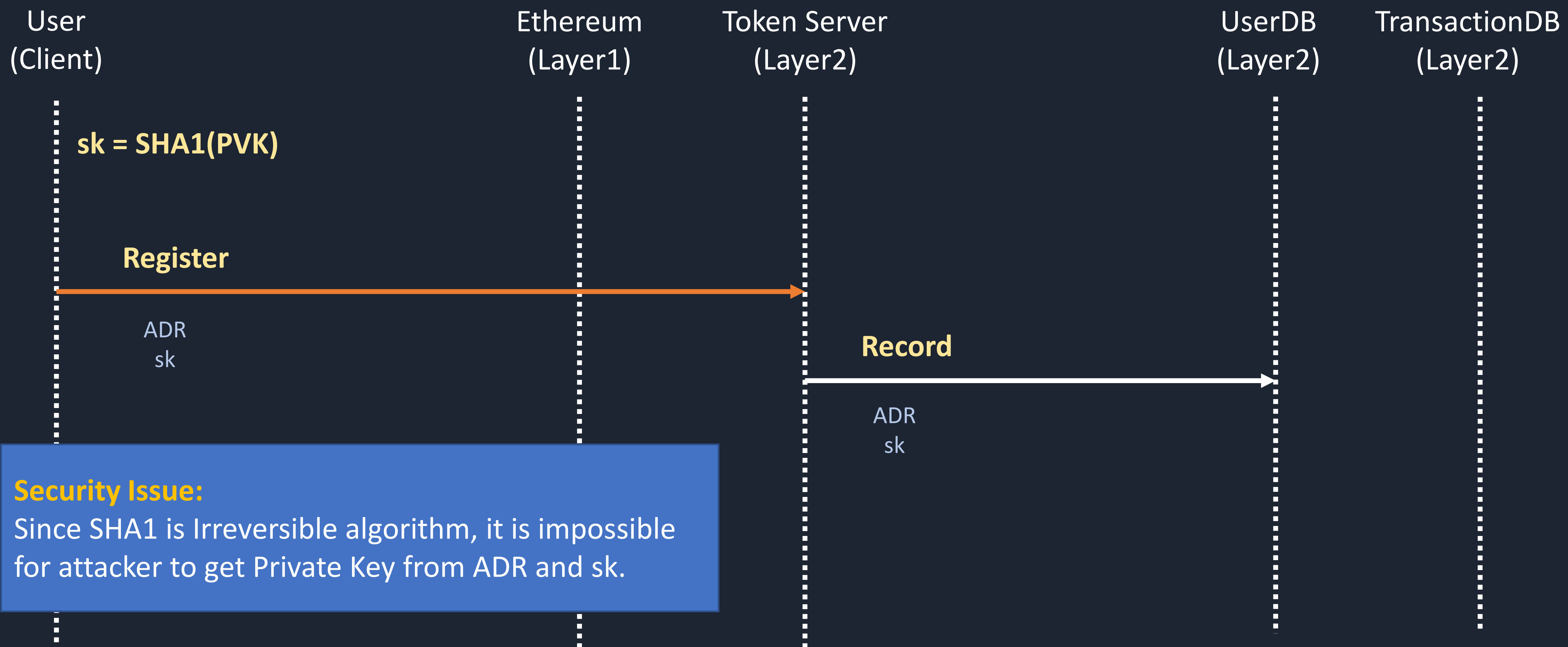
Like common Blockchain-based transaction, Deposit and Withdraw transaction may consume some gas fees and time.
However, in Accziom service, user only needs Transfer transaction and the transaction is real-time, so that Accziom service can be completed quickly.

This system has been designed with the security of transaction using ZKP tech.

- Layer 2 never saves any user-related privacy (i.e. address, mnemonic and private key of Layer 1).
- Address and Verification Key of Layer2 is independent to Address of Layer 1.

MERC Token System (Security-Enhanced)

UseCase1 (Register): Create a new account in Layer2



User (Client)

Ethereum (Layer1)

Token Server (Layer2)

UserDB (Layer2)

TransactionDB (Layer2)

sk = SHA1(PVK)

Register

ADR
sk

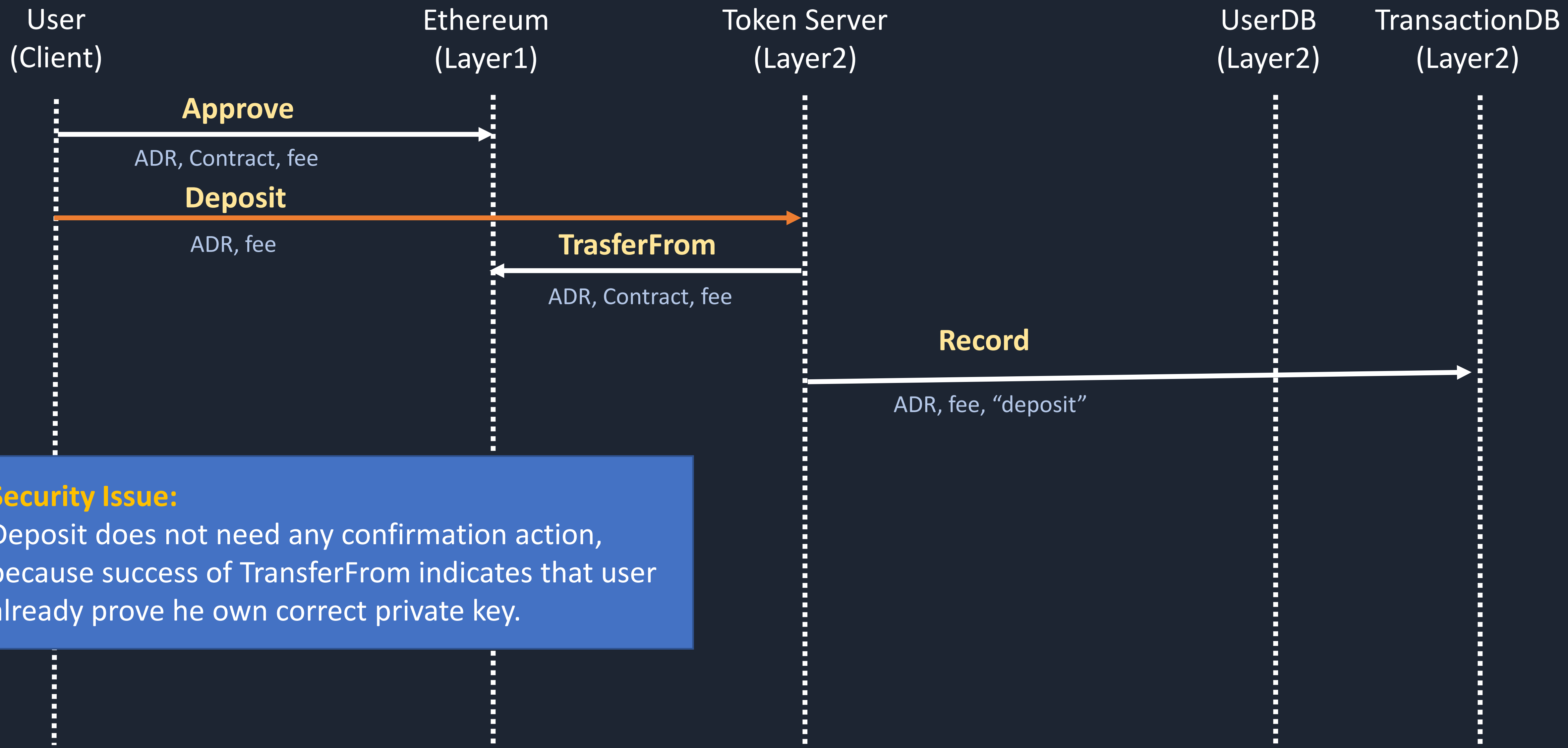
Record

ADR
sk

Security Issue:
Since SHA1 is Irreversible algorithm, it is impossible for attacker to get Private Key from ADR and sk.

MERC Token System (Security-Enhanced)

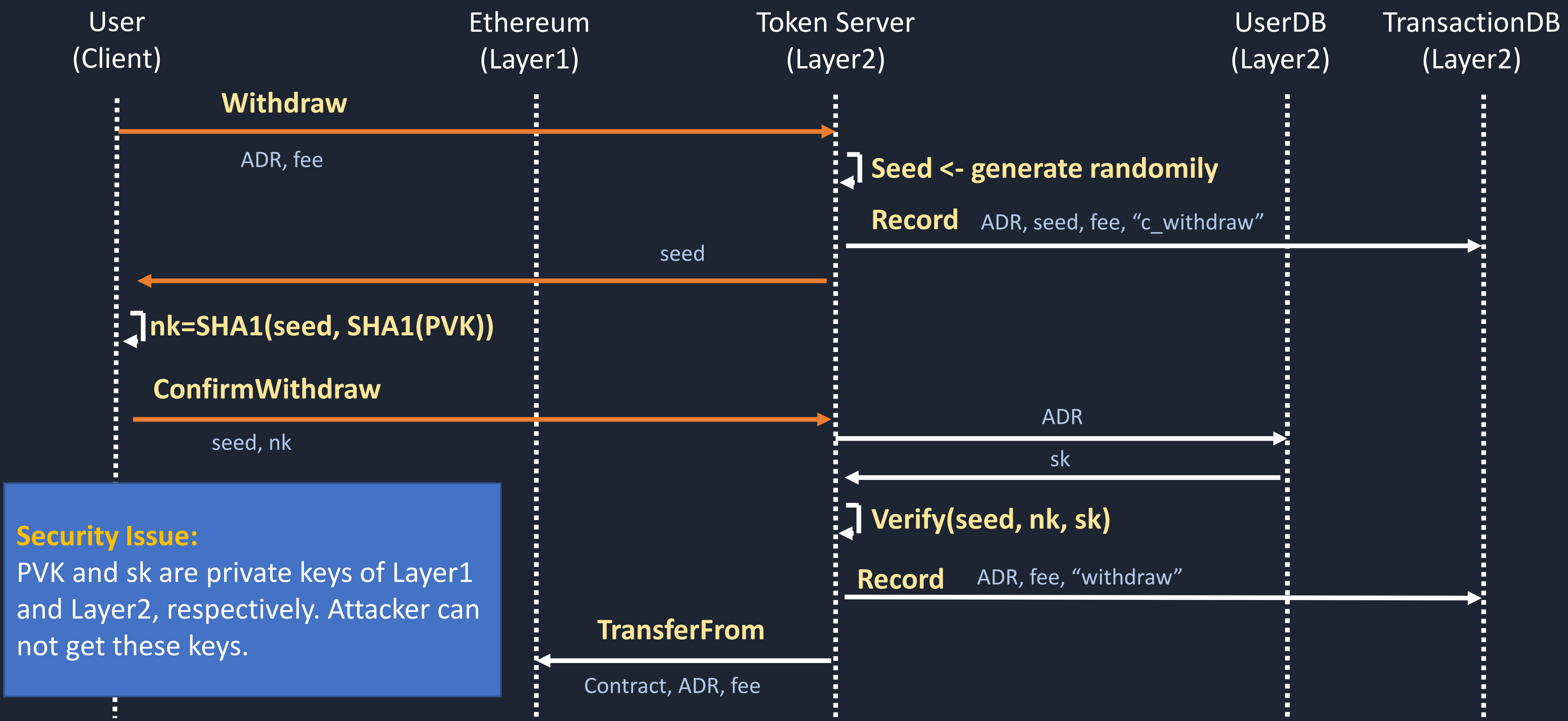
UseCase2 (Deposit): Transfer fees from Layer1 to Layer2



Security Issue:
Deposit does not need any confirmation action, because success of TransferFrom indicates that user already prove he own correct private key.

MERC Token System (Security-Enhanced)

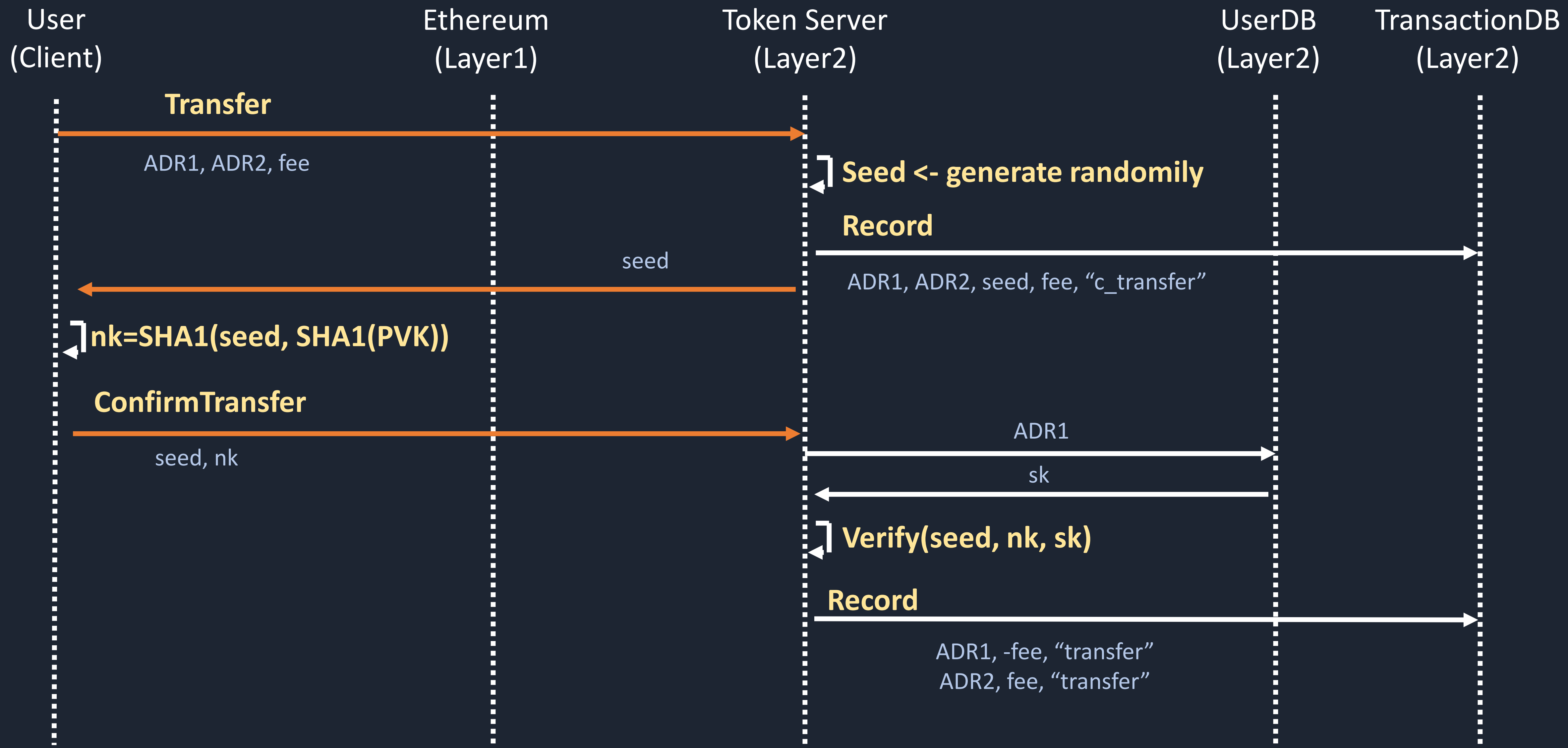
UseCase3 (Withdraw): Transfer fees from Layer2 to Layer1



Security Issue:
PVK and sk are private keys of Layer1 and Layer2, respectively. Attacker can not get these keys.

MERC Token System (Security-Enhanced)

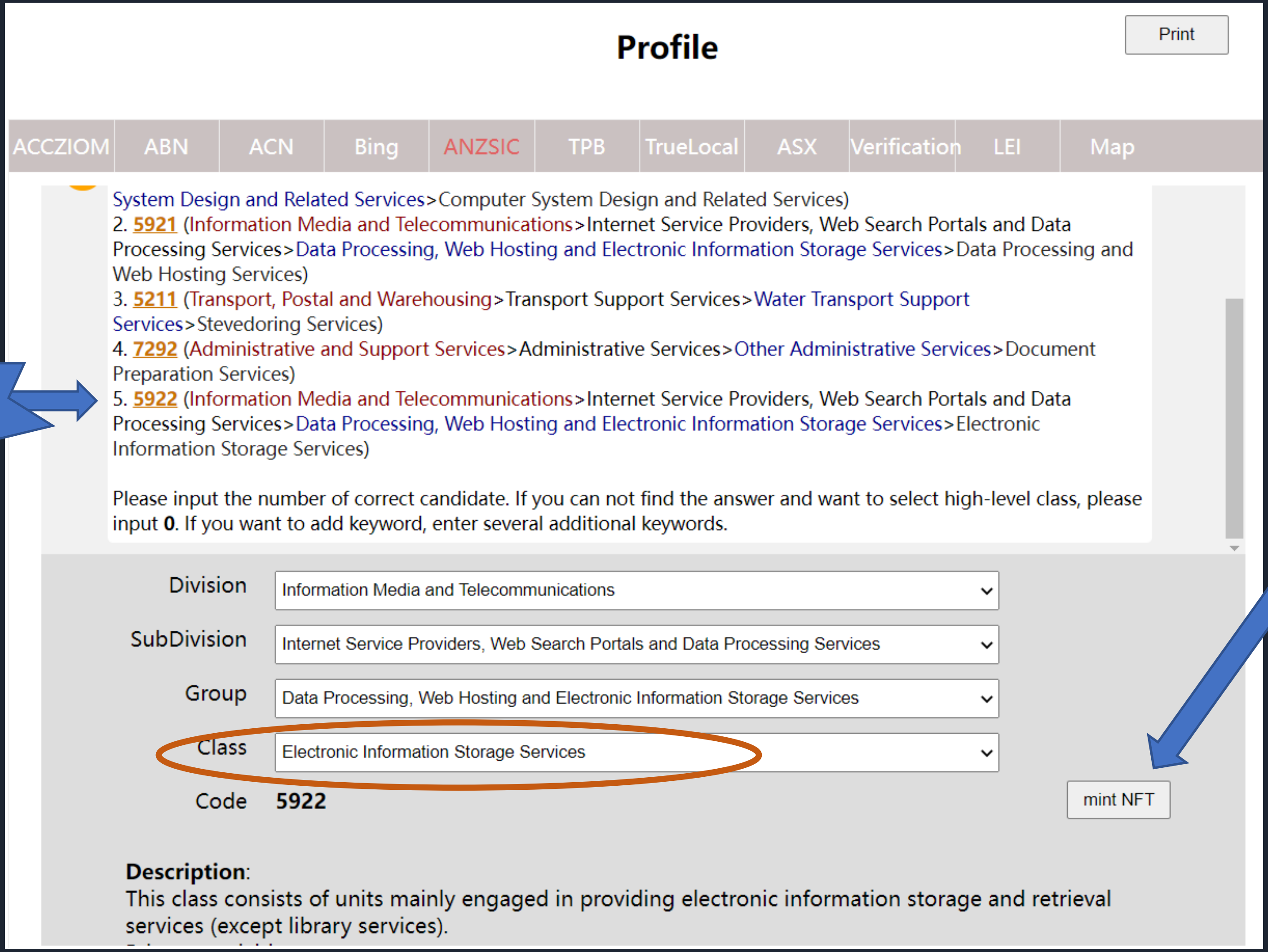
UseCase4 (Transfer): Transfer fees between accounts of Layer2



Example of ACCZIOM Reward System

Minting NFT from ANZSIC Category Information

Click



Profile

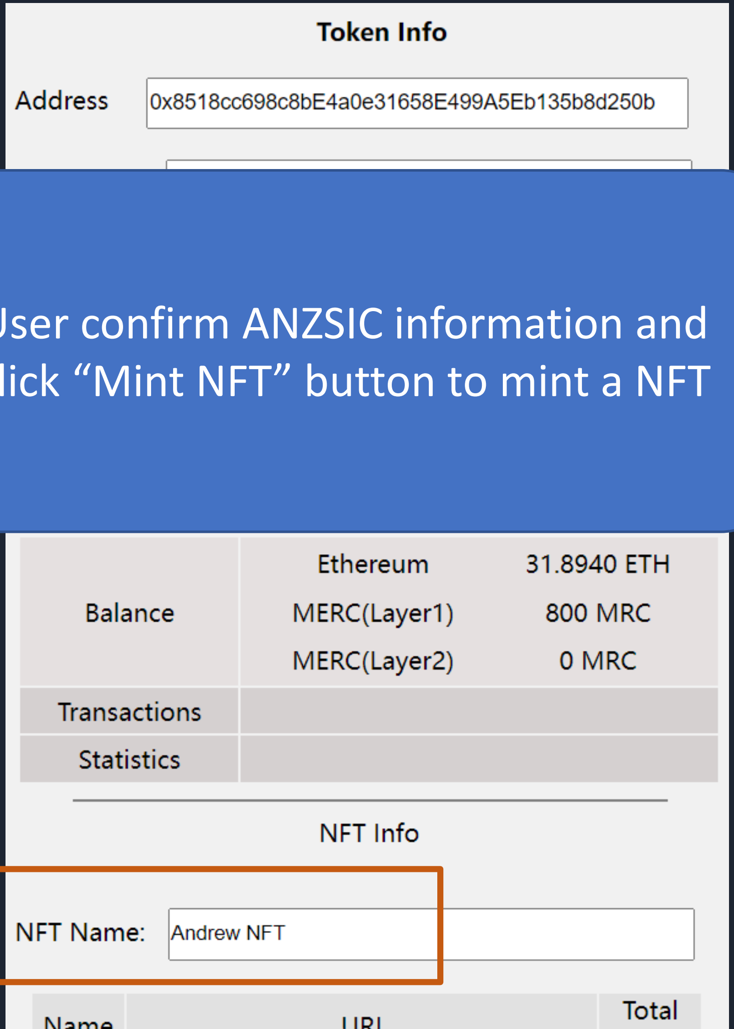
System Design and Related Services>Computer System Design and Related Services)
2. 5921 (Information Media and Telecommunications>Internet Service Providers, Web Search Portals and Data Processing Services>Data Processing, Web Hosting and Electronic Information Storage Services>Data Processing and Web Hosting Services)
3. 5211 (Transport, Postal and Warehousing>Transport Support Services>Water Transport Support Services>Stevedoring Services)
4. 7292 (Administrative and Support Services>Administrative Services>Other Administrative Services>Document Preparation Services)
5. 5922 (Information Media and Telecommunications>Internet Service Providers, Web Search Portals and Data Processing Services>Data Processing, Web Hosting and Electronic Information Storage Services>Electronic Information Storage Services)

Please input the number of correct candidate. If you can not find the answer and want to select high-level class, please input **0**. If you want to add keyword, enter several additional keywords.

Division	Information Media and Telecommunications
SubDivision	Internet Service Providers, Web Search Portals and Data Processing Services
Group	Data Processing, Web Hosting and Electronic Information Storage Services
Class	Electronic Information Storage Services
Code	**5922**

Description:
This class consists of units mainly engaged in providing electronic information storage and retrieval services (except library services).

User confirm ANZSIC information and click "Mint NFT" button to mint a NFT



Token Info

Address: 0x8518cc698c8bE4a0e31658E499A5Eb135b8d250b

Balance	Ethereum	31.8940 ETH
	MERC(Layer1)	800 MRC
	MERC(Layer2)	0 MRC
Transactions		
Statistics		

NFT Info

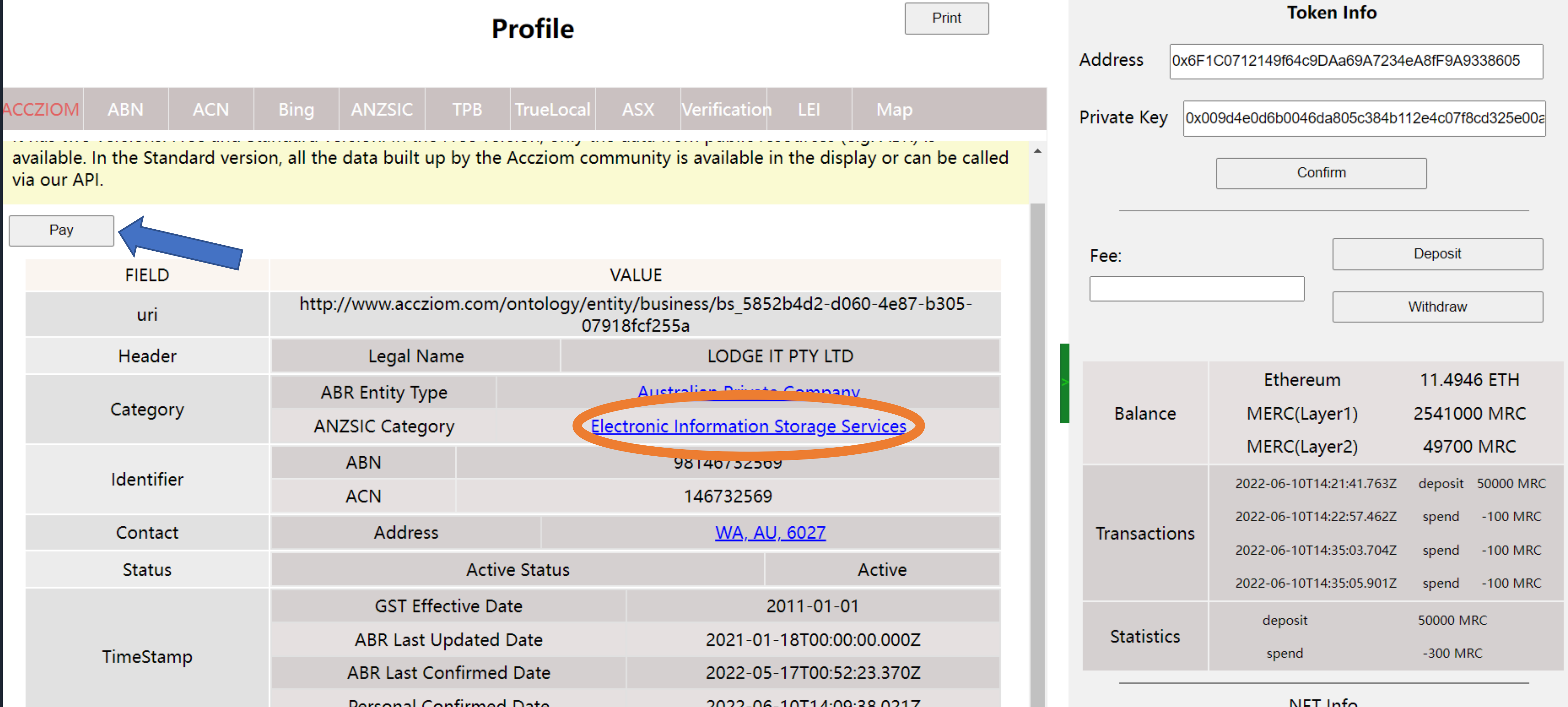
NFT Name: Andrew NFT

Name	URI	Total

Example of ACCZIOM Reward System

ACCZIOM
PUTTING YOU IN CONTROL

Browsing NFT information with pay from another user



Profile

It has two versions: Free and Standard version. In the Free version, only the data from public resources (e.g. ABN) is available. In the Standard version, all the data built up by the Accziom community is available in the display or can be called via our API.

FIELD	VALUE	
uri	http://www.accziom.com/ontology/entity/business/bs_5852b4d2-d060-4e87-b305-07918fcf255a	
Header	Legal Name	LODGE IT PTY LTD
Category	ABR Entity Type	Australian Private Company
	ANZSIC Category	Electronic Information Storage Services
Identifier	ABN	98146732569
	ACN	146732569
Contact	Address	WA, AU, 6027
Status	Active Status	Active
TimeStamp	GST Effective Date	2011-01-01
	ABR Last Updated Date	2021-01-18T00:00:00.000Z
	ABR Last Confirmed Date	2022-05-17T00:52:23.370Z
	Personal Confirmed Date	2022-06-10T14:09:38.021Z

Token Info

Address 0x6F1C0712149f64c9DAa69A7234eA8fF9A9338605

Private Key 0x009d4e0d6b0046da805c384b112e4c07f8cd325e00a

Fee:

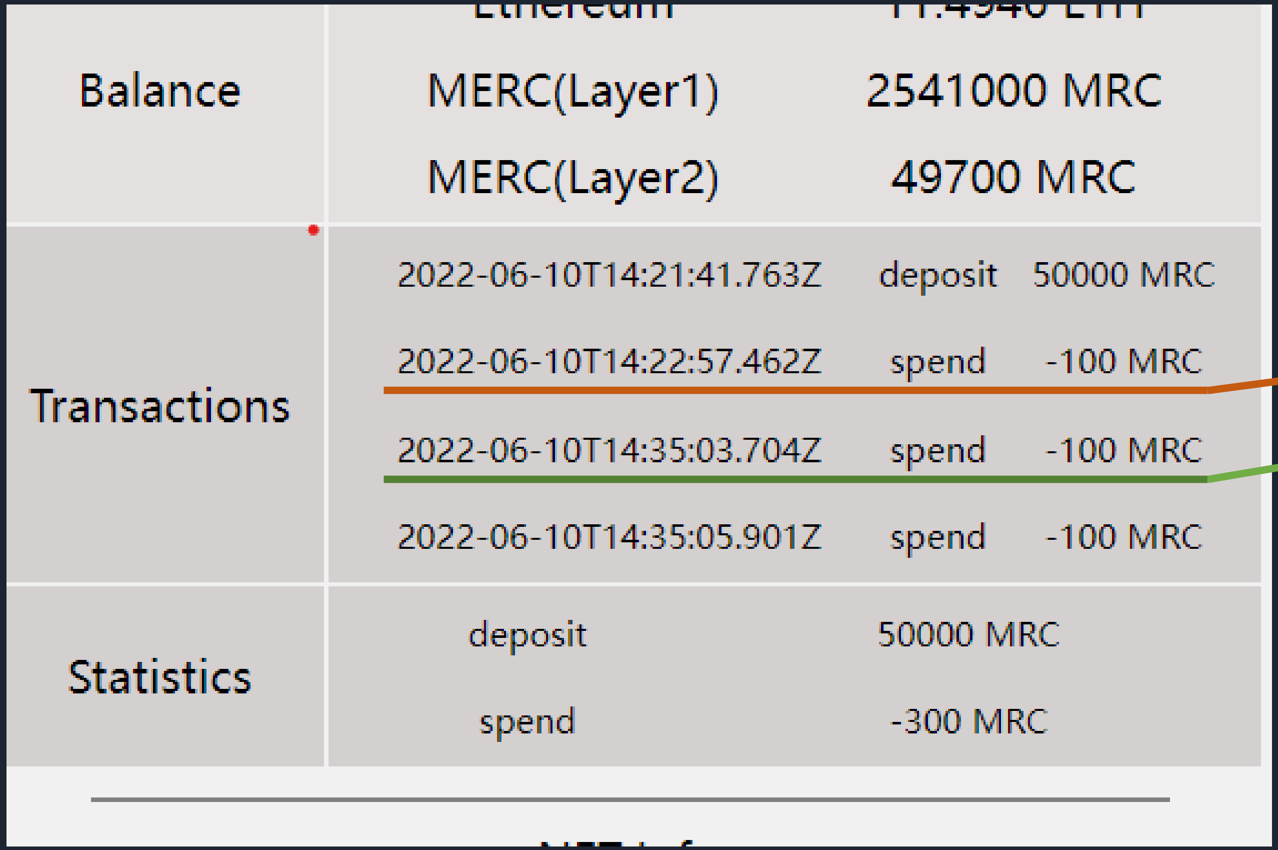
Balance	Ethereum	11.4946 ETH	
	MERC(Layer1)	2541000 MRC	
	MERC(Layer2)	49700 MRC	
Transactions	2022-06-10T14:21:41.763Z	deposit	50000 MRC
	2022-06-10T14:22:57.462Z	spend	-100 MRC
	2022-06-10T14:35:03.704Z	spend	-100 MRC
	2022-06-10T14:35:05.901Z	spend	-100 MRC
Statistics	deposit	50000 MRC	
	spend	-300 MRC	

NFT Info

Example of ACCZIOM Reward System

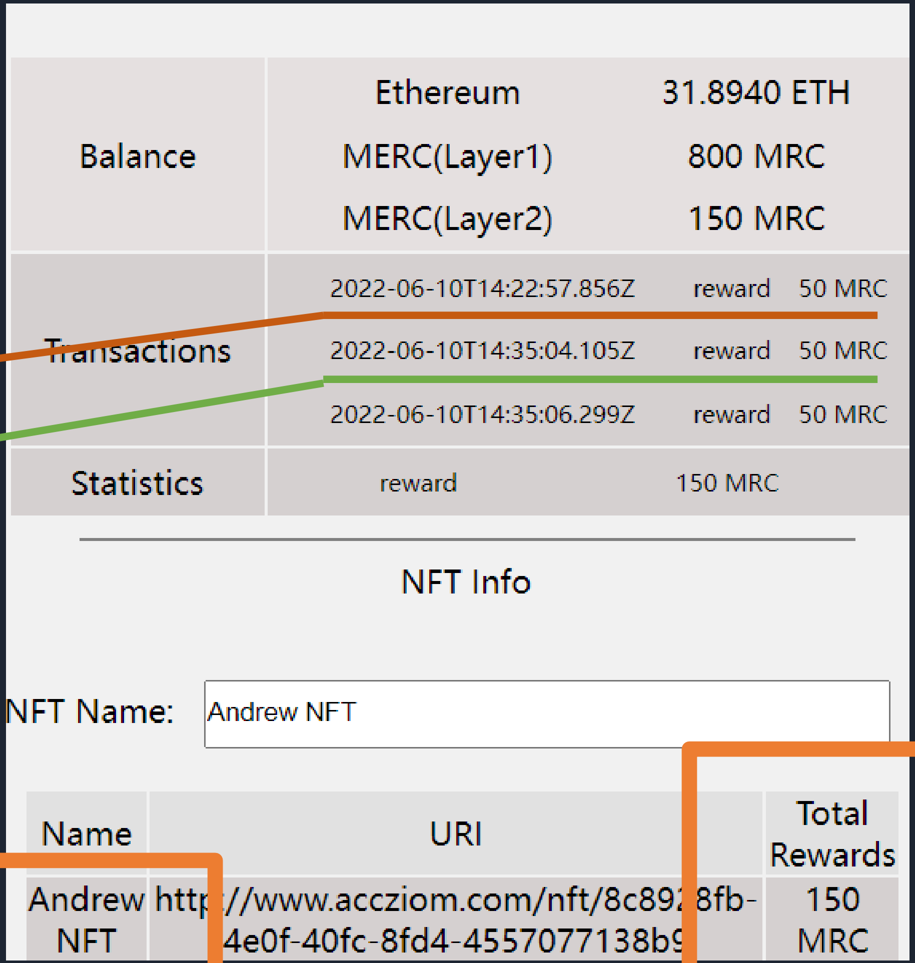
ACCZIOM
PUTTING YOU IN CONTROL

Whenever a user pay, NFT owner will get reward.



Balance	Ethereum	11.4940 ETH	
	MERC(Layer1)	2541000 MRC	
	MERC(Layer2)	49700 MRC	
Transactions	2022-06-10T14:21:41.763Z	deposit	50000 MRC
	2022-06-10T14:22:57.462Z	spend	-100 MRC
	2022-06-10T14:35:03.704Z	spend	-100 MRC
	2022-06-10T14:35:05.901Z	spend	-100 MRC
Statistics	deposit	50000 MRC	
	spend	-300 MRC	

User



Balance	Ethereum	31.8940 ETH	
	MERC(Layer1)	800 MRC	
	MERC(Layer2)	150 MRC	
Transactions	2022-06-10T14:22:57.856Z	reward	50 MRC
	2022-06-10T14:35:04.105Z	reward	50 MRC
	2022-06-10T14:35:06.299Z	reward	50 MRC
Statistics	reward	150 MRC	

NFT Info

NFT Name: Andrew NFT

Name	URI	Total Rewards
Andrew NFT	http://www.accziom.com/nft/8c8928fb-4e0f-40fc-8fd4-4557077138b9	150 MRC

NFT Owner

ACCZIOM
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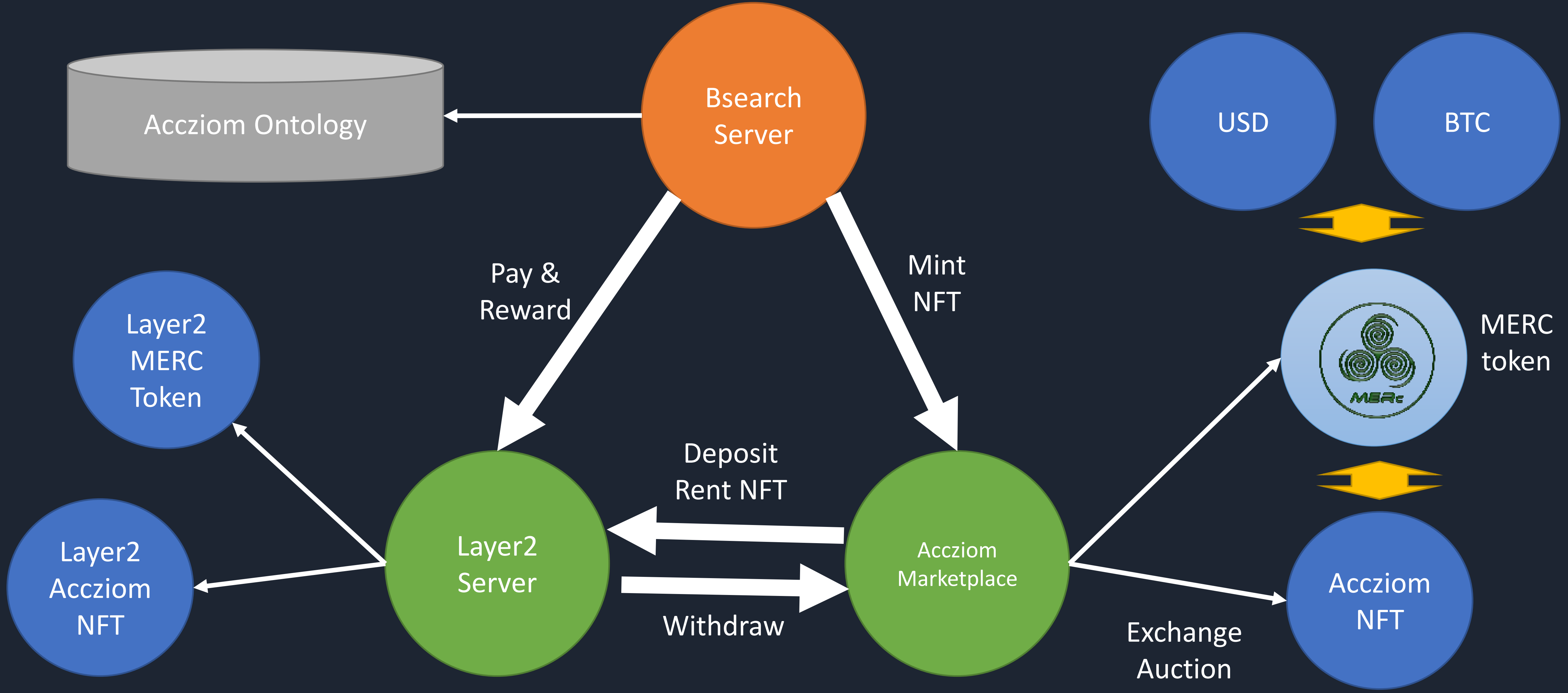
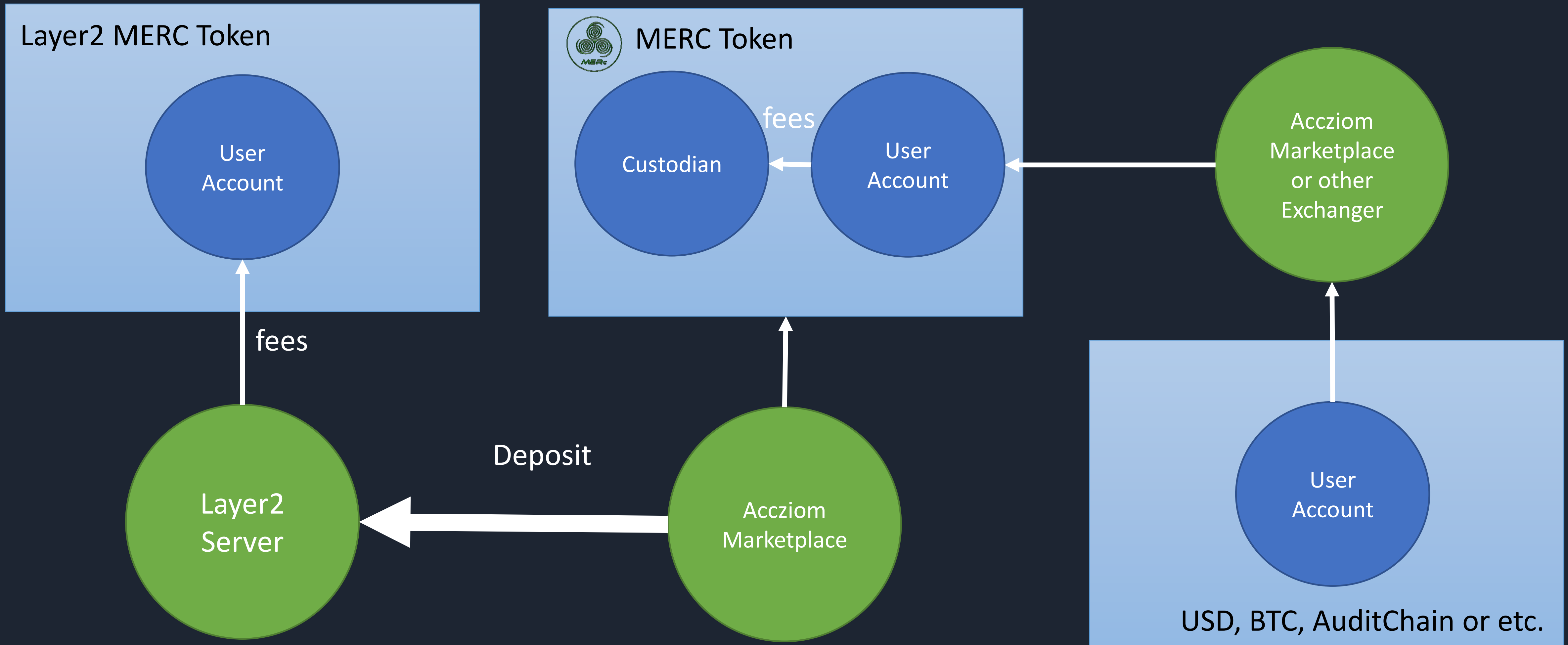
MERC Token and ACCZIOM NFT



MERC Token and ACCZIOM NFT

ACCZIOM
PUTTING YOU IN CONTROL

Making deposit of MERC token to Layer2



MERC Token and ACCZIOM NFT

Making deposit of MERC token to Layer2

Since the current Blockchain technique has a series of problems (e.g. gas fee and time-consuming), most pay of ACCZIOM activities should be done in Layer2.
To use ACCZIOM microservice, user has to own MERC token and deposit it to Layer2. Once user deposit to Layer2, any gas fee is not required while using it in Accziom service.
User can select deposit mode:

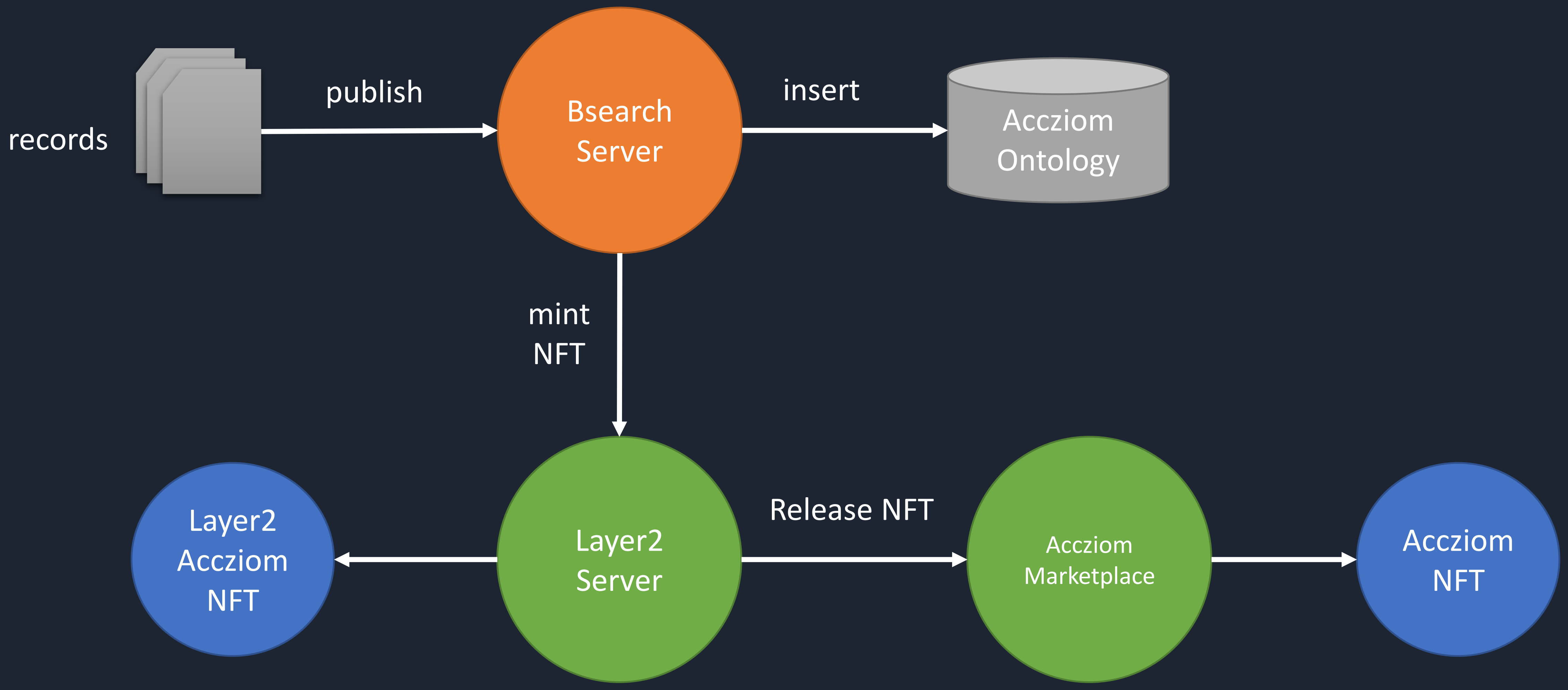
(1) Depositing from MERC token of Layer1
In this case, user should bear gas fee for deposit. The gas fee is about 32.3kgas and Gas Price depends on the situation of Blockchain. In general, gas price is range at 2 ~ 50 gwei. Accordingly, gas fee is 0.0007 ~ 0.0016 ETH (350 ~ 8500 MERC, $0.08~$2).

(2) Depositing from USD, BTC or other (crypto)currency
In this case, user can save the gas fee.

MERC Token and ACCZIOM NFT

PUTTING YOU IN CONTROL

Minting Accziom NFT



MERC Token and ACCZIOM NFT

ACCZIOM
PUTTING YOU IN CONTROL

Minting Accziom NFT

User mint Accziom NFT and can get reward from Accziom paid services (e.g. bsearch).

User should bear gas fee for minting NFT. The gas fee is about 32.3kgas and Gas Price depends on the situation of Blockchain. In general, gas price is range at 2 ~ 50 gwei. Accordingly, gas fee is 0.0007 ~ 0.0016 ETH (350 ~ 8500 MERC, $0.08~$2).

MERC Token and ACCZIOM NFT

ACCZIOM
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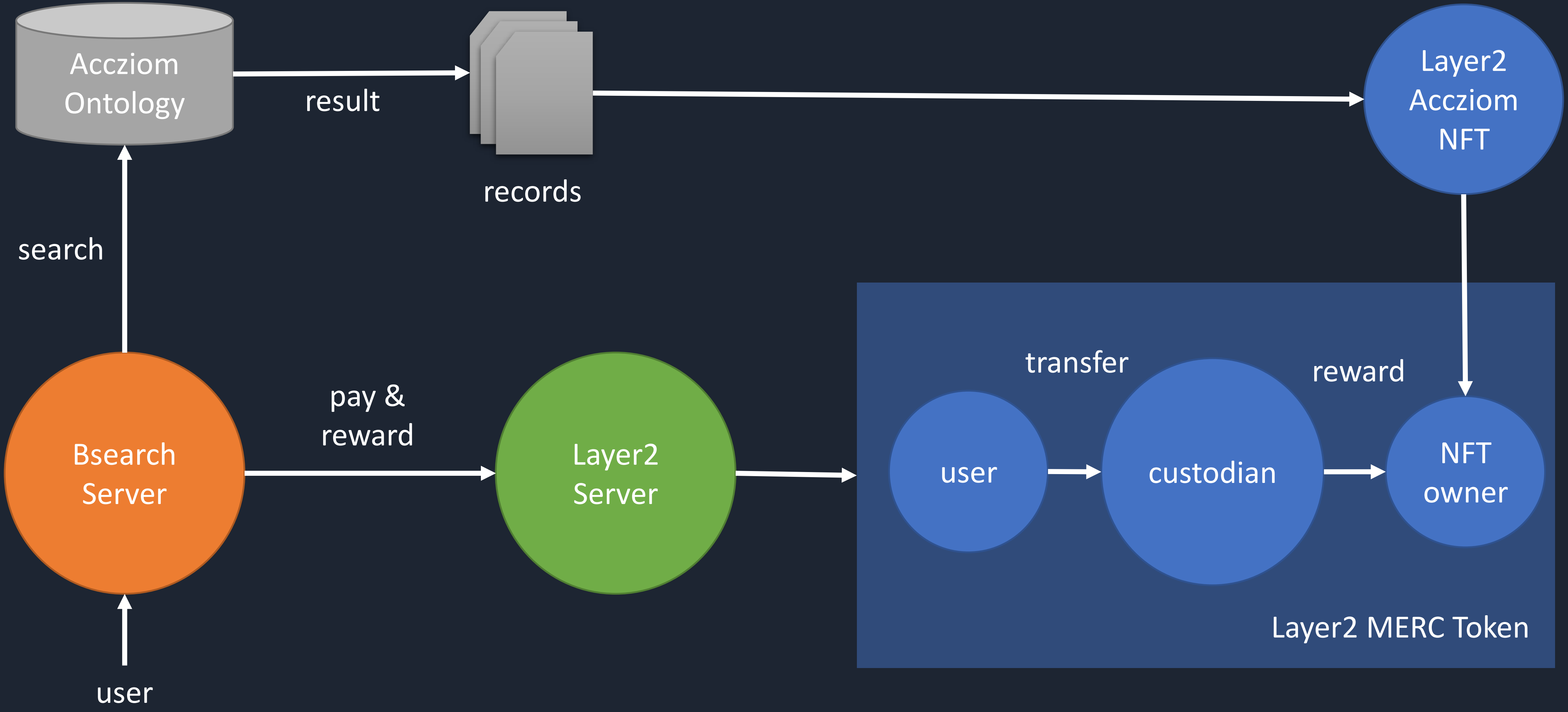
Receiving reward by Accziom NFT



MERC Token and ACCZIOM NFT

Receiving reward by Accziom NFT

User mint Accziom NFT and can get reward from Accziom paid services (e.g. bsearch).

In ASIC website, the data of single legal entity needs $15. If we assume that the average number of records is 30, the price of one record can be estimated as $0.5.

Contrasting ASIC, we can set the price of one record as $0.2 (920 MERC).

NFT owner can receive 50% of the selling price per record as reward. (i.e. $0.1, 460 MERC).

NFT owner's responsibility:

NFT owners should take responsibility for their data. They have to put $1 (4600 MERC) in pledge per record. If a record is judged as incorrect data, the pledge will be confiscated. At the same time, the complainant can receive bonus of $0.1 (460 MERC) per record.

If NFT owner wants to open a data to the public, he can burn the NFT and the corresponding pledge will be returned to him.

MERC Token and ACCZIOM NFT

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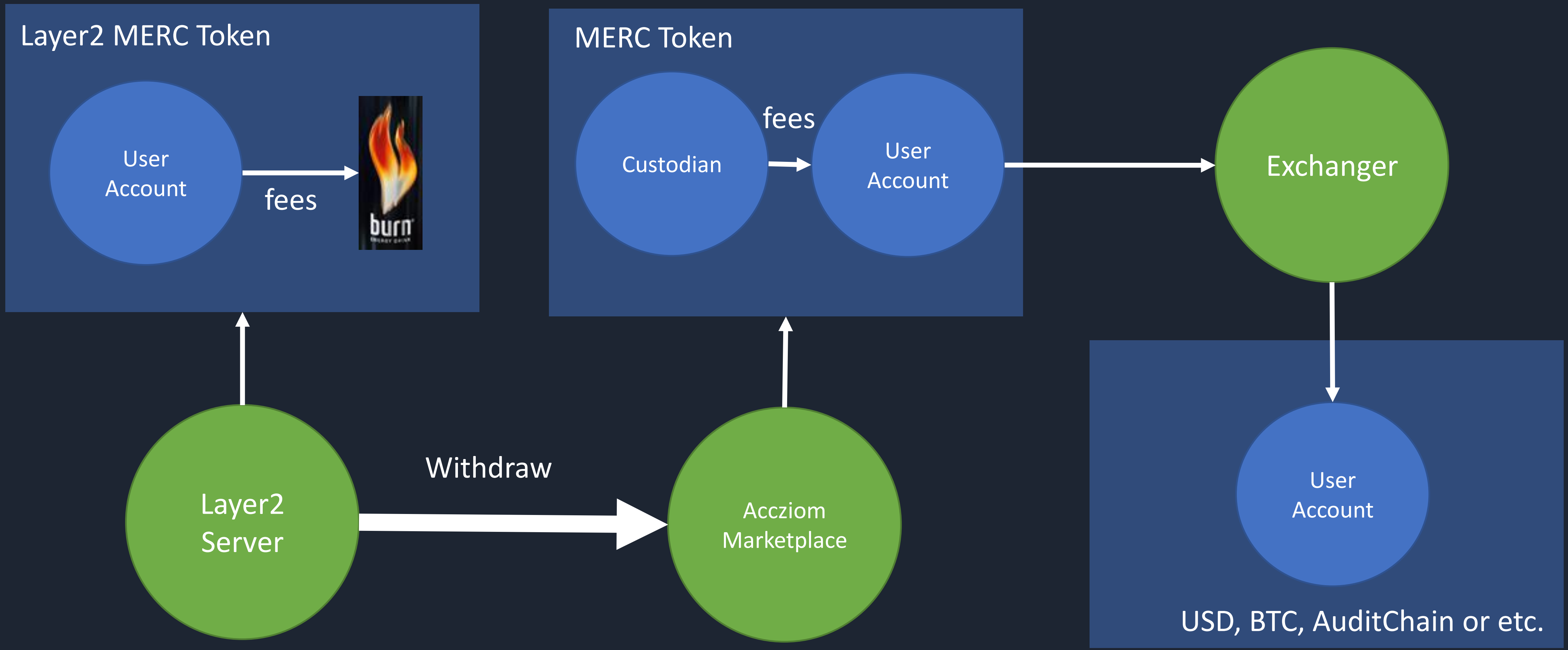
Withdrawing MERC token from Layer2



MERC Token and ACCZIOM NFT

Withdrawing MERC token from Layer2

User withdraw Layer2 token and push it to Cryptocurrency system.

User should bear gas fee for withdrawing NFT.
Since Accziom custodian pays the gas fee in withdraw process, Accziom will decrease the Layer2 balance of user.
The gas fee is about 32.3kgas and Gas Price depends on the situation of Blockchain. In general, gas price is range at 2 ~ 50 gwei. Accordingly, gas fee is 0.0007 ~ 0.0016 ETH (350 ~ 8500 MERC, $0.08~$2).

MERC Token and ACCZIOM NFT

Recommended Strategy for User

In Accziom transactions, gas fee is needed only for deposit, withdraw and minting of NFT. All other pay and reward does not need any gas fee, because it is done in Layer 2.

Therefore, user is recommended that he make deposit and withdraw as few times as possible.

To avoid penalty of incorrect NFT data, user should update the data periodically.

For NFT owner to earn money from the NFT, they have to pay \$1(for pledge) + \$2(for minting NFT) + \$2(for withdraw) = \$5.

If reward per record is \$0.1 and 50 users pay to read this record, NFT owner can recover the cost.

If NFT owners make single NFT include two or more records, they can save \$4 per record.

If NFT owner make single NFT include two records, they have to pay \$6.

If 30 users pay to read these two records, NFT owner can recover the cost.

MERC Token and ACCZIOM NFT

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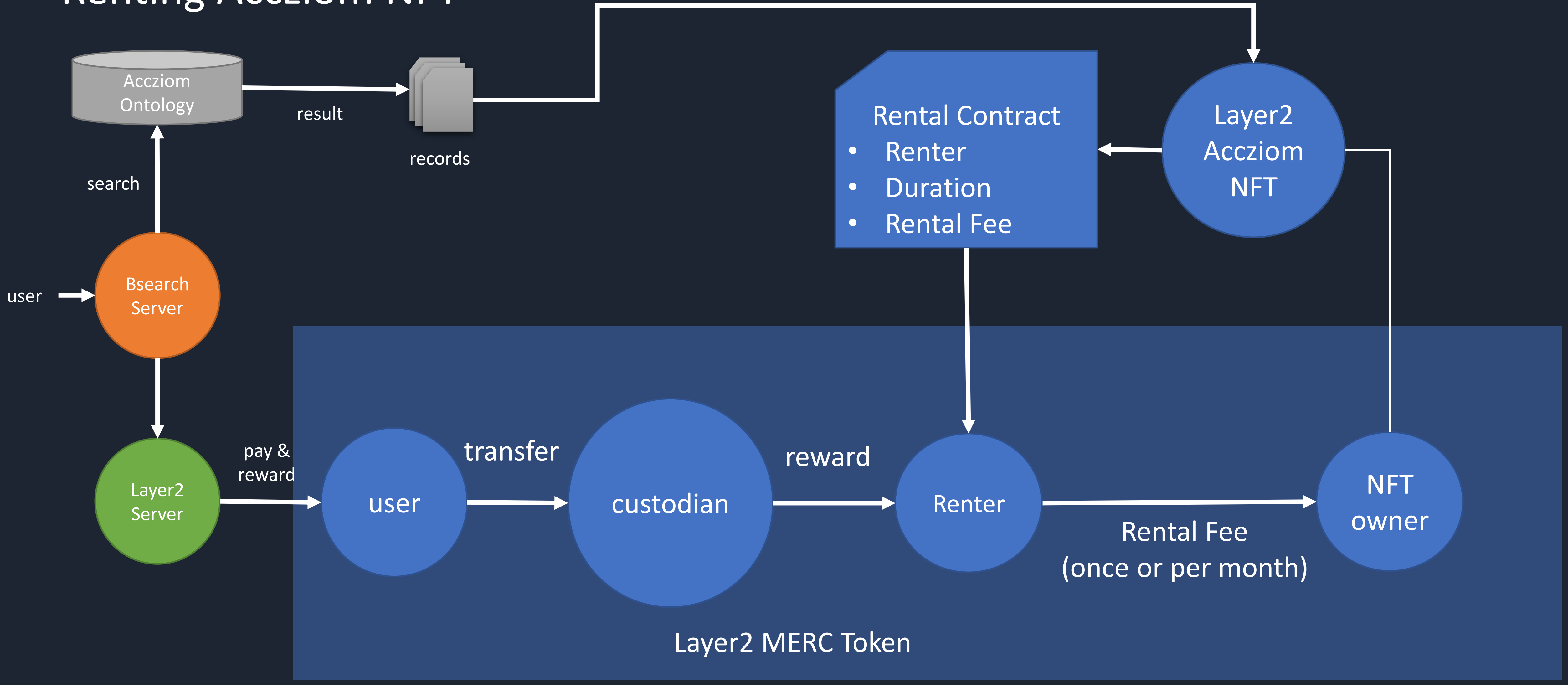
Renting Accziom NFT



MERC Token and ACCZIOM NFT

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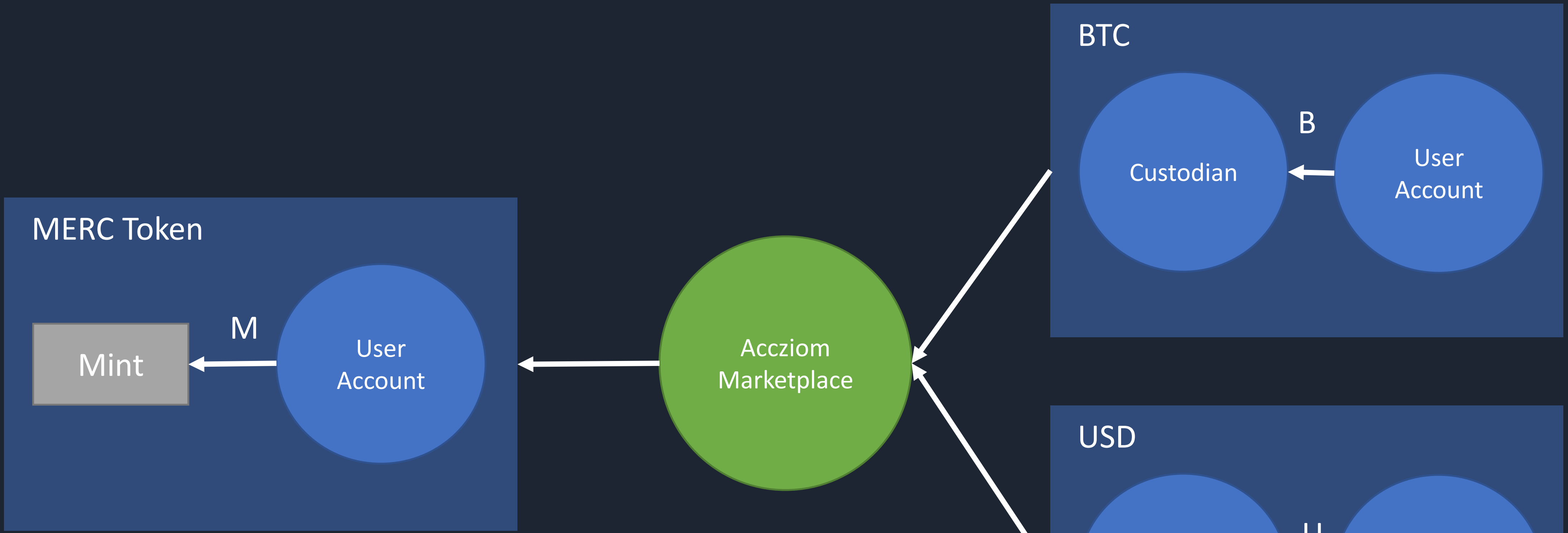
Exchanging MERC Token



$M=B*10^8$
$M=U/23451.60*10^8$

1BTC=10^8 Satoshi
1BTC=23451.60 USD

MERC Token and ACCZIOM NFT

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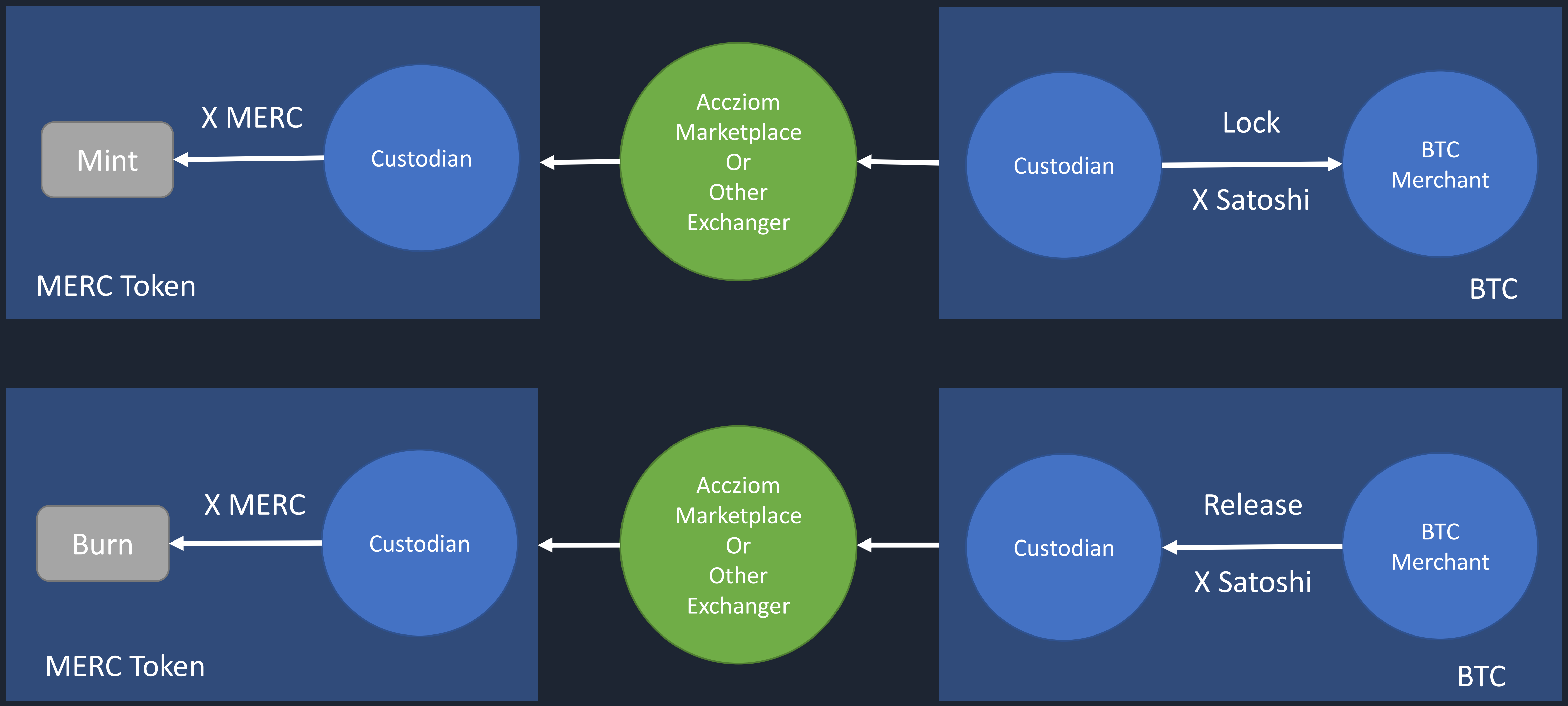
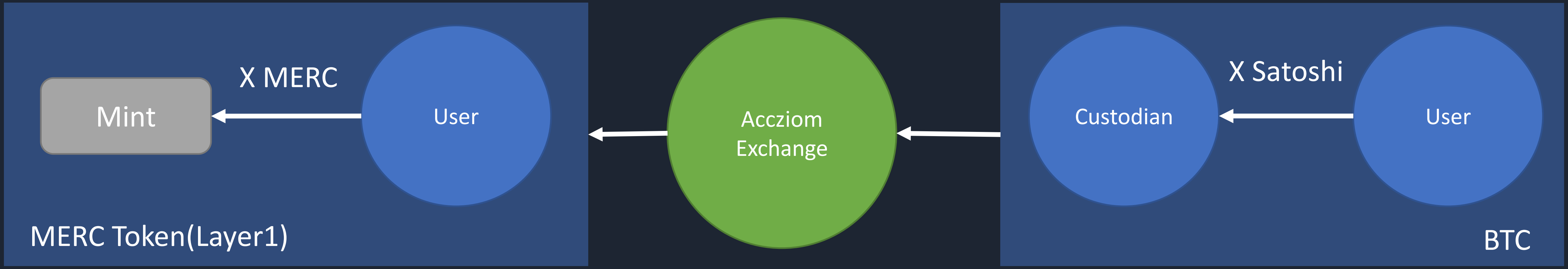
MERC Token as Wrapped Satoshi



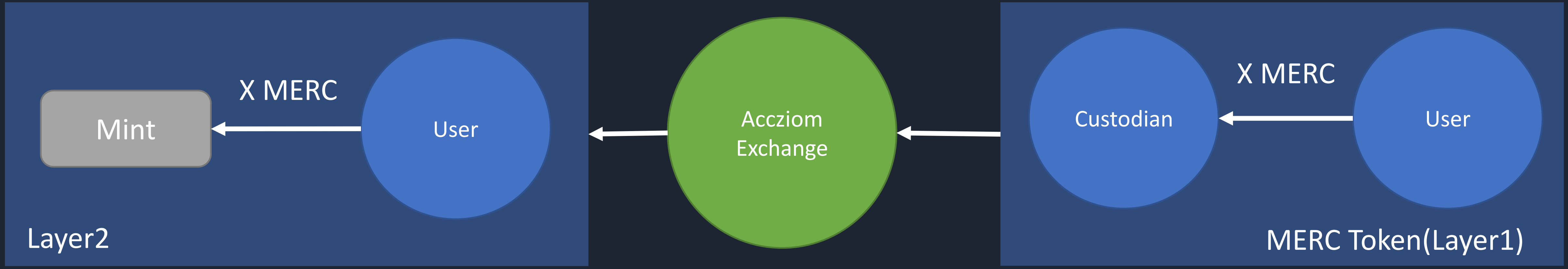
Coin Exchanger for ACCZIOM Marketplace

ACCZIOM
PUTTING YOU IN CONTROL

Buying MERC from BTC



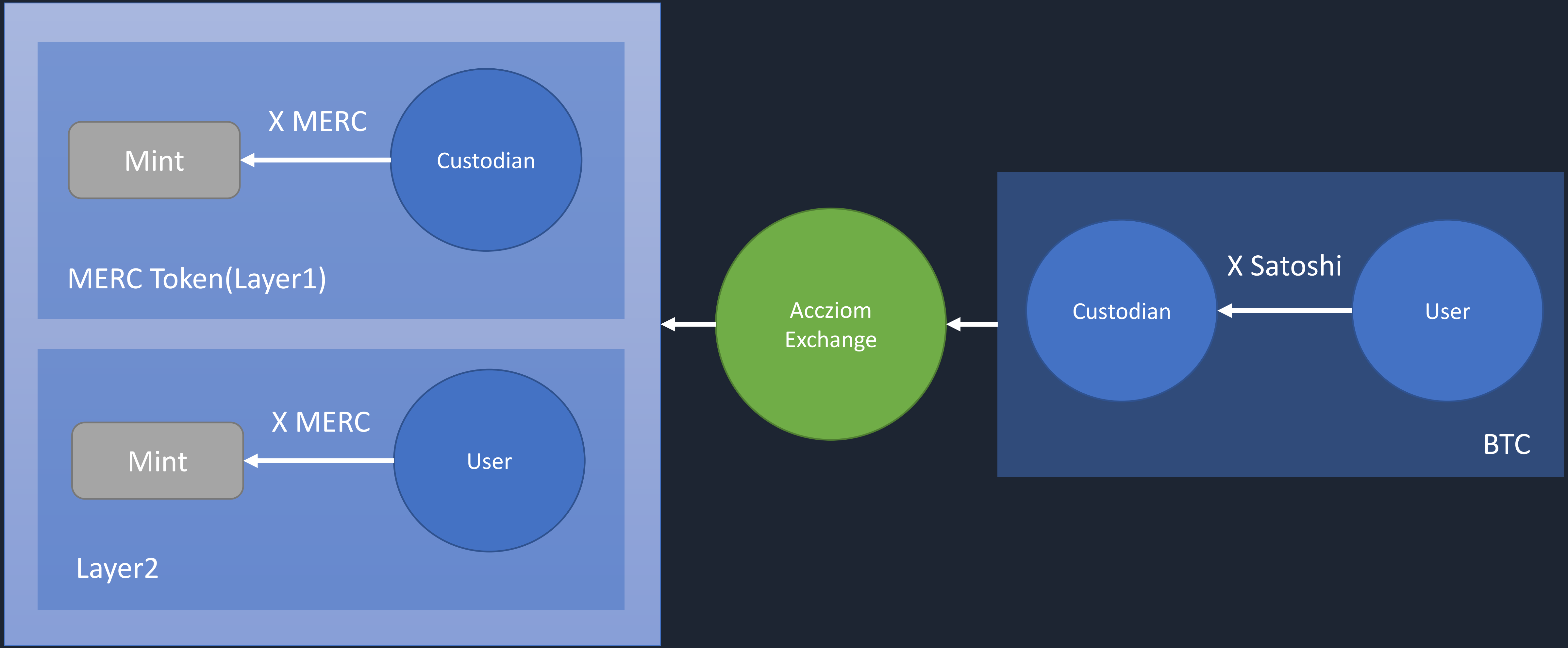
Making deposit to Layer2



Coin Exchanger for ACCZIOM Marketplace

ACCZIOM
PUTTING YOU IN CONTROL

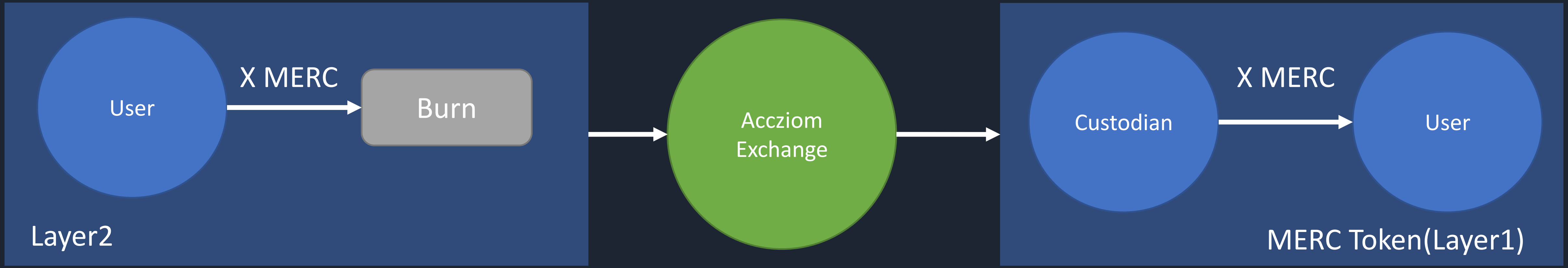
Making a direct deposit from BTC



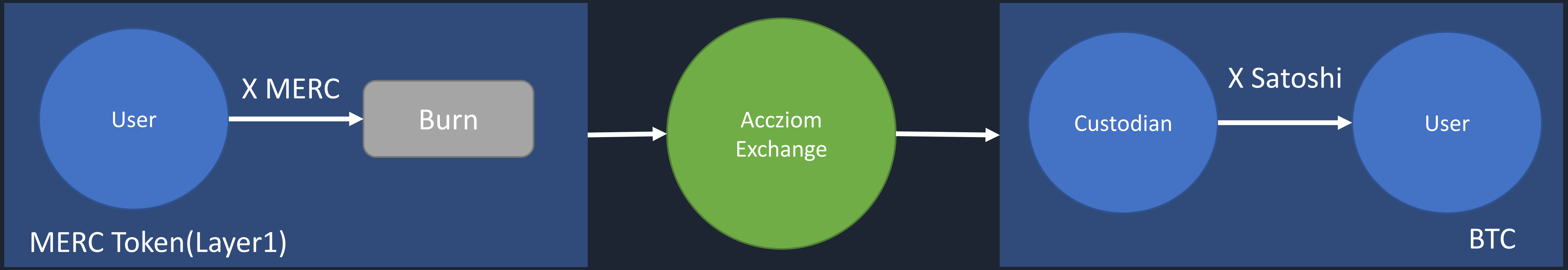
Coin Exchanger for ACCZIOM Marketplace

ACCZIOM
PUTTING YOU IN CONTROL

Withdrawing to Layer1 (optional)



Buying BTC from MERC



Coin Exchanger for ACCZIOM Marketplace

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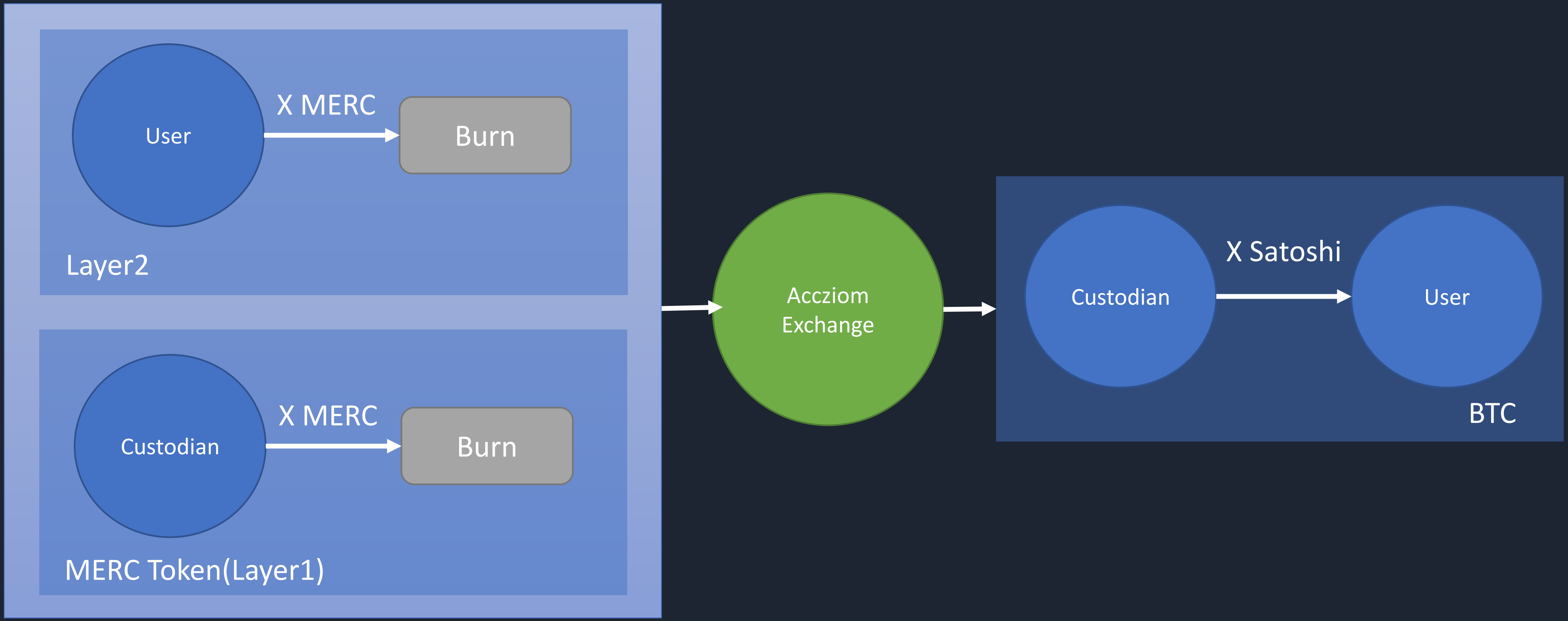
Directly buying from Layer2



Coin Exchanger for ACCZIOM Marketplace

In order to implement coin exchanger, we can create an account in Bitcoin.com and use it as Accziom custodian account on the Bitcoin side.

When user wants to buy MERC, he transfer Bitcoin to Accziom custodian account and then, on MERC token side, Accziom custodian will transfer MERC tokens to user account.

When user wants to sell MERC, he transfer MERCs to Accziom custodian account and then, on Bitcoin side, Accziom custodian will transfer Bitcoins to user account.

To maintain the exchange rate between MERC and Bitcoin, Accziom custodian account should be used only to exchange coin.

According to the demand for MERC, we can adjust the amount of money by minting or burning.

Stability and Transparency of MERC Token

We would like to make MERC token to be stable coin. It has been designed to crypto-collateralized stable coin. i.e. MERC token is backed by Bitcoin reserves. The exchange rate between MERC and Satoshi is constantly 1:1. In any time, customer can buy an amount of MERC from the same amount of Satoshi and vice versa.

MERC token is transparent. To keep the exchange rate, Accziom Exchange should be designed with sufficient consideration, so that MERC supply equals to Satoshi reserves. MERC token has been designed to mintable and burnable token. Whenever customer buy MERC token, Accziom Exchange will work on both BTC and MERC side: on BTC side, Satoshi reserves will be increased; on MERC side, MERC token will be minted. In same way, whenever customer buy BTC from MERC, Accziom Exchange will work on two side: on MERC side, MERC token will be burned; on BTC side, Satoshi reserves will be decreased.

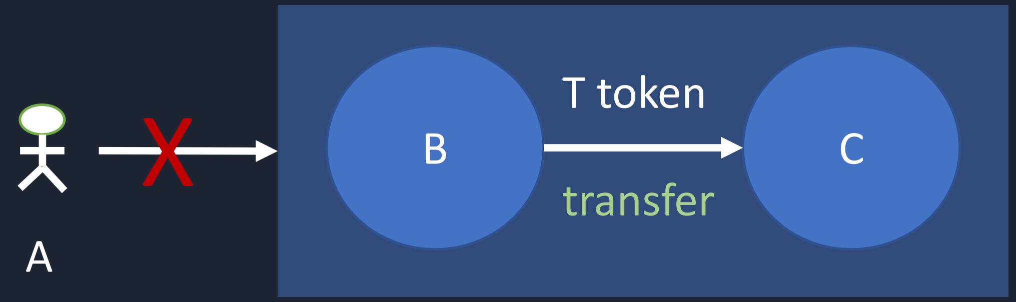
An issue on management of custodian account

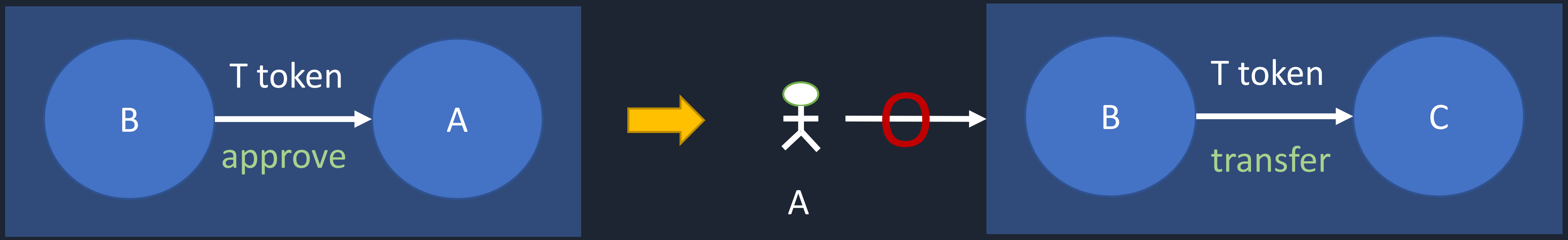
Whenever user mint or withdraw from Layer2, MERC custodian account must pay for gas fees and the gas fees are paid with Ethers. i.e. MERC custodian has to keep some gas fees constantly. It means that we should charge some ethers to MERC custodian account periodically. In management perspective, it is not desirable. Also, if a lot of user use MERC token, the needed gas fee will be not small.

To solve this problem, we should extend traditional ERC20 so that use off-chain mechanism.

Extension of ERC20

Current ERC20 protocol adopt approval mechanism to transfer from account of other people who is not sender of message.

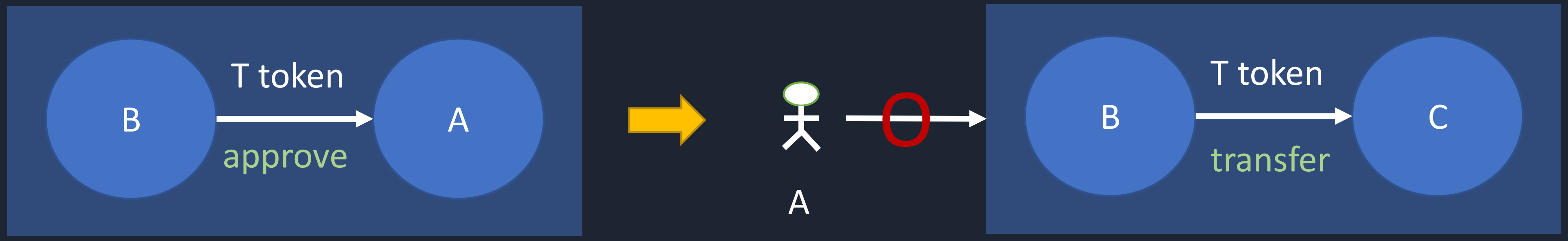




Extension of ERC20

ERC20 is entirely on-chain and is very secure. However, for approve, user B must pay some gas fees. And since congestion of Blockchain, it may delay.

To solve this issue, I would like to adopt off-chain mechanism. On-chain approval mechanism will be replaced with Off-chain signature mechanism. Off-chain signature mechanism does not require any gas fee and has real-time performance.



B should pay gas fee.

A should pay gas fee.

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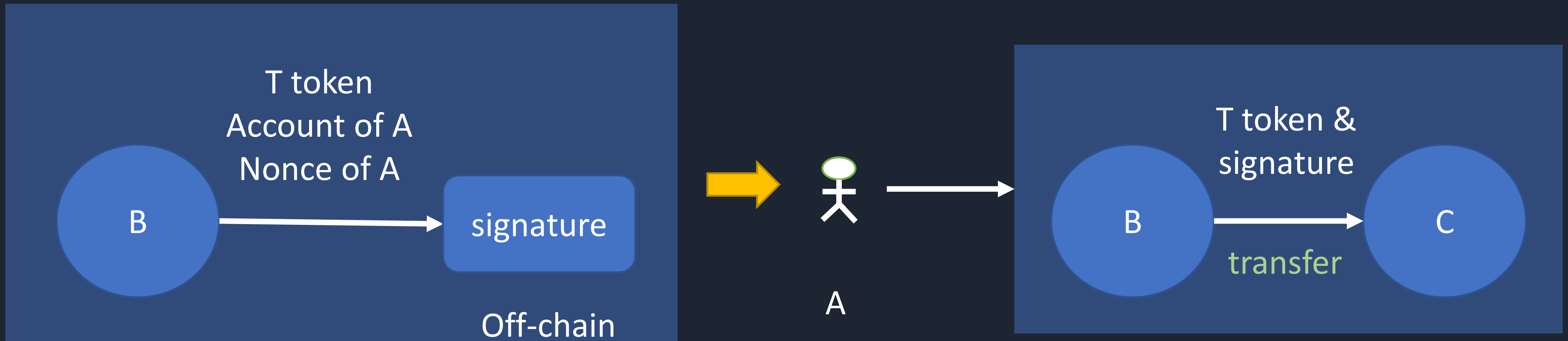
Sign Off-chain and Verify On-chain



A should pay gas fee.

Sign Off-chain and Verify On-chain

To ensure the security of this mechanism, I had considered following issues:

1. How to let smart contract know if B approved A?
   In this problem, message is [account of A, amount] and this message should be signed by private key of B. Then, smart contract can use public key of B to decrypt message and know account info and amount info of the message.

2. Can attackers know private key from signature?
   No, they can't. Sign algorithm is using on Bitcoin and Ethereum and it is very secure. Even though attacker caught signature, they can not know private key from signature. So, B can use this mechanism safely.

3. Can attackers reuse signature?
   It is critical issue.
   Firstly, attackers can try to reuse signature of other people. Since smart contract know whom B approved to, this attempt will be failed.
   Secondly, attackers can try to reuse their own signature. In other words, after A received signature of B, A can use it more than one times. It is not desirable and is very dangerous attempt. To prevent it, I add nonce info to message when signing. i.e. message is [account of A, amount, nonce of A]. Once the message is verified on smart contract, nonce of A is automatically increase. It makes signature disposable.

Sign Off-chain and Verify On-chain

Using this mechanism, we can do many kind of transactions in which the custodian should participate :

- Minting MERC token to an account.

  When customer buy MERC token, custodian must mint MERC token to the account of the customer. Using this mechanism, customer can call mint function with signature of custodian. As the result, custodian don’t have to pay gas fee.

- Withdrawing

  When customer withdraw from Layer2, custodian must transfer the amount to the account of the customer. Using this mechanism, customer can directly transfer from account of custodian, with signature of custodian. Since customer call transfer function, custodian don’t have to pay gas fee.

We can use this mechanism in other use case.

> Let’s assume the following use case: a person want to receive MERC tokens from another one. If sender does not want to pay gas fee or sender have not enough Ether balances. Note that gas fees are paid with Ethers, but not with MERC.
>
> Using this mechanism, receiver can transfer from a sender with signature of the sender. In this time, receiver will pay gas fees.

Rights of each kind of account

custodian

- Deploy contract
- Register or unregister exchanger
- Reserves all the MERcs of Layer2

exchanger

- Mint or Burn
- Manage BTC reserve

user

- Buy or Sell MERc in own wallet
- Transfer or Pay MERc from own wallet

Transparency and Trust

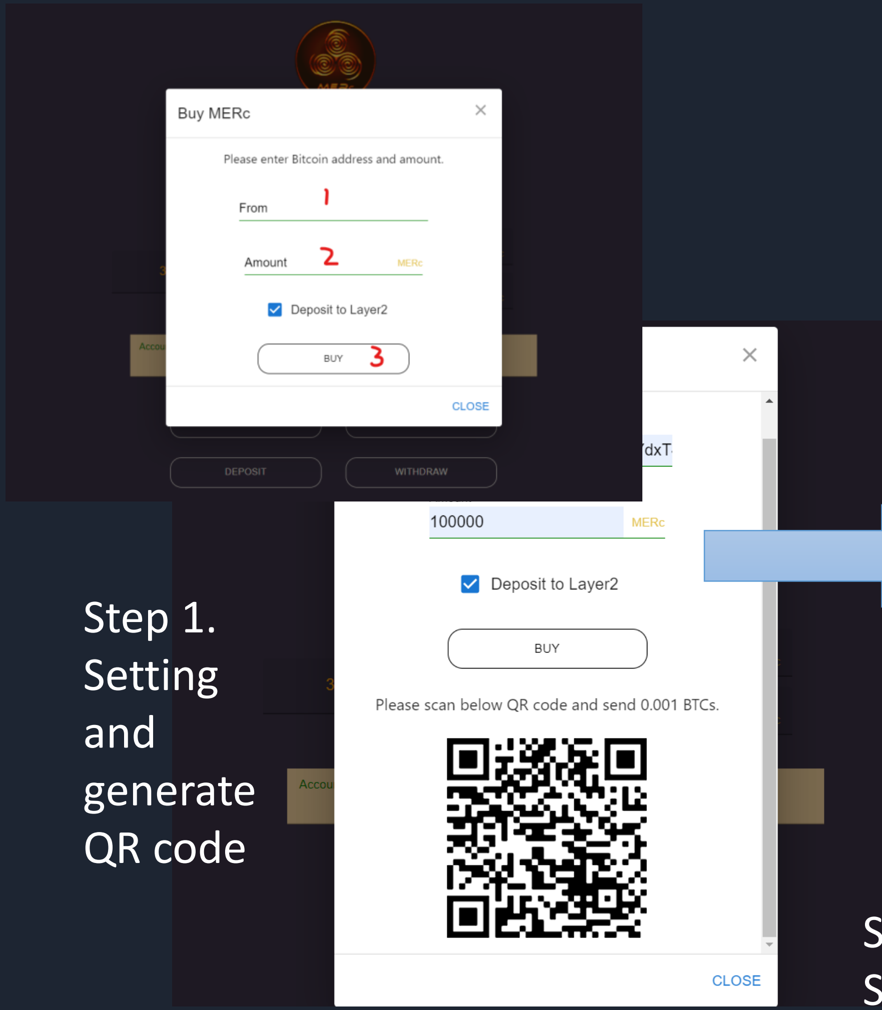
Customer may have following worries about security:

- Can custodian abuse MERC reserves?
- Can exchanger abuse the right of mint or burn?
- Can exchanger abuse the BTC reserves?

To resolve these worries, Accziom Exchange system should demonstrate following information:

- BTC reserves and MERC total supply
  Rule: BTC reserves >= MERC total supply
  If our system always satisfy above condition, customer can redeem BTCs in any time.
- MERC reserves and Layer2 total amount
  Rule: MERC reserves >= Layer2 total amount
  If above condition is always satisfied, customer can withdraw in any time.
- Customer transaction history
  Transaction history records BTC transaction, Layer1 transaction and Layer2 transaction so that we can prove each transaction is exact and transparency.

Event-Driven Token Management
Use case1: Buy MERc



Buy MERc

Please enter Bitcoin address and amount.

From 1

Amount 2 MERc

☑ Deposit to Layer2

BUY 3

CLOSE

DEPOSIT WITHDRAW

dxT

100000 MERc

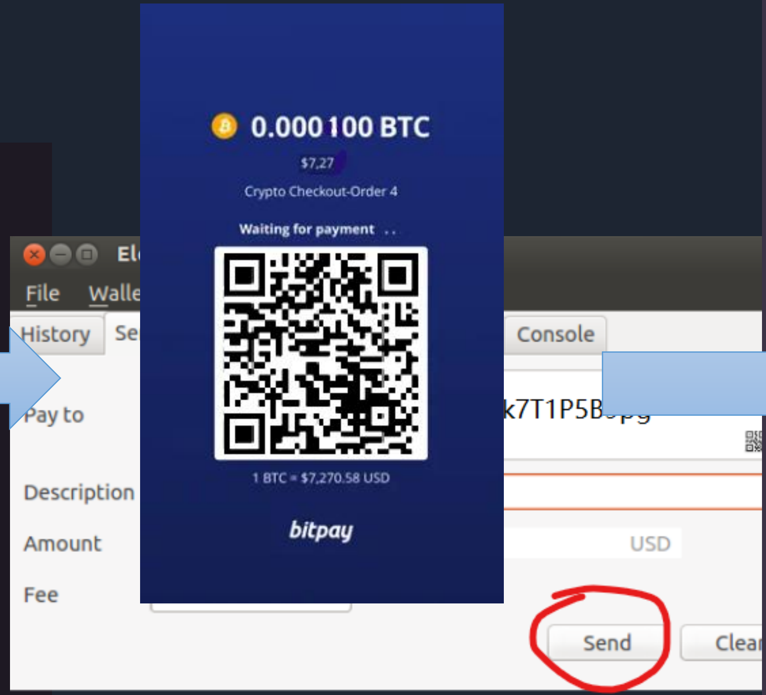
☑ Deposit to Layer2

BUY

Please scan below QR code and send 0.001 BTCs.

CLOSE

Step 1.
Setting and generate QR code



0.000100 BTC
$7.27
Crypto Checkout-Order 4
Waiting for payment ..
1 BTC = $7,270.58 USD
bitpay

Pay to k7T1P5B

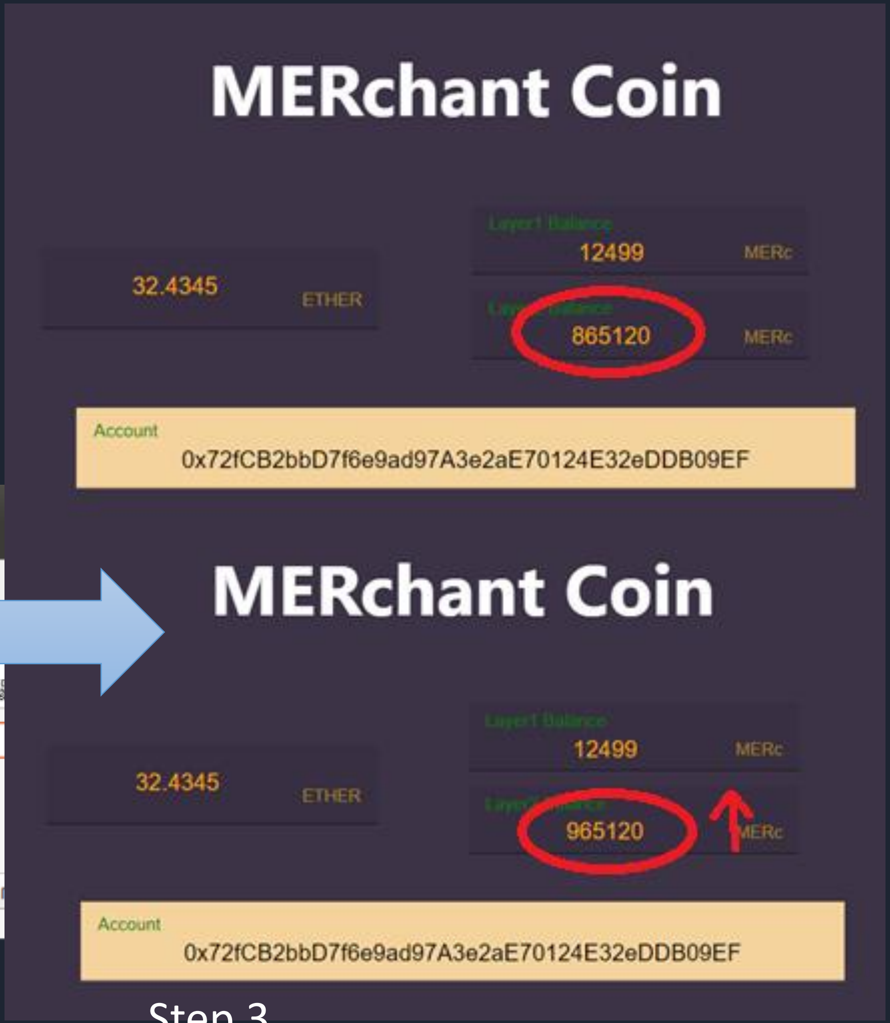
Description

Amount USD

Fee

Send Clear

Step 2.
Scan and send to BTC reserve account.



MERchant Coin

Layer1 Balance 12499 MERc

32.4345 ETHER

Layer2 Balance 865120 MERc

Account 0x72fCB2bbD7f6e9ad97A3e2aE70124E32eDDB09EF

MERchant Coin

Layer1 Balance 12499 MERc

32.4345 ETHER

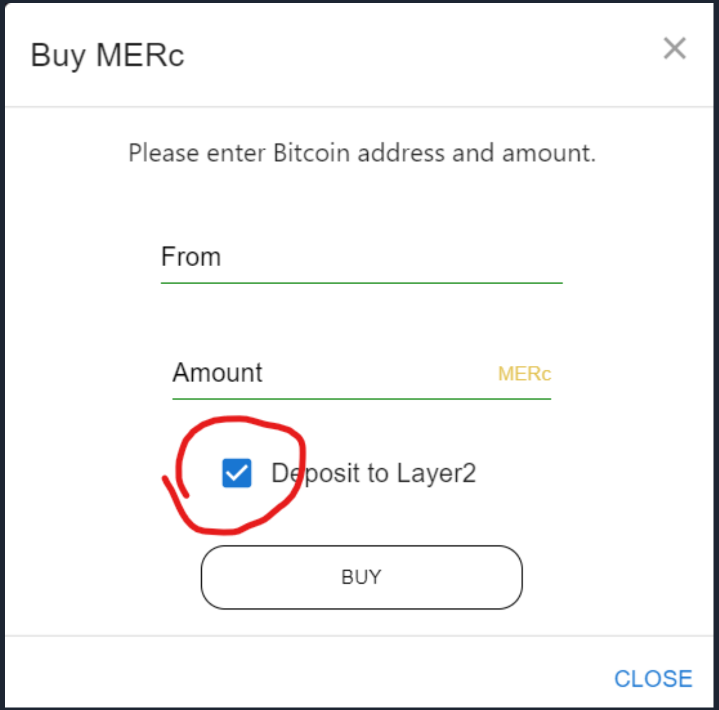
Layer2 Balance 965120 MERc

Account 0x72fCB2bbD7f6e9ad97A3e2aE70124E32eDDB09EF

Step 3.
Confirm the change of balance.

Event-Driven Token Management
Use case 1: Buy MERc

Buy MERc and deposit to Layer2.



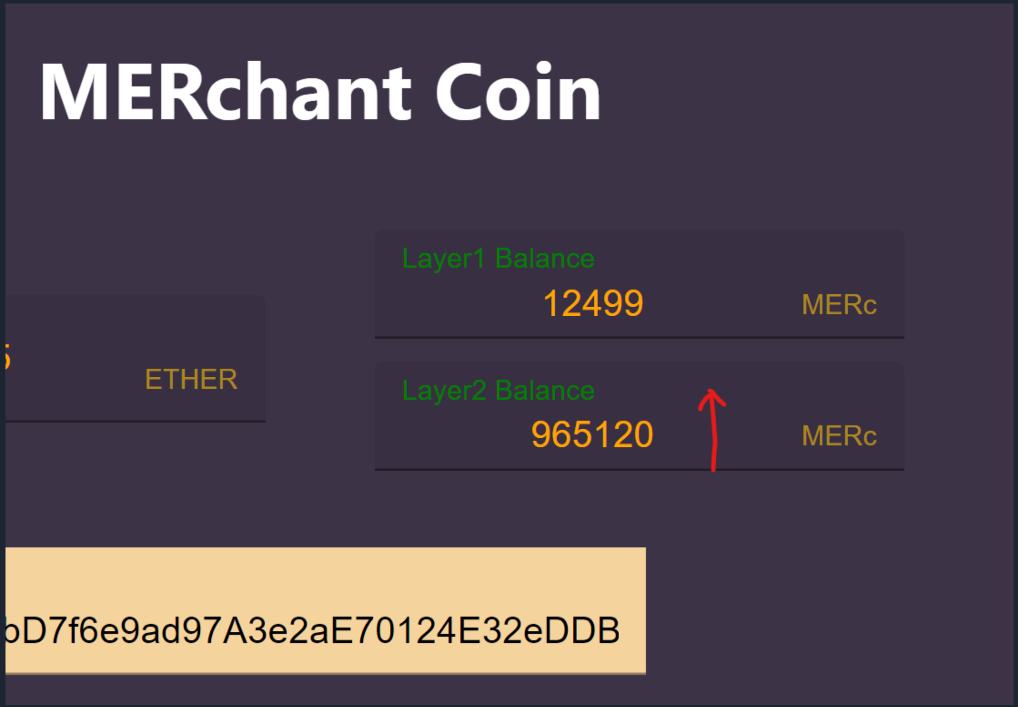
Buy MERc

Please enter Bitcoin address and amount.

From

Amount MERc

☑ Deposit to Layer2



MERchant Coin

ETHER

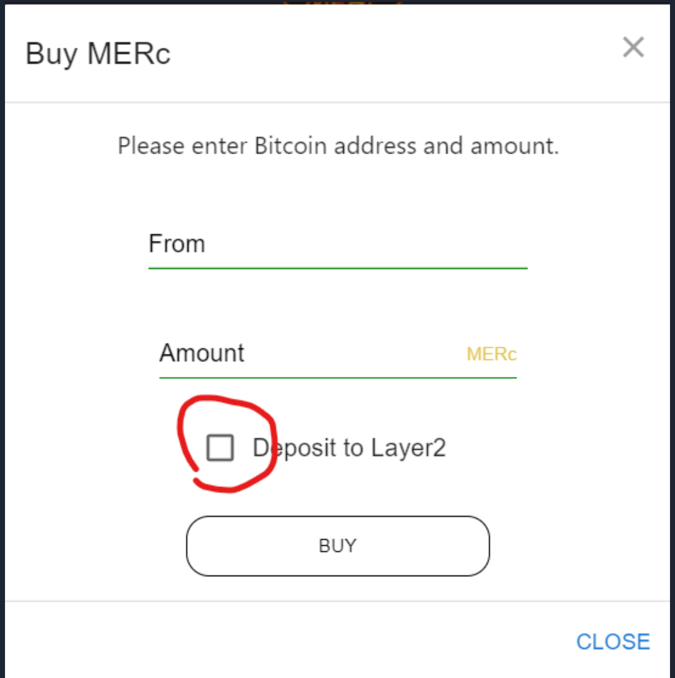
Layer1 Balance 12499 MERc

Layer2 Balance 965120 MERc

bD7f6e9ad97A3e2aE70124E32eDDB

Event-Driven Token Management
Use case 1: Buy MERc

Buy MERc without deposit.



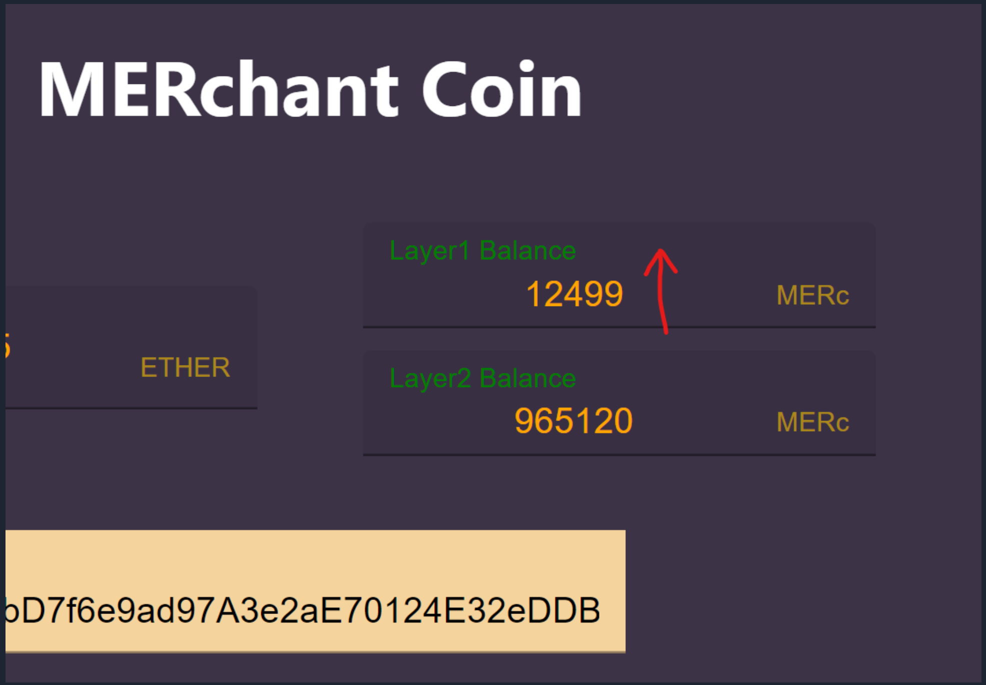
Buy MERc

Please enter Bitcoin address and amount.

From

Amount MERc

□ Deposit to Layer2



MERchant Coin

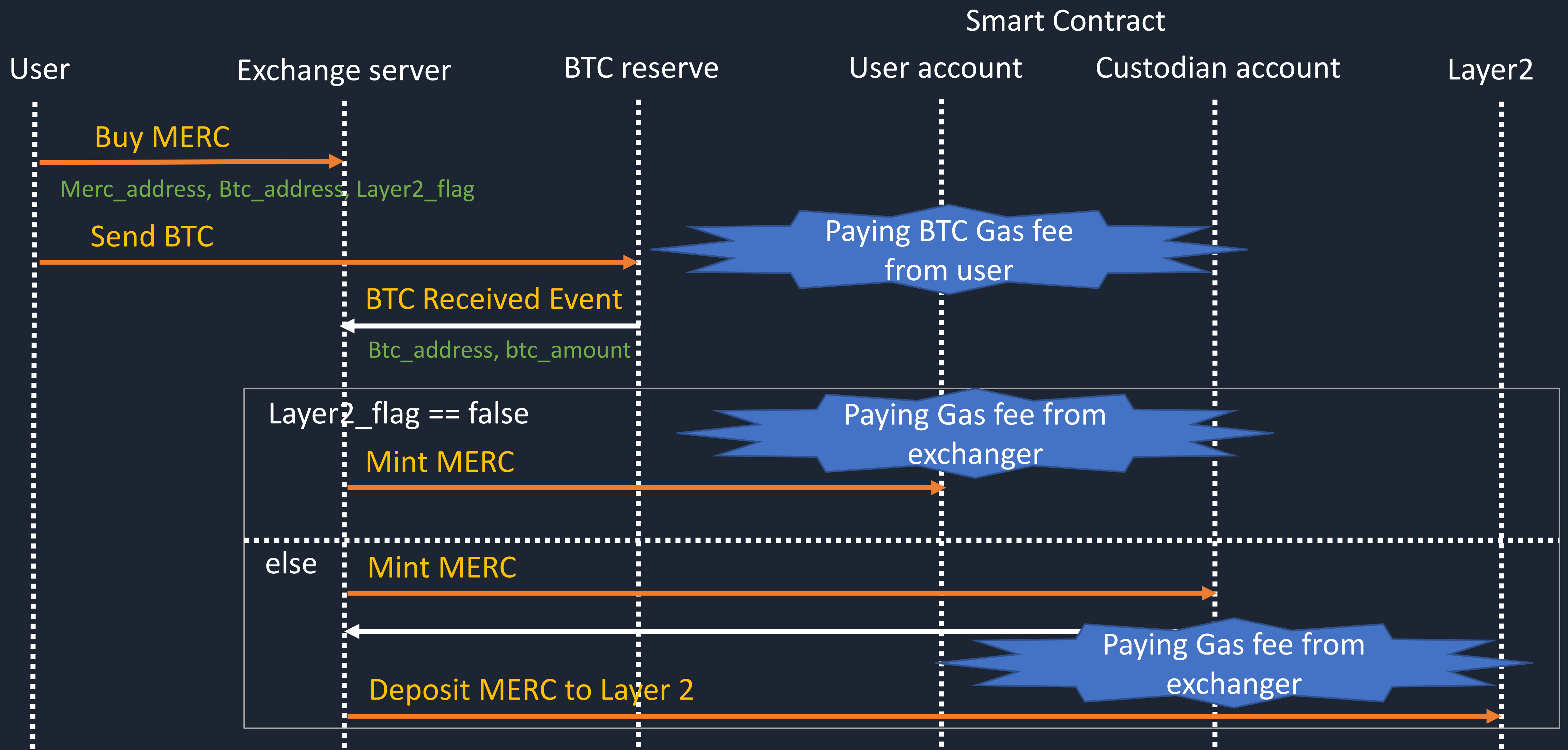
ETHER

Layer1 Balance 12499 MERc

Layer2 Balance 965120 MERc

bD7f6e9ad97A3e2aE70124E32eDDB

Event-Driven Token Management
Use case 1: Buy MERc



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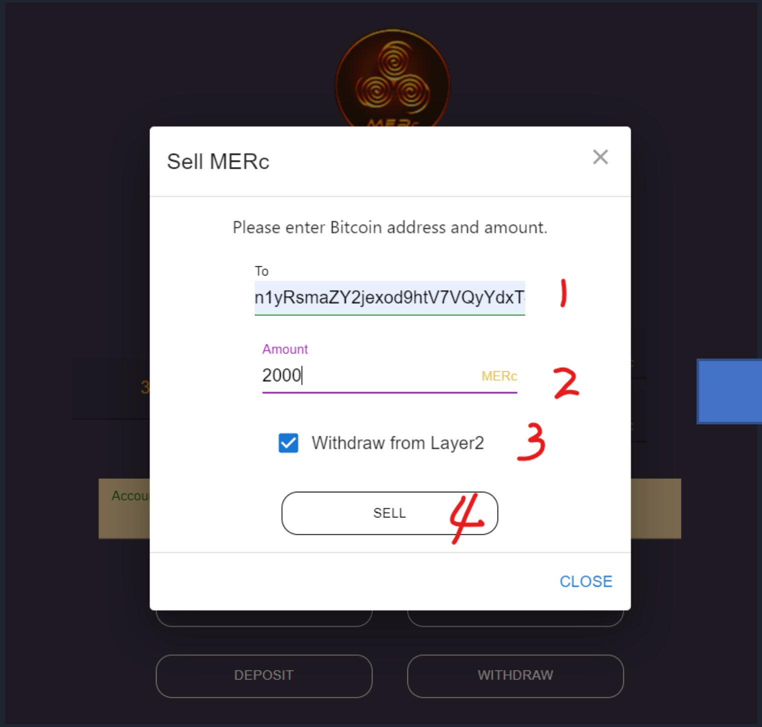
Event-Driven Token Management
Use case 2: Sell MERc



Sell MERc

Please enter Bitcoin address and amount.

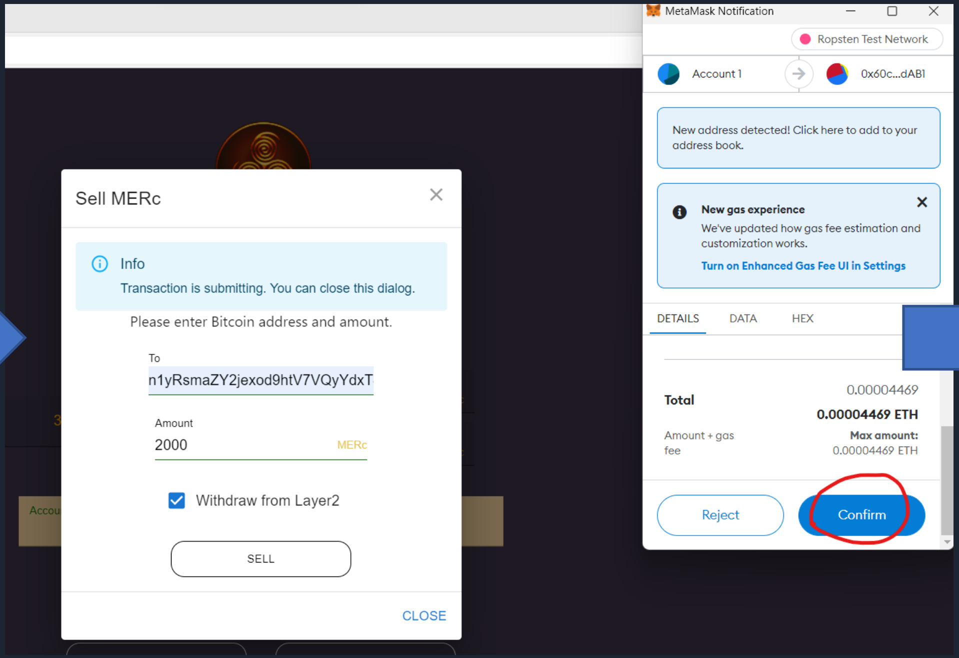
To
n1yRsmaZY2jexod9htV7VQyYdxT 1

Amount
2000 MERc 2

☑ Withdraw from Layer2 3

SELL 4

CLOSE



Sell MERc

Info
Transaction is submitting. You can close this dialog.

Please enter Bitcoin address and amount.

To
n1yRsmaZY2jexod9htV7VQyYdxT

Amount
2000 MERc

☑ Withdraw from Layer2

SELL

CLOSE

MetaMask Notification

Ropsten Test Network

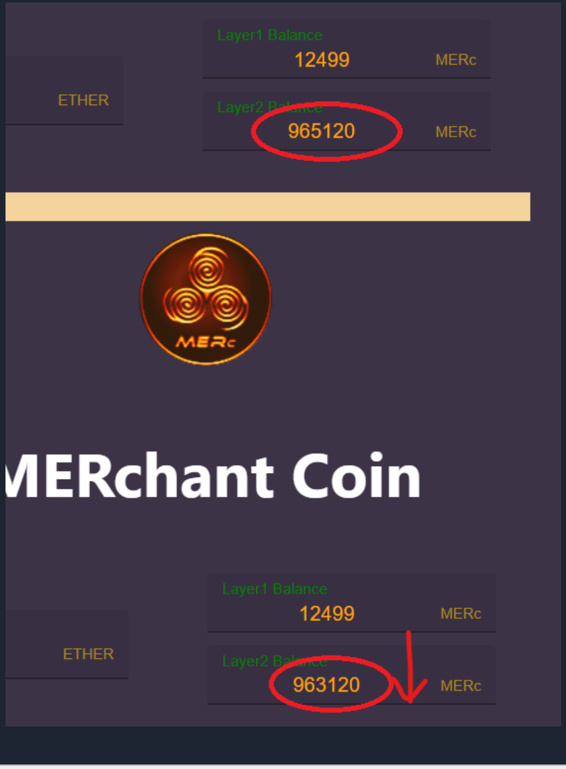
Account 1 → 0x60c...dAB1

New address detected! Click here to add to your address book.

New gas experience
We've updated how gas fee estimation and customization works.
Turn on Enhanced Gas Fee UI in Settings

Total 0.00004469
0.00004469 ETH
Amount + gas fee
Max amount: 0.00004469 ETH

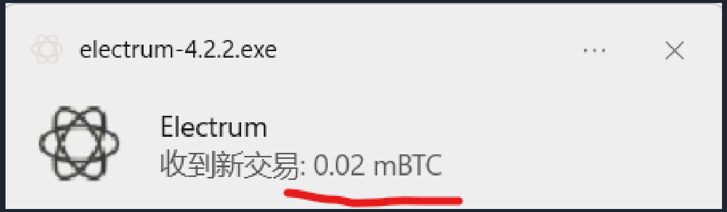
Reject
Confirm



ETHER
Layer1 Balance 12499 MERc
Layer2 Balance 965120 MERc

MERchant Coin

ETHER
Layer1 Balance 12499 MERc
Layer2 Balance 963120 MERc



electrum-4.2.2.exe

Electrum
收到新交易: 0.02 mBTC

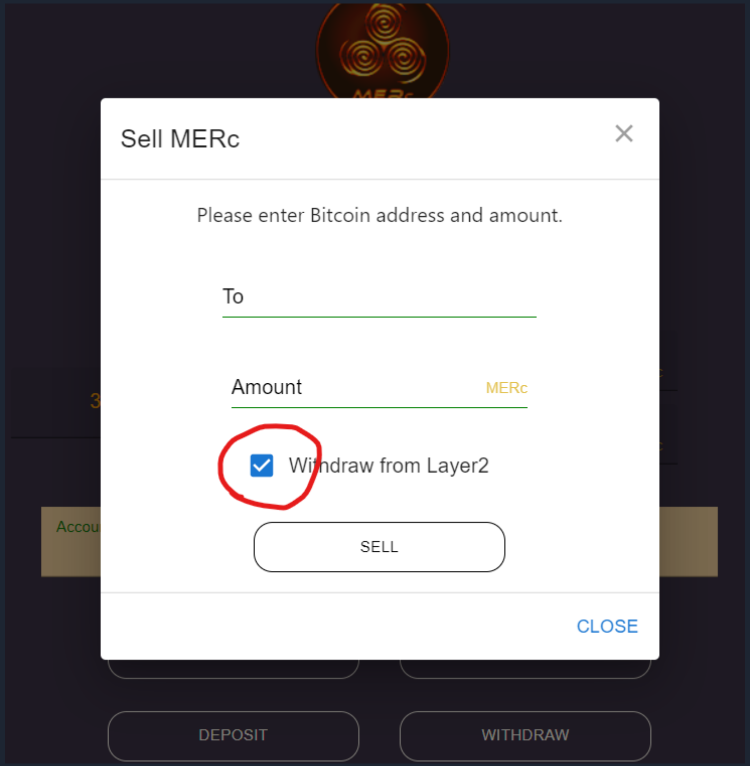
Step 1.
Setting and submit request.

Step 2.
Confirm to pay gas fee in Metamask.

Step 3.
Confirm the change of balance.

Event-Driven Token Management
Use case 2: Sell MERc

Sell MERc from Layer2.



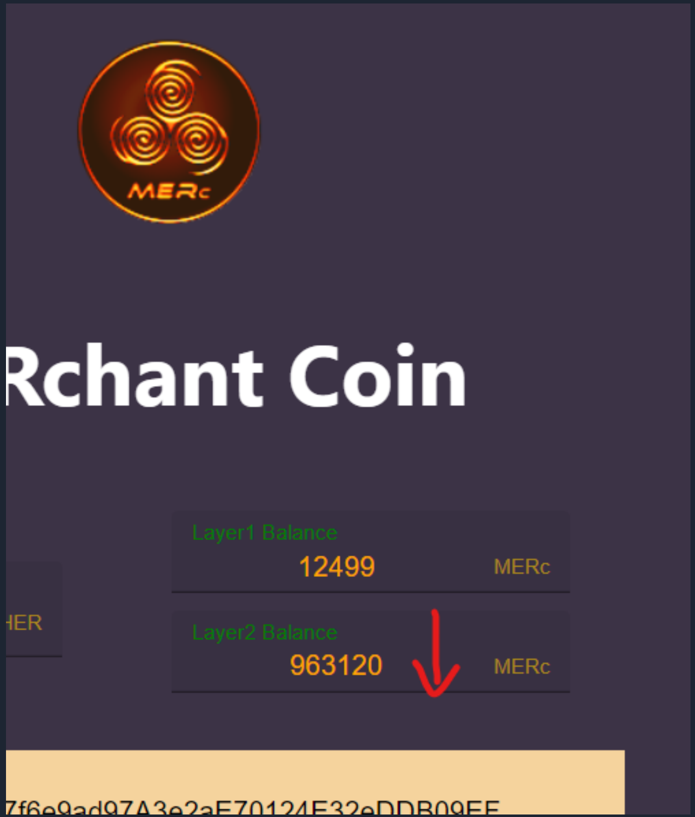
Sell MERc

Please enter Bitcoin address and amount.

To

Amount MERc

☑ Withdraw from Layer2



Rchant Coin

Layer1 Balance 12499 MERc

Layer2 Balance 963120 MERc

7f6e9ad97A3e2aF70124E32eDDB09EE

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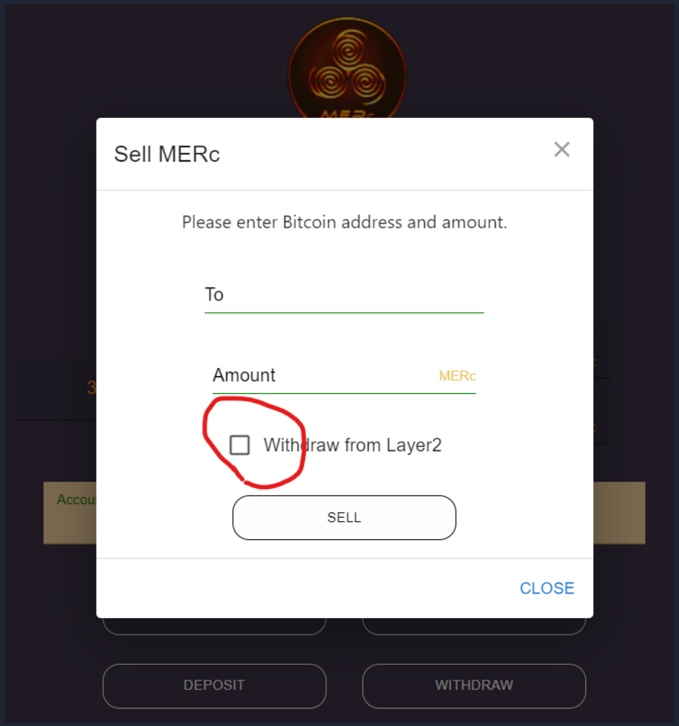
Event-Driven Token Management
Use case 2: Sell MERc

Sell MERc from Layer1.



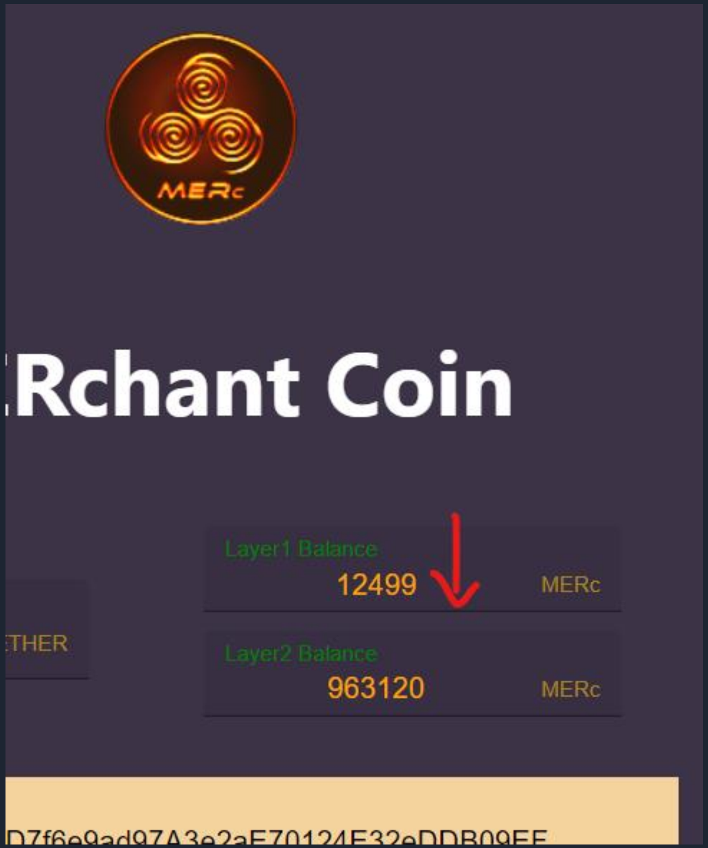
Sell MERc

Please enter Bitcoin address and amount.

To

Amount MERc

□ Withdraw from Layer2



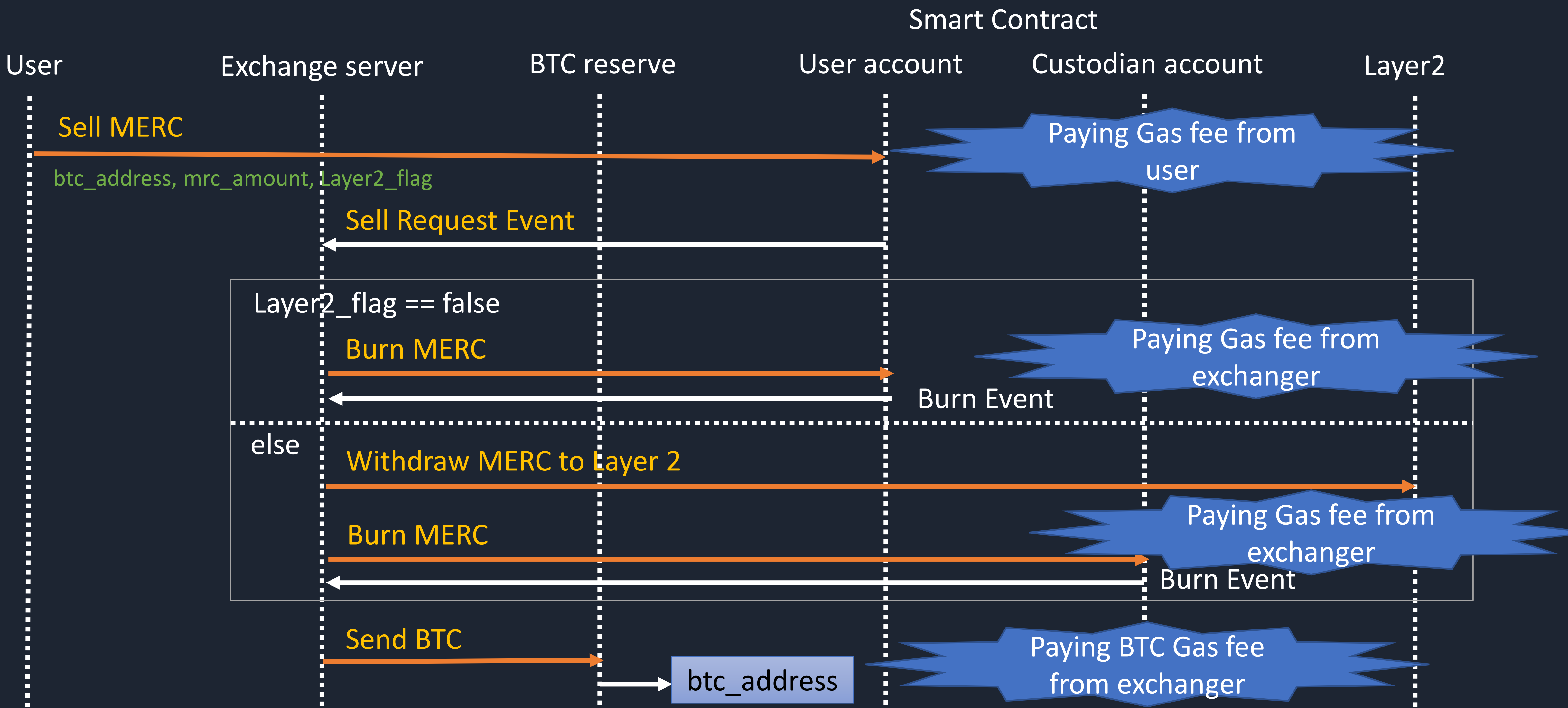
Rchant Coin

Layer1 Balance 12499 MERc

Layer2 Balance 963120 MERc

D7f6e9ad97A3e2aF70124E32eDDB09EE

Event-Driven Token Management
Use case 2: Sell MERc



Smart Contract

User

Exchange server

BTC reserve

User account

Custodian account

Layer2

Sell MERC

btc_address, mrc_amount, Layer2_flag

Paying Gas fee from user

Sell Request Event

Layer2_flag == false

Burn MERC

Paying Gas fee from exchanger

Burn Event

else

Withdraw MERC to Layer 2

Burn MERC

Paying Gas fee from exchanger

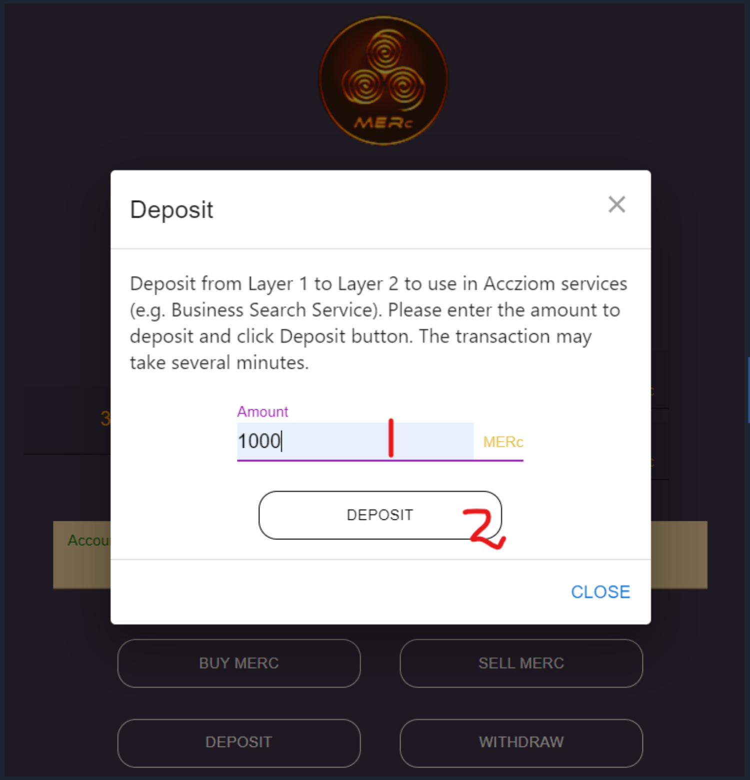
Burn Event

Send BTC

btc_address

Paying BTC Gas fee from exchanger

Event-Driven Token Management
Use case 3: Deposit

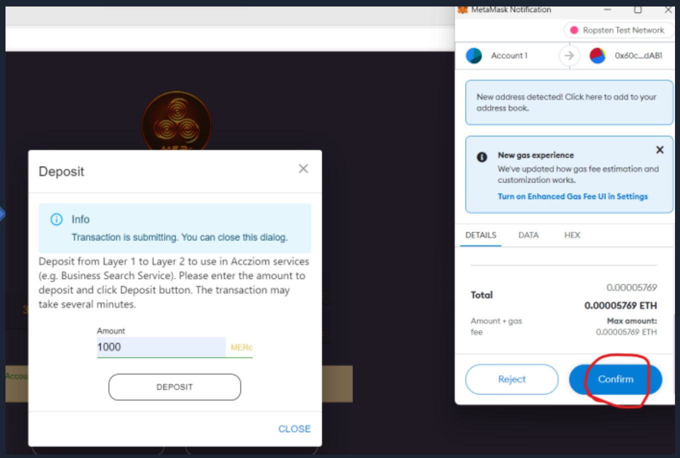


Deposit

Deposit from Layer 1 to Layer 2 to use in Accziom services (e.g. Business Search Service). Please enter the amount to deposit and click Deposit button. The transaction may take several minutes.

Amount: 1000 MERc

Step 1.
Setting and submit request.



Deposit

Info
Transaction is submitting. You can close this dialog.

Deposit from Layer 1 to Layer 2 to use in Accziom services (e.g. Business Search Service). Please enter the amount to deposit and click Deposit button. The transaction may take several minutes.

Amount: 1000 MERc

MetaMask Notification

Ropsten Test Network

Account 1 → 0x60c...dAB1

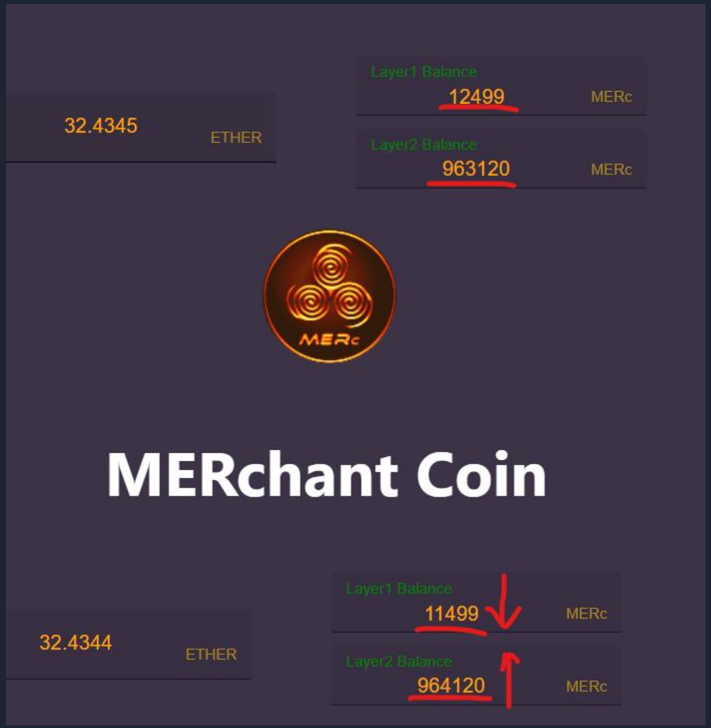
New address detected! Click here to add to your address book.

New gas experience
We've updated how gas fee estimation and customization works.
Turn on Enhanced Gas Fee UI in Settings

Total: 0.00005769
0.00005769 ETH

Amount + gas fee: Max amount: 0.00005769 ETH

Step 2.
Confirm to pay gas fee in Metamask.



32.4345 ETHER

Layer1 Balance: 12499 MERc

Layer2 Balance: 963120 MERc

MERchant Coin

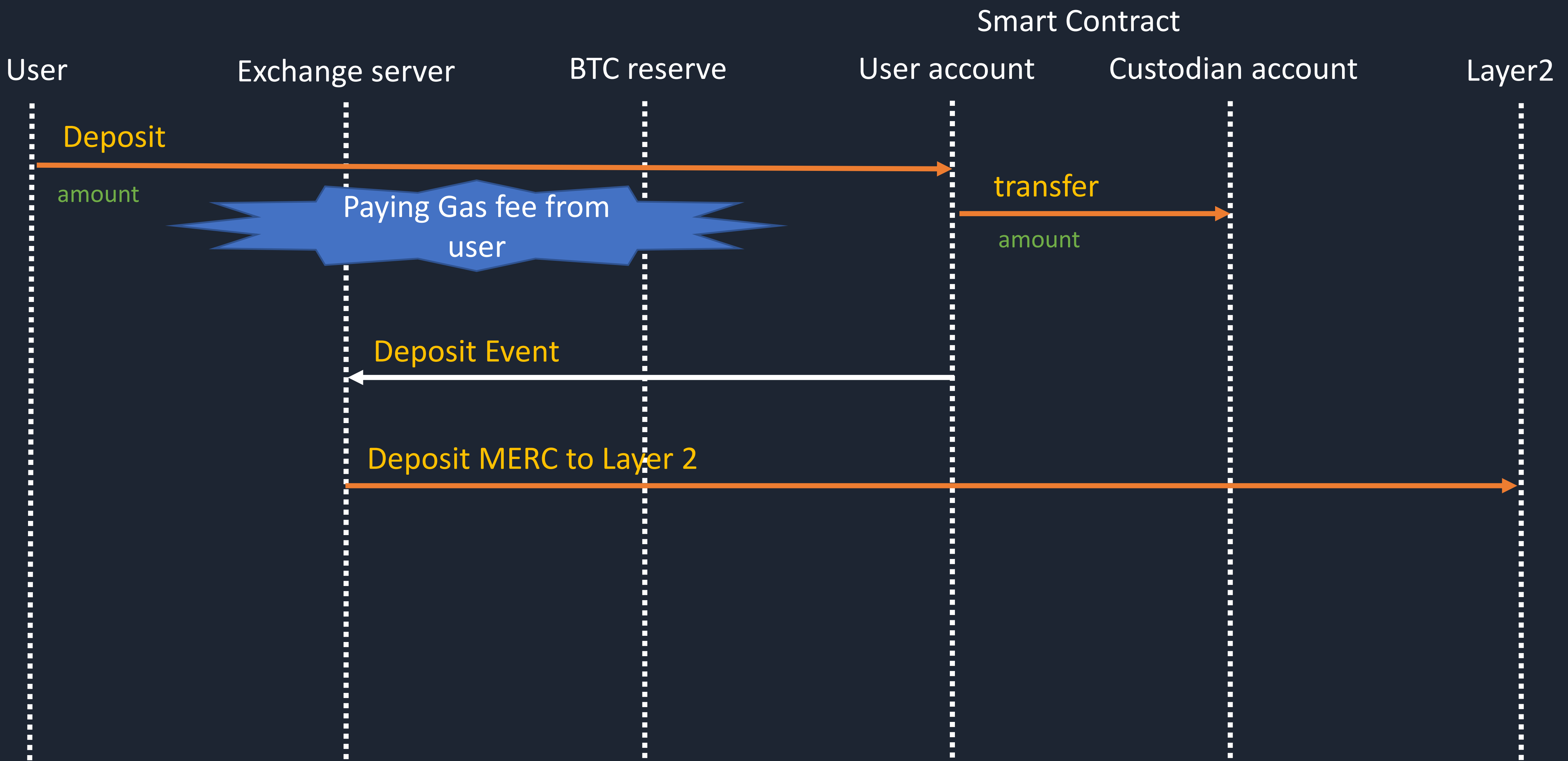
32.4344 ETHER

Layer1 Balance: 11499 MERc

Layer2 Balance: 964120 MERc

Step 3.
Confirm the change of balance.

Event-Driven Token Management
Use case 3: Deposit



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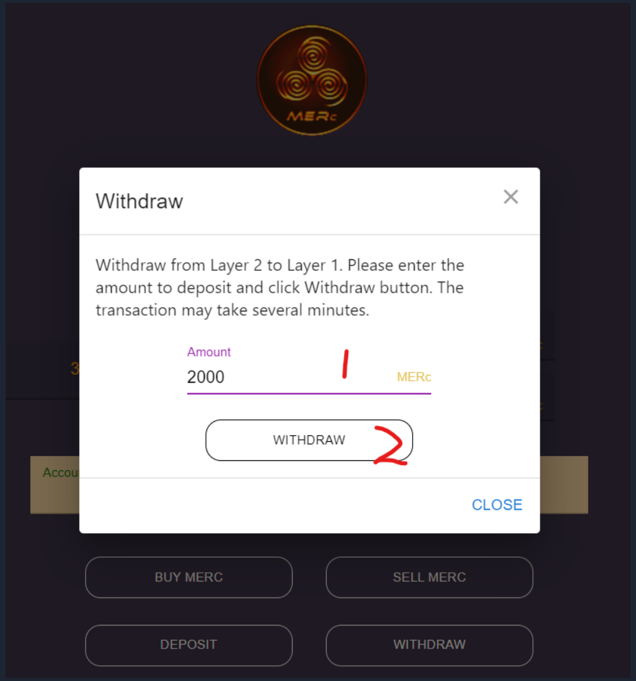
Event-Driven Token Management
Use case 4: Withdraw

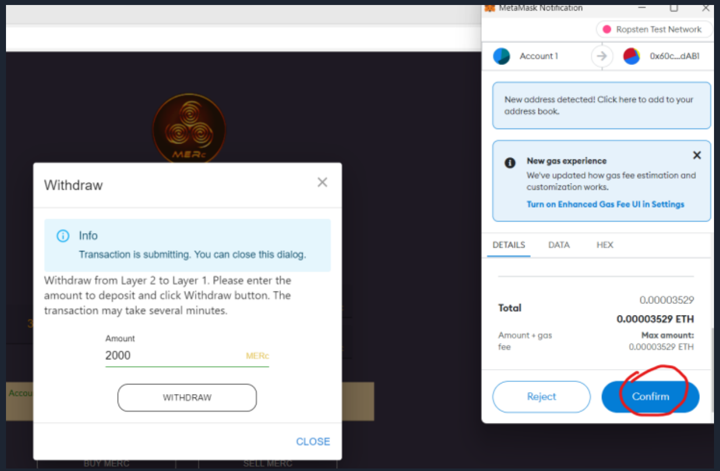


Withdraw

Withdraw from Layer 2 to Layer 1. Please enter the amount to deposit and click Withdraw button. The transaction may take several minutes.

Amount: 2000 MERc

Step 1.
Setting and submit request.



Withdraw

Info
Transaction is submitting. You can close this dialog.

Withdraw from Layer 2 to Layer 1. Please enter the amount to deposit and click Withdraw button. The transaction may take several minutes.

Amount: 2000 MERc

MetaMask Notification

Ropsten Test Network

Account 1 → 0x60c...dAB1

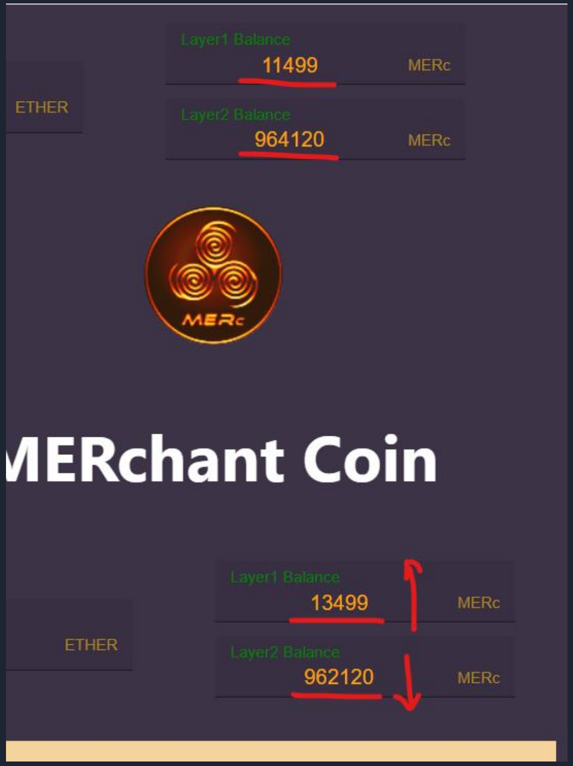
New address detected! Click here to add to your address book.

New gas experience
We've updated how gas fee estimation and customization works.
Turn on Enhanced Gas Fee UI in Settings

DETAILS DATA HEX

Total: 0.00003529
0.00003529 ETH
Amount + gas fee — **Max amount:** 0.00003529 ETH

Step 2.
Confirm to pay gas fee in Metamask.



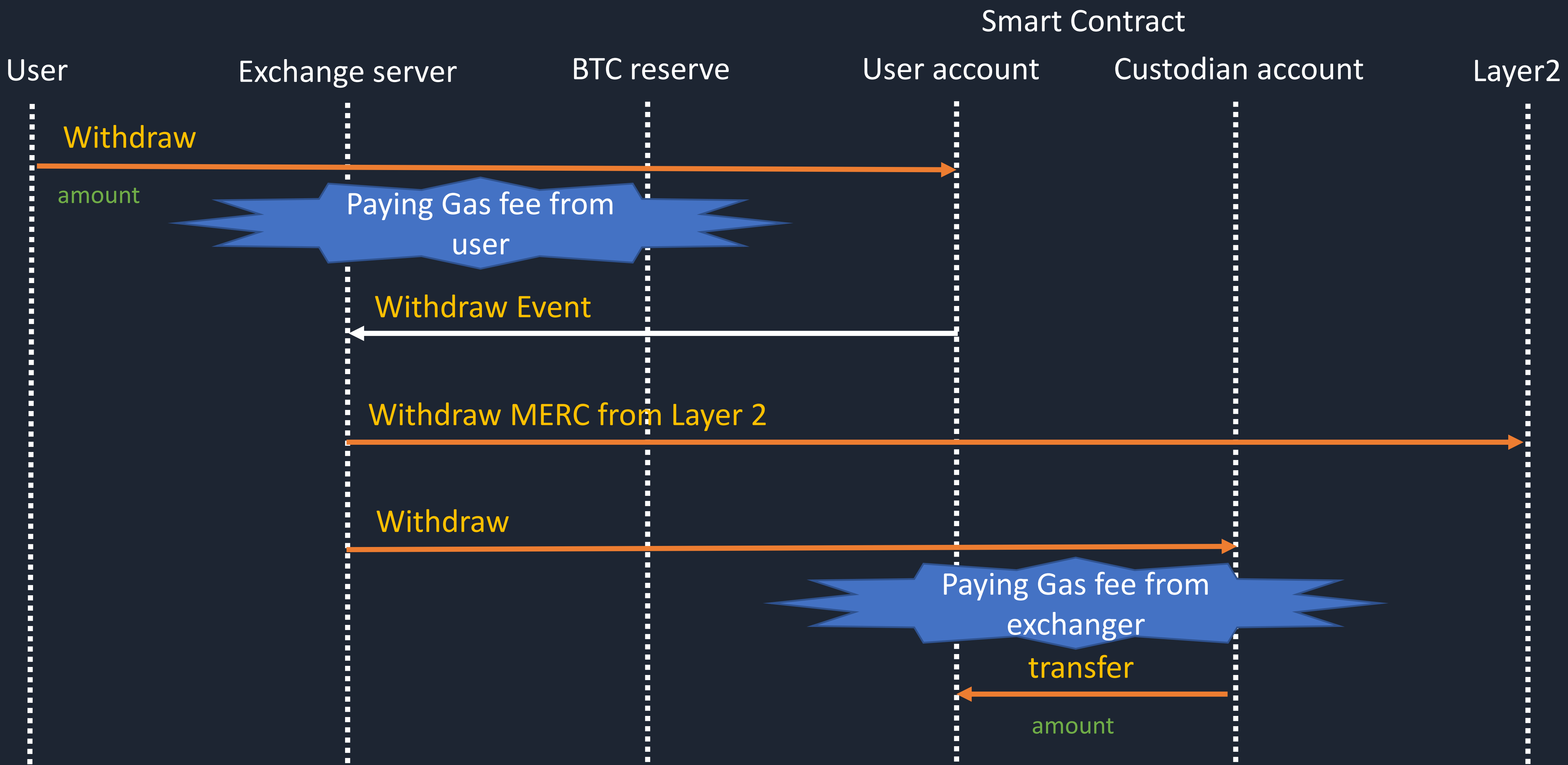
Layer1 Balance: 11499 MERc
Layer2 Balance: 964120 MERc

MERchant Coin

Layer1 Balance: 13499 MERc
Layer2 Balance: 962120 MERc

Step 3.
Confirm the change of balance.

Event-Driven Token Management
Use case 4: Withdraw



Smart Contract

User

Exchange server

BTC reserve

User account

Custodian account

Layer2

Withdraw

amount

Paying Gas fee from user

Withdraw Event

Withdraw MERC from Layer 2

Withdraw

Paying Gas fee from exchanger

transfer

amount

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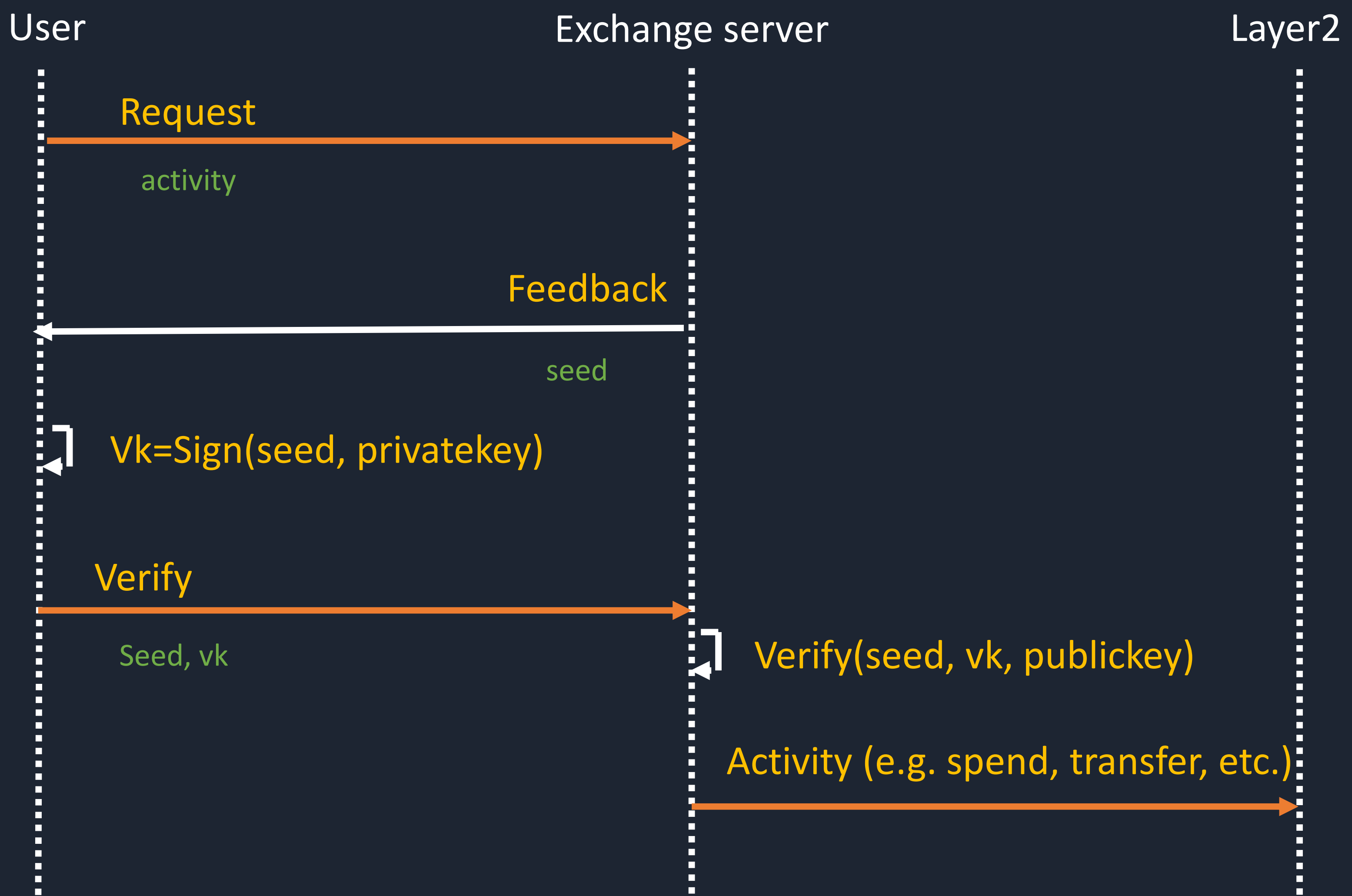
Certification when accessing to Layer2


User
Exchange server
Layer2
Request
activity
Feedback
seed
Vk=Sign(seed, privatekey)
Verify
Seed, vk
Verify(seed, vk, publickey)
Activity (e.g. spend, transfer, etc.)

Fractional BTC Reserves

if someone want to provide btc reserve, the procedure can be as follows:

(1) applicant buys block.io api and registers security pin to accziom server.

(2) administrator authorize the requisition of the applicant and sets some options, including reserve limit, reward percent.

(3) accziom server allocates merc account for the applicant to get rewards.

administrator can have following right:

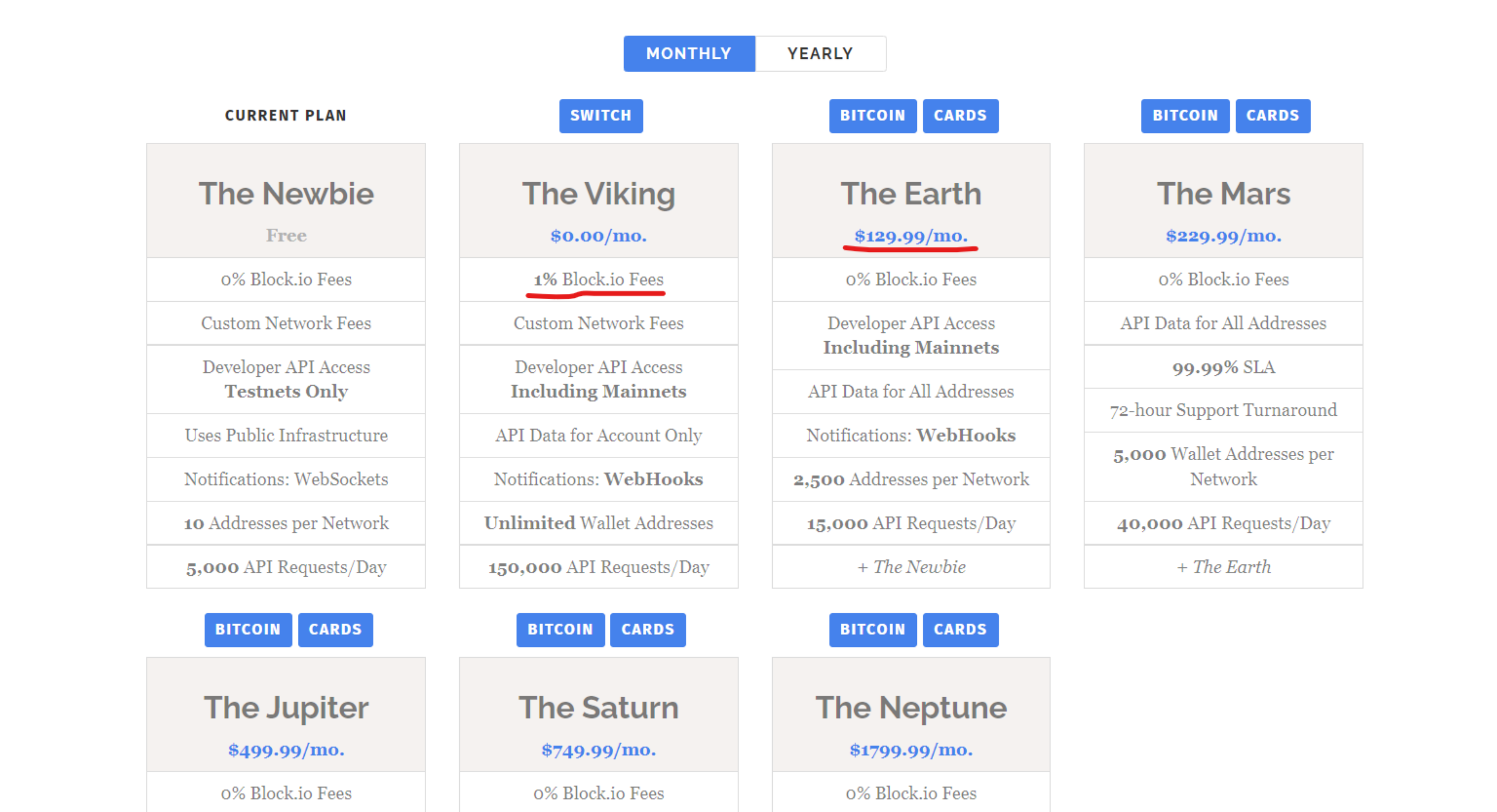
(1) authorizes a requistion

(2) set reserve limit of a btc reserve owner, according to IOU

(3) set percent of reward, according to IOU

(4) cancel a btc reserve account.

Block.io API Fee

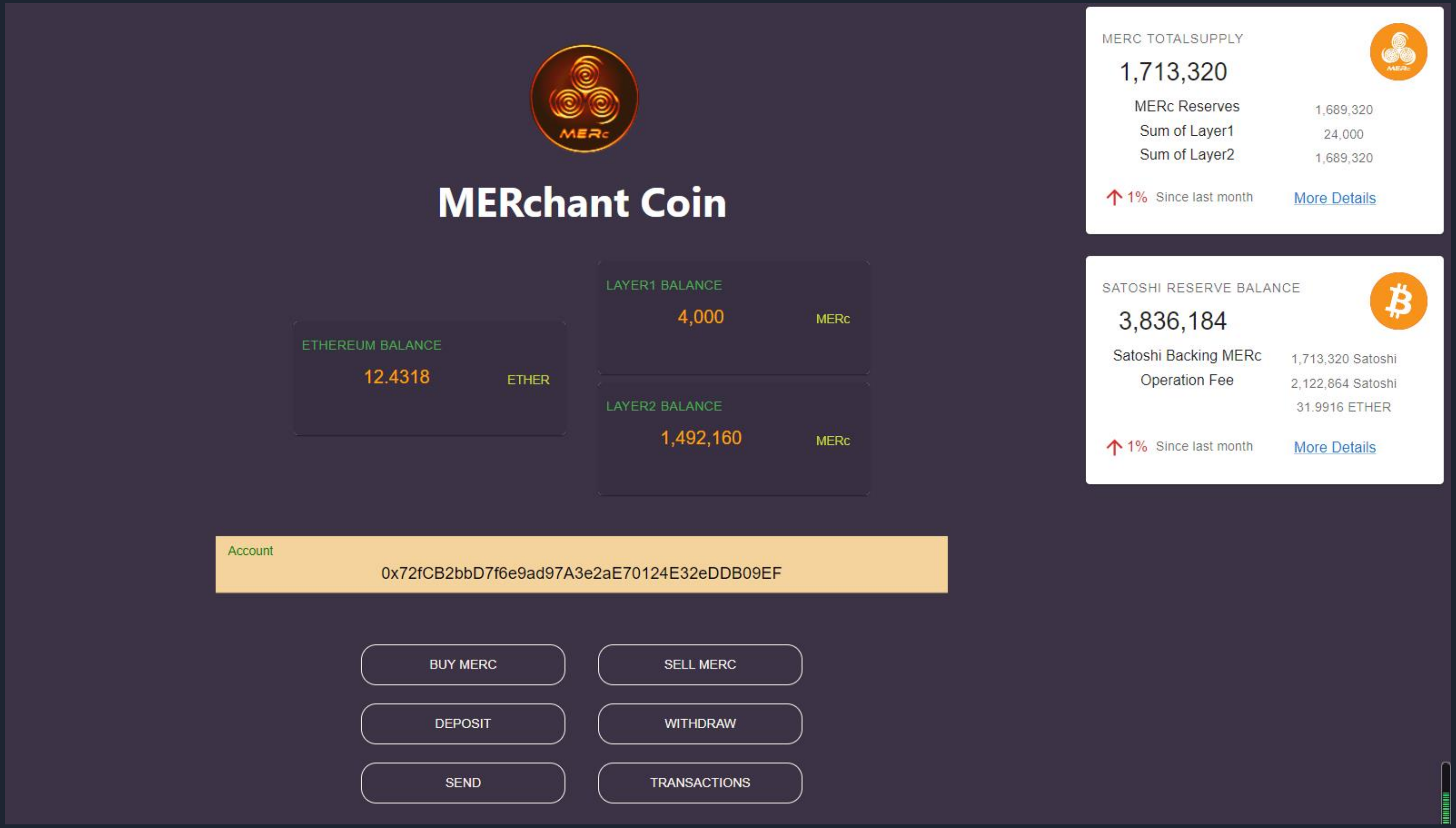


MONTHLY | YEARLY

CURRENT PLAN	SWITCH	BITCOIN CARDS	BITCOIN CARDS
The Newbie	**The Viking**	**The Earth**	**The Mars**
Free	$0.00/mo.	$129.99/mo.	$229.99/mo.
0% Block.io Fees	**1%** Block.io Fees	0% Block.io Fees	0% Block.io Fees
Custom Network Fees	Custom Network Fees	Developer API Access **Including Mainnets**	API Data for All Addresses
Developer API Access **Testnets Only**	Developer API Access **Including Mainnets**	API Data for All Addresses	**99.99%** SLA
Uses Public Infrastructure	API Data for Account Only	Notifications: **WebHooks**	72-hour Support Turnaround
Notifications: WebSockets	Notifications: **WebHooks**	**2,500** Addresses per Network	**5,000** Wallet Addresses per Network
10 Addresses per Network	**Unlimited** Wallet Addresses	**15,000** API Requests/Day	**40,000** API Requests/Day
5,000 API Requests/Day	**150,000** API Requests/Day	+ *The Newbie*	+ *The Earth*

BITCOIN CARDS	BITCOIN CARDS	BITCOIN CARDS
The Jupiter	**The Saturn**	**The Neptune**
$499.99/mo.	$749.99/mo.	$1799.99/mo.
0% Block.io Fees	0% Block.io Fees	0% Block.io Fees

MERc Payment System



MERchant Coin

ETHEREUM BALANCE
12.4318 ETHER

LAYER1 BALANCE
4,000 MERc

LAYER2 BALANCE
1,492,160 MERc

Account
0x72fCB2bbD7f6e9ad97A3e2aE70124E32eDDB09EF

MERC TOTALSUPPLY
1,713,320

MERc Reserves	1,689,320
Sum of Layer1	24,000
Sum of Layer2	1,689,320

↑ 1% Since last month

SATOSHI RESERVE BALANCE
3,836,184

Satoshi Backing MERc	1,713,320 Satoshi
Operation Fee	2,122,864 Satoshi
	31.9916 ETHER

↑ 1% Since last month

MERc Payment System

- It is a general micropayment system using decentralized cryptocurrency, MERc.

  Current cryptocurrency is safe, but each transaction needs rather expensive gas fee. It is critical for every micropayment system.

  MERc payment system apply 2 layers structure that make each transaction both fast and cheap(for the aspect of gas fee).

MERc Payment System

- It also can be commonly used for information marketplace.
  MERc payment system also has two APIs:
  (1) PAY
  Using this api, customer pay some service costs to information service account.
  (2) REWARD
  Using this api, information service provider allocate some incomes to all contributors of each service result. Rewarding system can encourage every information providers to ensure richness, correctness and reliability of database.

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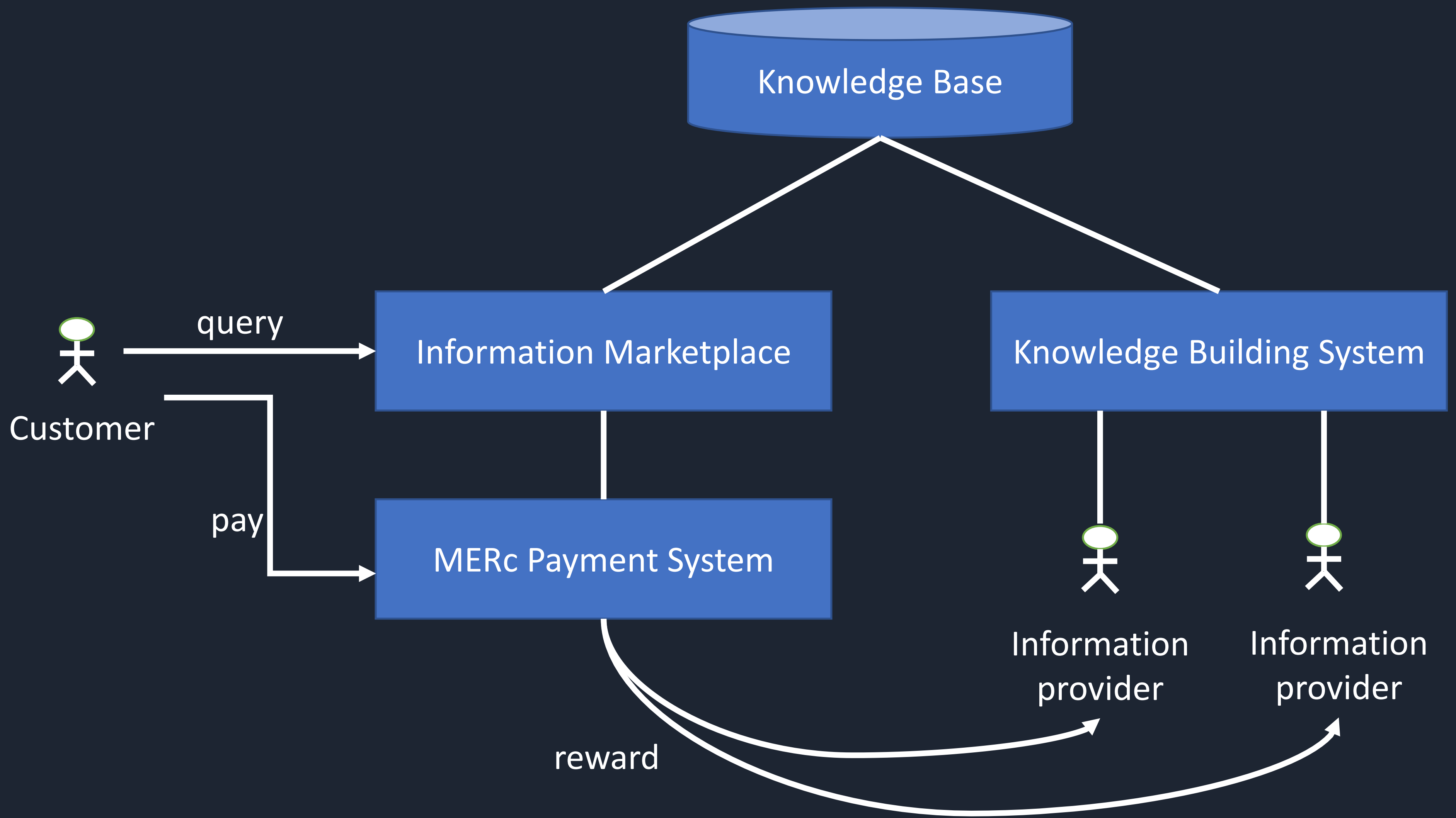
Information Marketplace



Information Marketplace

(1) accepts a query from customer.
(2) searches the result using AnzoGraph and estimates the cost.
(3) uses PAY api to request paying transaction to MERC payment server.
(4) if success, returns the search results to customer.
(5) uses REWARD api to send all contributors the corresponding bonus.

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Information Marketplace

This is a solution for Information marketplace. It will encourage more other peoples/organizations to build their own knowledge and earn money through knowledge service.

We recommend them to build knowledge base by using AnzoGraph.
Business Search is a sample of this information marketplace solution.