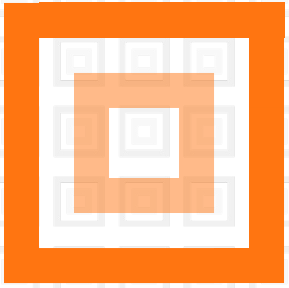


MUD

PAST
PRESENT
FUTURE

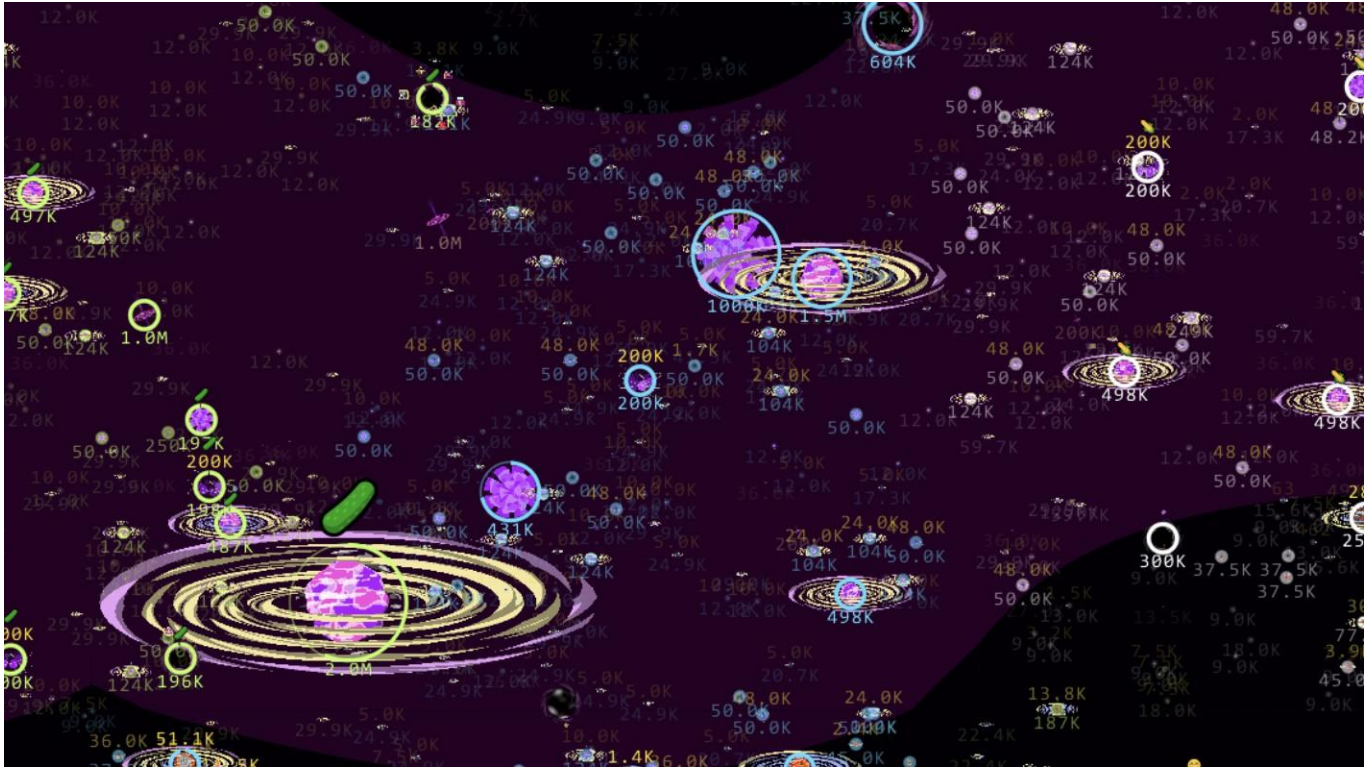
PAST
PRESENT
FUTURE

MAKE IT WORK
MAKE IT RIGHT
MAKE IT FAST

KENT BECK

CHAPTER 1: PAST

MAKE IT WORK


50.0K
604K
124K
200K
497K
1.0M
48.0K
1000K
1.5M
104K
498K
1.7K
431K
197K
187K
2.0M
196K
300K
37.5K
13.8K
187K
36.0K
51.1K
1.4K


tor
ors turn time into
40
0x5ff7


$0.02
A dungeon heart has been claimed
A dungeon heart has been claimed
Funds
Settings


20

Game.sol

```
struct Coord {
  int32 x;
  int32 y;
}

mapping(bytes32 => Coord) positions;

function getPosition(bytes32 entity)
  returns (Coord);

event PositionChanged(
  bytes32 entity,
  Coord position
);

function move(bytes32 entity, Coord position) {
  emit PositionChanged(entity, position);
  positions[entity] = position;
}
```

Client.ts

```
type Coord {
  x: number;
  y: number;
}

const positions = Map<string, Coord>();

function syncInitialPositions() {
  for(const entity of entities) {
    const coord = contract.getPosition(entity)
    positions.set(entity, coord);
  }
}

function onPositionChanged(
  entity: string,
  position: Coord
) {
  positions.set(entity, position);
}
```

Game.sol

```
struct Health {
  int32 health;
}

mapping(bytes32 => Health) healths;

function getHealth(bytes32 entity)
  returns (Health);

event HealthChanged(
  bytes32 entity,
  Health health
);

function heal(bytes32 entity, Health health) {
  emit HealthChanged(entity, health);
  healths[entity] = health;
}
```

Client.ts

```
type Health {
  health: number;
}

const healths = Map<string, Health>();

function syncInitialHealth() {
  for(const entity of entities) {
    const health = contract.getHealth(entity)
    healths.set(entity, health);
  }
}

function onHealthChanged(
  entity: string,
  health: Health
) {
  healths.set(entity, health);
}
```

Game.sol

```
struct Energy {
  int32 energy;
}

mapping(bytes32 => Energy) energies;

function getEnergy(bytes32 entity)
  returns (Energy);

event EnergyChanged(
  bytes32 entity,
  Energy energy
);

function boost(bytes32 entity, Energy energy) {
  emit EnergyChanged(entity, energy);
  energies[entity] = energy;
}
```

Client.ts

```
type Energy {
  energy: number;
}

const energies = Map<string, Energy>();

function syncInitialEnergy() {
  for(const entity of entities) {
    const energy = contract.getEnergy(entity)
    energies.set(entity, energy);
  }
}

function onEnergyChanged(
  entity: string,
  energy: Energy
) {
  energies.set(entity, energy);
}
```

Game.sol

```
struct Skill {
  bytes32 skill;
  uint256 level;
}

mapping(bytes32 => bytes32 => Skill) skills;

function getSkill(bytes32 entity, bytes32 name)
  returns (Skill);

event SkillChanged(
  bytes32 entity,
  Skill skill
);

function learn(bytes32 entity, Skill skill) {
  emit SkillChanged(entity, skill);
  skills[entity][skill.skill] = skill;
}
```

Client.ts

```
type Skill {
  skill: string;
  level: number;
}

const skills = Map<string, Skill>();

function syncInitialSkill() {
  for(const entity of entities) {
    const energy = contract.getSkill(entity,name)
    skills.set(entity+"/"+skill.skill, skill);
  }
}

function onSkillChanged(
  entity: string,
  skill: Skill
) {
  skills.set(entity+"/"+skill.skill, skill);
}
```

Game.sol

```
struct Item {
  bytes32 item;
  uint256 amount;
}

mapping(bytes32 => bytes32 => Item) inventory;

function getItem(bytes32 entity, bytes32 item)
  returns (Item);

event InventoryChanged(
  bytes32 entity,
  Item item
);

function spend(bytes32 entity, Item item) {
  emit InventoryChanged(entity, item);
  inventory[entity][item.item] = item;
}
```

Client.ts

```
type Item {
  item: string;
  amount: number;
}

const inventory = Map<string, Item>();

function syncInitialInventory() {
  for(const entity of entities) {
    for(const id of items) {
      const item = contract.getItem(entity, id)
      inventory.set(entity+"/"+id, item);
    }
  }
}

function onInventoryChanged(
  entity: string,
  item: Item
) {
  inventory.set(entity+"/"+id, skill);
}
```

ECS 101

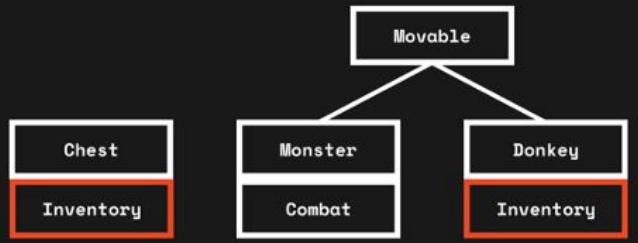
Entity
Component
Systems

the solution

entities

t a collection of components.

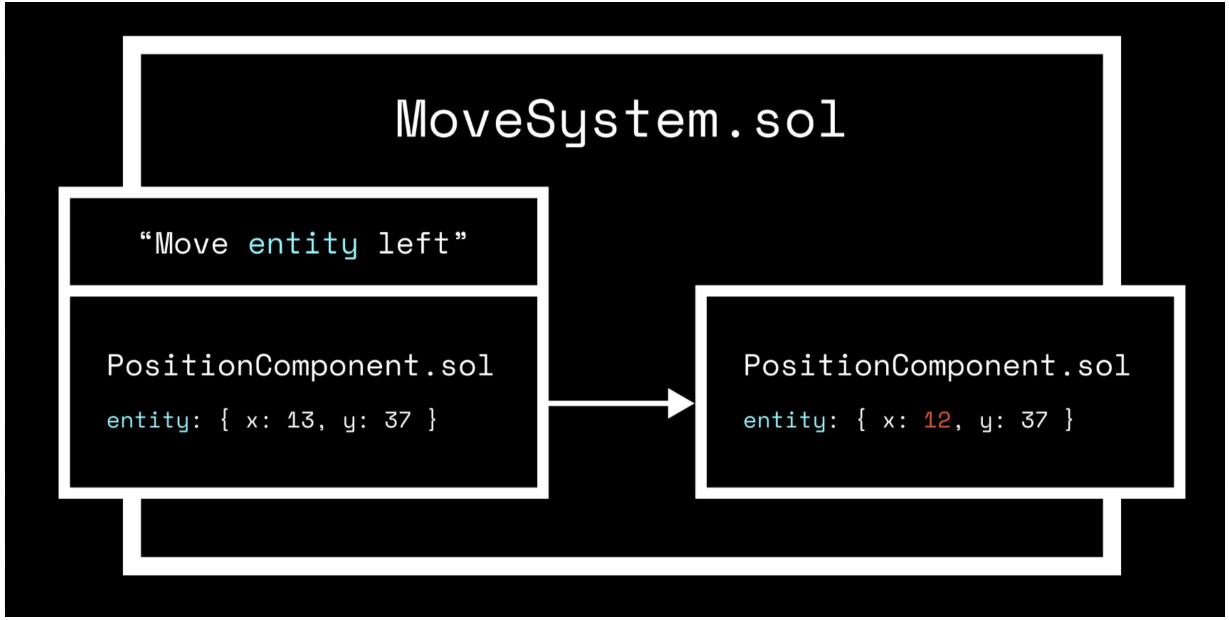
the problem

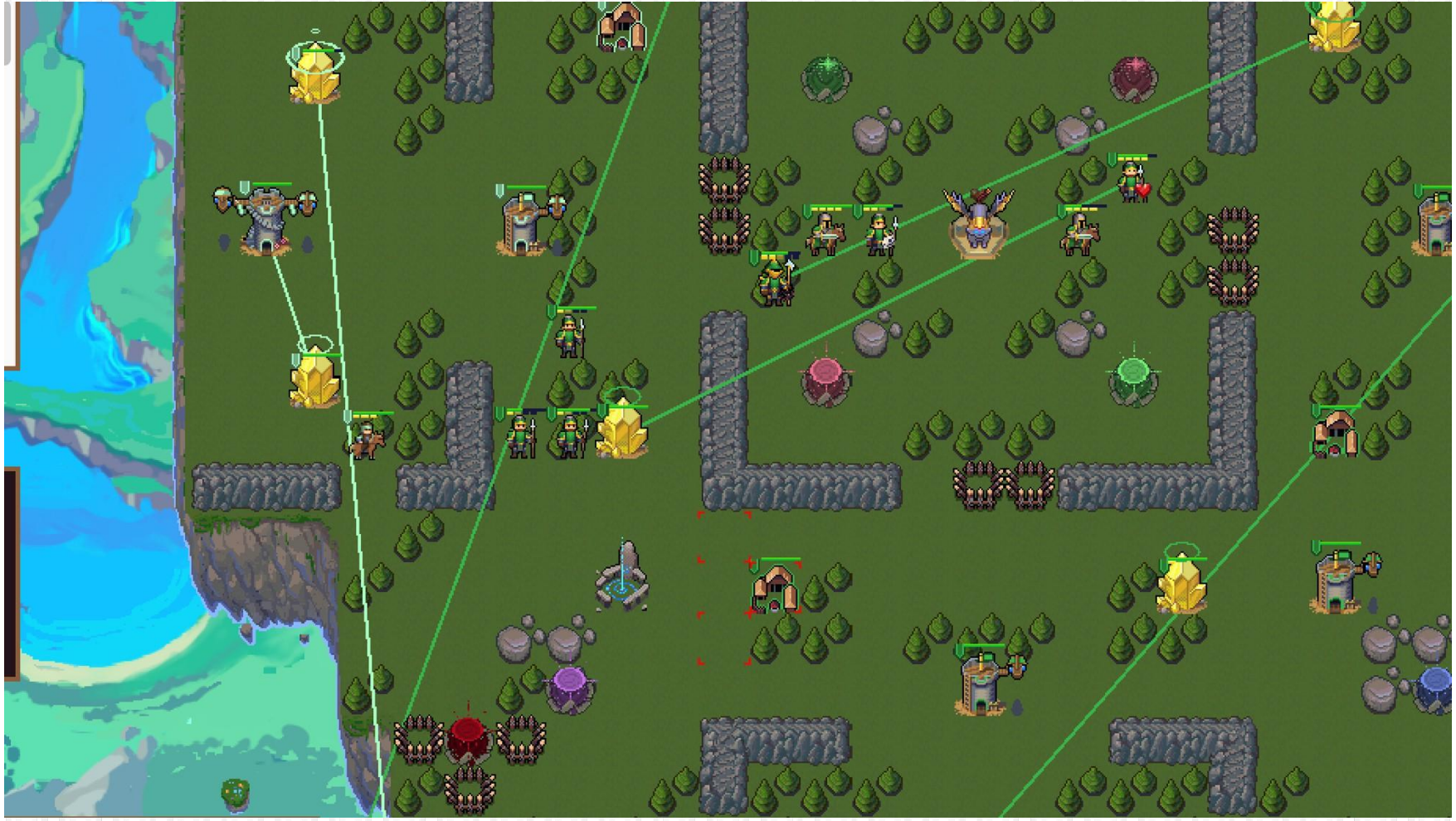


It becomes worse the more entities with shared functionality we add.

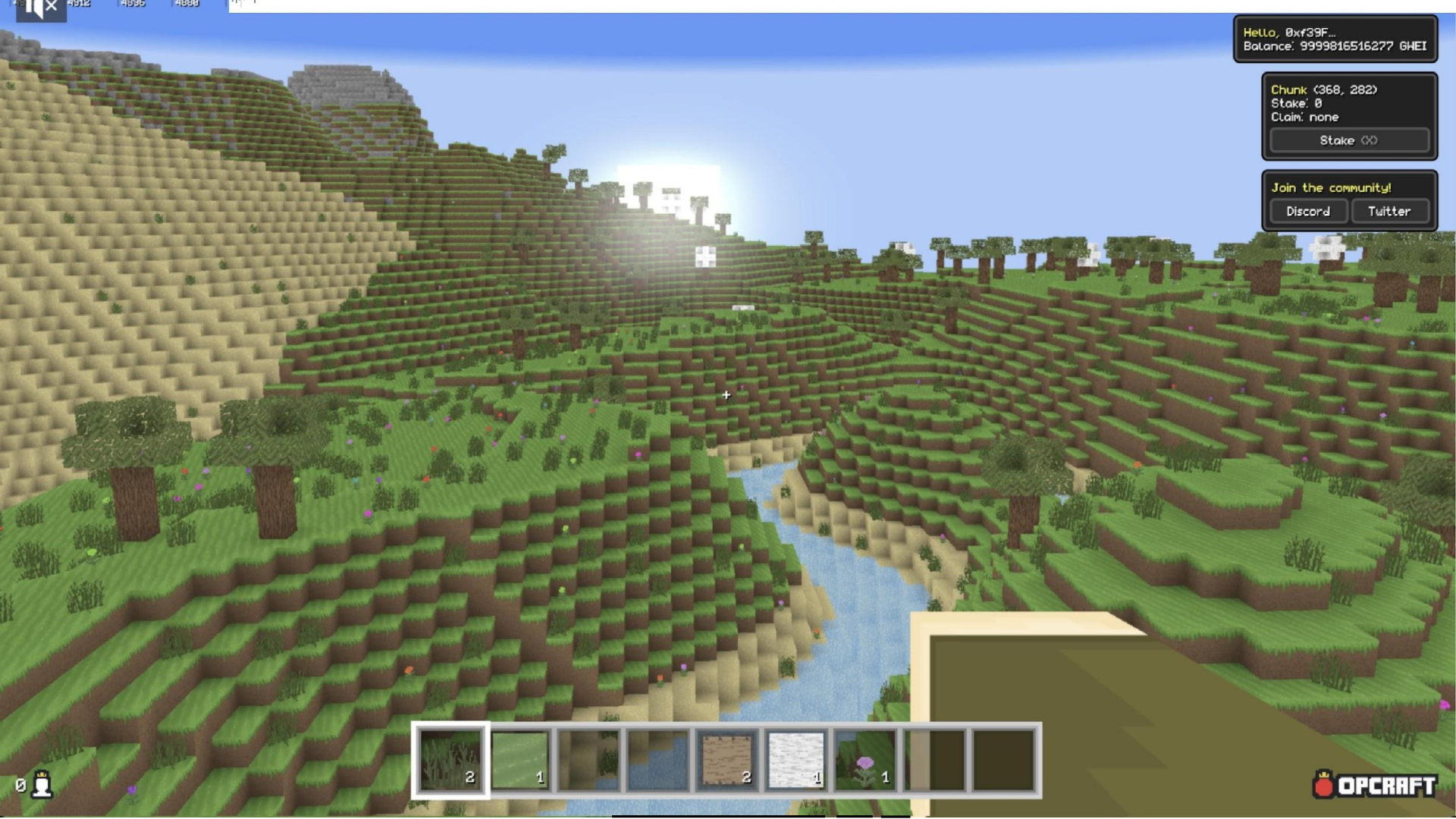

Game.sol
struct Item {
bytes32 item;
uint256 amount;
}
mapping(bytes32 => bytes32 => Item) inventory;
function getItem(bytes32 entity, bytes32 item)
returns (Item);
event InventoryChanged(
bytes32 entity,
Item item
);
function spend(bytes32 entity, Item item) {
emit InventoryChanged(entity, item);
inventory[entity][item.item] = item;
}


MUD
V1


MoveSystem.sol
“Move entity left”
PositionComponent.sol
entity: { x: 13, y: 37 }
PositionComponent.sol
entity: { x: 12, y: 37 }




60
55


Hello, 0xf39F...
Balance: 9999816516277 GWEI
Chunk (368, 282)
Stake: 0
Claim: none
Stake (X)
Join the community!
Discord
Twitter
2
1
2
1
1
0
OPCRAFT

Autonomous People's Republic of OPCraft
@SupremeLeaderOP

The game has now changed. As you may have already seen, the chunks around the spawn have been claimed by me, The Supreme Leader of OPCraft (address 0x3b256f590b9004af28641d74e2298dd63b529458).

9:44 PM · Oct 29, 2022

2 Retweets **7** Quote Tweets **19** Likes

Tweet your reply

Reply

Autonomous People's Republic of OP... @SupremeLeade... · Oct 29
Replying to @SupremeLeaderOP
I have created an OPCraft client plugin which will transform you into a member of our republic. All of your private property will be added to the government treasury, however from that point forward you will have access to the near limitless resources of our treasury.

1 2

Autonomous People's Republic of OP... @SupremeLeade... · Oct 29
Your mining and building on behalf of the government will increase your Comrade Rank.

1 4

Autonomous People's Republic of OP... @SupremeLeade... · Oct 29
More details will be provided in time. Let us break free of our material bonds and create a Utopia in our lifetimes.

4

SupremeLeaderOP 29/10/2022 21:36
@here Greetings comrades,

The game has now changed. As you may have already seen, the chunks around the spawn have been claimed by me, The Supreme Leader of OPCraft (address 0x3b256f590b9004af28641d74e2298dd63b529458). I hereby declare this territory free from the perversion of the capitalist pigs.

Fear not, I am a generous God. You may continue to build on your previously claimed chunks with one concession: you must join me in creating a People's Utopia in OPCraft.

I have created an OPCraft client plugin which will transform you into a member of our republic. All of your private property will be added to the government treasury, however from that point forward you will have access to the near limitless resources of our treasury. Your mining and building on behalf of the government will increase your Comrade Rank.

More details will be provided in time. Let us break free of our material bonds and create a Utopia in our lifetimes.

Supreme Leader OP

hi.wav
589.25 KB
0:00 / 0:09


Welcome, comrade.
You are a rank 4 Comrade.
You have 20 Comrade Karma.
You have contributed 9 blocks built and 2015 blocks mined. You must mine more than you build!
All Comrades
: Rank 0
: Rank 0
: Rank 12
SupremeLeaderOP: Rank 4
InferiorOP: Rank 21


13175
197
33
334
71
30
7
30
12
25
105
109
38
47
207
34
18
5
12
32
1
1
2
1
4
You control this chunk!
161201
554
10858
41862
28
2100
2315
3464
442

Loading state...

0%

CHAPTER 2: RECENT PAST / PRESENT

MAKE IT RIGHT

Position Component		
bytes32 Entity	uint256 x	uint256 y
0x00001	1	1
0x00002	0	3
0x00003	2	4

OwnedBy Component	
bytes32 Entity	owner x
0x00001	1
0x00002	0
0x00003	2

Inventory Component

address Player + uint8 Item	uint256 amount
keccak256(0x00001, 0)	1
keccak256(0x00001, 1)	0
keccak256(0x00002, 0)	2

Inventory Table

address Player	uint8 Item	uint256 amount
0x00001	1	1
0x00002	0	3
0x00003	2	4

Position Table		
address Entity	uint256 x	uint256 y
0x00001	1	1
0x00002	0	3
0x00003	2	4

Proposal: Data Modelling v2 #347

Closed **alvrs** opened this issue on Jan 17, 2023 · 40 comments

alvrs commented on Jan 17, 2023 • edited Member

Note: this proposal contains a lot of pseudo code and some of the core aspects of the proposal are contained in the code comments - don't skip over it

Table of contents

Abstract

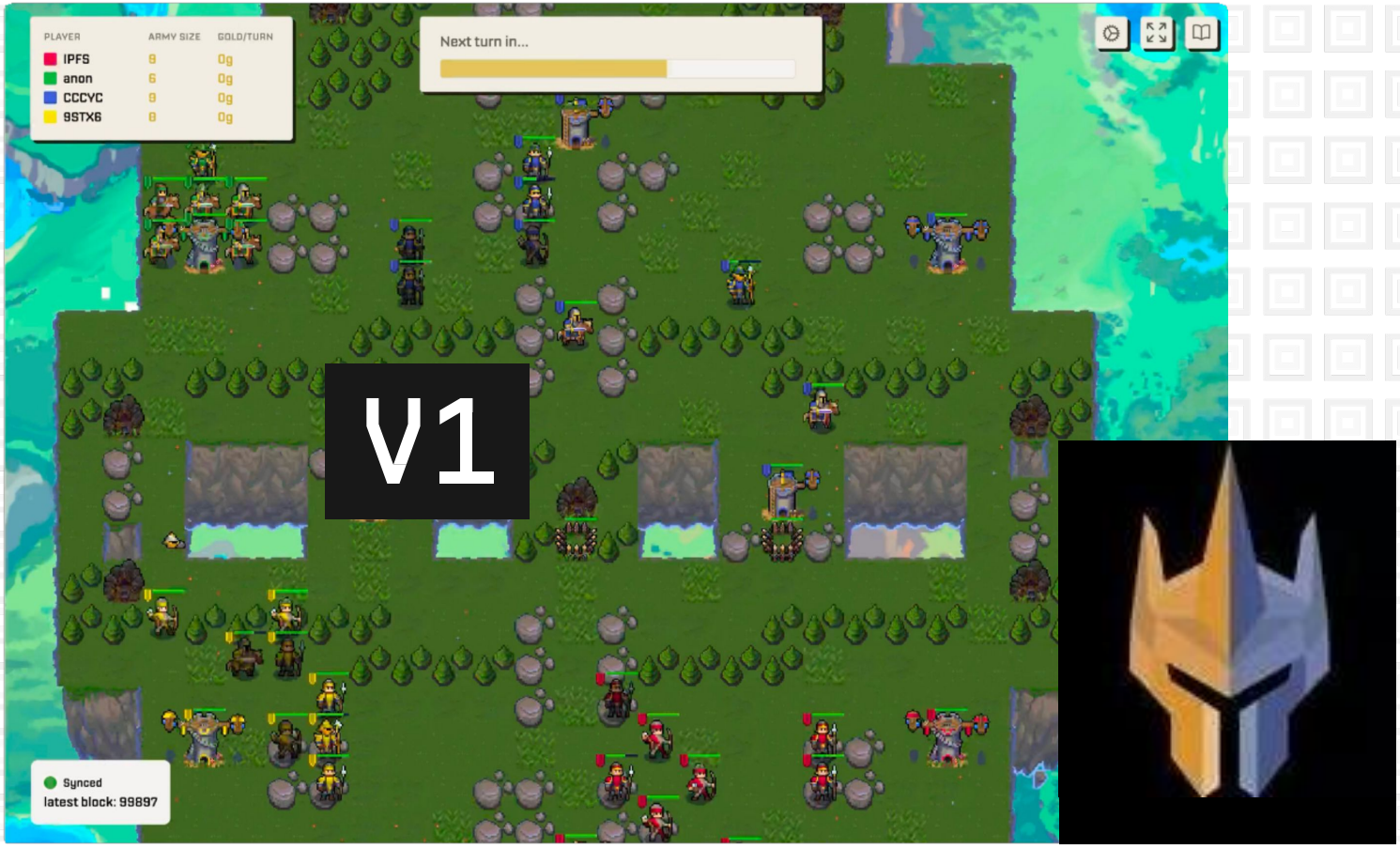
Proposal: World framework v2 #393

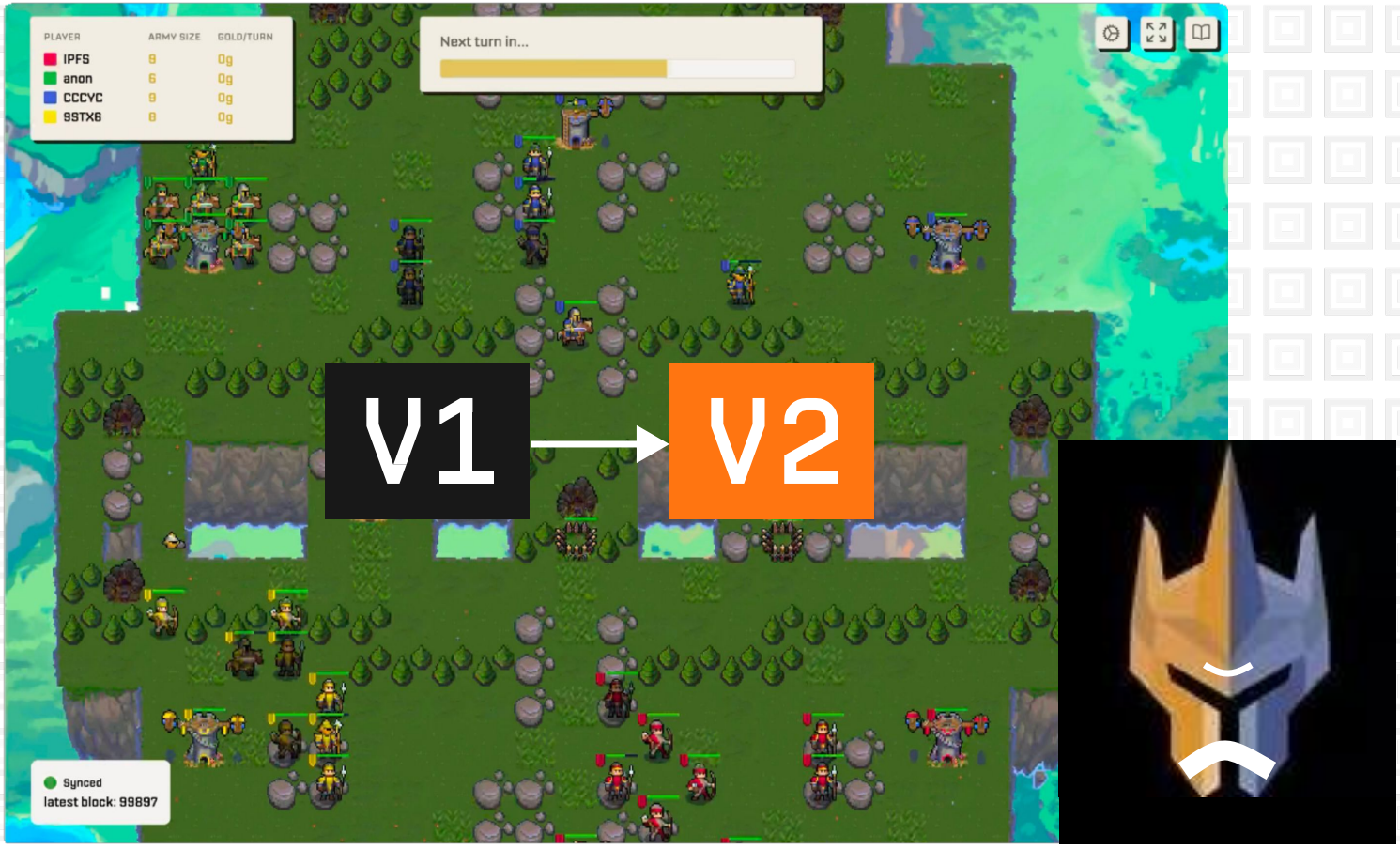
Closed **alvrs** opened this issue on Feb 11, 2023 · 8 comments

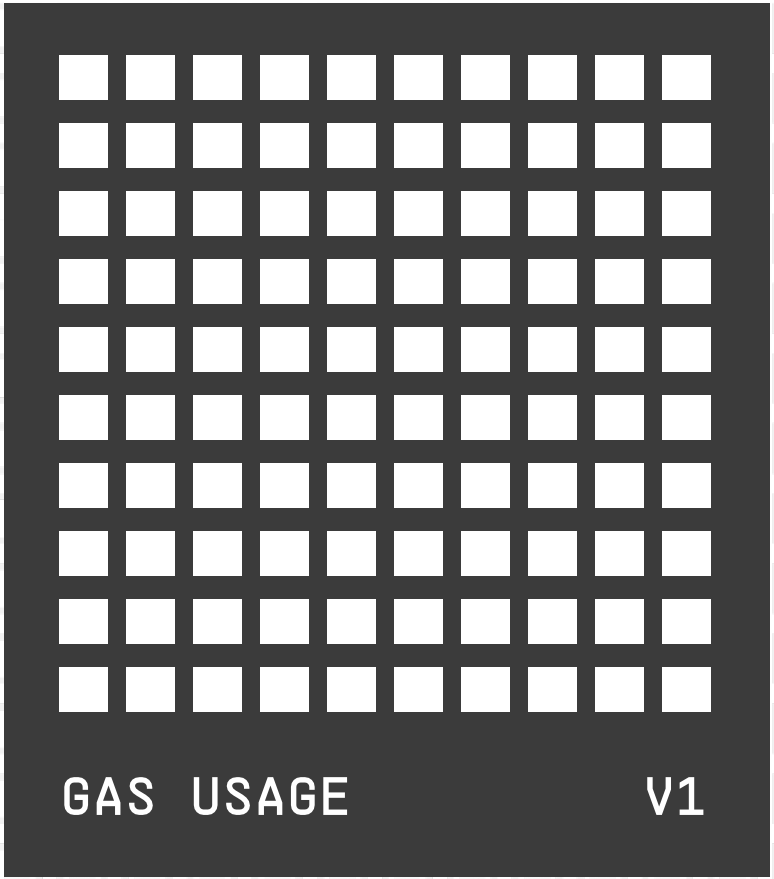
alvrs commented on Feb 11, 2023 • edited Member

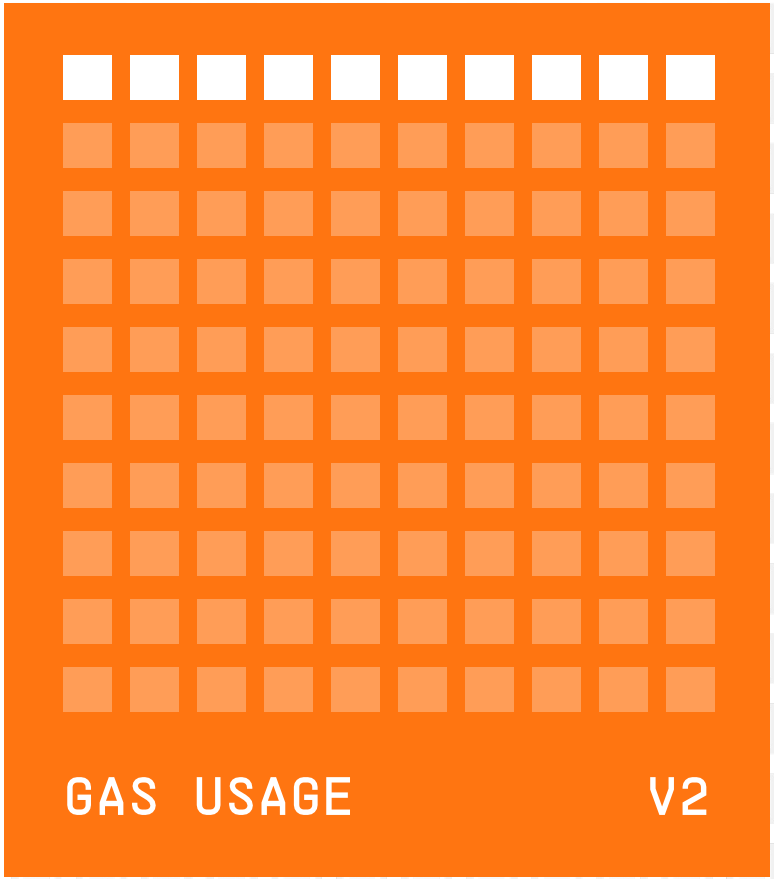
Table of contents

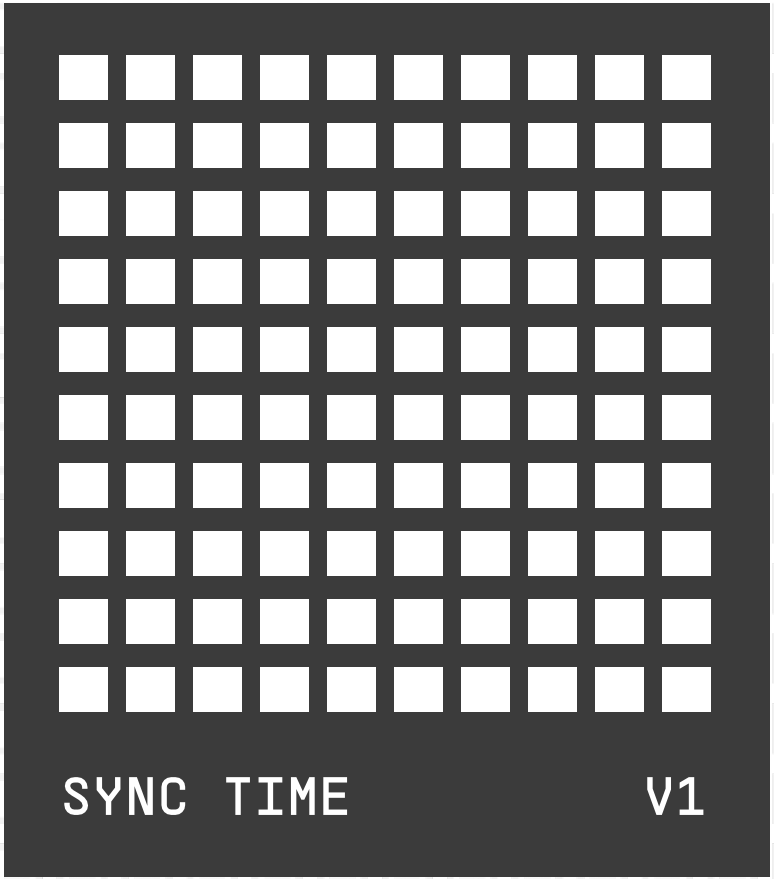

ONE YEAR
LATER...

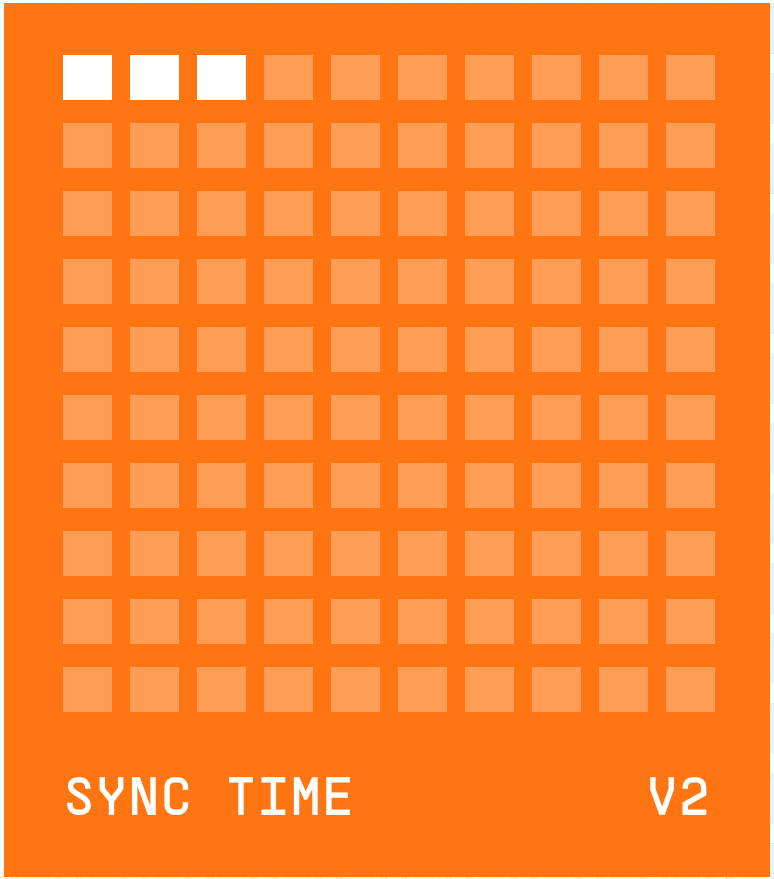

PLAYER
ARMY SIZE
GOLD/TURN
IPFS
anon
CCCYC
9STX6
Next turn in...
V1
Synced
latest block: 99897

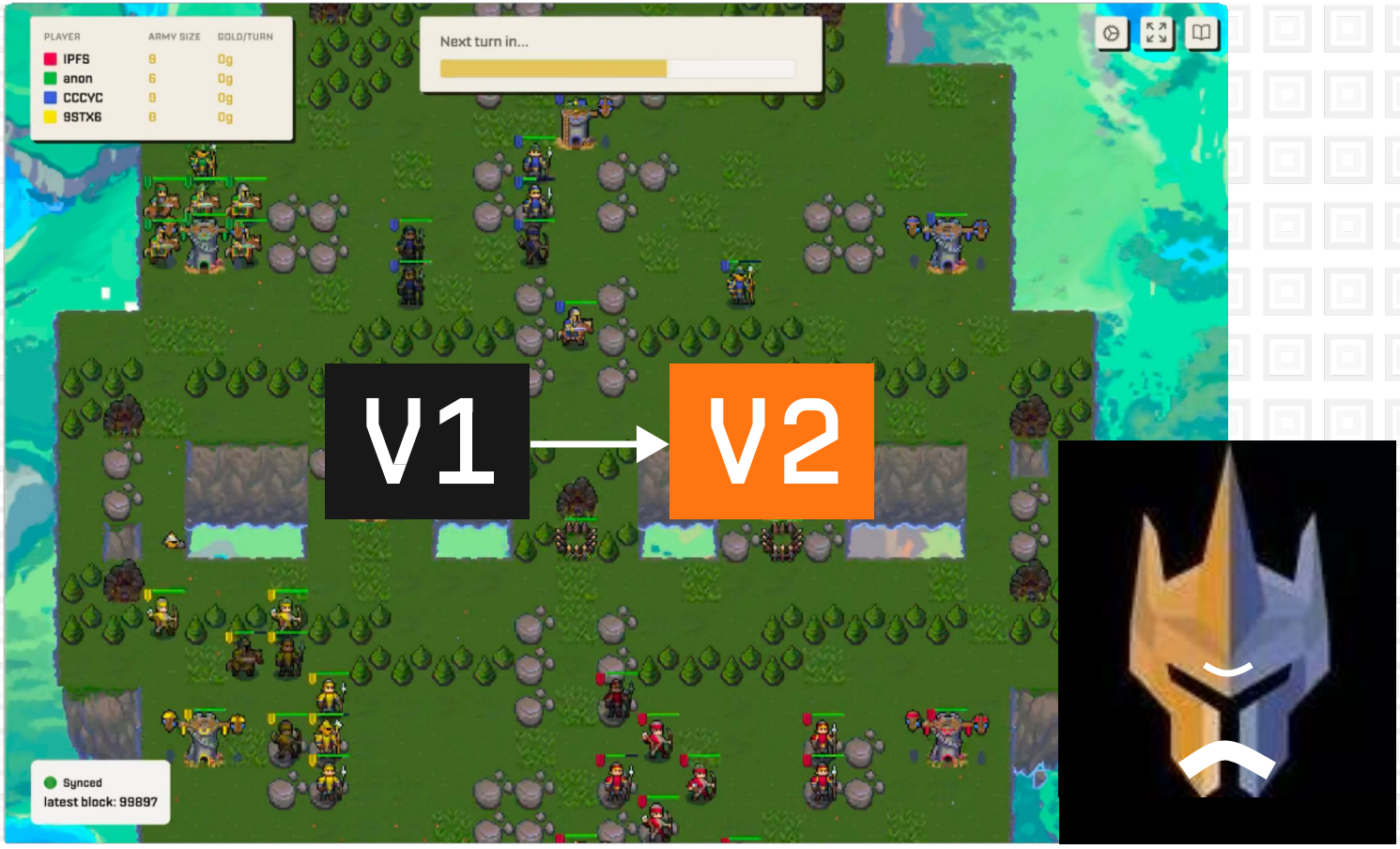

PLAYER
ARMY SIZE
GOLD/TURN
IPFS
anon
CCCYC
9STX6
Next turn in...
V1
V2
Synced
latest block: 99897


GAS USAGE
V1

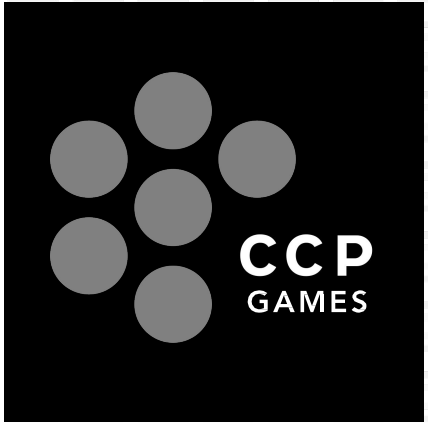

GAS USAGE
V2


SYNC TIME
V1

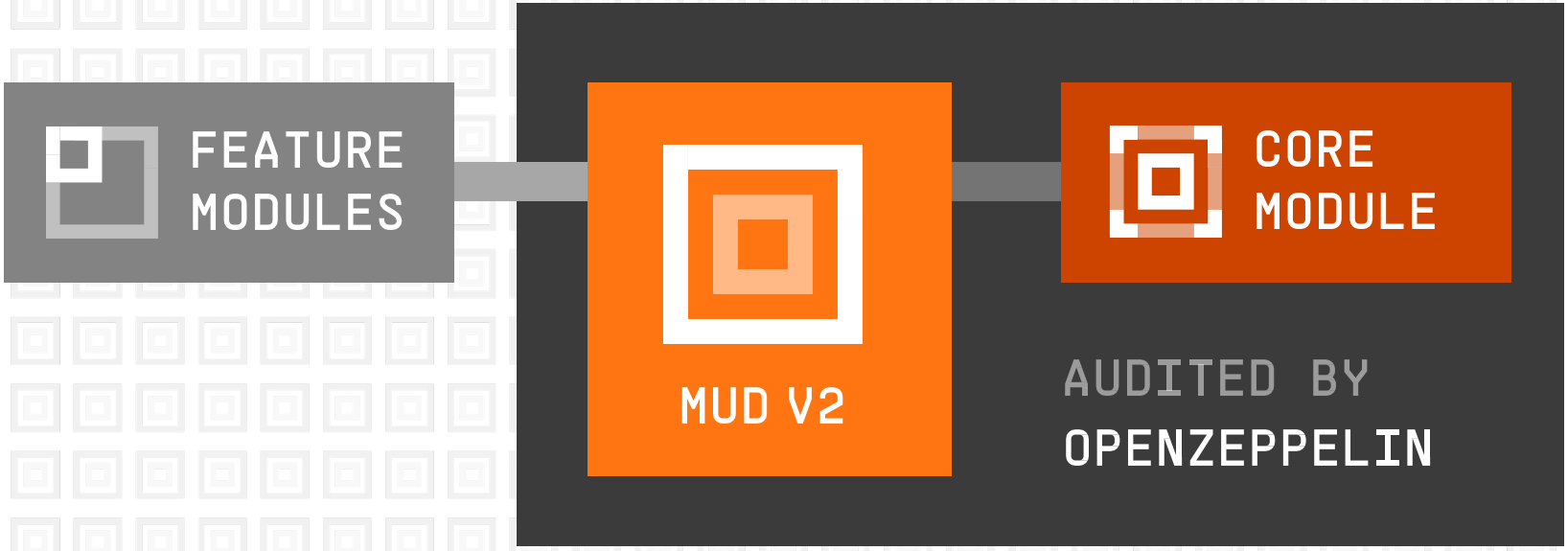

SYNC TIME
V2

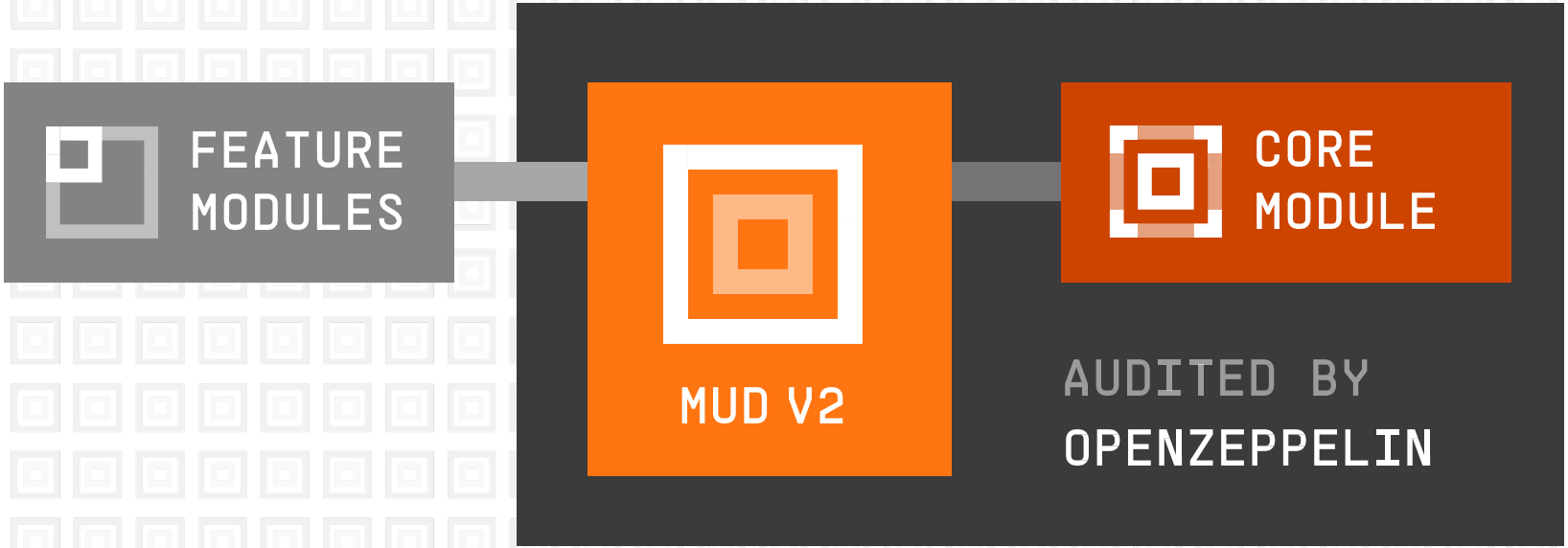

PLAYER
ARMY SIZE
GOLD/TURN
IPFS
anon
CCCYC
9STX6
Next turn in...
V1
V2
Synced
latest block: 99897


PLAYER
ARMY SIZE
GOLD/TURN
IPFS
anon
CCCYC
9STX6
Next turn in...
V2
Synced
latest block: 99897

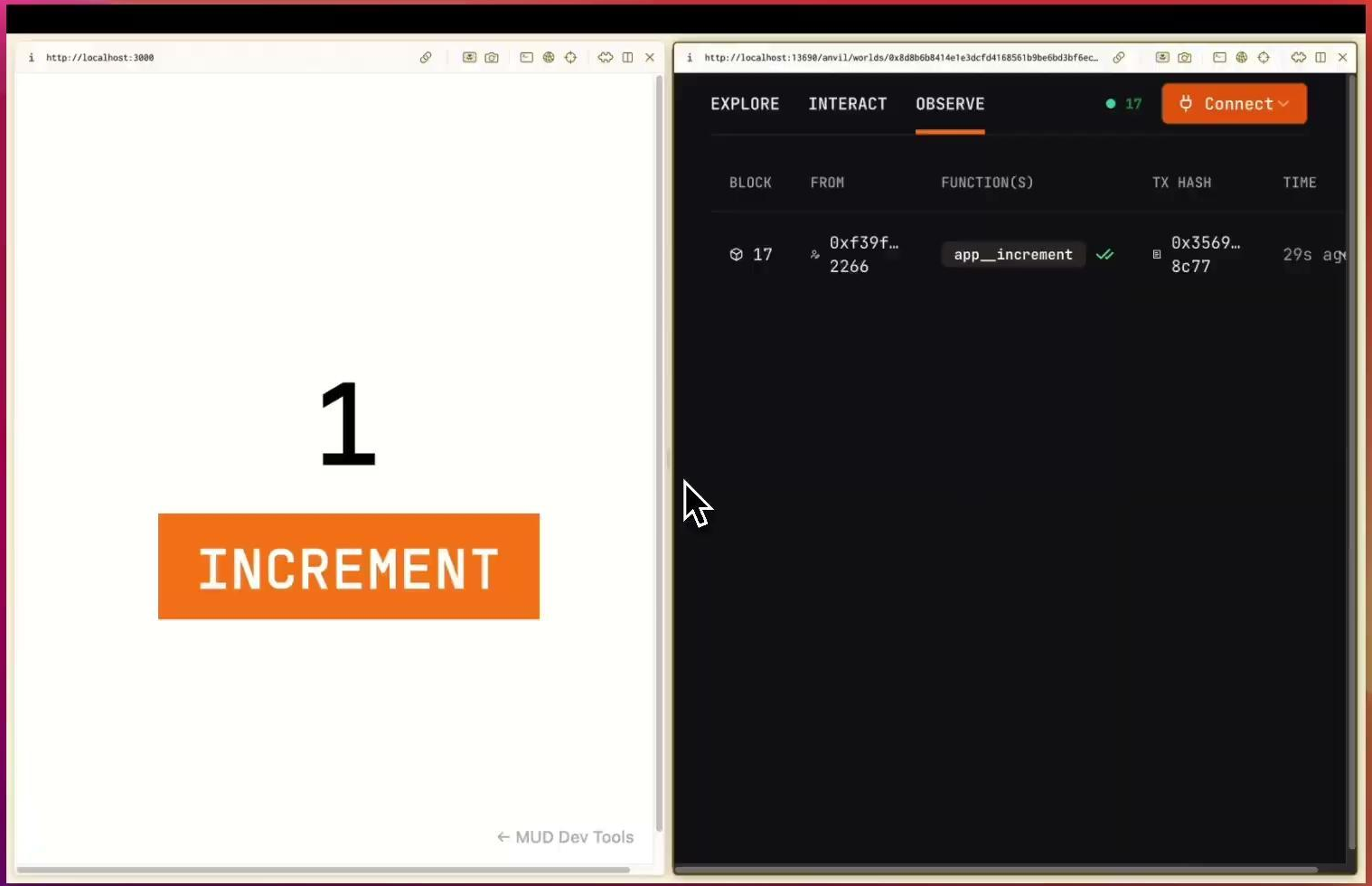

CCP
GAMES

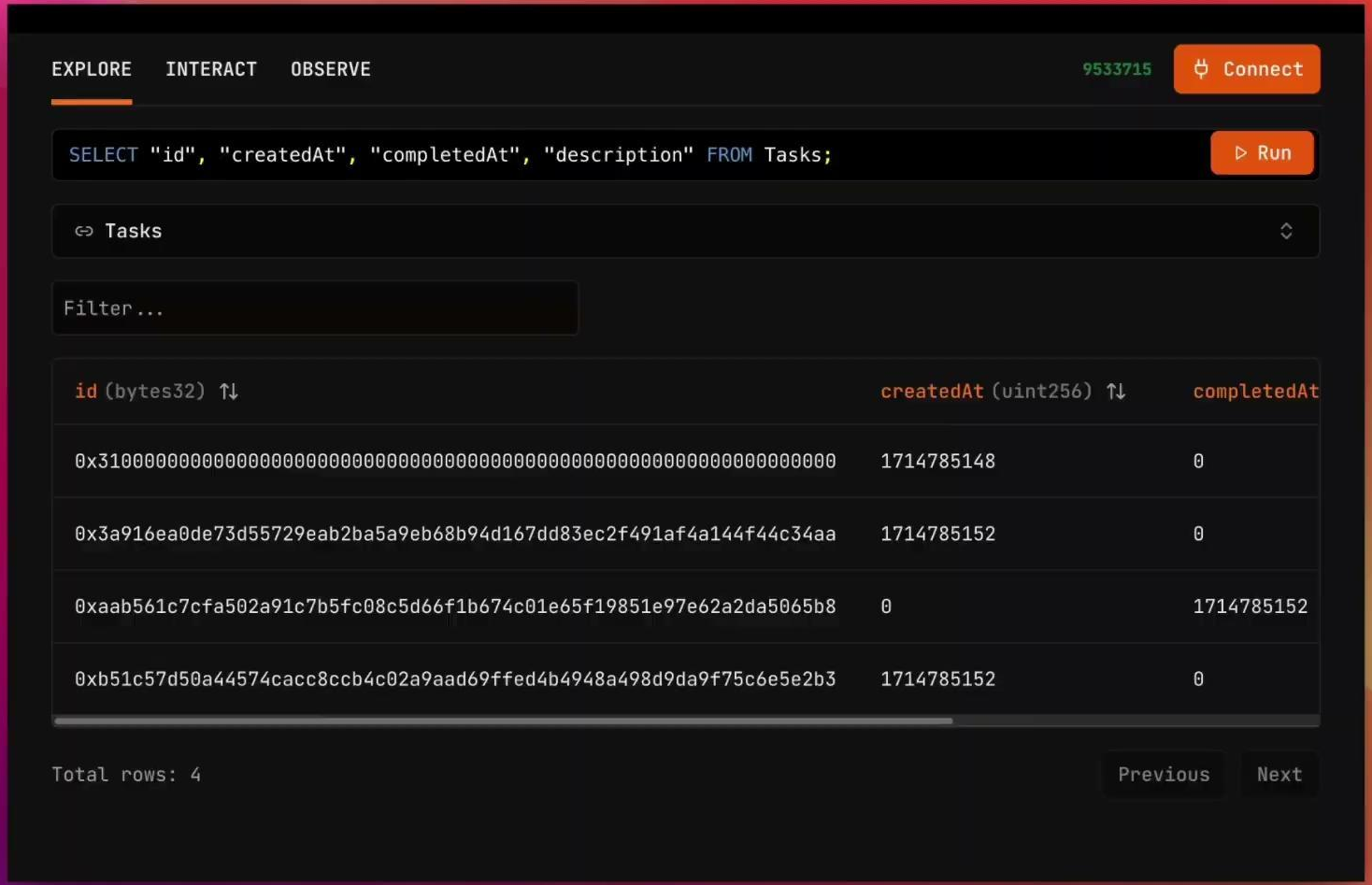

×178 TILES EARNING REWARDS
$56.24111 EARNED
×1 $0.01133
DRAW!
TILE
Prices
Units USD Sort Price
MacBook


FEATURE
MODULES
MUD V2
CORE
MODULE
AUDITED BY
OPENZEPPELIN

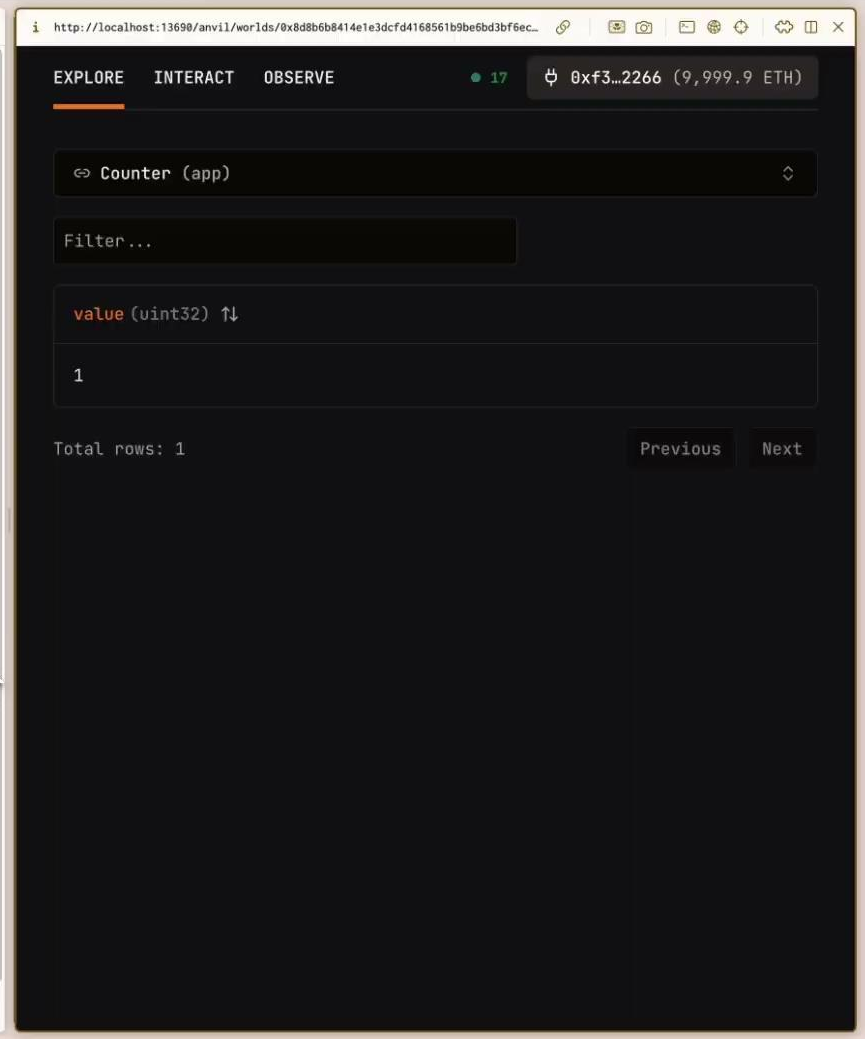


NO MORE BREAKING CHANGES


http://localhost:3000
1
INCREMENT
← MUD Dev Tools
http://localhost:13690/anvil/worlds/0x8d8b6b8414e1e3dcfd4168561b9be6bd3bf6ec...
EXPLORE
INTERACT
OBSERVE
17
Connect
BLOCK
FROM
FUNCTION(S)
TX HASH
TIME
17
0xf39f...
2266
app__increment
0x3569...
8c77
29s ag


EXPLORE
INTERACT
OBSERVE
9533715
Connect
SELECT "id", "createdAt", "completedAt", "description" FROM Tasks;
Run
Tasks
Filter...
id (bytes32)
createdAt (uint256)
completedAt
0x3100000000000000000000000000000000000000000000000000000000000000
1714785148
0
0x3a916ea0de73d55729eab2ba5a9eb68b94d167dd83ec2f491af4a144f44c34aa
1714785152
0
0xaab561c7cfa502a91c7b5fc08c5d66f1b674c01e65f19851e97e62a2da5065b8
0
1714785152
0xb51c57d50a44574cacc8ccb4c02a9aad69ffed4b4948a498d9da9f75c6e5e2b3
1714785152
0
Total rows: 4
Previous
Next


http://localhost:3000
1
INCREMENT
← MUD Dev Tools


http://localhost:13690/anvil/worlds/0x8d8b6b8414e1e3dcfd4168561b9be6bd3bf6ec...
EXPLORE
INTERACT
OBSERVE
17
0xf3…2266 (9,999.9 ETH)
Counter (app)
Filter...
value (uint32)
1
Total rows: 1
Previous
Next

eip	title	description	authors	discussions-to	status	type	category
<to be assigned>	Store, Table-Based Introspectable Storage	On-chain tables for automatic indexing and introspectable state	alvarius <alvarius@latticex.xyz>, dk1a <dk1a@protonmail.com>, frolic <frolic@lattice.xyz>, ludens <ludens@lattice.xyz>, vdrg <vdrg@lattice.xyz>, yonada	https://ethereum-magicians.org/t/erc-xxxx-store-table-based-introspectable-storage/21628	Draft	Standards Track	ERC

Abstract

This standard introduces a flexible on-chain storage pattern that organizes data into structured tables with schemas, similar to a traditional database. This approach allows new tables to be added at runtime without impacting existing contracts, thereby simplifying upgrades and extensions. By providing a unified interface for data access, the standard enables any contract or off-chain service to read stored data without the need for custom getter functions. Additionally, by standardizing event emissions for state changes it enables automatic, schema-aware indexing.

Motivation

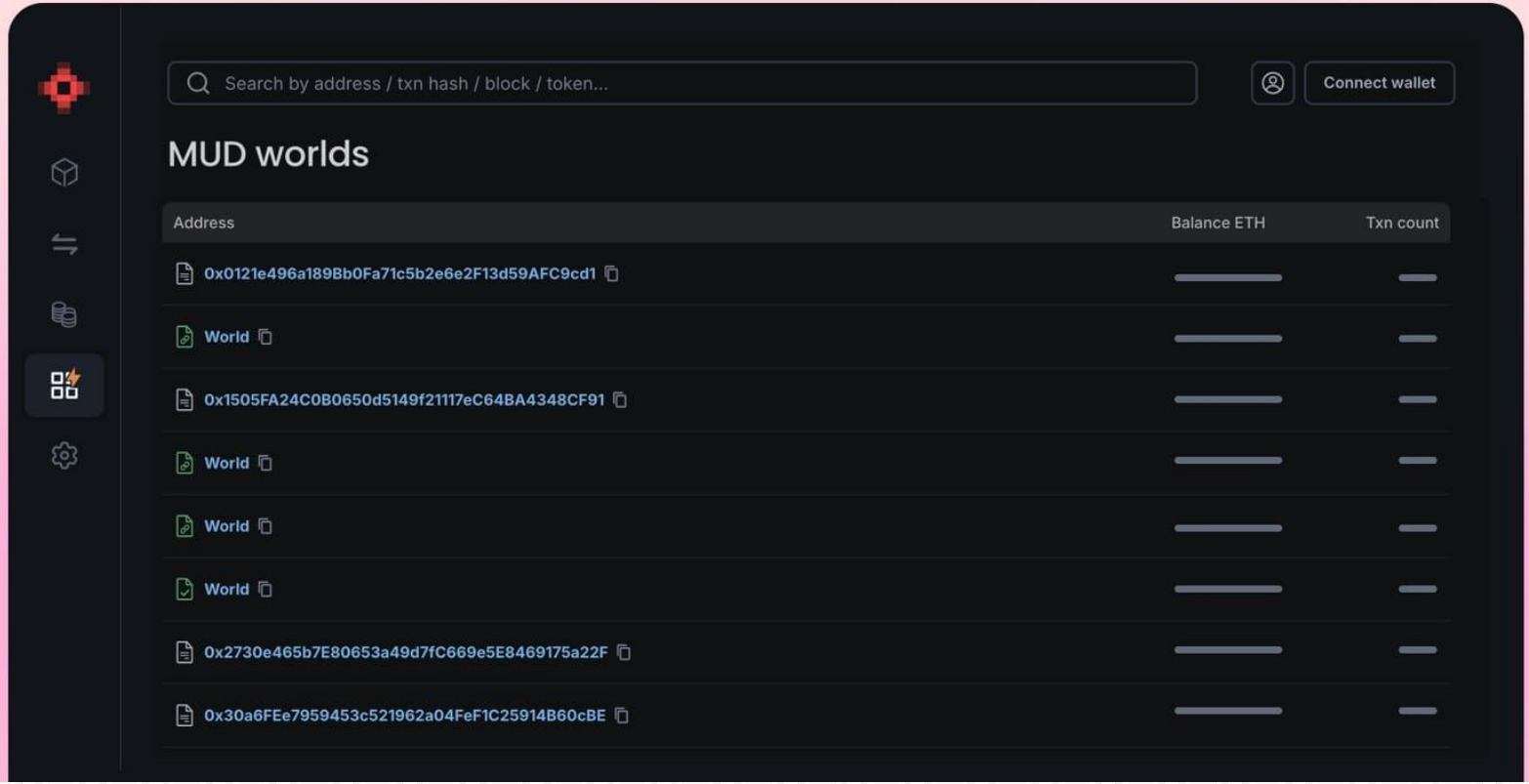
The absence of consistent standards for on-chain data management in smart contracts can lead to rigid implementations, tightly coupled contract logic with off-chain services, and challenges in updating or extending a contract's data layout without breaking existing integrations.

Using the storage mechanism defined in this ERC provides the following benefits:

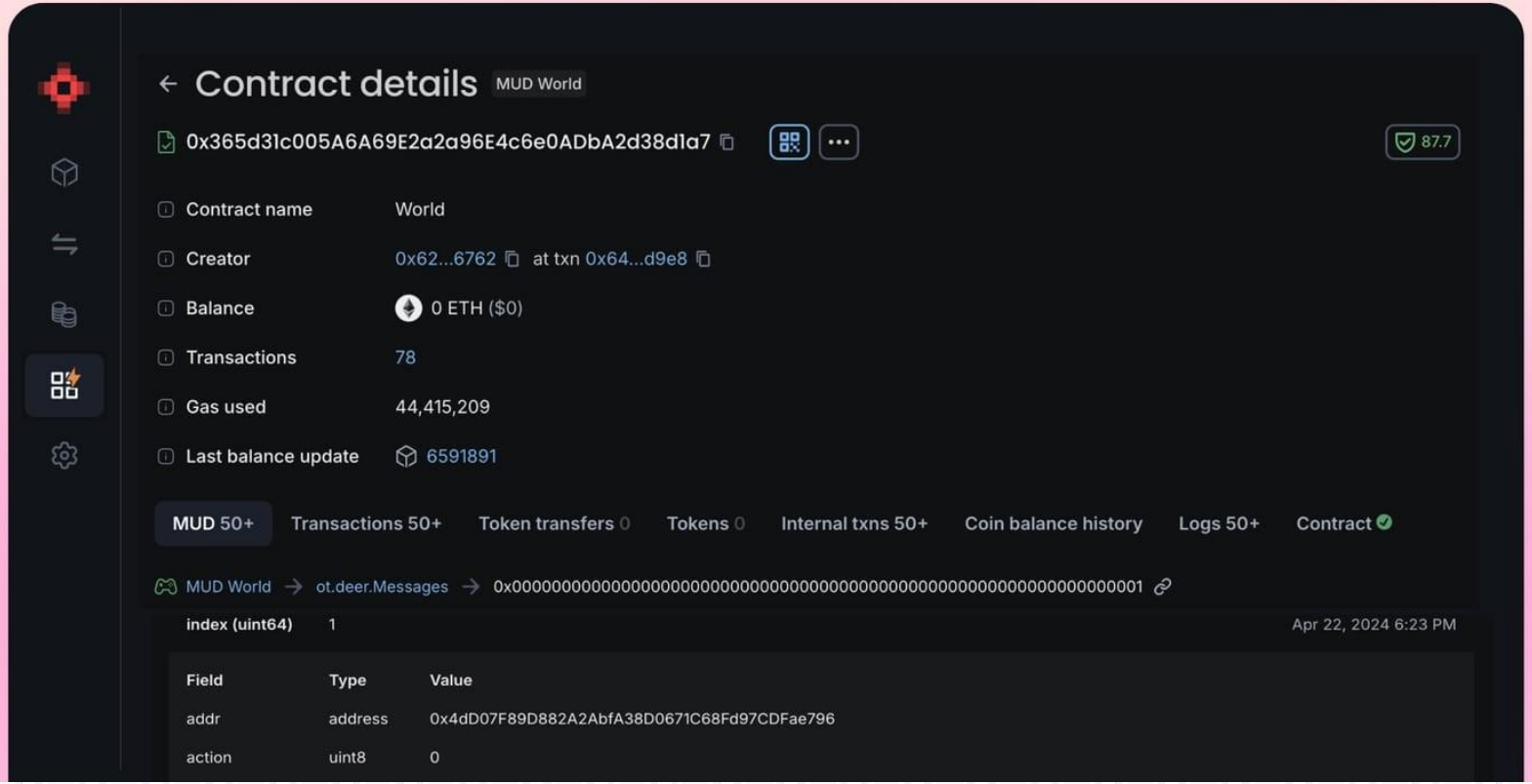
1. **Automatic Indexing**: By emitting consistent, standardized events during state changes, off-chain services can automatically track on-chain state and provide schema-aware indexer APIs.
2. **Elimination of Custom Getter Functions**: Any contract or off-chain service can read stored data through a consistent interface, decoupling smart contract implementation from specific data access patterns and reducing development overhead.
3. **Simpler Upgradability**: This pattern leverages unstructured storage, making it easier to upgrade contract logic without the risks

ERC-7813

BLOCKSCOUT

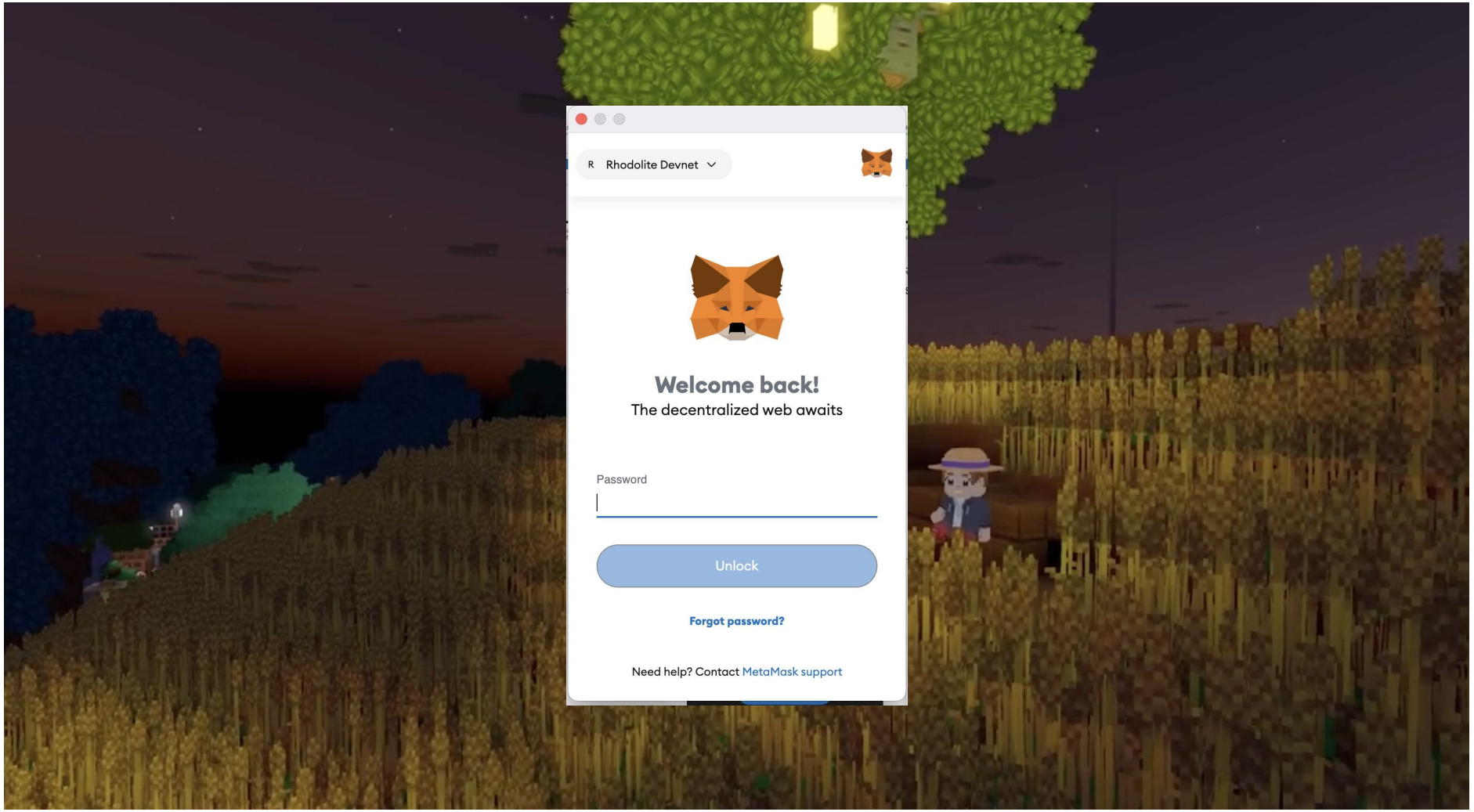

Search by address / txn hash / block / token...
Connect wallet
MUD worlds
Address
Balance ETH
Txn count
0x0121e496a189Bb0Fa71c5b2e6e2F13d59AFC9cd1
World
0x1505FA24C0B0650d5149f21117eC64BA4348CF91
World
World
World
0x2730e465b7E80653a49d7fC669e5E8469175a22F
0x30a6FEe7959453c521962a04FeF1C25914B60cBE

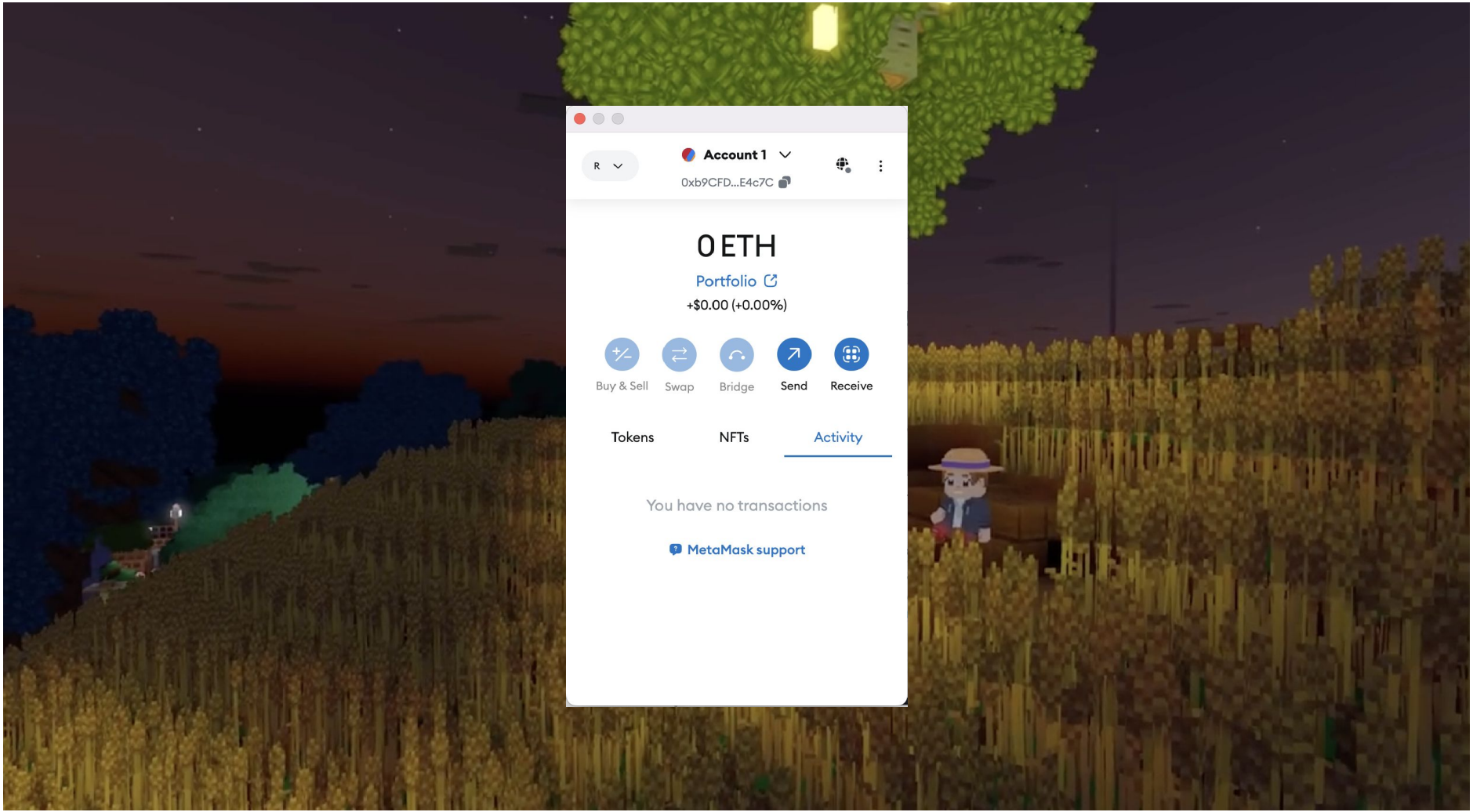
BLOCKSCOUT

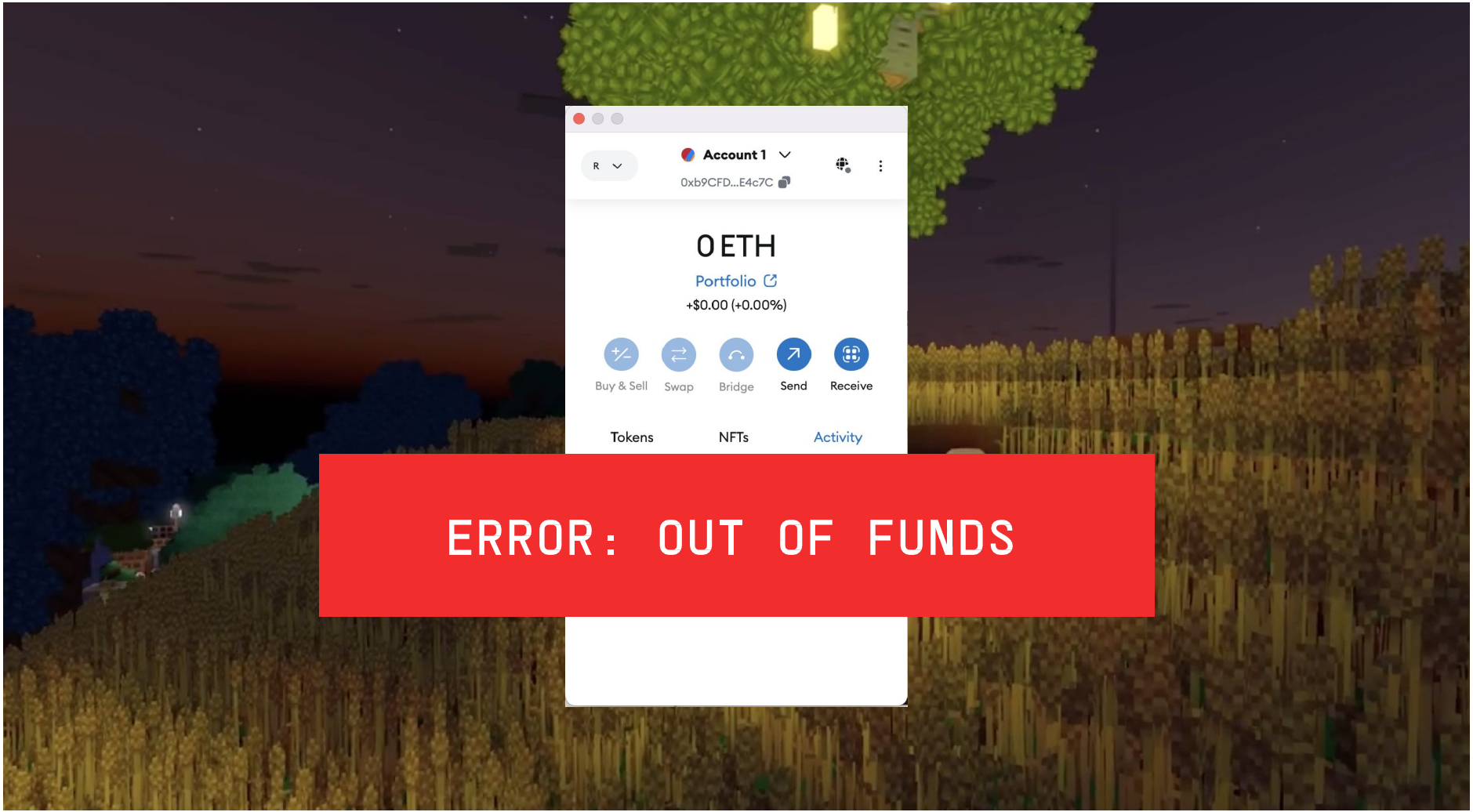

Contract details
MUD World
0x365d31c005A6A69E2a2a96E4c6e0ADbA2d38d1a7
87.7
Contract name
World
Creator
0x62...6762
at txn 0x64...d9e8
Balance
0 ETH ($0)
Transactions
78
Gas used
44,415,209
Last balance update
6591891
MUD 50+
Transactions 50+
Token transfers 0
Tokens 0
Internal txns 50+
Coin balance history
Logs 50+
Contract
MUD World
ot.deer.Messages
0x0000000000000000000000000000000000000000000000000000000000000001
index (uint64)
1
Apr 22, 2024 6:23 PM
Field
Type
Value
addr
address
0x4dD07F89D882A2AbfA38D0671C68Fd97CDFae796
action
uint8
0

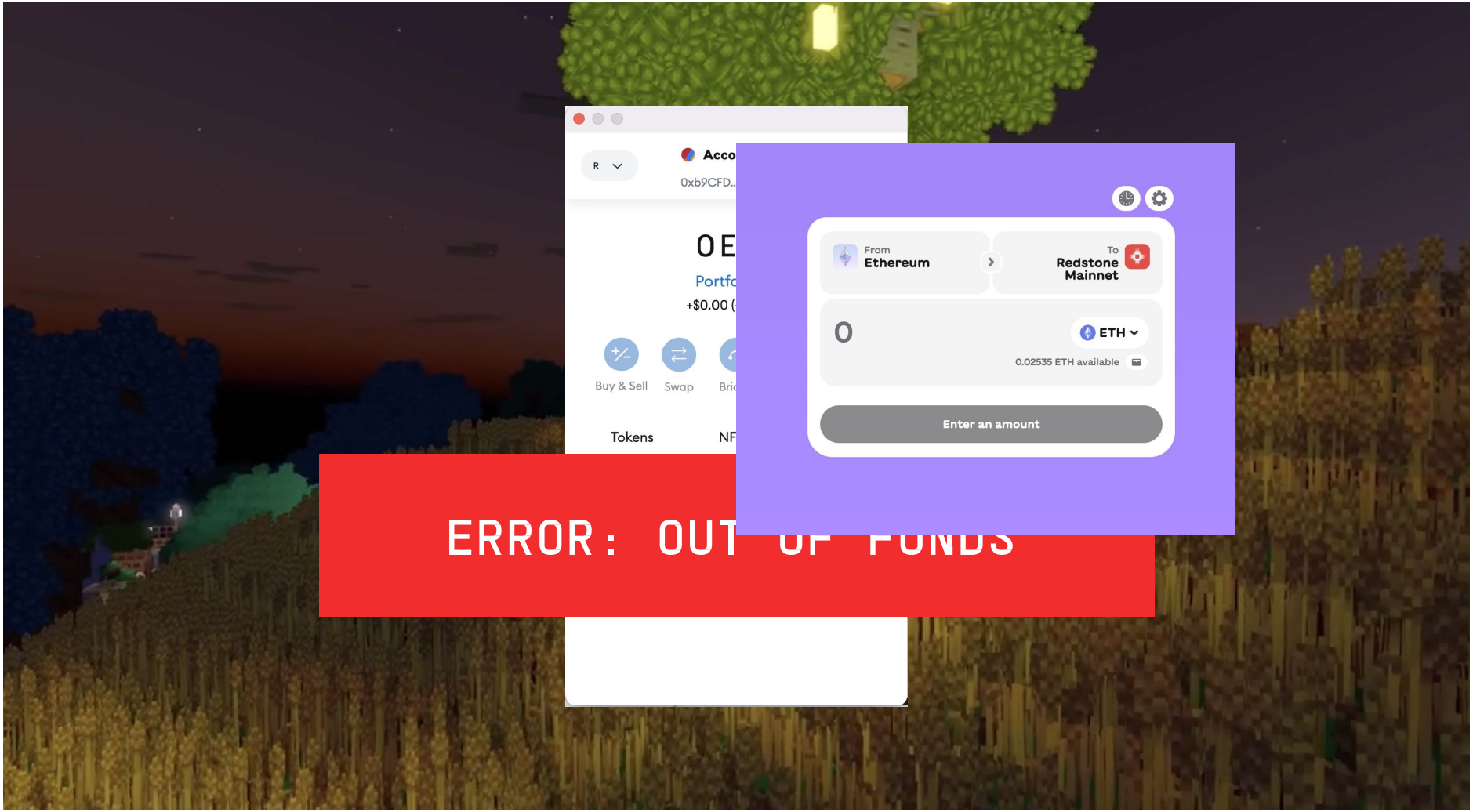
CHAPTER 3: PRESENT / NEAR FUTURE

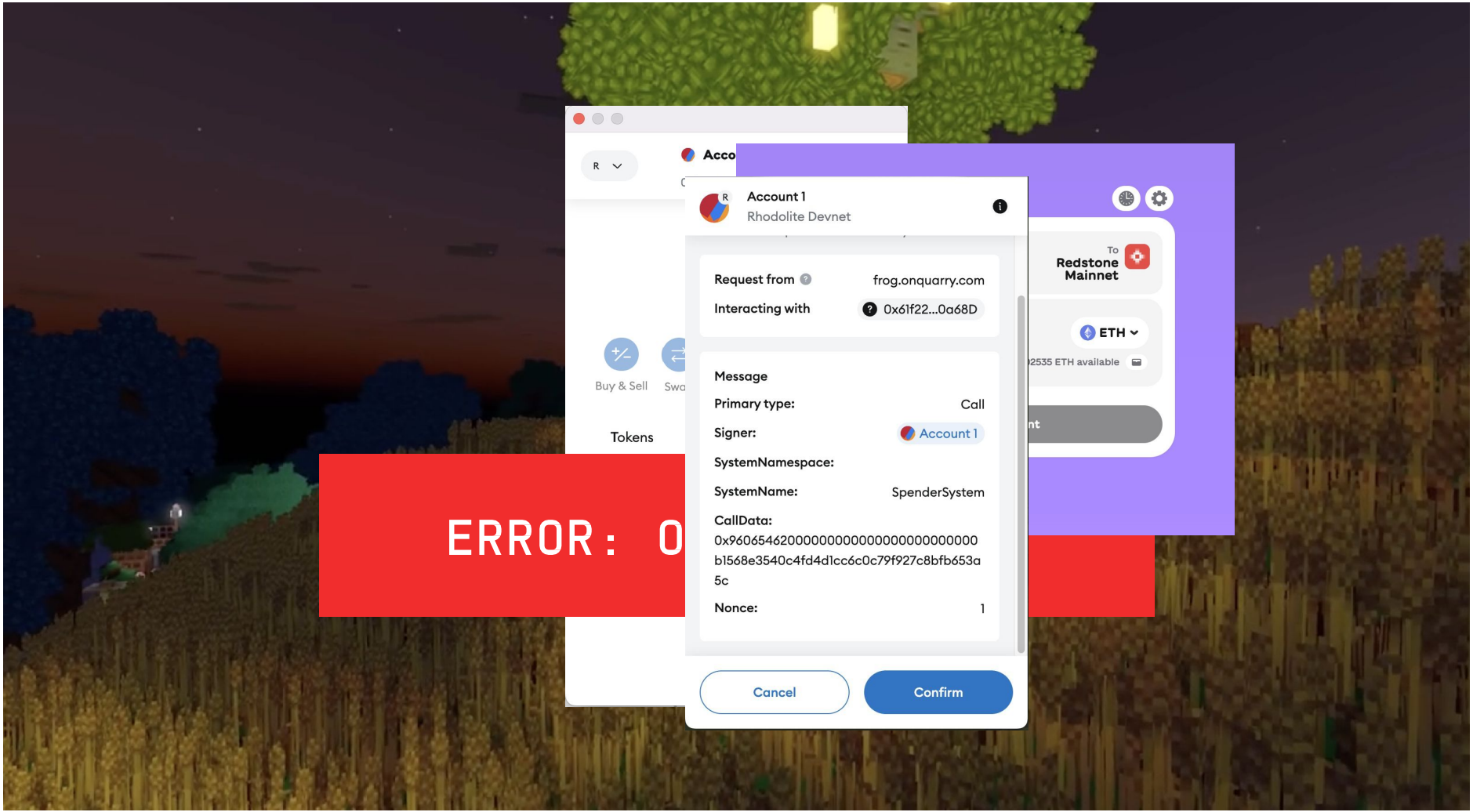
MAKE IT FAST

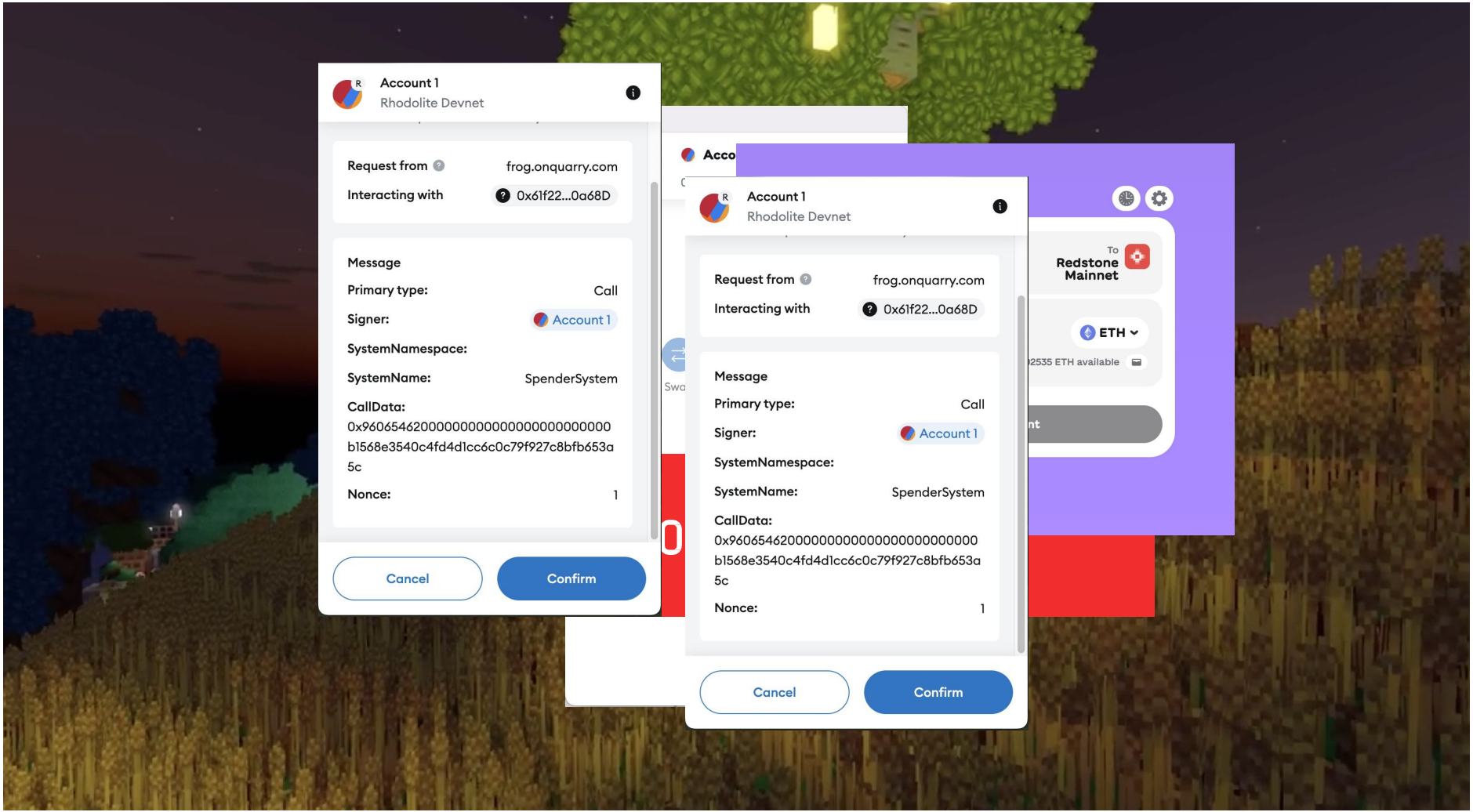

R Rhodolite Devnet
Welcome back!
The decentralized web awaits
Password
Unlock
Forgot password?
Need help? Contact MetaMask support

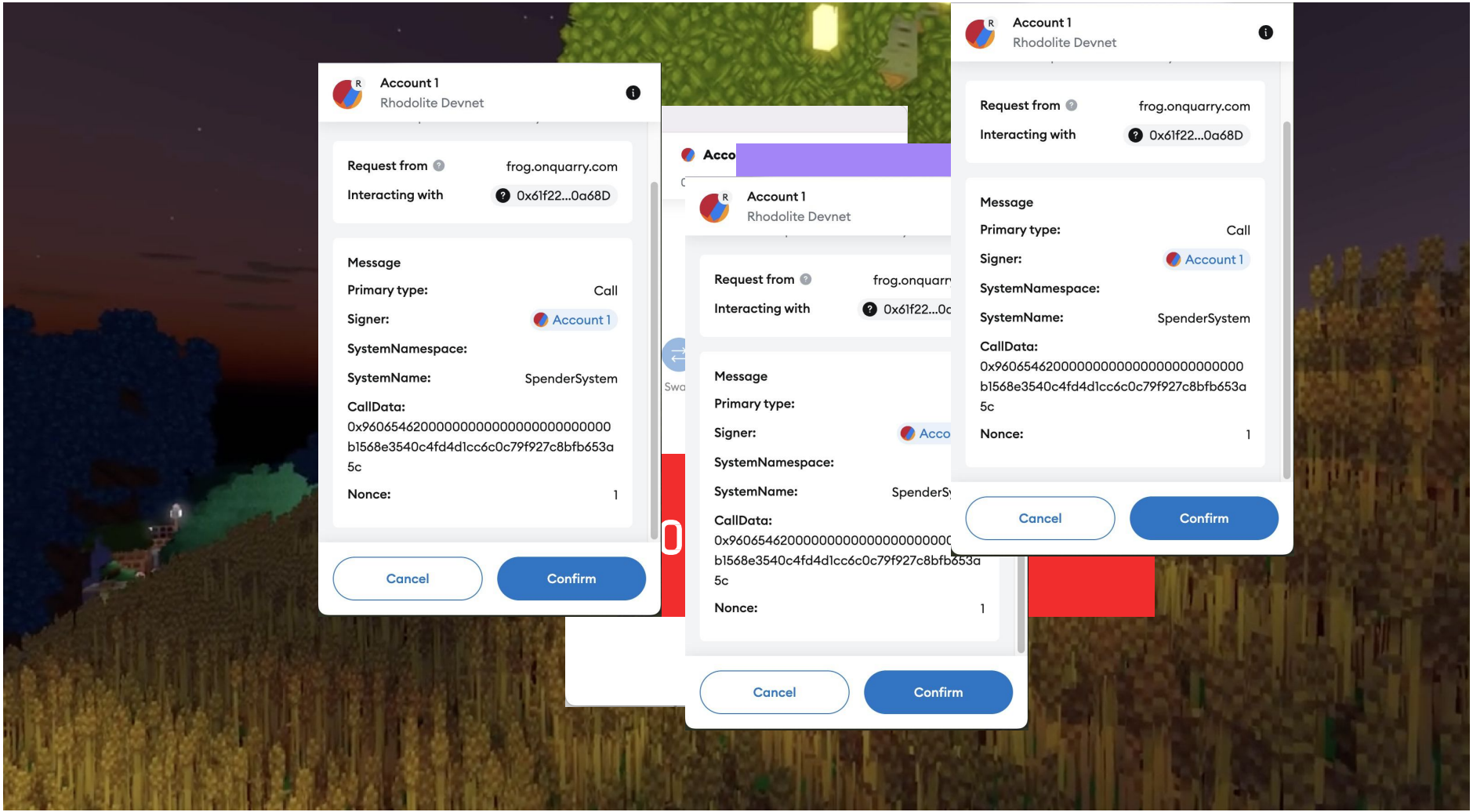

R
Account 1
0xb9CFD...E4c7C
0 ETH
Portfolio
+$0.00 (+0.00%)
Buy & Sell
Swap
Bridge
Send
Receive
Tokens
NFTs
Activity
You have no transactions
MetaMask support

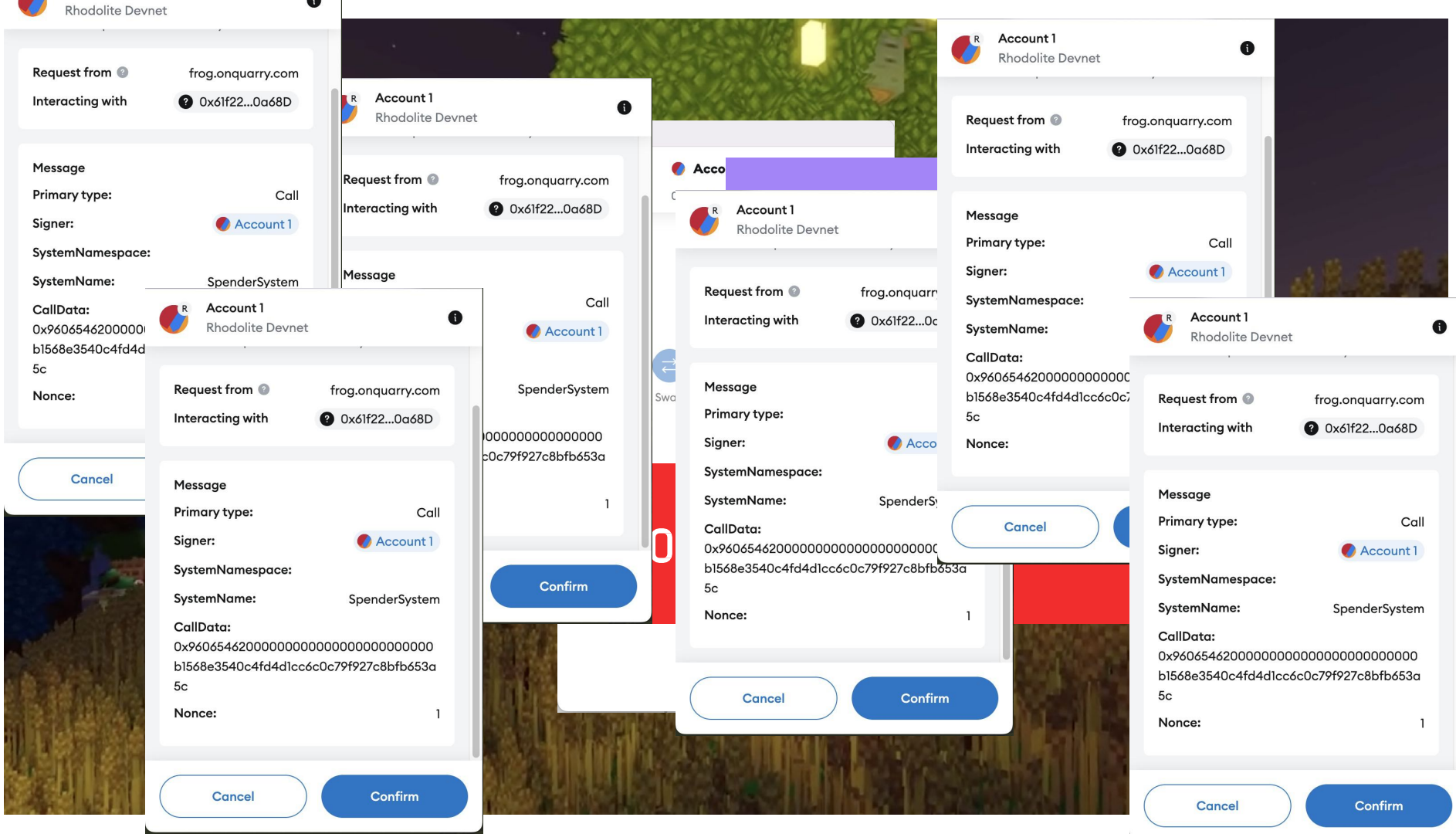

Account 1
0xb9CFD...E4c7C
0 ETH
Portfolio
+$0.00 (+0.00%)
Buy & Sell
Swap
Bridge
Send
Receive
Tokens
NFTs
Activity
ERROR: OUT OF FUNDS

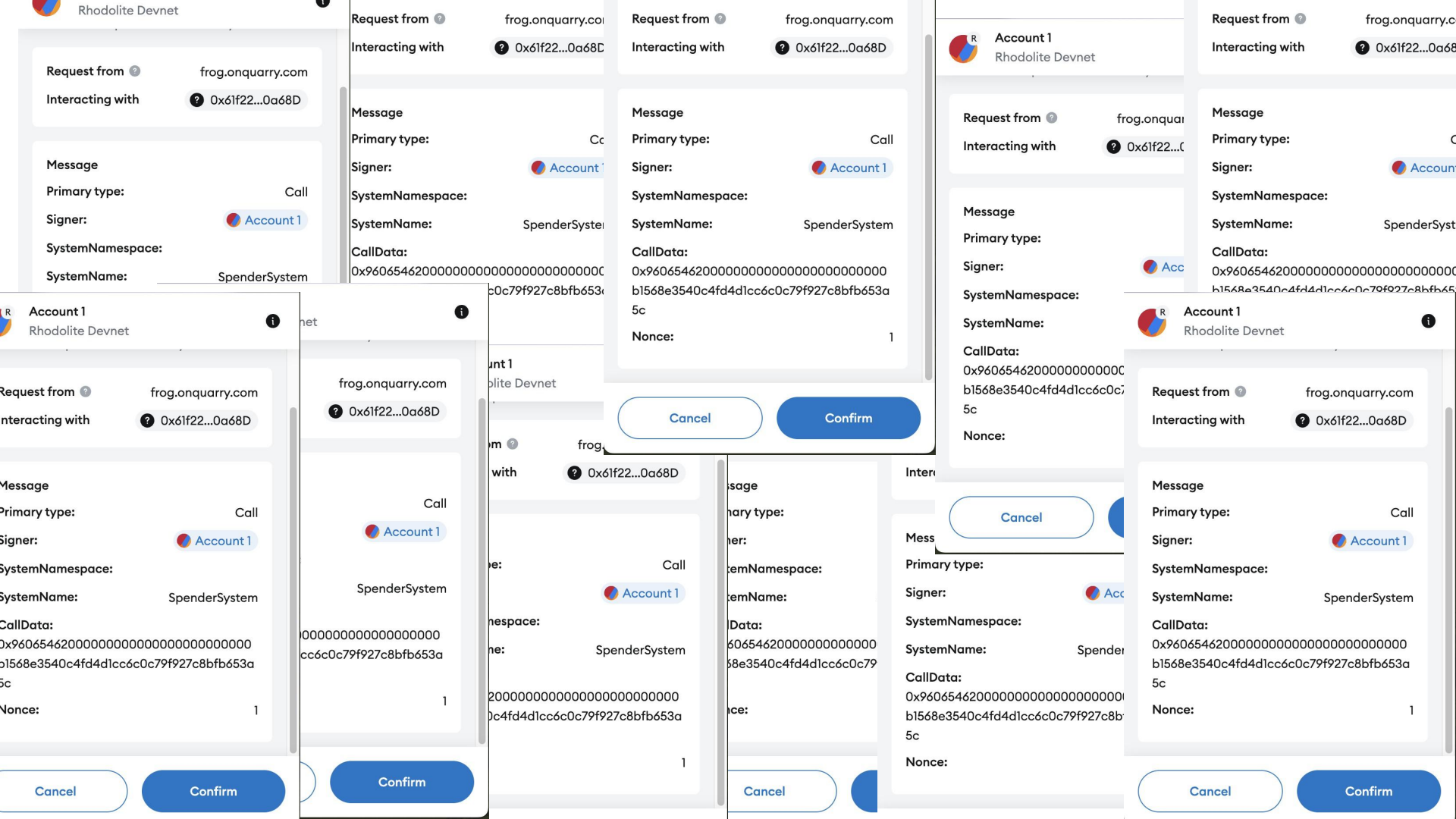

Acco
0xb9CFD..
Buy & Sell
Swap
Tokens
From
Ethereum
To
Redstone
Mainnet
0
ETH
0.02535 ETH available
Enter an amount
ERROR: OUT OF FUNDS

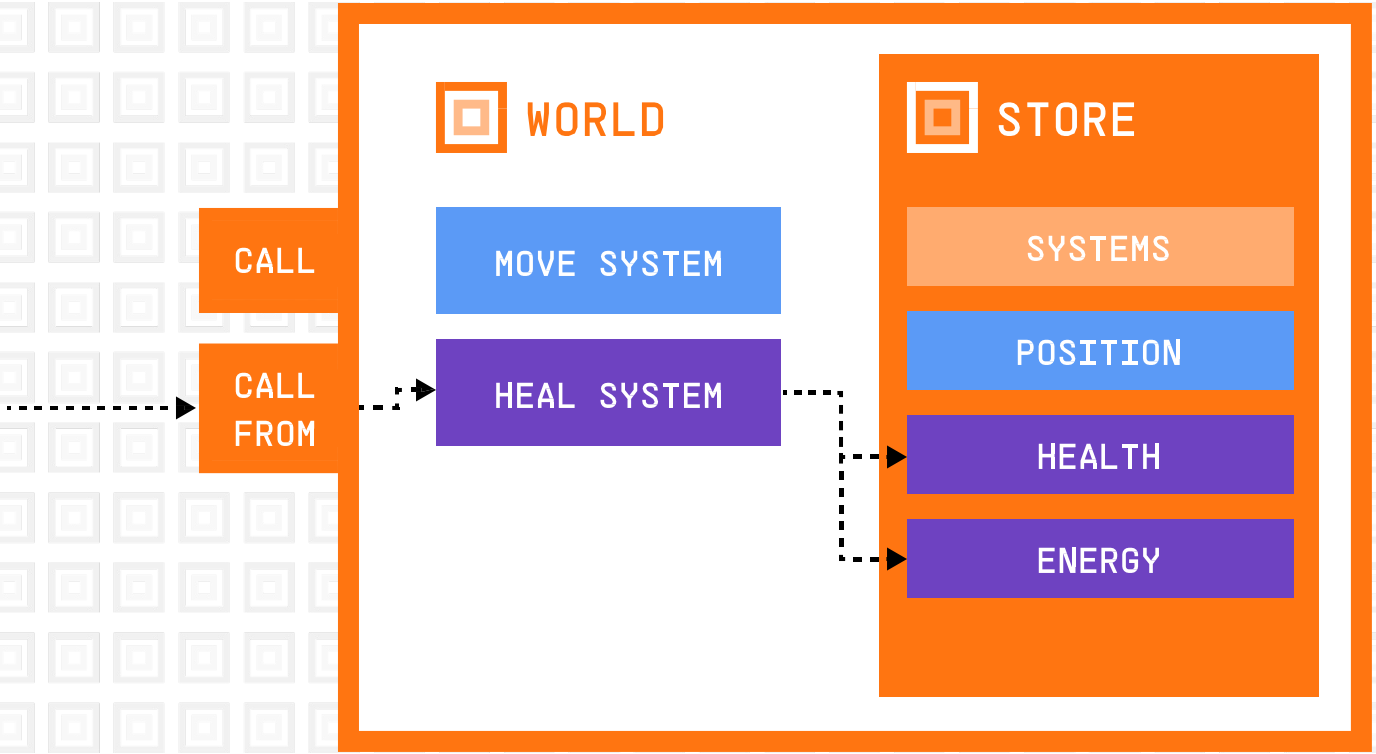

Account 1
Rhodolite Devnet
Request from
frog.onquarry.com
Interacting with
0x61f22...0a68D
Message
Primary type:
Call
Signer:
Account 1
SystemNamespace:
SystemName:
SpenderSystem
CallData:
0x960654620000000000000000000000000
b1568e3540c4fd4d1cc6c0c79f927c8bfb653a
5c
Nonce:
1
Cancel
Confirm
To
Redstone
Mainnet
ETH
Buy & Sell
Tokens
ERROR: O

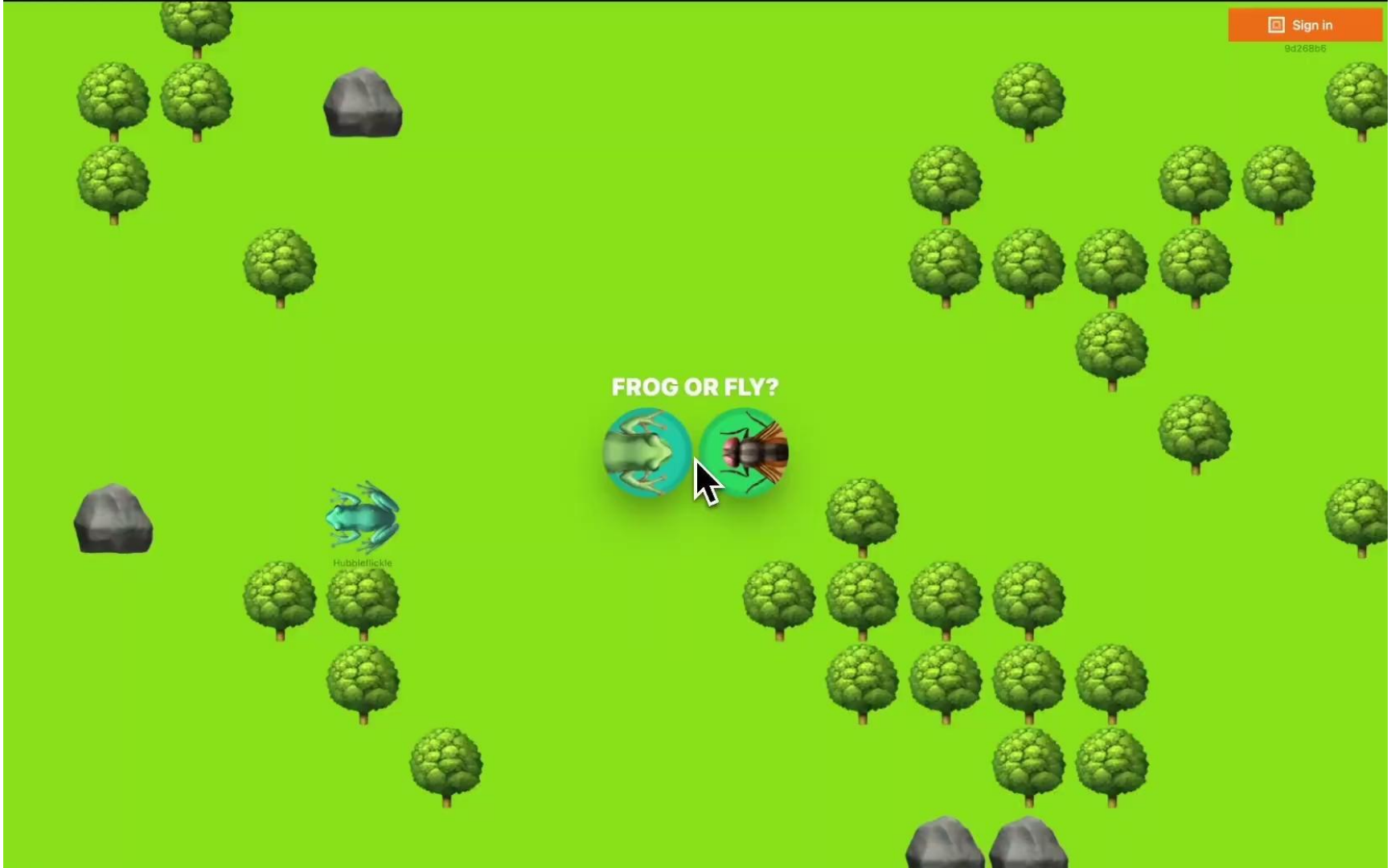

Account 1
Rhodolite Devnet
Request from
frog.onquarry.com
Interacting with
0x61f22...0a68D
Message
Primary type:
Call
Signer:
Account 1
SystemNamespace:
SystemName:
SpenderSystem
CallData:
0x960654620000000000000000000000000
b1568e3540c4fd4d1cc6c0c79f927c8bfb653a
5c
Nonce:
1
Cancel
Confirm
To
Redstone
Mainnet
ETH


Account 1
Rhodolite Devnet
Request from
frog.onquarry.com
Interacting with
0x61f22...0a68D
Message
Primary type:
Call
Signer:
Account 1
SystemNamespace:
SystemName:
SpenderSystem
CallData:
0x960654620000000000000000000000000
b1568e3540c4fd4d1cc6c0c79f927c8bfb653a
5c
Nonce:
1
Cancel
Confirm


Rhodolite Devnet
Request from
frog.onquarry.com
Interacting with
0x61f22...0a68D
Message
Primary type:
Call
Signer:
Account 1
SystemNamespace:
SystemName:
SpenderSystem
CallData:
Nonce:
Cancel
Confirm
Account 1

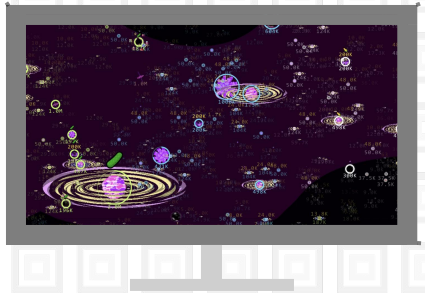

Account 1
Rhodolite Devnet
Request from
frog.onquarry.com
Interacting with
0x61f22...0a68D
Message
Primary type:
Call
Signer:
Account 1
SystemNamespace:
SystemName:
SpenderSystem
CallData:
0x960654620000000000000000000000000
b1568e3540c4fd4d1cc6c0c79f927c8bfb653a
5c
Nonce:
1
Cancel
Confirm


WORLD
STORE
CALL
CALL FROM
MOVE SYSTEM
HEAL SYSTEM
SYSTEMS
POSITION
HEALTH
ENERGY


Sign in
9d268b6
FROG OR FLY?
Hubbleflickle

BONUS CHAPTER: FUTURE

MAKE IT SCALE

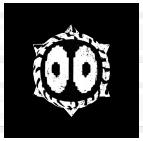
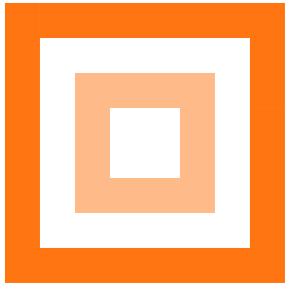




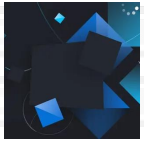




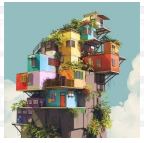
TX
MONSTER



MUD

EVE
FRONTIER

.NET



UD

CAFE
COSMOS