

POLKADOT BLOCKCHAIN ACADEMY



FORGING THE FUTURE OF WEB3

Singapore
MAY 2024

Launching a Parachain



Polkadot Technical Design

Relaychain/Parachains - Execution Sharding

POLKADOT LAUNCHED IN 2020 IS ONE OF THE FIRST PRODUCTION GRADE SHARDED BLOCKCHAIN NETWORKS!

Block#1	
Timestamp	2019-11-28 17:27:54 (+UTC)
Block Time	1404 days 1 hr ago
Status	✓ Finalized
Hash	0xcd9b8e2fc2f57c4570a86319b005832080e0c478ab41ae5d44e23705872f5ad3
Parent Hash	0xb0a8d493285c2df73290dfb7e61f870f17b41801197a149ca93654499ea3dafe

kusama.subscan.io

Polkadot Technical Design

Custom Blockchain Runtimes in Rust.

Compiled to Wasm

**POLKADOT SDK - A MODULAR,
FLEXIBLE, EXTENSIBLE FRAMEWORK
FOR BUILDING BLOCKCHAINS.**



POLKADOT NETWORK

Polkadot
polkadot/1000001 ▾
#19,104,754

Accounts ▾ Network ▾ Governance ▾ Developer ▾ Settings

Explorer Chain info Block details Latency Forks Node info API stats

block hash or number to query

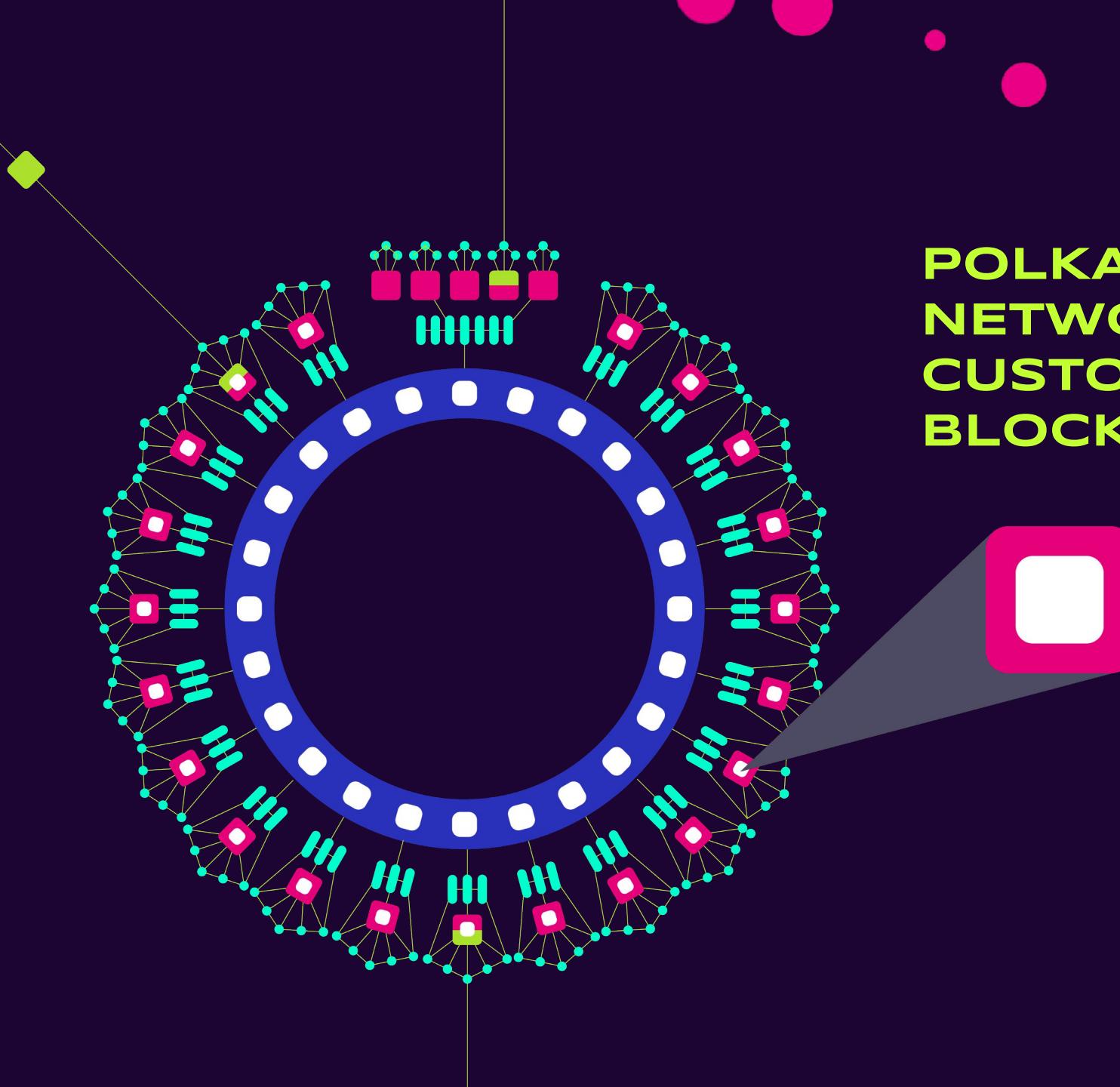
last block	target	total issuance	epoch	finalized	best
4.0 s	6 s	1.4014 BDOT	4 hrs 3 hrs 15 mins	18% 19,104,751	19,104,754

recent blocks

19,104,754	0x57b9b93665ea4116f20...	 SEKOYA LABS/1
19,104,753	0x4382b498b0fc63a9f14...	
19,104,752	0xb957264ab5b70df266...	 SEITAN BLOCK...
19,104,751	0x0ea5a63b729f50954cc...	 WWW.ISG.DEV
19,104,750	0xdfdf0f0d9e4ec6c43d3...	
19,104,749	0x7c91bce72ef27e6632d...	
19,104,748	0x0d7540071771dc2dc9b...	
19,104,747	0x05a41c1dcc816d6869c...	 GENERAL-BECK/L...

recent events

balances.Transfer	19,104,754-43
Transfer succeeded	
balances.DustLost	19,104,754-42
An account was removed whose balance was non-zero but below...	
xcmPallet.Attempted	19,104,752-45
Execution of an XCM message was attempted	
balances.Transfer	19,104,752-44
Transfer succeeded	
staking.Withdrawn	19,104,751-46
An account has called withdraw_unbonded and removed unbonding chunks...	
balances.Unlocked	19,104,751-45
Some balance was unlocked	
balances.Transfer	19,104,750-47
Transfer succeeded	



POLKADOT CONNECTS A NETWORK OF CUSTOM-BUILT BLOCKCHAINS & APPS

PARACHAINS

CUSTOM-BUILT USING
POLKADOT-SDK FOR
APPLICATION SPECIFIC USE
CASES



POLKADOT PARACHAINS

Polkadot
polkadot/1002004 ▾
#21,249,758

Accounts ▾ Network ▾ Governance ▾ Developer ▾ Settings 1

[GitHub](#) [Wiki](#)

Parachains Overview Parathreads Auctions Crowdloan

parachains	parathreads	current lease	lease period	finalized	epoch
50	25	16	84 days 16 days 7 hrs	21,249,756	4 hrs 2 hrs 15 mins

80% 

parachains	lifecycle	included	backed	chain	leases
1,000  AssetHub	Non-voters (0) ▾	6 s	21,249,757	21,249,756	21,249,758 polkadot/1002004
1,001  Collectives	Non-voters (0) ▾	6 s	21,249,757	21,249,758	4,019,117 collectives/1002004
1,002  BridgeHub	Non-voters (0) ▾	6 s	21,249,757	21,249,758	2,810,036 bridge-hub-polkadot/1002004
2,000  Acala	Non-voters (0) ▾	6 s	21,249,757	21,249,756	6,401,720 acala/2250
2,002  Clover	Non-voters (0) ▾	12 s	21,249,756	21,249,758	
2,004  Moonbeam	Non-voters (0) ▾		21,249,758	21,249,757	6,391,791 moonbeam/2901
2,006  Astar	Non-voters (0) ▾	6 s	21,249,757	21,249,758	6,406,515 astar/88
2,008  Crust	Non-voters (0) ▾	6 s	21,249,757	21,249,758	3,498,536 polkadot-crust-par... /6

POLKADOT SYSTEM CHAINS

► POLKADOT & PARACHAINS



Polkadot



AssetHub



BridgeHub



Collectives

MAINTAINED AND UPGRADED THROUGH POLKADOT
OPENGOV

NUMBER OF SYSTEM CHAINS PROJECTED TO GROW -
CORETIME, STAKING, GOVERNANCE, IDENTITY ETC.

WHAT ARE PEOPLE BUILDING ON POLKADOT?

500+ PROJECTS



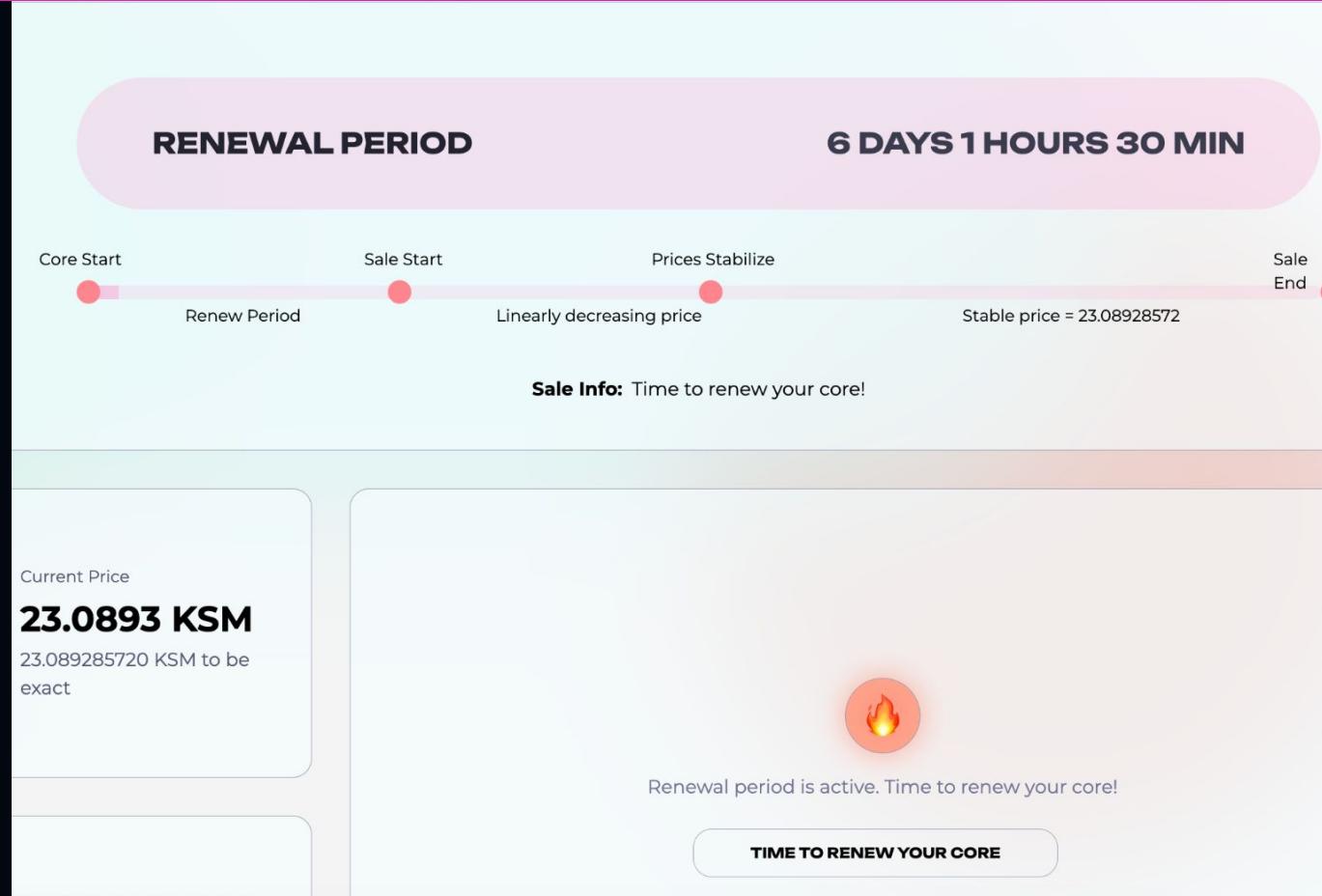


Agile Coretime and Blockspace Markets



Coretime Marketplace

Join a new era where trading blockspace is as fluid as trading tokens. With Lastic, Appchains can leverage fully flexible on-demand onchain computation while brokers can trade blockspace with ease.



<https://www.lastic.xyz/>



Launch a Parachain

...in two hours!



Launch a Parachain

...in two hours*!

* and the time it takes to compile Polkadot SDK on your machine



PARACHAIN REGISTRATION

POLKADOT

Deposit: 3300 DOT, Fees: 150 DOT

KUSAMA

Deposit: 1100 KSM, Fees: 5 KSM

ROCOCO

Deposit: 200 ROC, Fees: 1 ROC



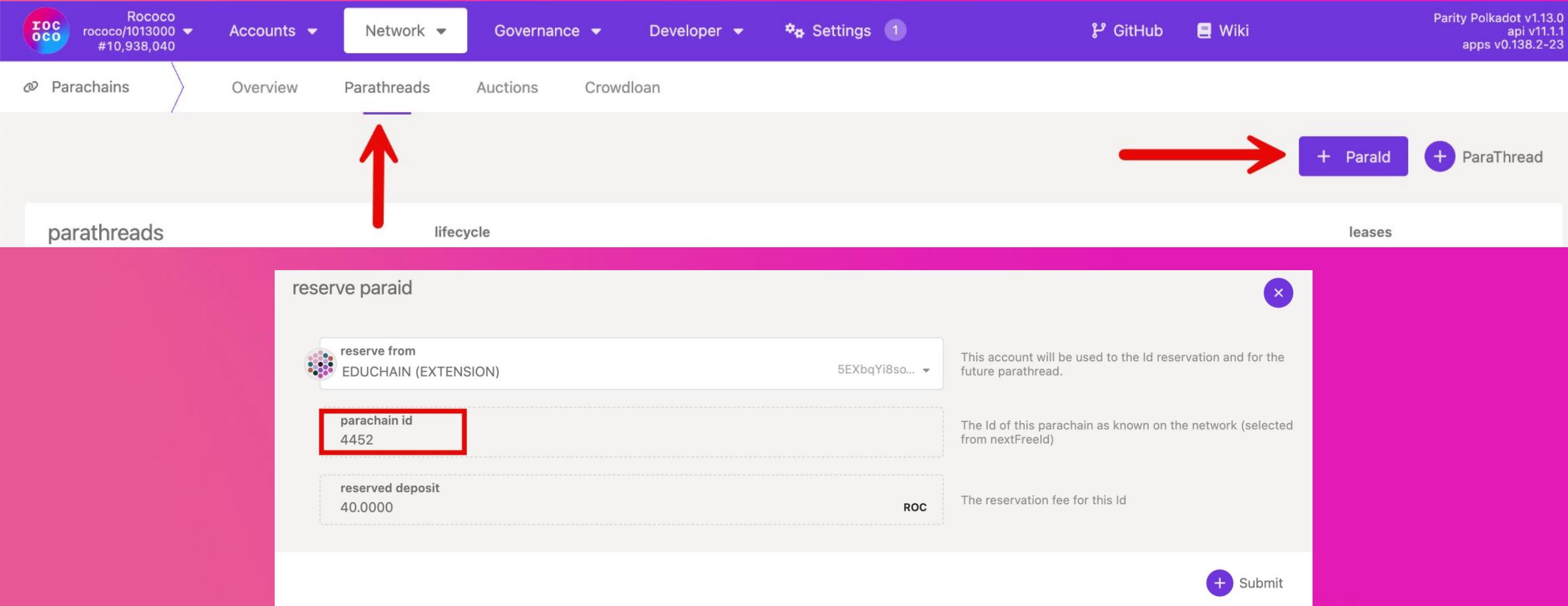
TESTNET FAUCET



The image shows the Rococo Faucet interface. At the top left is a small Polkadot logo. At the top right is a button labeled "→ Questions?". The main title "Rococo Faucet" is centered above a subtitle "Get ROC tokens for Polkadot's Rococo testnet and its parachains." Below this are two dropdown menus: "Network" set to "Rococo" and "Chain" set to "Rococo Relay". A link "→ Use custom chain id" is also present. On the left, a dropdown menu for "Network" lists "Rococo" (selected), "Paseo", "Westend", and "Frequency". On the right, a dropdown menu for "Chain" lists "Rococo Relay" (selected) and "→ Use custom chain id". At the bottom is a reCAPTCHA field with the text "I'm not a robot" and a "Get some ROCs" button.

<https://faucet.polkadot.io/>

Register ParalID



The screenshot shows the Polkadot.js interface for managing parachains. The top navigation bar includes links for Accounts, Network (selected), Governance, Developer, Settings, GitHub, and Wiki. The status bar indicates the network is Rococo with account #10,938,040. The main menu has 'Parachains' selected, with sub-options Overview, Parathreads (selected), Auctions, and Crowdloan. Below this, there are tabs for parathreads, lifecycle, and leases. A prominent red arrow points upwards to the 'Parathreads' tab. Another red arrow points to the '+ ParaID' button in the top right corner of the main content area. A modal window titled 'reserve paraid' is open, showing fields for 'reserve from' (EDUCHAIN (EXTENSION)), 'parachain id' (4452, highlighted with a red box), and 'reserved deposit' (40.0000 ROC). A note states the account will be used for ID reservation and future parathread. The modal has an 'x' close button and a 'Submit' button at the bottom right.

Rococo
rococo/1013000 ▾
#10,938,040

Accounts ▾ Network ▾ Governance ▾ Developer ▾ Settings 1

GitHub Wiki

Parity Polkadot v1.13.0
api v11.1.1
apps v0.138.2-23

Parachains Overview Parathreads Auctions Crowdloan

parathreads lifecycle leases

reserve paraid

reserve from
EDUCHAIN (EXTENSION)

parachain id
4452

reserved deposit
40.0000 ROC

This account will be used to the Id reservation and for the future parathread.

The Id of this parachain as known on the network (selected from nextFreeld)

The reservation fee for this Id

+ ParaID + ParaThread

+ Submit

<https://polkadot.js.org/apps/?rpc=wss%3A%2F%2Frococo-rpc.polkadot.io#/parachains/parathreads>



Parachain Templates

[OpenZeppelin Polkadot Runtime Templates](#)

[Templates on Polkadot SDK](#)

[Play on Polkadot \(POP\) Templates](#)

[Templates by Tanssi](#)

polkadot-sdk / templates / [...](#)

 bkontur Use aggregated types

Name

 ..

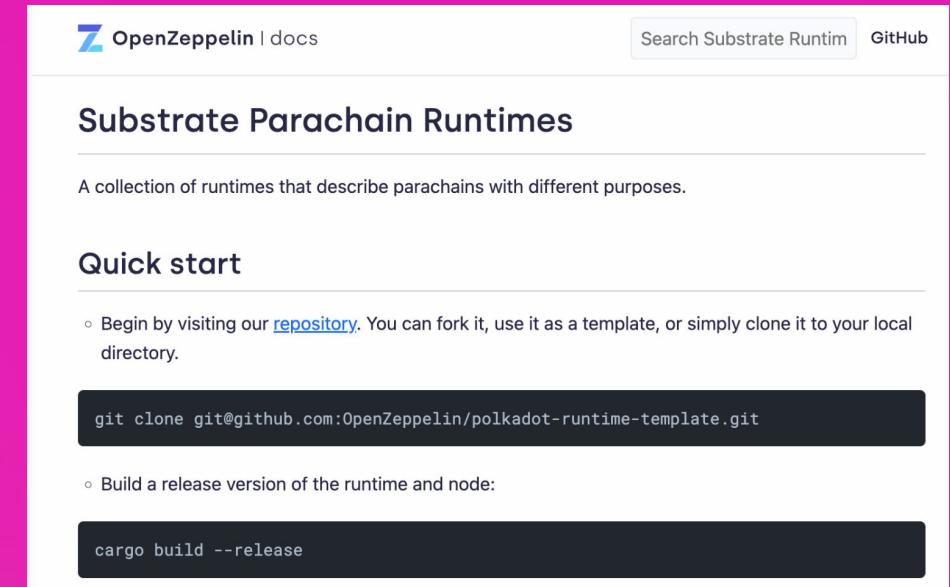
 minimal

 parachain

 solochain

OpenZeppelin Template

- **Both Generic and EVM Templates**
- **Pallet docs**
- **General Guides**
- **Runtime related guides**
- **High level docs**



The screenshot shows a documentation page for the OpenZeppelin Substrate Parachain Runtimes. At the top right are search and GitHub links. Below the header, a section titled "Substrate Parachain Runtimes" is described as a collection of runtimes for parachains. A "Quick start" section provides instructions and command-line examples for cloning the repository and building the runtime.

Z OpenZeppelin | docs

Substrate Parachain Runtimes

A collection of runtimes that describe parachains with different purposes.

Quick start

- Begin by visiting our [repository](#). You can fork it, use it as a template, or simply clone it to your local directory.
`git clone git@github.com:OpenZeppelin/polkadot-runtime-template.git`
- Build a release version of the runtime and node:
`cargo build --release`

<https://docs.openzeppelin.com/substrate-runtimes/1.0.0/>

Personalize and Build Template

```
generic-template > runtime > ⚙ Cargo.toml
```

```
1 [package]
2   name = "pba-chain-runtime"
3   authors = { workspace = true }
4   description = "A generic parachain runtime template"
```

```
○ radha@Radhakrishnas-MacBook-Air generic-template % cargo build --release
  Updating git repository `https://github.com/paritytech/polkadot-sdk`
  Downloaded const-random v0.1.17
  Downloaded async-executor v1.8.0
  Downloaded wasm-bindgen-shared v0.2.91
  Downloaded pest_generator v2.7.7
  Downloaded thiserror-impl v1.0.57
  Downloaded fastrand v2.0.1
  Downloaded cxxbridge-flags v1.0.117
  Downloaded async-io v2.3.1
  Downloaded color-print v0.3.5
  Downloaded wasm-bindgen-macro v0.2.91
```

```
Compiling cumulus-client-service v0.7.0 (https://github.com/paritytech/polkadot-sdk?tag=polkadot-v1.10.0#7049c3c9)
Compiling template-fuzzer v0.1.0 (/Users/radha/Documents/GitHub/pba-openzeppelin/generic-template/template-fuzzer)
Finished `release` profile [optimized] target(s) in 17m 07s
radha@Radhakrishnas-MacBook-Air generic-template %
```

Update ChainSpec - Production Release

- Replace Alice and Bob keys
- ParalD update
- Specify Relay chain
- Add sudo account
- Add native token symbol and decimals
- Pre-fund selected accounts
- Add invulnerable collator keys
-

```
generic-template > node > src > chain_spec.rs
107
108 pub fn live_config() -> ChainSpec {
109     // Give your base currency a unit name and decimal places
110     let mut properties = sc_chain_spec::Properties::new();
111     properties.insert("tokenSymbol".into(), "PBA".into());
112     properties.insert("tokenDecimals".into(), 12.into());
113     properties.insert("ss58Format".into(), 42.into());
114
115     #[allow(deprecated)]
116     ChainSpec::builder()
117         .pba_chain_runtime::WASM_BINARY.expect("WASM binary was not bu
118         Extensions {
119             relay_chain: "rococo".into(),
120             // You MUST set this to the correct network!
121             para_id: ROCOCO_PARA_ID,
122         },
123 }
```

Generate ChainSpec JSON

```
generic-template > {} plain-parachain-chainspec.json > ...
```

```
1  {
2    "name": "PBA Chain Rococo",
3    "id": "live",
4    "chainType": "Live",
5    "bootNodes": [],
6    "telemetryEndpoints": null,
7    "protocolId": "pba-chain-live",
8    "properties": {
9      "ss58Format": 42,
10     "tokenDecimals": 12,
11     "tokenSymbol": "PBA"
12   },
13   "relay_chain": "rococo",
14   "para_id": 4452,
15   "codeSubstitutes": {},
16   "genesis": {
17     "runtimeGenesis": {
```

```
● radha@Radhakrishnas-MacBook-Air generic-template % ./target/release/pba-chain-node build-spec --chain live --disable-default-bootnode > plain-parachain-chainspec.json
2024-06-18 11:32:15 Building chain spec
```



Export Genesis State and Wasm

- radha@Radhakrishnas-MacBook-Air generic-template % ./target/release/pba-chain-node export-genesis-state --chain raw-parachain-chainspec.json para-4452-genesis-state
2024-06-18 11:43:38 ↵ Initializing Genesis block/state (state: 0x1278..f9ce, header-hash: 0x5e38..9963)
- radha@Radhakrishnas-MacBook-Air generic-template % ./target/release/pba-chain-node export-genesis-wasm --chain raw-parachain-chainspec.json para-4452-wasm

```
≡ para-4452-genesis-state
≡ para-4452-wasm
{} plain-parachain-chainspec.json
{} raw-parachain-chainspec.json
```

Register Parachain Genesis State and Wasm

register parachain

parachain owner
EDUCHAIN (EXTENSION) 5EXbqYi8so...

parachain id
4452

code
para-4452-wasm (1,253,568 bytes)

initial state
para-4452-genesis-state (98 bytes)

reserved deposit
144.860932284724 ROC

This account that has been used to register the parachain. This will pay all associated fees.

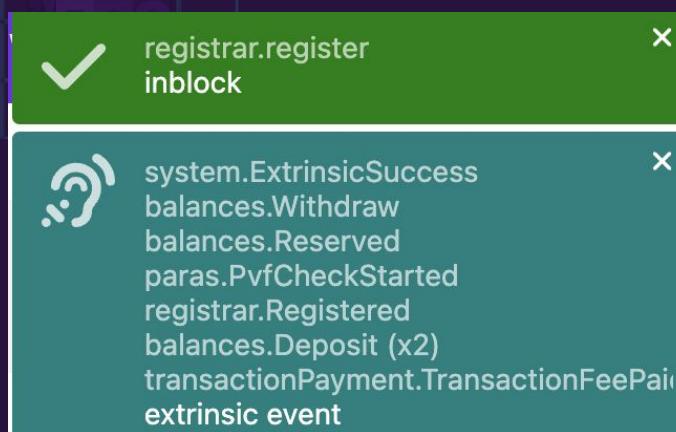
The parachain id is associated with the selected account via parathread registration.

The WASM validation function for this parachain.

The genesis state for this parachain.

The reservation fee for this parachain, including base fee and per-byte fees

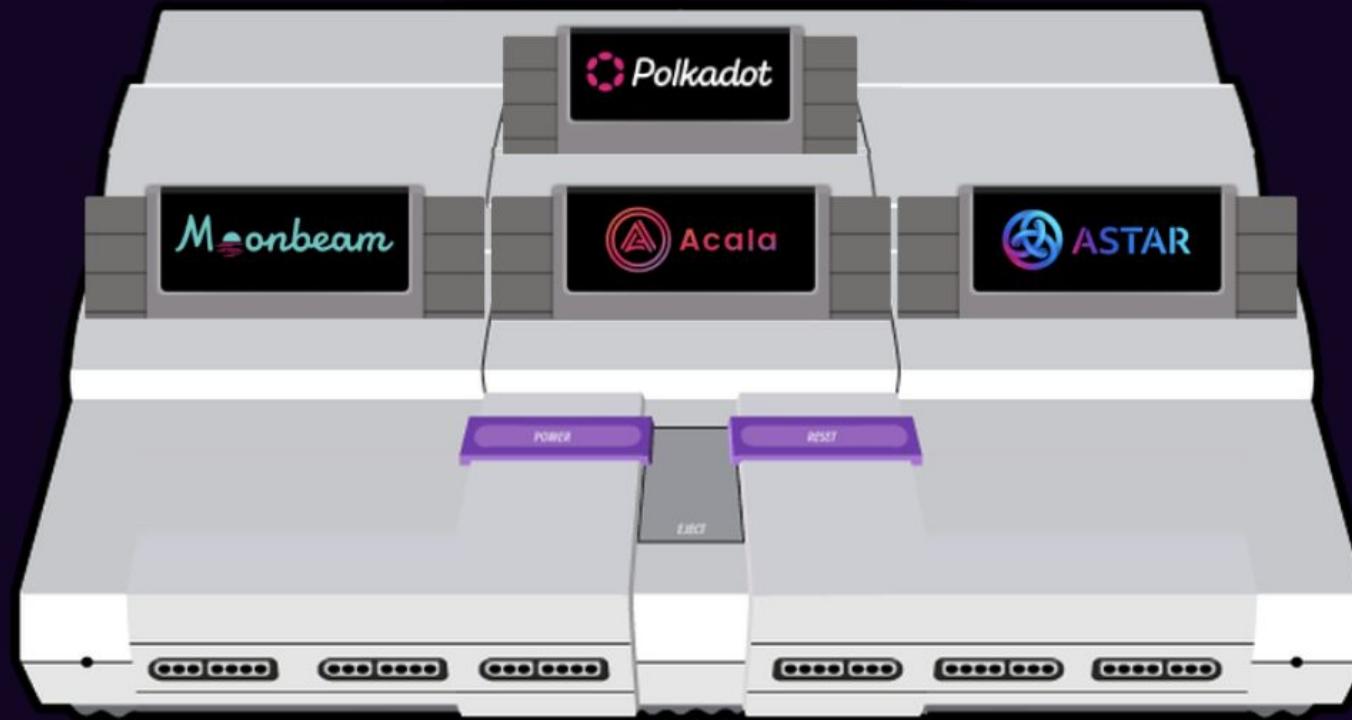
+ Submit



4,450	Parathread
4,452	Onboarding 1 hr 20 mins

PLUG AND PLAY WASM RUNTIMES

A Polkadot Validator Node



VALIDATORS AND COLLATORS

Polkadot polkadot/9430 #17,098,710

Accounts Network Governance Developer Settings 1 GitHub Wiki Parity Polkadot v1.0.0 api v10.9.1 apps v0.132.2-83

Parachains Overview Parathreads Auctions Crowdloan

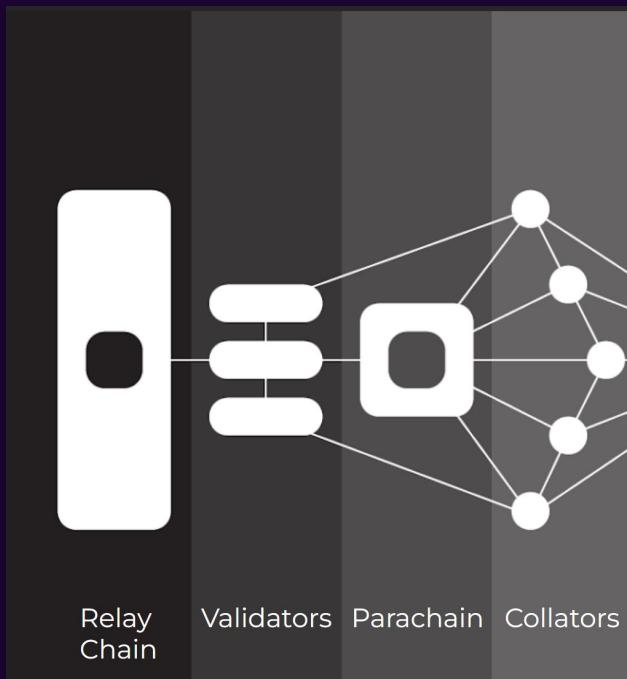
parachains 48 parathreads 13 current lease 13 lease period 84 days 52 days 14 hrs 37% finalized 17,098,708 epoch 4 hrs 1 hr 52 mins 53%

	parachains	lifecycle	included	backed	chain	leases
parachains						
1,000	 AssetHub	Val. Group 26 (5) ▲ JOE/v02 (21) P2P.ORG/12 (167) 13mscy5wf... (146) 15wT5c8vY... (258) 14Meq7tN9... (176) Non-voters (0)	17,098,710	17,098,709	4,483,275 statemint/9430	
1,001	 Collectives	Val. Group 27 (5) ▲ 12g7WPT9... (100) 12YFWxpS... (86) 14Xi1iQvaH... (186) 1RhqvG4S... (28) 1iyDF3iHuN... (40) Non-voters (0)	17,098,710	17,098,709	2,019,006 collectives/9430	
1,002	 BridgeHub	Val. Group 28 (5) ▼ Non-voters (0)	17,098,710	17,098,709	800,003 bridge-hub-polkadot/9430	
2,000	 Acala	Val. Group 29 (5) ▼ Non-voters (0)	17,098,710	17,098,709	4,359,919 acala/2180	

[HTTPS://POLKADOT.JS.ORG/](https://polkadot.js.org/)

VALIDATORS AND COLLATORS

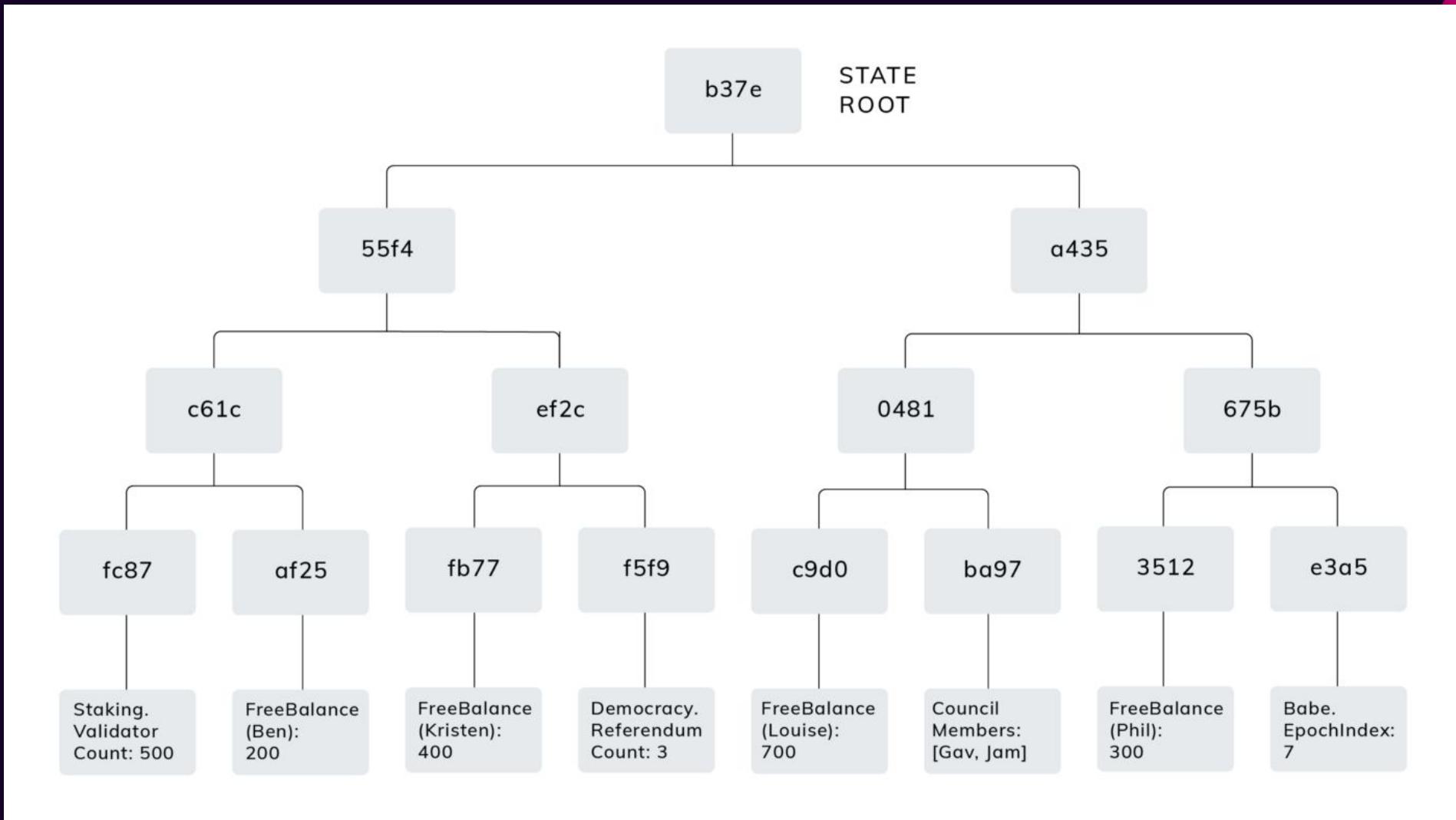
- The parachain selects a collator to submit a block to the relay chain
- Polkadot shuffles and assigns a set of validators to this parachain
- The collators and validators open connections to submit a block.



parachains	lifecycle	included	backed
1,000	Val. Group 36 (5) ▲ DECENTRADOT.COM (260) 13xUAQ2p... (156) COINBASE CLOUD/CC1 (11) 16hzCDgyq... (292) P2P.ORG/15 (116)	1 min 24 s	17,098,792
	Non-voters (0) ▼	17,098,797	

<https://polkadot.js.org/apps/#/parachains>

PARACHAIN STATE

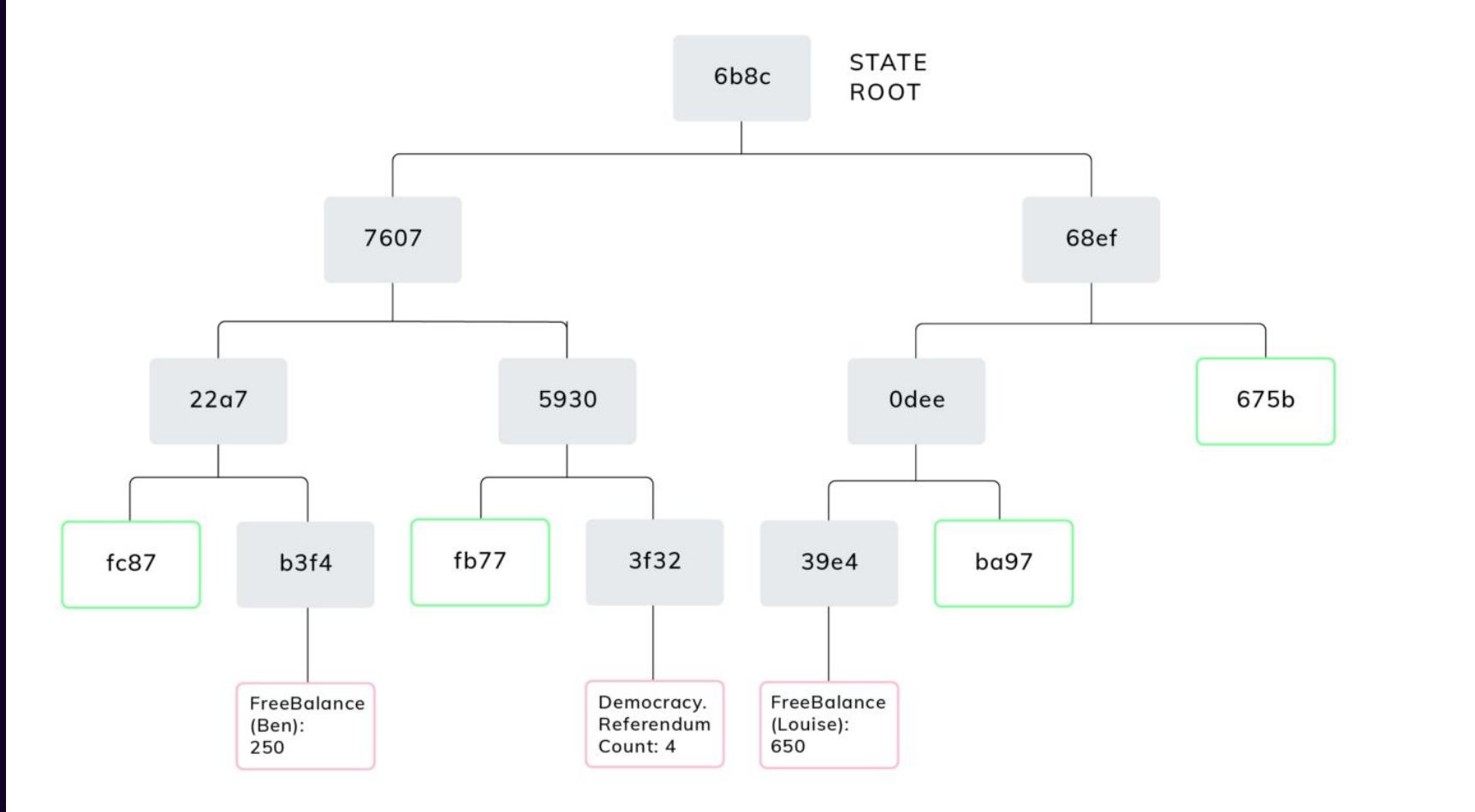


PARACHAIN STATE TRANSITION

```

parent_hash: 7a42
number: 2
state_root: 6b8c
extrinsics_root: 3bf9
digest: vec<consensus, ...>

democracy.on_initialize(),
balances.transfer(
    Louise,
    Ben,
    50
)
  
```



PROOF OF VALIDITY

A validator can verify a state transition without having access to the entire state. It only needs:

- The block (list of state transitions)
- The values in the parachain's database that the block modifies
- The hashes of the unaffected points in the Merkle tree.

```
parent_hash: 7a42
number: 2
state_root: 6b8c
extrinsics_root: 3bf9
digest: vec<consensus, ...>

democracy.on_initialize(),

balances.transfer(
    Louise,
    Ben,
    50
)
```



Launch Collator

```
○ radha@Radhakrishnas-MacBook-Air generic-template % ./target/release/pba-chain-node --collator --chain raw-parachain-chainspec.json --base-path /tmp/parachain/pba-collator --port 40333 --rpc-port 8844 --- --chain roccoco.json --port 30343 --rpc-port 9977 --sync fast-unsafe --blocks-pruning 256
2024-06-18 12:05:31 PBA Collator
2024-06-18 12:05:31 ✨ version 1.0.0-b2b65e9364c
2024-06-18 12:05:31 ❤️ by OpenZeppelin, 2020-2024
2024-06-18 12:05:31 📜 Chain specification: PBA Chain Rococo
2024-06-18 12:05:31 🎖 Node name: auspicious-shame-9852
2024-06-18 12:05:31 🧑 Role: AUTHORITY
2024-06-18 12:05:31 🗁 Database: RocksDb at /tmp/parachain/pba-collator/chains/live/db/full
2024-06-18 12:05:33 Parachain Account: 5Ec4AhP7Ji4YPY2cE5vreapxpKCdjNMYTxcrg3PLTFyHnt1B
2024-06-18 12:05:33 Is collating: yes
2024-06-18 12:05:34 [Parachain] ✨ Initializing Genesis block/state (state: 0x1278...f9ce, header-hash: 0x5e38...9963)
```

OR

```
cumulus > polkadot-parachain > ⚙ Cargo.toml
1 [package]
2 name = "polkadot-parachain-bin"
3 version = "4.0.0"
4 authors.workspace = true
5 build = "build.rs"
6 edition.workspace = true
7 description = "Runs a polkadot parachain node which could be a collator."
8 license = "Apache-2.0"
9
```



Interact with Collator Node

```
○ radha@Radhakrishnas-MacBook-Air polkadot-sdk % ./target/debug/polkadot-parachain --chain raw-parachain-chainspec-pba.json  
--rpc-port 9944 --relay-chain-rpc-url wss://rococo-rpc.polkadot.io --rpc-cors=all --no-telemetry --no-mdns --rpc-external  
--rpc-methods safe --port 30335 --state-pruning archive --blocks-pruning archive -- --chain rococo --port 30336
```

```
2024-06-18 13:11:40 Polkadot parachain  
2024-06-18 13:11:40 ✨ version 4.0.0-55a13abcd2f  
2024-06-18 13:11:40 ❤️ by Parity Technologies <admin@parity.io>, 2017-2024  
2024-06-18 13:11:40 📜 Chain specification: PBA Chain Rococo  
2024-06-18 13:11:40 🎖 Node name: teeny-tiny-bottle-5472  
2024-06-18 13:11:40 🔍 Data: FULL
```

The screenshot shows the Polkadot Parachain Explorer interface for the "PBA Chain Rococo" chain. The top navigation bar includes tabs for Accounts, Network (selected), Governance, Developer, and Settings. The main content area displays network statistics: last block (0.0 s), target (12 s), total issuance (3.4587 MPBA), inactive issuance (0.0000 PBA), and session (#0). Below this, two sections show recent blocks and events.

last block	target	total issuance	inactive issuance	session
0.0 s	12 s	3.4587 MPBA	0.0000 PBA	#0

recent blocks

- 0 0x5e38a65ef44aaeced0c23ea2ddf99349160783adfe168e...

recent events

- No events available



Insert Collator Session Keys

The screenshot shows the Polkadot Substrate UI with the 'Developer' tab selected. Under the 'Submission' tab, the 'call the selected endpoint' dropdown is set to 'author'. The RPC call is 'insertKey(keyType, suri, publicKey)'. The 'keyType' field contains 'aura'. The 'suri' field is highlighted with a red border. The 'publicKey' field contains the bytes '0x1e0f4e48f26d802ce3699872c97e2ec7f8476a9b27a5d4307986ce0ddf0d8530'. A green checkmark icon is visible in the top right corner.

The screenshot shows the Polkadot Substrate UI with the 'Developer' tab selected. Under the 'Submission' tab, the 'call the selected endpoint' dropdown is set to 'author'. The RPC call is 'hasSessionKeys(sessionKeys)'. The 'sessionKeys' field contains the bytes '0x1e0f4e48f26d802ce3699872c97e2ec7f8476a9b27a5d4307986ce0ddf0d8530'. A green checkmark icon is visible in the top right corner. Below the form, the response '2: author.hasSessionKeys: bool true' is displayed.

Submit Transactions

send funds

 send from account
EDUCHAIN (EXTENSION)

 send to address
DRW3RK (EXTENSION)

amount
1000

existential deposit
0.0010

transferrable 1.1529 MPBA
5EXbqYi8so...

transferrable 0.0000 PBA
5F4QMAtnY...

PBA

PBA

The transferred balance will be subtracted (along with fees) from the sender account.

The beneficiary will have access to the transferred fees when the transaction is included in a block.

If the recipient account is new, the balance needs to be more than the existential deposit. Likewise if the sending account balance drops below the same value, the account will be removed from the state.

With the keep-alive option set, the account is protected against removal due to low balances.

transfer with account keep-alive checks

Make Transfer

PBA Chain Rococo template-parachain/1 #0 Accounts Network Governance Developer Settings 1 GitHub Wiki Polkadot parachain apps v0

Accounts My accounts Vanity generator

You have 1 extension that needs to be updated with the latest chain properties in order to display the correct information for the chain you are connected to. This update includes chain metadata and chain properties.
Visit your [settings page](#) to apply the updates to the injected extensions.

In transaction pool

total balance 2.3058 MPBA	total transferrable 2.3058 MPBA	total locked 0.0000 PBA
------------------------------	------------------------------------	----------------------------

filter by name or tags

+ Account
From JSON
From Qr
+ Multisig
+ Proxied



On-Demand Block Production

The screenshot shows the Polkadot Substrate UI interface. At the top, there's a navigation bar with tabs for 'Extrinsics' (selected), 'Submission' (disabled), and 'Decode'. Below this, a section titled 'using the selected account EDUCHAIN (EXTENSION)' displays an extrinsic to be submitted: `onDemandAssignmentProvider placeOrderAllowDeath(maxAmount, parald)`. This section is highlighted with a red box. To the right, there's a 'free balance' of `110.9816 ROC` and a green button with a checkmark icon. A red arrow points from the text 'submit the following extrinsic' towards this button.

The screenshot shows the Polkadot Substrate UI interface. At the top, there's a navigation bar with tabs for 'Accounts' (selected), 'Network', 'Governance', 'Developer', 'Settings' (with a notification count of 1), 'GitHub', and 'Wiki'. Below this, a section titled 'My accounts' shows a message: 'You have 1 extension that needs to be updated with the latest chain properties in order to display the correct information for the chain you are connected to. This update includes chain metadata and chain properties.' A red arrow points from this message towards a green button with a checkmark icon. At the bottom, account statistics are shown: `total balance 2.3058 MPBA`, `total transferrable 2.3058 MPBA`, and `total locked 0.0000 PBA`.

On-Demand Block Production

PBA Chain Rococo
template-parachain/1 #1 Accounts Network Governance Developer Settings 1 GitHub Wiki Polkadot parachain v4.0.0 api v11.1.1 apps v0.138.2-23

Explorer Chain info Block details Latency Node info API stats block hash or number to query

last block target total issuance inactive issuance session last events best
4 min 12 s 3.4587 MPBA 0.0000 PBA #0 2 1

recent blocks

- 1 0xb620c4f344b5c2000cb14807972a7c99514dce29b084... EDU COLLATOR (EXT...)
- 0 0x5e38a65ef44aaeced0c23ea2ddf99349160783adfe168e...

recent events

- balances.Transfer Transfer succeeded. 1-05
 - from: AccountId32 EDUCHAIN (EXTENSION)
 - to: AccountId32 DRW3RK (EXTENSION)
 - amount: u128 1,000.0000
 - 5EXbqYi8so...
- balances.Endowed An account was created with some free balance. 1-04
 - account: AccountId32 DRW3RK (EXTENSION)
 - freeBalance: u128 1,000.0000
 - 5F4QMaTnY...



PBA chain launched!!

...in two hours seventeen minutes!

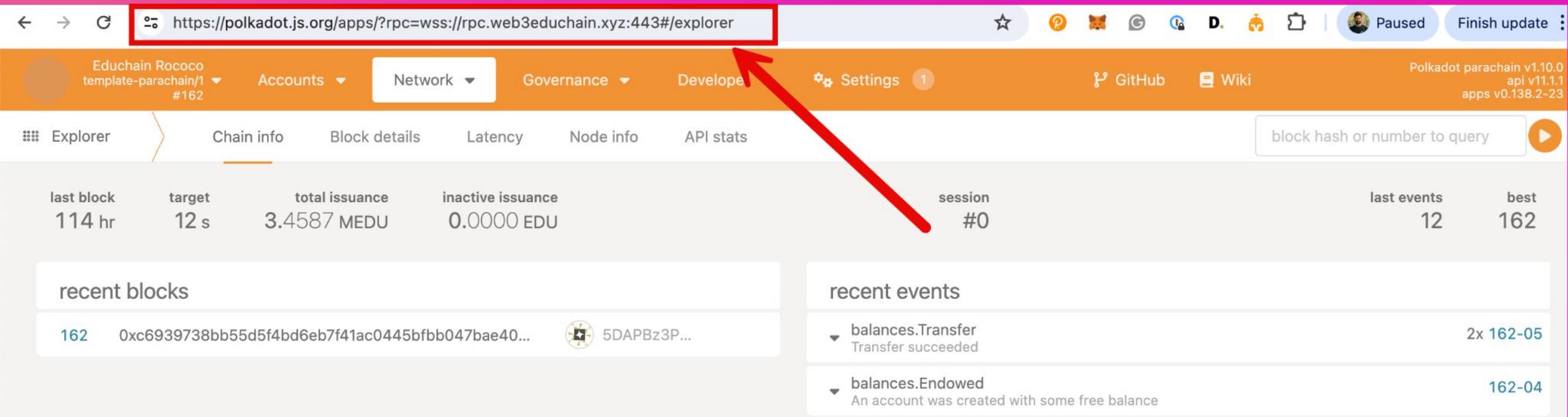
Next steps

NEXT STEPS

- Setup remote RPC Node for parachain
- Integrate with Asset Hub
- Add additional pallets
- Perform on-chain upgrade using sudo privileges
- Develop custom pallets

..... change the world!

Setup Remote RPC Node



A screenshot of the Polkadot.js Explorer interface. The URL bar at the top shows the address <https://polkadot.js.org/apps/?rpc=wss://rpc.web3educhain.xyz:443#/explorer>. A red arrow points from the text "Setup Remote RPC Node" in the main heading down to the "Developer" tab in the navigation bar. The "Developer" tab is highlighted with a blue background. The page displays various blockchain metrics and recent activity.

Educhain Rococo template-parachain/1 #162

Accounts Network Governance Developer Settings 1

Polkadot parachain v1.10.0 api v11.1 apps v0.138.2-23

Explorer Chain info Block details Latency Node info API stats

block hash or number to query

last block target total issuance inactive issuance session last events best

114 hr 12 s 3.4587 MEDU 0.0000 EDU #0 12 162

recent blocks

162 0xc6939738bb55d5f4bd6eb7f41ac0445fb047bae40... 5DAPBz3P...

recent events

- balances.Transfer Transfer succeeded 2x 162-05
- balances.Endowed An account was created with some free balance 162-04

<https://web3educhain.xyz/collator/#setting-up-ssl-and-nginx-proxy>

TEST TOOLING

- [Parachain Launch](#)
- [Zombienet](#)

Cross-chain Testing

- ParaSpell - <https://github.com/paraspell/xcm-tools>
- XCM-SDK - <https://github.com/moonbeam-foundation/xcm-sdk/>
- XCM-Tools - <https://github.com/Moonsong-Labs/xcm-tools>
- BagPipes (formerly xcmse) - <https://github.com/XcmSend/app>
- Ocelloids SDK - <https://github.com/sodazone/ocelloids-sdk>

APP DEVELOPMENT

Web Apps

- Apillon - <https://apillon.io/>

Mobile Apps

- Substrate SDK iOS - <https://github.com/novasamatech/substrate-sdk-ios>
- Substrate SDK Android - <https://github.com/novasamatech/substrate-sdk-android>



GAME DEVELOPMENT

- Gaming SDK for Substrate and Polkadot - <https://github.com/SubstrateGaming/>
- Polkadot SDK for Unity - <https://github.com/PolkadotPlay/Polkadot.Unity.SDK>
(A powerful toolkit that integrates substrate seamless into Unity projects.)
- <https://github.com/PolkadotPlay/Polkadot.Unity.SDK/wiki>

APIS

- Polkadot-JS - <https://polkadot.js.org/>
- Polkadot-API - <https://github.com/polkadot-api/polkadot-api>
- Python Substrate Interface -
<https://github.com/polkascan/py-substrate-interface>
- Subxt - <https://github.com/paritytech/subxt>
- Substrate API Sidecar -
<https://github.com/paritytech/substrate-api-sidecar/>

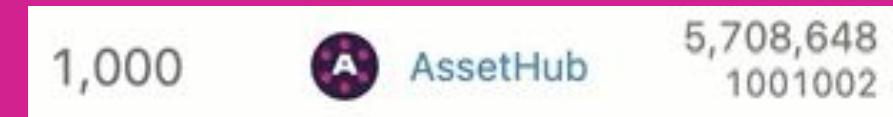
POLKADOT OPEN SOURCE STACK

- About
- Layers of Polkadot Stack
 - Wallets
 - User Interface
 - Tools, APIs, and Languages
 - ink! Smart Contracts
 - Chains and Pallets
 - Host
 - Network Maintenance Tools
 - Signatures
 - Consensus
 - Networking
 - Primitives
- Contributing

<https://wiki.polkadot.network/docs/build-open-source>



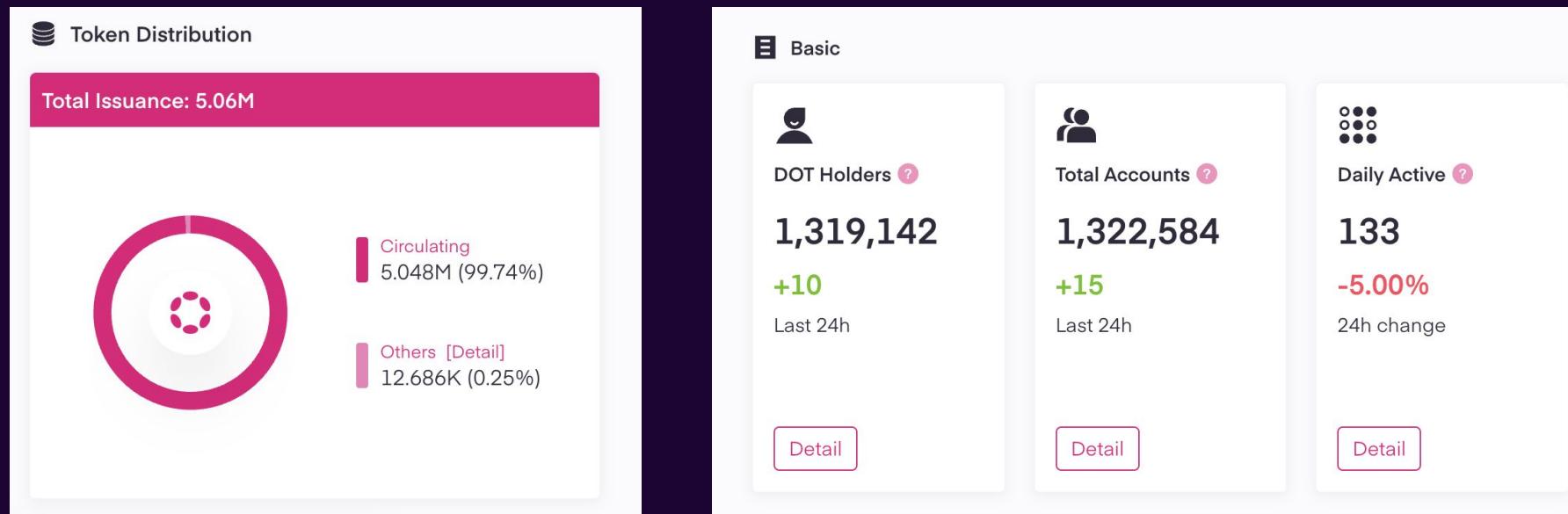
Polkadot AssetHub



System Parachain

DOT on AssetHub

- **Teleported from Polkadot Relay chain**
- **0.01 DOT Existential Deposit (100 times lower than Relay chain)**
- **Can be used for transaction fee and be reserved for minting assets**

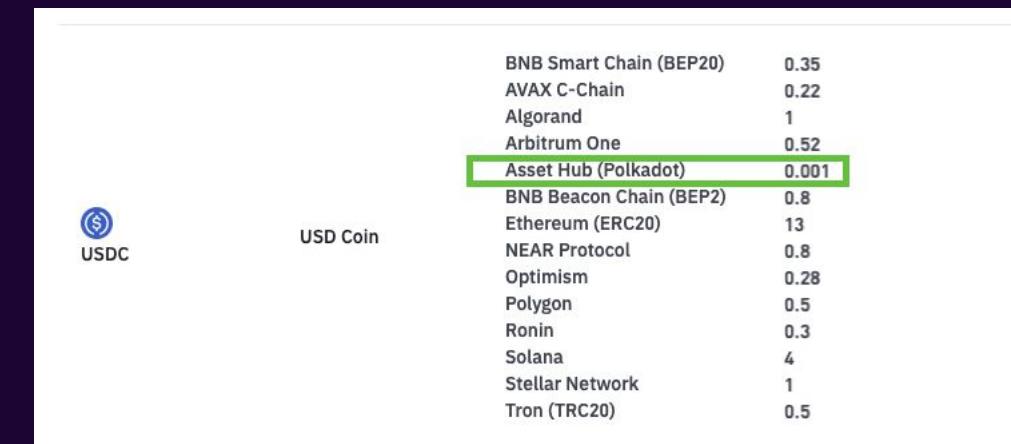


<https://www.subscan.io/>

Polkadot Technical Design

Efficient Transaction Processing - Gas vs Weights

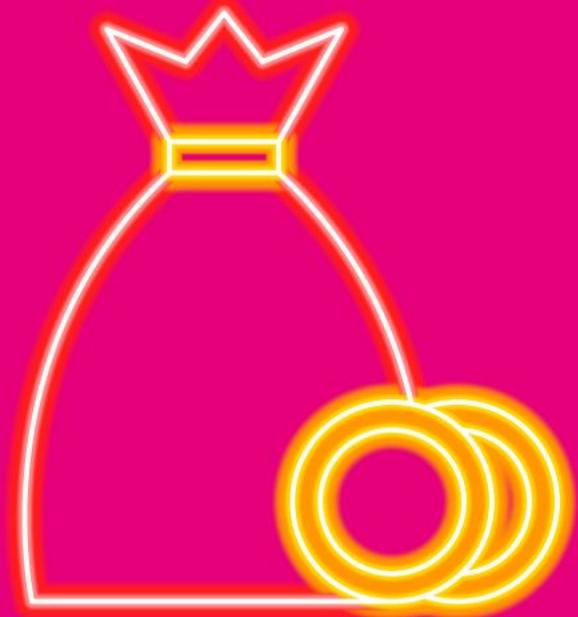
Process Millions of Transactions limited predictable or no spike in gas fees



10000X cheaper than Ethereum, 1000X cheaper than Solana, and 100X cheaper than Optimism

<https://www.binance.com/en/fee/cryptoFee>

Assets on AssetHub



Fungible Assets



Non-Fungible Assets

Fungible Assets on AssetHub

- **44 Tokens Minted**
- **Around 10 DOT reserved to mint an asset and 0.5 DOT for its metadata**

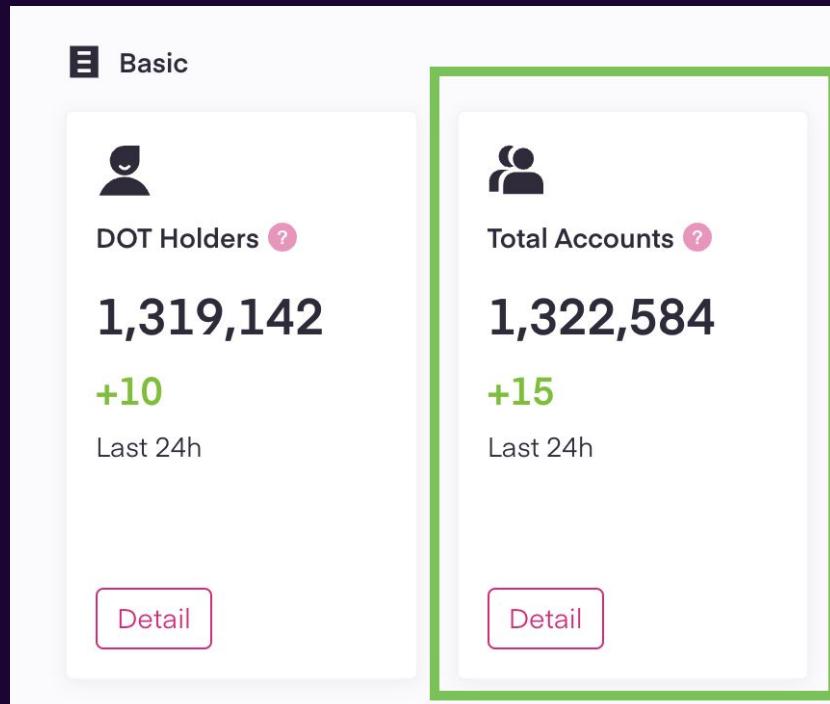
create asset 1/2 x

creator account  TECHED (EXTENSION)	14fk74wxmbMDFnZzvWpFYvdmg6ehg8KdgavoB... ▾	The account that is to be used to create this asset and setup the initial metadata.
asset name	EduCoin	The descriptive name for this asset.
asset symbol	EDU	The symbol that will represent this asset.
asset decimals	10	The number of decimals for this token. Max allowed via the UI is set to 20.
minimum balance	0.000001 EDU ▾	The minimum balance for the asset. This is specified in the units and decimals as requested.
asset id	12345	The selected id for the asset. This should not match an already-existing asset id.

▶ Next

Sufficient Assets on AssetHub

- **Fungible Assets can be made **sufficient** through Polkadot OpenGov**
- **Can be used for Existential Deposit and as a Fee payment token**



USDC and USDT are currently sufficient assets on Polkadot AssetHub

7 Cents is the Existential Deposit!!



web3
foundation



AssetHub Integrations



HydraDX ↔ Moonbeam



Bifrost ↔ Polkadot



Polkadex ↔



Equilibrium ↔



Pendulum ↔



Acala ↔



Unique Network ↔



Subsocial ↔



Bitgreen ↔



Litentry ↔ Kapex Parachain



Centrifuge ↔



Manta Network ↔



Collectives ↔



Bridge Hub ↔



Phala Network ↔



Ajuna Network ↔



Efinity ↔

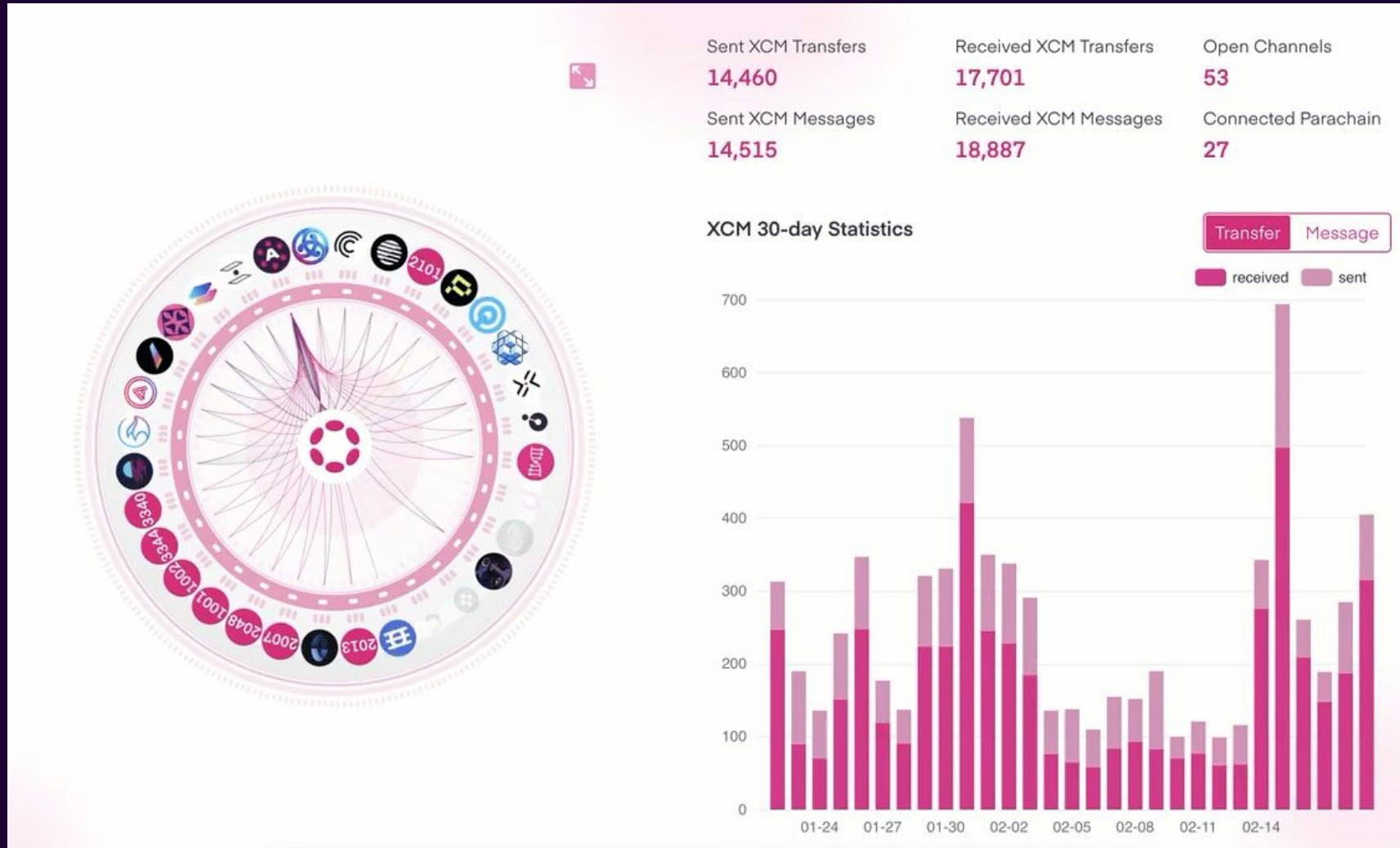
https://parachains.info/details/assethub_polkadot



web3
foundation



AssetHub XCM Activity





web3
foundation



Non-Fungible Assets on AssetHub

- **95 Collections of NFTs**
- **2437 NFTs minted in total**

The screenshot shows the KODA AssetHub interface. At the top, there's a search bar with the placeholder "Search by Collection or NFT". To the right of the search bar are navigation links: "Drops", "Explore", "Learn", "Create", "Ahp", a bell icon for notifications, a shopping cart icon, and the PolkadotHub logo.

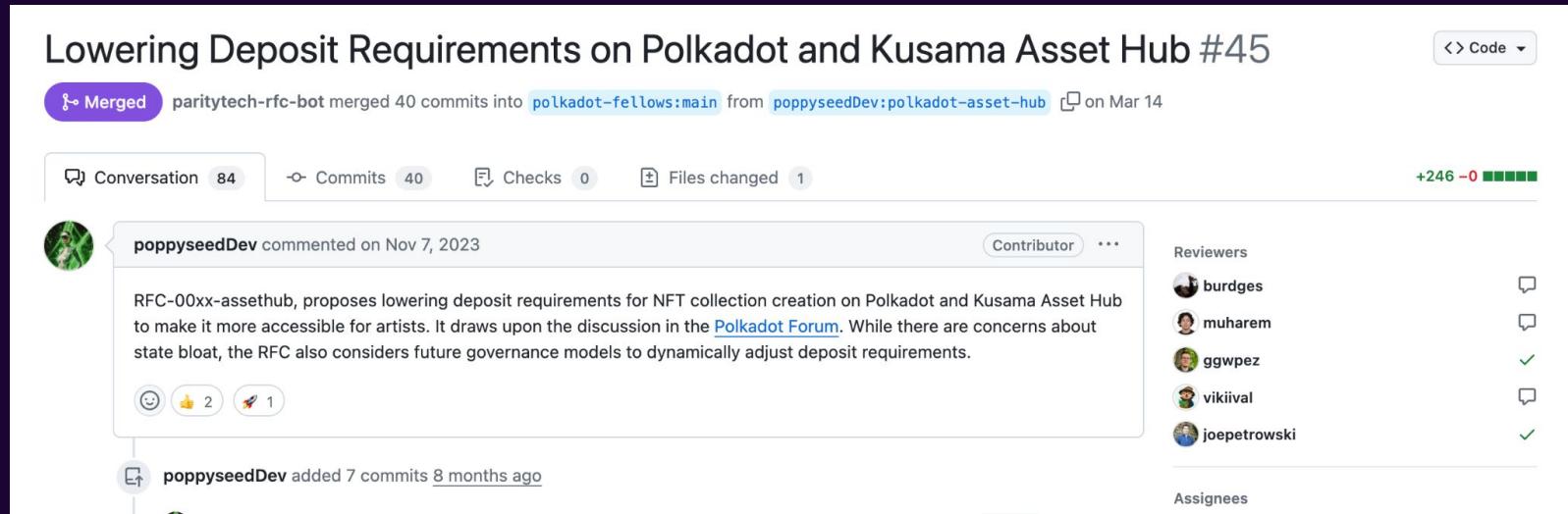
Below the header, the page title "Top Collections" is displayed. Underneath this title are two rows of six collection cards each. Each card includes a thumbnail image, the collection name, its current price, and the volume of DOTs traded.

Collection	Price (DOT)	Volume (DOT)
.motherboard	1.17 DOT - 88%	20.4 DOT
Split	0.85 DOT - 96%	11.0 DOT
Alchemy	0.50 DOT	237.6 DOT
Assemblies	0.70 DOT - 98%	2.8 DOT
Swirls	0.98 DOT - 56%	2.0 DOT
Chroma Lattice	2.50 DOT - 84%	12.5 DOT
.cpu	0.40 DOT + 106%	76.0 DOT
The sub0 2023 Biodiversit...	5.50 DOT + 618%	28.7 DOT
Genera	0.57 DOT - 98%	1.8 DOT
Pare1d0scope	9.50 DOT	0 DOT
Snowflakes	0.20 DOT	0 DOT
Florist	1.06 DOT	37.2 DOT

<https://kodadot.xyz/>

NFT Deposit Requirements on AssetHub

- Previously, 10 DOT reserved to minting an NFT collection, 2 DOT for metadata and 0.01 DOT per item



- Now, 0.2 DOT to be reserved to minting an NFT collection, 0.005 DOT for metadata and item!!

Bridge Security

The more value on them, the more susceptible they are for attacks

Tech

Blockchain Bridge Wormhole Suffers Possible Exploit Worth Over \$326M

The popular bridge for connecting Ethereum, Solana and more is now attempting to negotiate on-chain with the hacker.

By Andrew Thurman | Feb 2, 2022 at 10:30 p.m. | Updated Feb 3, 2022 at 3:24 p.m.



Bloomberg
Europe Edition ▾

• Live Now Markets **Technology** Politics Wealth Pursuits Opinion Businessweek Equality Green City

Technology

Crypto Firm Nomad Loses Nearly \$200 Million in Bridge Hack

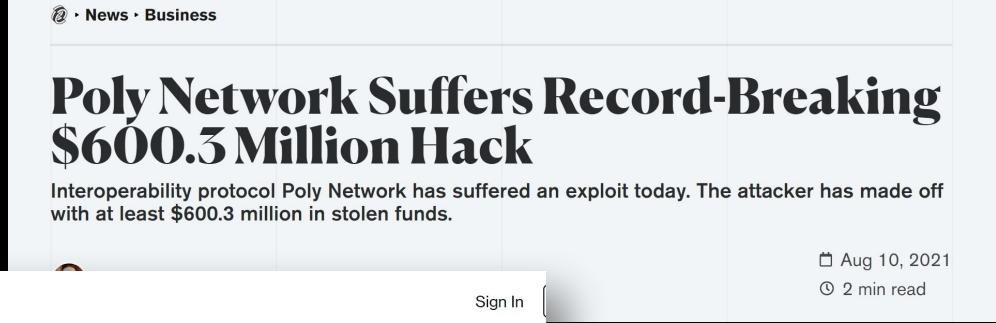
- More than \$1 billion has been stolen in bridge hacks this year
- Nomad had recently raised \$22 million in a seed round

• News • Business

Poly Network Suffers Record-Breaking \$600.3 Million Hack

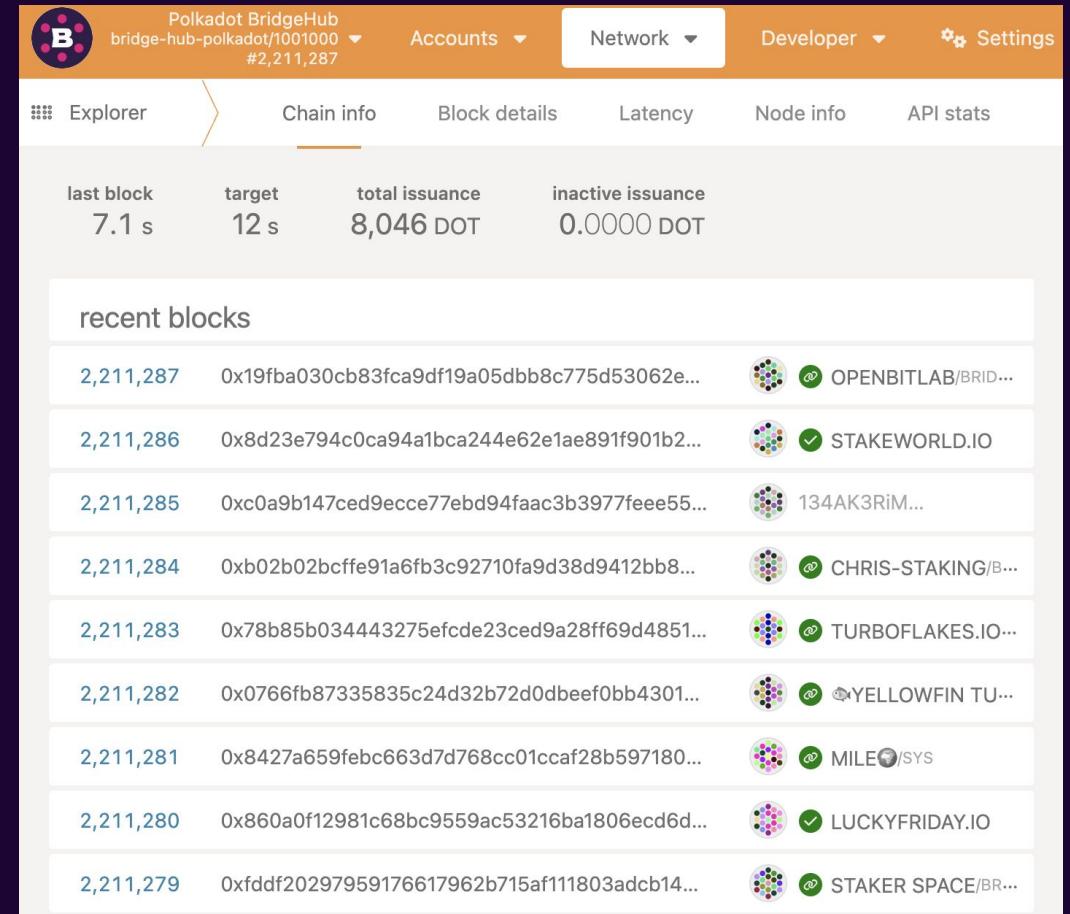
Interoperability protocol Poly Network has suffered an exploit today. The attacker has made off with at least \$600.3 million in stolen funds.

Aug 10, 2021 | 2 min read



Polkadot BridgeHub

- **Polkadot System Chain**
- **Launched in 2023**
- **Enables Trustless Bridges**
- **Polkadot < > Kusama**
- **Polkadot < > Ethereum**
- **Governed through Polkadot OpenGov**



The screenshot shows the Polkadot BridgeHub interface. At the top, there's a navigation bar with the title "Polkadot BridgeHub" and a sub-path "bridge-hub-polkadot/1001000 #2,211,287". The navigation bar also includes links for "Accounts", "Network", "Developer", and "Settings". Below the navigation bar, there are tabs for "Explorer" (which is selected), "Chain info", "Block details", "Latency", "Node info", and "API stats". Under the "Chain info" tab, it displays the "last block" (7.1 s), "target" (12 s), "total issuance" (8,046 DOT), and "inactive issuance" (0.0000 DOT). A section titled "recent blocks" lists the last 10 blocks, each with a hash, a timestamp, a hex string, and a small circular icon representing the staking pool. The blocks listed are: 2,211,287, 2,211,286, 2,211,285, 2,211,284, 2,211,283, 2,211,282, 2,211,281, 2,211,280, and 2,211,279.

Block Number	Block Hash	Timestamp	Staking Pool
2,211,287	0x19fba030cb83fca9df19a05dbb8c775d53062e...	7.1 s	OPENBITLAB/BRID...
2,211,286	0x8d23e794c0ca94a1bca244e62e1ae891f901b2...	12 s	STAKEWORLD.IO
2,211,285	0xc0a9b147ced9ecce77ebd94faac3b3977feee55...		134AK3RiM...
2,211,284	0xb02b02bcffe91a6fb3c92710fa9d38d9412bb8...		CHRIS-STAKING/B...
2,211,283	0x78b85b034443275efcde23ced9a28ff69d4851...		TURBOFLAKES.IO...
2,211,282	0x0766fb87335835c24d32b72d0dbeef0bb4301...		YELLOWFIN TU...
2,211,281	0x8427a659febcb663d7d768cc01ccaf28b597180...		MILESYS
2,211,280	0x860a0f12981c68bc9559ac53216ba1806ecd6d...		LUCKYFRIDAY.IO
2,211,279	0xfddfd20297959176617962b715af111803adcb14...		STAKER SPACE/BR...

Web3 Educhain

Why Educhain?

Why Polkadot?

Launch a Parachain

Launching on Rococo

Dependencies

Collator Setup

Ordering Coretime

Upgrading Your Runtime

Asset Hub Integration

Web3 Educhain

Educating Web3 through [Polkadot SDK](#).

[Educhain On-demand Parachain is now live on Rococo](#)

Why Educhain?

When creating the [Web3 Educhain](#) project, there were around 50 parachains on the Polkadot network but no concrete guides on launching and maintaining a production-grade parachain. There are also very limited tutorials that demonstrate the [Polkadot SDK](#) features that are shipped with [FRAME](#) library.

Web3 Educhain intends to address these issues by providing insights, examples and tutorials *with* documentation on how to launch and maintain a parachain.

Execution Sharded Blockchain with Elastic Scaling!

Elastic Scaling #1829

 Open

 15 of 23 tasks

eskimor opened this issue on Oct 9, 2023 · 6 comments



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Technical Education Lead

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Twitter @DrW3RK

*Thank,
you!*