如何使用 Near Indexer Framework

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本次分享的主要内容

- Near 区块链简介与特点.
- Near Indexer 的现状.
- Near 的节点几种运行模式.
- Near Indexer Explorer 项目.
- Near Indexer Framework 与 example 展示.

Near 区块链

- 关注高性能公链, 高性能公链永远是核心竞争力.
- 目前, 以太坊是整个区块链生态中使用最多的智能合约平台.
- 目前比较主流的三条以太坊竞品 Rust 公链: Substrate, Solana, Near.
- Near 对开发者非常友好, Learn By Earn. https://learnnear.club/
- Near 原生智能合约采用 Rust, AssemblyScript, JavaScript(upcomming), 开发体验非常流畅.
- 梦之队: 3 个 ICPC 金牌得主, 3 个早期 MemSQL(为分布式数据库构建分片), 4 个 Xooglers(大规模构建分布式系统)

现有的 Near Explorer

- 官方: https://explorer.near.org/
- 第三方: https://www.nearscan.org/
- 可以看到目前 Near 区块链数据分析还是做的不很完善.

Near 节点运行模式

- 网络: localnet, testnet, mainnet
- 不同的网络协议版本可能不同, 对应代码分支版本不同需注意.
- 建议不要使用 nearup, 因为 mainnet 不用 nearup. (nearup 提供了官方编译好的二进制程序)
- 一个普通节点配置 archival option disabled, 表示节点有一个 GC 来删除过期数据，只保留最近 5 个 epoch(差不多 2.5 天)的数据. archival node 是保留所有数据.
- https://docs.near.org/docs/develop/node/rpc/run-rpc-node-without-nearup

编译 neard 节点程序

Compile neard node

Bash

```
git clone https://github.com/near/nearcore
cd nearcore
git fetch origin --tags
git checkout tags/1.25.0-rc.2 -b testnet
make release # 差不多半小时左右
neard -V # 检查 protocol version https://explorer.testnet.near.org/stats
```

运行 testnet node

初始化工作目录: ./target/release/neard --home ~/.near/tesenet init --chain-id testnet --download-genesis —download-config

注意: 官方提供了 testnet 跟 mainnet 的 config.json, genesis.json, data/ 的 s3 备份数据, 不要直接去同步.

运行节点: ./target/release/neard --home ~/.near/testnet run

注意: 基于 Near 框架的程序一般都分为 init 跟 run 两步.

https://docs.near.org/docs/develop/node/rpc/run-rpc-node-without-nearup

编译 Near Indexer Explorer

- git clnoe https://github.com/near/near-indexer-for-explorer
- cargo build —release

注意 Cargo.toml 中依赖的 near 版本要与使用的节点一致

```
near-indexer = { git = "https://github.com/near/nearcore", tag = "1.25.0-rc.2" }
near-crypto = { git = "https://github.com/near/nearcore", tag = "1.25.0-rc.2" }
near-client = { git = "https://github.com/near/nearcore", tag = "1.25.0-rc.2" }
```

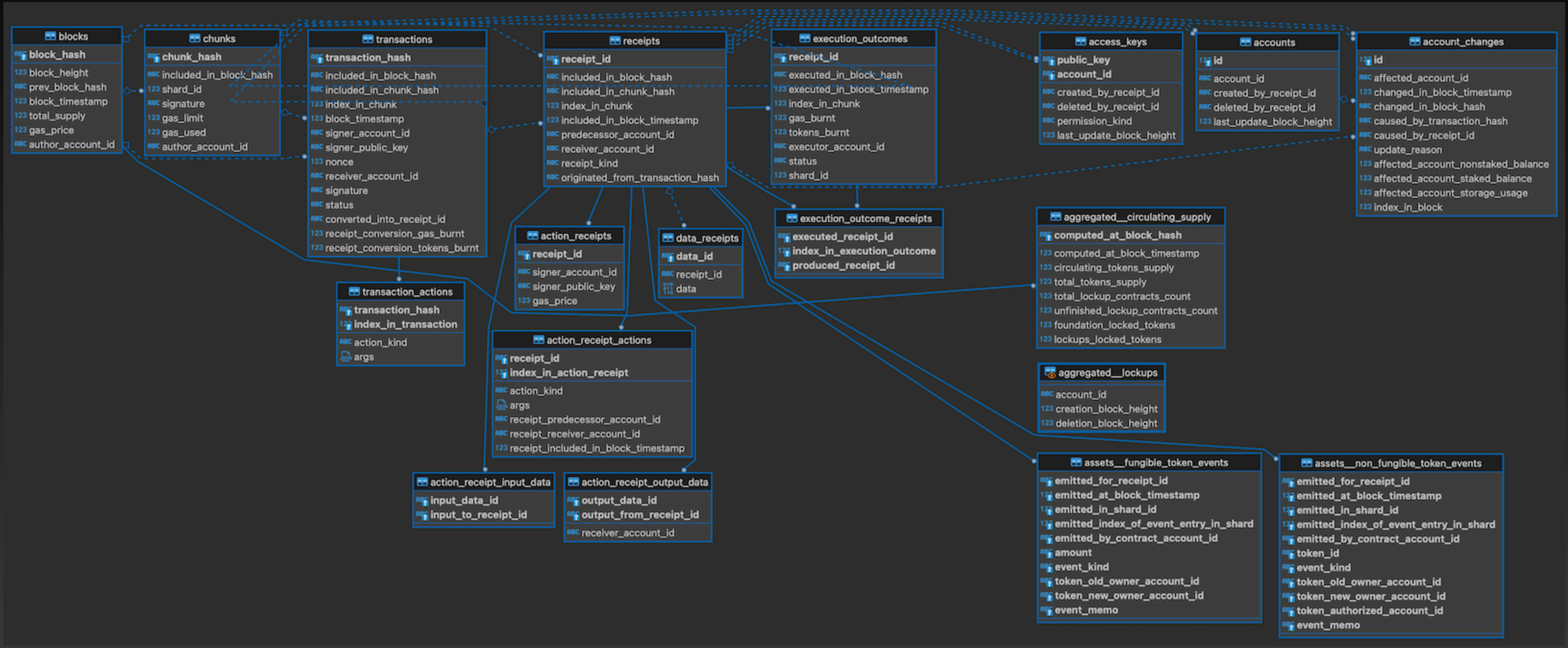
运行 Near Indexer for Explorer

- echo "DATABASE_URL=postgres://user:password@host/db_name" > .env
- direnv allow .
- cargo install diesel_cli --no-default-features --features “postgres"
- diesel migration run

Near Indexer Schema

Name	OID	Owner	ACL	Table Type	Partition Of	Rows	Primary Key
__diesel_schema_migrations	81971	admin		Normal		-1	0
access_keys	82035	admin		Normal		625,065	1
account_changes	82041	admin		Normal		-1	0
accounts	82048	admin		Normal		495,000	1
action_receipt_actions	82054	admin		Normal		-1	0
action_receipt_input_data	82059	admin		Normal		-1	0
action_receipt_output_data	82064	admin		Normal		-1	0
action_receipts	82069	admin		Normal		-1	0
aggregated__circulating_supply	82330	admin		Normal		-1	0
assets__fungible_token_events	82389	admin		Normal		-1	0
assets__non_fungible_token_events	82357	admin		Normal		-1	0
blocks	82074	admin		Normal		-1	1
chunks	82079	admin		Normal		-1	1
data_receipts	82084	admin		Normal		-1	0
execution_outcome_receipts	82089	admin		Normal		-1	1
execution_outcomes	82094	admin		Normal		-1	1
receipts	82099	admin		Normal		-1	1
transaction_actions	82104	admin		Normal		-1	0
transactions	82109	admin		Normal		-1	1

Schema Relationship



Near Indexer Explorer 参数

同步参数说明

```
--store-genesis # 来自 genesis(账户和访问密钥)的数据
--stream-while-syncing # 在 indexer 索引区块时边同步边索引数据
--concurrency <number> # 指定线程数量 (默认 1)
--non-strict-mode # 禁用严格模式, 遇到问题区块检测时间长时会跳过这个区块
--stop-after-number-of-blocks <number> # 运行检测指定区块后停止.
sync-from-latest # 从最新的最终区块开始索引区块
# 从 NEAR Indexer 上次中断区块开始索引区块, 如果参数后有数量则从中断块高度减去指定数量的区块高度开始索引.
sync-from-interruption --delta <number-of-block>
sync-from-block --height <block_height> # 从特定块高度开始索引块
```

运行 Near Indexer Explorer

- 从指定区块高度开始索引: ./target/release/indexer-explorer --home-dir ~/.near/testnet run --store-genesis --stream-while-syncing --concurrency 1 sync-from-block —height
- 从上次中断区块之前 1000 个区块开始索引: ./target/release/indexer-explorer --home-dir ~/.near/testnet run --store-genesis --stream-while-syncing --concurrency 1 sync-from-interruption --delta 1000
- 建议首次同步采用非严格模式, 同步更快不会卡块, 然后再使用普通模式: ./target/release/indexer-explorer --home-dir ~/.near/testnet run --store-genesis --stream-while-syncing --non-strict-mode --stop-after-number-of-blocks 100 sync-from-block --height 55095298

```
Feb 24 15:33:55.219  INFO indexer_for_explorer: Adding/updating access keys from genesis...
Feb 24 15:33:55.558  INFO indexer_for_explorer: Adding/updating access keys from genesis...
Feb 24 15:33:55.899  INFO indexer_for_explorer: Adding/updating access keys from genesis...
Feb 24 15:33:56.236  INFO indexer_for_explorer: Adding/updating access keys from genesis...
Feb 24 15:33:56.529  INFO stats: #42376888 Downloading headers 0.13% (41144311) 5 peers ⬇ 125.9kiB/s ⬆ 347.9kiB/s 0.00 bps 0 gas/s CPU: 15%, Mem: 14.1 GiB
Feb 24 15:33:56.573  INFO indexer_for_explorer: Adding/updating access keys from genesis...
Feb 24 15:33:56.954  INFO indexer_for_explorer: Adding/updating accounts from genesis...
Feb 24 15:33:56.985  INFO indexer_for_explorer: Adding/updating access keys from genesis...
Feb 24 15:33:57.475  INFO indexer_for_explorer: Genesis records has been stored.
Feb 24 15:33:58.504  WARN indexer_for_explorer: Indexer is starting in NON-STRICT mode
Feb 24 15:33:58.504  INFO indexer_for_explorer: Stream has started
Feb 24 15:33:58.504  INFO indexer: Starting Streamer...
Feb 24 15:33:58.504  INFO near: Opening store database at "/Users/akagi201/.near/testnet/data"
Feb 24 15:33:59.017  INFO indexer_for_explorer: Block height 42376888
Feb 24 15:34:06.531  INFO stats: #42376888 Downloading headers 0.13% (41144330) 5 peers ⬇ 215.3kiB/s ⬆ 433.9kiB/s 0.00 bps 0 gas/s CPU: 19%, Mem: 8.7 GiB
Feb 24 15:34:16.533  INFO stats: #42376888 Downloading headers 0.13% (41143734) 5 peers ⬇ 228.7kiB/s ⬆ 434.0kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.7 GiB
Feb 24 15:34:26.535  INFO stats: #42376888 Downloading headers 0.13% (41143146) 5 peers ⬇ 229.4kiB/s ⬆ 434.0kiB/s 0.00 bps 0 gas/s CPU: 9%, Mem: 8.5 GiB
Feb 24 15:34:36.537  INFO stats: #42376888 Downloading headers 0.13% (41142549) 5 peers ⬇ 345.5kiB/s ⬆ 442.5kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:34:41.143  INFO near_network::peer_manager::peer_manager_actor: Bandwidth stats total_bandwidth_used_by_all_peers=14381604 total_msg_received_count=398 max_
max_record_num_messages_in_progress=6
Feb 24 15:34:46.539  INFO stats: #42376888 Downloading headers 0.14% (41141948) 6 peers ⬇ 285.7kiB/s ⬆ 182.2kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:34:56.542  INFO stats: #42376888 Downloading headers 0.14% (41141957) 6 peers ⬇ 249.5kiB/s ⬆ 182.5kiB/s 0.00 bps 0 gas/s CPU: 3%, Mem: 8.5 GiB
Feb 24 15:35:06.545  INFO stats: #42376888 Downloading headers 0.14% (41141371) 6 peers ⬇ 174.4kiB/s ⬆ 96.6kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:35:16.546  INFO stats: #42376888 Downloading headers 0.14% (41141377) 7 peers ⬇ 266.2kiB/s ⬆ 199.4kiB/s 0.00 bps 0 gas/s CPU: 3%, Mem: 8.5 GiB
Feb 24 15:35:26.547  INFO stats: #42376888 Downloading headers 0.14% (41140801) 7 peers ⬇ 280.4kiB/s ⬆ 199.8kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:35:36.549  INFO stats: #42376888 Downloading headers 0.14% (41140230) 7 peers ⬇ 179.6kiB/s ⬆ 191.6kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:35:41.146  INFO near_network::peer_manager::peer_manager_actor: Bandwidth stats total_bandwidth_used_by_all_peers=16885709 total_msg_received_count=724 max_
max_record_num_messages_in_progress=14
Feb 24 15:35:46.551  INFO stats: #42376888 Downloading headers 0.14% (41139658) 7 peers ⬇ 169.3kiB/s ⬆ 105.4kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:35:56.553  INFO stats: #42376888 Downloading headers 0.14% (41139082) 7 peers ⬇ 283.2kiB/s ⬆ 106.3kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:36:06.556  INFO stats: #42376888 Downloading headers 0.14% (41138505) 7 peers ⬇ 298.6kiB/s ⬆ 108.2kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:36:16.557  INFO stats: #42376888 Downloading headers 0.15% (41137927) 7 peers ⬇ 221.9kiB/s ⬆ 6.1kiB/s 0.00 bps 0 gas/s CPU: 7%, Mem: 8.5 GiB
Feb 24 15:36:26.560  INFO stats: #42376888 Downloading headers 0.15% (41137353) 7 peers ⬇ 210.8kiB/s ⬆ 6.9kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:36:36.563  INFO stats: #42376888 Downloading headers 0.15% (41136776) 7 peers ⬇ 225.5kiB/s ⬆ 8.1kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:36:41.149  INFO near_network::peer_manager::peer_manager_actor: Bandwidth stats total_bandwidth_used_by_all_peers=10849429 total_msg_received_count=1182 max
_max_record_num_messages_in_progress=11
Feb 24 15:36:46.566  INFO stats: #42376888 Downloading headers 0.15% (41135624) 7 peers ⬇ 251.4kiB/s ⬆ 8.0kiB/s 0.00 bps 0 gas/s CPU: 13%, Mem: 8.5 GiB
Feb 24 15:36:56.568  INFO stats: #42376888 Downloading headers 0.15% (41134463) 7 peers ⬇ 150.5kiB/s ⬆ 6.6kiB/s 0.00 bps 0 gas/s CPU: 14%, Mem: 8.5 GiB
Feb 24 15:37:06.571  INFO stats: #42376888 Downloading headers 0.16% (41132732) 7 peers ⬇ 165.1kiB/s ⬆ 6.9kiB/s 0.00 bps 0 gas/s CPU: 19%, Mem: 8.5 GiB
Feb 24 15:37:16.572  INFO stats: #42376888 Downloading headers 0.16% (41132155) 7 peers ⬇ 166.4kiB/s ⬆ 7.4kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:37:26.578  INFO stats: #42376888 Downloading headers 0.16% (41131586) 8 peers ⬇ 166.5kiB/s ⬆ 96.2kiB/s 0.00 bps 0 gas/s CPU: 10%, Mem: 8.5 GiB
Feb 24 15:37:36.583  INFO stats: #42376888 Downloading headers 0.16% (41130430) 8 peers ⬇ 267.4kiB/s ⬆ 97.9kiB/s 0.00 bps 0 gas/s CPU: 13%, Mem: 8.5 GiB
Feb 24 15:37:41.160  INFO near_network::peer_manager::peer_manager_actor: Bandwidth stats total_bandwidth_used_by_all_peers=17821781 total_msg_received_count=1406 max
_max_record_num_messages_in_progress=6
Feb 24 15:37:46.587  INFO stats: #42376888 Downloading headers 0.17% (41129272) 8 peers ⬇ 256.4kiB/s ⬆ 99.5kiB/s 0.00 bps 0 gas/s CPU: 16%, Mem: 8.5 GiB
Feb 24 15:37:56.589  INFO stats: #42376888 Downloading headers 0.17% (41128697) 8 peers ⬇ 243.3kiB/s ⬆ 99.7kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:38:06.592  INFO stats: #42376888 Downloading headers 0.17% (41128119) 8 peers ⬇ 242.0kiB/s ⬆ 99.4kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB

Feb 24 15:38:16.594  INFO stats: #42376888 Downloading headers 0.17% (41126966) 9 peers ⬇ 231.1kiB/s ⬆ 189.6kiB/s 0.00 bps 0 gas/s CPU: 14%, Mem: 8.5 GiB
Feb 24 15:38:26.596  INFO stats: #42376888 Downloading headers 0.17% (41126392) 9 peers ⬇ 245.7kiB/s ⬆ 101.9kiB/s 0.00 bps 0 gas/s CPU: 9%, Mem: 8.5 GiB
Feb 24 15:38:36.715  INFO stats: #42376888 Downloading headers 0.17% (41126397) 9 peers ⬇ 132.8kiB/s ⬆ 100.7kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:38:41.391  INFO near_network::peer_manager::peer_manager_actor: Bandwidth stats total_bandwidth_used_by_all_peers=14166119 total_msg_received_count=1295 max
_max_record_num_messages_in_progress=7
Feb 24 15:38:46.717  INFO stats: #42376888 Downloading headers 0.18% (41125816) 9 peers ⬇ 203.7kiB/s ⬆ 99.8kiB/s 0.00 bps 0 gas/s CPU: 3%, Mem: 8.5 GiB
Feb 24 15:38:56.720  INFO stats: #42376888 Downloading headers 0.18% (41125243) 9 peers ⬇ 214.3kiB/s ⬆ 98.6kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:39:06.723  INFO stats: #42376888 Downloading headers 0.18% (41124665) 9 peers ⬇ 218.4kiB/s ⬆ 101.3kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:39:16.725  INFO stats: #42376888 Downloading headers 0.18% (41124092) 9 peers ⬇ 202.7kiB/s ⬆ 10.8kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:39:26.727  INFO stats: #42376888 Downloading headers 0.18% (41123514) 9 peers ⬇ 212.0kiB/s ⬆ 8.4kiB/s 0.00 bps 0 gas/s CPU: 7%, Mem: 8.5 GiB
Feb 24 15:39:36.729  INFO stats: #42376888 Downloading headers 0.18% (41122941) 9 peers ⬇ 224.6kiB/s ⬆ 8.5kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:39:41.393  INFO near_network::peer_manager::peer_manager_actor: Bandwidth stats total_bandwidth_used_by_all_peers=10213341 total_msg_received_count=776 max_
max_record_num_messages_in_progress=8
Feb 24 15:39:46.730  INFO stats: #42376888 Downloading headers 0.18% (41122363) 9 peers ⬇ 151.7kiB/s ⬆ 7.6kiB/s 0.00 bps 0 gas/s CPU: 8%, Mem: 8.5 GiB
Feb 24 15:39:56.732  INFO stats: #42376888 Downloading headers 0.19% (41121214) 9 peers ⬇ 139.4kiB/s ⬆ 7.6kiB/s 0.00 bps 0 gas/s CPU: 15%, Mem: 8.5 GiB
Feb 24 15:40:06.734  INFO stats: #42376888 Downloading headers 0.19% (41120640) 9 peers ⬇ 139.4kiB/s ⬆ 6.9kiB/s 0.00 bps 0 gas/s CPU: 9%, Mem: 8.5 GiB
Feb 24 15:40:16.736  INFO stats: #42376888 Downloading headers 0.19% (41119496) 9 peers ⬇ 171.1kiB/s ⬆ 10.3kiB/s 0.00 bps 0 gas/s CPU: 15%, Mem: 8.5 GiB
```

基于 Near Framework 编写 indexer

- 可以过滤掉不想要的数据, 自己设计数据库 schema.
- 提供类似 the graph 和 subquery 的用途.
- 缺点: 目前整个 indexer framework 还是太重了, 太依赖节点数据. 连接 testnet 或者 mainnet 你的节点必须完全与网络同步.
- https://docs.near.org/docs/tutorials/near-indexer

QA

- 中文学习资源: https://segmentfault.com/a/1190000041181012
- https://learnnear.club/
- https://github.com/near-examples
- https://docs.near.org/docs/develop/basics/getting-started
- https://www.near-sdk.io/zero-to-hero/basics/overview