ChatGPT

Integrating Blockchair API & Enhancing Multi-Chain Wallet Scanner

API Key Configuration & Proper Usage

To ensure all Blockchair API calls succeed and avoid rate-limit bans, configure the API key correctly for every request. Blockchair **requires** an API key for constant use [1] [2]. Include your key as a URL parameter in each request – e.g. `...?key=YOUR_API_KEY` – rather than relying on anonymous calls. The Blockchair documentation states: *"The key is applied to the end of the request string like this: api.blockchair.com/bitcoin/blocks?key=MYSECRETKEY"* [2]. Make sure your backend code injects this key on every request (the current design already prefers the primary key and falls back to a backup key if provided [3]). **Do not** expose this key on the client side – keep it in your server environment variables or config so it's not visible publicly [2]. Using the key will raise your rate limits and prevent 430 errors, which is crucial since the scanner will be making rapid, repeated API calls.

Using Blockchair Endpoints for Bulk Address Scanning

Leverage Blockchair's **multi-address balance** endpoint to dramatically improve scanning throughput. Instead of querying one address per request, use the batch query that Blockchair provides for UTXO chains (Bitcoin-like networks). Blockchair allows a comma-separated list of addresses (up to **25,000 addresses at once**) in a single call to the `/addresses/balances` API [4]. This endpoint returns the confirmed balances for all provided addresses in one response, *omitting any addresses that have zero balance or have never appeared on-chain* [5]. It's extremely fast – **under 1 second for 25k addresses** – and efficient (e.g. ~26 request points for 25k addresses) [6]. By using this bulk request, the scanner can check many keys in parallel without hitting rate limits.

Implementation tip: When scanning a batch of addresses, call:

```
GET https://api.blockchair.com/bitcoin/addresses/balances?
addresses=addr1,addr2,...,addrN&key=YOUR_API_KEY
```

(Blockchair supports this `addresses/balances` endpoint for Bitcoin, Bitcoin Cash, Bitcoin SV, Litecoin, Dash, Zcash, Dogecoin, and Groestlcoin [7]). The JSON response will include balance info for any address that has funds or history; if an address is missing from the result, you can assume it has no balance (i.e. not used). Using this bulk lookup strategy will allow the scanner to process thousands of addresses per minute. For Ethereum or other account-based chains, Blockchair's API does not have the same bulk endpoint, so you can query each address's dashboard individually (e.g. `GET /ethereum/dashboards/address/{addr}` with your key) or use existing providers as a fallback for those chains. The key idea is to **minimize per-address calls** by bundling queries whenever possible.

Random Key Mode – Rapid Key Generation & Scanning

Random Key Mode requires no user-provided hex input – when the user initiates a scan, the backend should continuously generate random 64-character hex private keys and check them for balances **in rapid succession**. The system should aim to generate and test as many keys as possible, as quickly as possible. To achieve this:

- Use the backend's hex generation utility (or a cryptography library) to produce large batches of random 64-character hex strings. For example, generate a batch of a few hundred or thousand random keys at a time (the backend's `/utils/hex/generate` can produce up to a configured maximum like 2048 keys per call [8]). Ensure uniqueness in each batch (the utility's `unique=true` by default helps avoid duplicates [9]).
- For each batch of private keys, derive the corresponding public addresses **for each target blockchain**. For Bitcoin-like chains, convert the 64-hex private key to a compressed public key and then to an address (e.g. a P2PKH address on mainnet) using a trusted library (the project plans to use a vetted HD wallet library for key derivation [10]). For Ethereum, derive the 20-byte address (e.g. via keccak-256 of the public key). If multiple chains are being scanned in parallel, derive the appropriate address for each chain from the same private key.
- **Batch the address checks:** Collect the derived addresses (for example, 100 or 1000 at a time) and query Blockchair's bulk balance API as described above. This way, instead of one HTTP call per address, you might do one call per 1000 addresses. This dramatically increases throughput – Blockchair can handle 25k addresses in under a second [11], so even using, say, 5k or 10k per request is very fast.
- Use asynchronous concurrency to overlap requests. The backend code already defines a semaphore-controlled concurrency limit (e.g. `BLOCKCHAIR_MAX_CONCURRENCY`, default 8 requests at once) to throttle API calls [12]. You can tune this value if needed, but with bulk requests the default may be enough. Launch multiple async tasks to generate and scan batches in parallel, up to the allowed concurrency. For instance, with 8 concurrent requests of 1000 addresses each, the system could be checking 8,000 keys in parallel per cycle.
- **Goal:** Strive for scanning on the order of thousands of keys per minute. For example, if each batch of 1000 addresses takes ~1 second to process, an concurrency of 5-6 parallel requests could yield ~5-6k addresses checked per second (though network and processing overhead might lower this, it's still in the thousands/minute range). The key is that random keys should be generated and checked continuously without idle time, until the user stops the scan or a key with a hit is found.

Range Mode – Sequential Range Scanning

In **Range Mode**, the user provides a start and end hex value (defining a range of private keys), and the system scans all keys in that range. This should be implemented in a similarly efficient way, given that a range can encompass a huge number of keys. The approach is to **iterate through the range in chunks**:

- Do not generate every key individually one-by-one (which would be very slow). Instead, break the range into manageable batches. For example, if the range is from `min_hex` to `max_hex`, you can iterate a cursor through this range and at each step generate, say, 500 or 1000 keys (or whatever chunk size is optimal) sequentially. The backend's hex generator can assist: by setting `randomize=false` and providing `min_hex` / `max_hex`, it could generate the next batch in sequence [9]. Alternatively, manually increment a counter for the private key and format it as hex.

- As with random mode, derive addresses from each batch of keys for the relevant blockchain(s) and use bulk API calls to check balances. The difference in range mode is that you cover every key in the sequence. Ensure that the loop moves the cursor forward by the batch size on each iteration.
- **Speed considerations:** Just like random mode, maintain concurrency and use bulk queries. You can pipeline multiple batches in parallel (e.g., while one batch's API call is in progress, start deriving the next batch of keys). This overlap keeps the scanner busy. The goal is again to scan thousands of keys per minute – range mode should be as optimized as random mode. If the range is extremely large, you might not scan it completely in reasonable time, but using large batch sizes and parallel requests will cover the space much faster than a naive approach.
- It's wise to allow the user to stop the range scan at any time, since ranges can be enormous. The system should periodically update progress (how far from the start it has scanned) and respond to stop signals, given the potentially long runtime of a full range scan.

Multi-Chain Scanning Support & Fallback Providers

This wallet recovery scanner is **multi-chain** by design, meaning it can scan for addresses across different blockchains. Blockchair's API is well-suited here because it provides a unified interface to **14+ blockchains** under the same API key [13]. In fact, one of Blockchair's examples is *"a wallet supporting multiple blockchains"* using their API [14]. To utilize this: structure your code so that adding support for a new chain is straightforward. For each blockchain, use the appropriate Blockchair endpoint (e.g. `/litecoin/addresses/balances` for Litecoin, `/dogecoin/…` for Dogecoin, etc., all with your API key). The scanner can either operate one chain at a time (as selected by the user) or even scan a given key across multiple chains in parallel. For example, you could take a random private key and derive both a Bitcoin address, a Litecoin address, and a Dogecoin address from it, then query all three via Blockchair. This increases the chances of finding any fund associated with that key on **any** chain. If implementing cross-chain checks for each key, structure the results to note which chain had a hit.

Finally, maintain other API providers as **backups** in case Blockchair fails or to cross-verify data. Your current implementation already includes alternate providers like Infura/Etherscan (for Ethereum) and Tatum (for Bitcoin) – these can be used if a Blockchair request errors out or if you want to compare results. For instance, the code could catch exceptions from Blockchair and then try an Infura call for an Ethereum address or a Tatum call for a Bitcoin address (if those API keys are configured). This way, scanning won't be completely blocked if Blockchair experiences downtime or returns unexpected results. However, under normal operation, prioritize Blockchair as the primary source (since it's faster and unified), and use others only as a fallback.

In summary, to **correct the API calls and implement the architecture**: update all blockchain queries to go through Blockchair's endpoints with the API key attached, use bulk address scanning for efficiency, and implement the Random/Range scanning modes to generate and check keys at high speed. This will align the code with the intended *Multi-Chain Wallet Recovery Scanner* architecture, maximizing performance and ensuring the API usage is correct and optimized (using your key and Blockchair's multi-chain capabilities). With these changes, the system will rapidly scan keys across multiple chains and reliably identify any wallets with balances, all while respecting the API's requirements and limits.

Key implementation steps (to provide to Codex for coding):

1. **API Key Inclusion:** Modify all Blockchair API calls to append the `key` parameter (e.g. `params["key"] = settings.BLOCKCHAIR_API_KEY`) so that every request uses your secret key [2]. This applies to Bitcoin, Ethereum, and any other chain endpoints used. Ensure the key is pulled from your config (e.g. environment) and not hard-coded, and prefer the primary key with fallback to backup if configured [3].
2. **Blockchair as Primary Data Source:** Refactor the blockchain scanner classes to use Blockchair's REST endpoints exclusively for address balance and transaction queries. For Bitcoin-like chains, use the `/addresses/balances` batch endpoint for efficiency [4]. For example, in the Bitcoin scanner, replace single-address calls to `/dashboards/address/{addr}` with a batch call for multiple addresses when scanning many keys at once. Parse the batch response to identify which addresses have non-zero balance. For Ethereum, integrate Blockchair's `dashboards/address` endpoint (or continue using Infura as a backup) to get ETH balance and transaction count.
3. **Random Key Mode Implementation:** Update the scanning logic to support continuous random key generation. When a random scan starts, have the backend generate a large list of random 64-character hex keys (you can call the existing `/utils/hex/generate` or use an internal function) and immediately convert them to addresses for the target chain(s). Send these addresses to Blockchair in bulk to check for any balances. Use asyncio to concurrently handle multiple batches – e.g., while one batch's API call is running, prepare the next batch of keys. Loop this process indefinitely (or until a stop condition), so the system is constantly generating and scanning new keys. This will allow *rapid-fire* checks – potentially thousands of keys per minute – as desired.
4. **Range Mode Implementation:** When a user supplies a `min_hex` and `max_hex`, implement a loop that walks through this range. Use a step size (batch size) to generate the next sequence of keys instead of one at a time. For instance, generate the next 500 or 1000 keys in the range, derive their addresses, and query Blockchair for all in one request. Then move on to the next set. Continue until the end of the range is reached or the user stops the scan. This ensures range scanning is as efficient as random mode. (If the range is extremely large, you might not realistically hit the very end, but the user can stop once enough of the space has been sampled or scanned.)
5. **Address Derivation:** Integrate a reliable library or method to derive addresses from the private key hex. The architecture notes suggest using a vetted HD wallet library for derivation [10]. This is crucial for accuracy – for example, deriving a Bitcoin address (P2PKH or Bech32) from a private key requires correct elliptic curve math and encoding. Implement utility functions for each blockchain: e.g., `derive_btc_address(private_key_hex)`, `derive_eth_address(private_key_hex)`, etc. This modular approach will make it easy to extend to new chains (derive LTC address, DOGE address, etc., from the same key).
6. **Multi-Chain Extension:** Ensure the scanning workflow can handle multiple chains. If the goal is to scan a given key across all supported chains, you might iterate over a list of blockchains, derive that chain's address from the key, and check via Blockchair for each. Alternatively, allow the user to choose the chain to focus on per scan. In code, this could mean having a base Scanner interface and multiple implementations (BitcoinScanner, EthereumScanner, LitecoinScanner, etc.) all using a common pattern. Because Blockchair's responses differ slightly per chain, make sure to parse each correctly (the project's Bitcoin scanner already handles Blockchair's JSON structure for addresses [15], and similar logic can be applied for other chains).
7. **Fallback Providers & Resilience:** Retain the alternate APIs (Infura, Etherscan, Tatum) as backups. Wrap Blockchair calls in try/except or use the existing circuit breaker (`breaker_blockchair`) so that if Blockchair fails (network error or returns an error code), the system can fall back to another

provider if available. For example, if a Blockchair Ethereum address query fails and you have an Infura key, automatically retry the balance fetch via Infura's JSON-RPC. This way, scans won't halt due to one service outage. You can also log or flag the use of backup providers for later analysis. Keeping this redundancy will make the scanner more robust, but under normal conditions Blockchair will handle the load.

By following these steps, your codebase will properly utilize the Blockchair API (with the API key) and implement the **Multi-Chain Wallet Recovery Scanner** architecture as intended. The result will be a high-performance scanner that quickly iterates over enormous key spaces, checks multiple blockchains, and reliably identifies any wallets with balance, all while staying within API guidelines and using your resources efficiently.

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1 2 4 5 6 7 11 Blockchair · Issue #1482 · Blockchair/Blockchair.Support · GitHub
https://github.com/Blockchair/Blockchair.Support/issues/1482

3 15 bitcoin.py
https://github.com/BloodLuust/hashapp/blob/3ab2187b7a679121fd8cd360e20269c1b2c0c78c/backend/app/services/blockchain/bitcoin.py

8 9 README.md
https://github.com/BloodLuust/hashapp/blob/3ab2187b7a679121fd8cd360e20269c1b2c0c78c/README.md

10 address_derivation.py
https://github.com/BloodLuust/hashapp/blob/3ab2187b7a679121fd8cd360e20269c1b2c0c78c/backend/app/services/address_derivation.py

12 config.py
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13 14 Blockchain API Documentation — Blockchair
https://blockchair.com/api/docs