10-k Itemization Backend V2.0

Overview

A REST API abstracting the complexity of itemizing a 10k filing and managing storage of processed filing content.

Functional Requirement

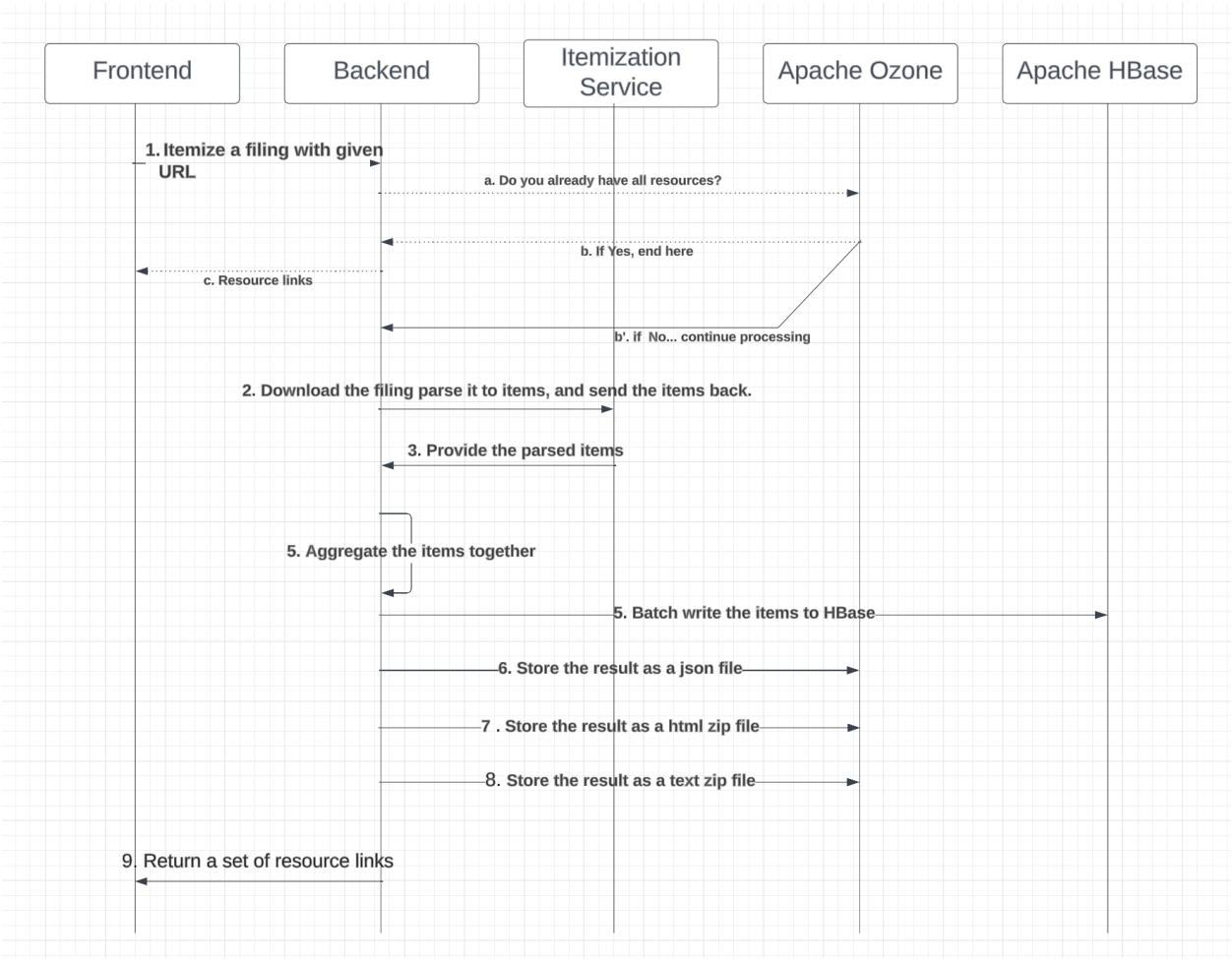
1. Being able to extract, process, and persist itemized filing items given an SEC filing URL.
2. Able to download filing resources given a downloading request. The possible resource could be a JSON file used to render the page on the frontend side; a zipped plain text formatted filing item; or a zipped html formatted filing item.
3. A mapping between the company ticker name(e.g.: AAPL-2021) chosen by the frontend, and the corresponding SEC filing URL.

Critical User Journey(CUJ)

There are three workflows:

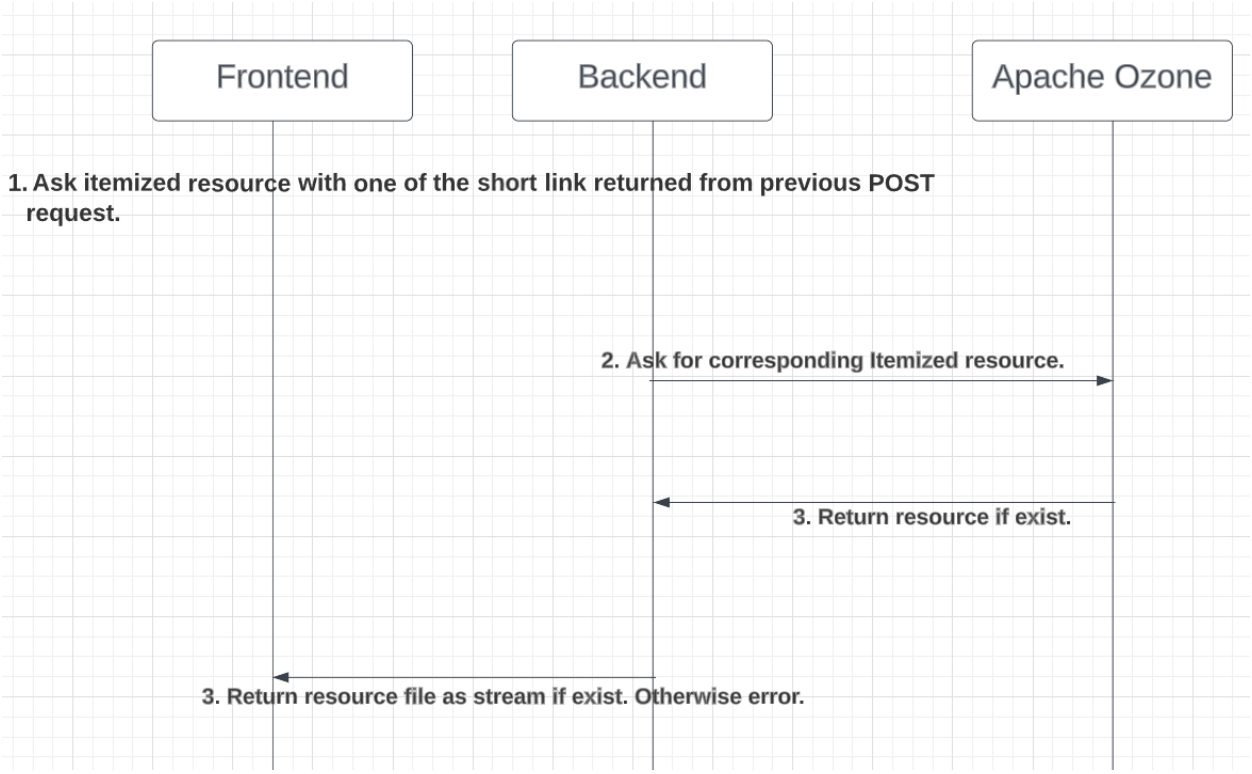
1. Fetching the mapping between a company ticker and a 10-k filing URL. Then store this mapping so that it can send the correct filing URL corresponding to the ticker selected by an end user to the backend.

2. Asking the backend to extract, process itemized filing resources and persist them, and to provide a set of resource links to download in the later downloading workflow. This action will be performed every time a particular itemized filing is to be displayed on the frontend.



Note: Step 5-8 can be done in parallel to reduce the time waste caused by blocking IO.

3. Downloading the appropriate resource from the given link returned in Step 2. The options are:
    a. a HTML zip file to download.
    b. a text zip file to download.
    c. a JSON file containing the items to render at the frontend.



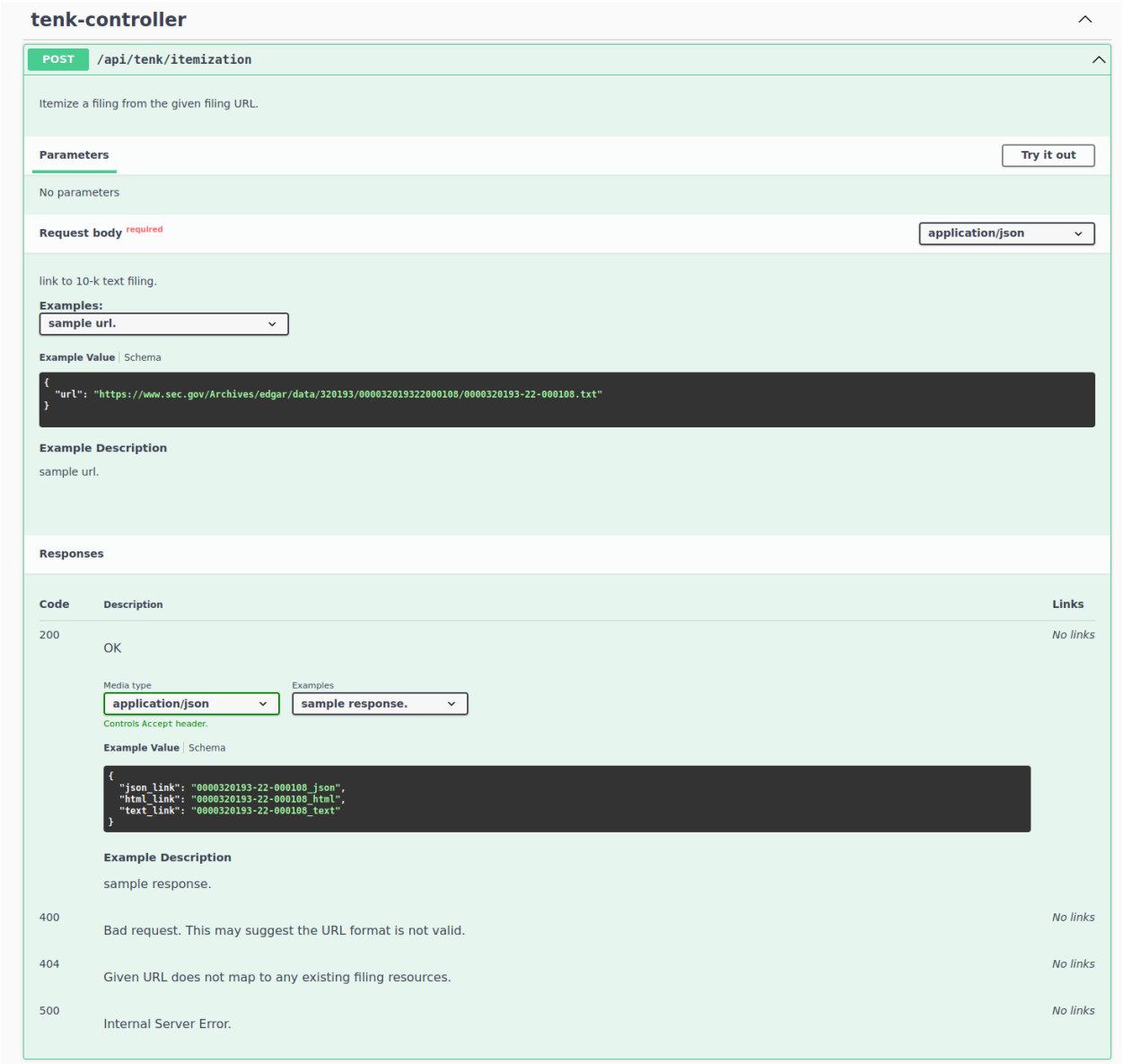
API

Download filing, Itemize, and store it at the background given a filing URL

```
REQUEST
        POST api/tenk/itemization

        Body: {“url”:”${tenk-filing-url}”}
—---------------------------------
RESPONSE
Body: {“json_link”:”xxx”, “html_link”:”xxx”, “text_link”:”xxx”}
```

Check below for an example:



Get sample filing links from ticker name

```
GET api/tenk/samples
——————————————————————
RESPONSE
Body: (a sample map)

```

Get itemized filing content

As a text zip file

```
GET api/tenk/sample-form?filing_name=${text_link}
—----------------------------------
RESPONSE
Body: a byte stream of a zip file

```

- text_link is the one returned in this section.

As a HTML zip file

```
GET api/tenk/sample-form?filing_name=${html_link}
—----------------------------------
RESPONSE
Body: a byte stream of a zip file

```

- html_link is the one returned in this section.

As a JSON items stream

```
GET api/tenk/sample-form?filing_name=${json_link}
—----------------------------------
RESPONSE
Body: a byte stream of a JSON file

```

- json_link is the one returned in this section.

The improvement compared with V1

- The algorithm is packed into another service(docker) and is triggered by RPC, the app and the algorithm can be deployed separately. There is no more git module issue.
- IO blocking time is reduced by running several tasks in parallel.
- API has less confusing field names in the response JSON.

- S3 is replaced with Ozone, so we can control all resources on our side without paying AWS.
- The frontend request flow is simpler. Now, the only entity that can interact with object storage is the backend server. So all the request is between the frontend and the backend. This change reduces downloading speed but gives much better control and hides the object storage behind, so we don't need to worry about setting a gateway for it.

Assumption

- Filing Data are stored in docker temporarily since they can be produced at any time if they are not persisted.
- The biggest processed filing is below 1G.
- The amount of storage space needed for this app(at this stage) is negligible.
- We would have another Functional Request that read a particular item from another HBase that has data already stored very soon (current pattern is url→itemized form). This service then will use that HBase as the persistence layer. Also we should also develop at least the DAO interface for this coming request. Even though at this moment, HBase is actually not needed.

- Ozone adapts well to the Hadoop ecosystem. Thus we'd choose it as the Object Store. We'd develop the solution now using the ozone docker cluster, and later we would migrate the storage there once our own Ozone Cluster is set up.

- As long as a resource is not found in Ozone, it is considered missing and will return 404 to frontend. It is expected that the user will manually reload the page and trigger another POST /itemization request to fetch the resource.

- The query load is negligible(max QPS < 10). And users can wait for 8-12s to get itemized responses during the POST request execution (this only happens if the resource is not stored in the Object Storage). The connection will keep open during the waiting time, and there is no need for a message queue.

- No Read/Write conflict since those 10-k filings are meant to be read-only. Once they are published on SEC, it keeps unchanged.