NVD CPE Assessment: Final Report

GitHub link: -

1. Project Overview

This project implements a system to retrieve, store, and serve Common Platform Enumeration (CPE) data from the National Vulnerability Database (NVD) XML file. The system includes a backend built with Flask (Python) and a frontend built with React. The goal was to parse the XML, store the required fields in a PostgreSQL database, and provide API endpoints to allow efficient querying and pagination of the data. A frontend UI was also developed to render the data and support interactive filtering and pagination.

2. Implementation Details

- **Backend:**
    - **Framework:** Flask (Python)
    - **Database:** PostgreSQL, with SQLAlchemy ORM
    - **Modules Used:** flask, flask_sqlalchemy, flask_cors, requests, lxml
    - **Functionality:**
        - Download and parse the official CPE dictionary XML file.
        - Extract fields: cpe_title, cpe_22_uri, cpe_23_uri, reference_links, cpe_22_deprecation_date, cpe_23_deprecation_date.
        - Store data in the database.
        - Provide two RESTful API endpoints:
            - /api/cpes: Paginated retrieval of CPEs.
            - /api/cpes/search: Filtered search by cpe_title, cpe_22_uri, cpe_23_uri, and deprecation_date.
- **Frontend:**
    - **Framework:** React
    - **Libraries Used:** Material-UI, Axios
    - **Features:**
        - Table/grid view of CPE data.
        - Filters for title, URIs, and deprecation date.
        - Pagination with selectable rows per page (15, 20, 30, 50).
        - Truncated long titles and tooltips for full text.
        - Popover to display extra reference links beyond the first two.

        - Fallback message if no data is found.

3. Testing and Verification

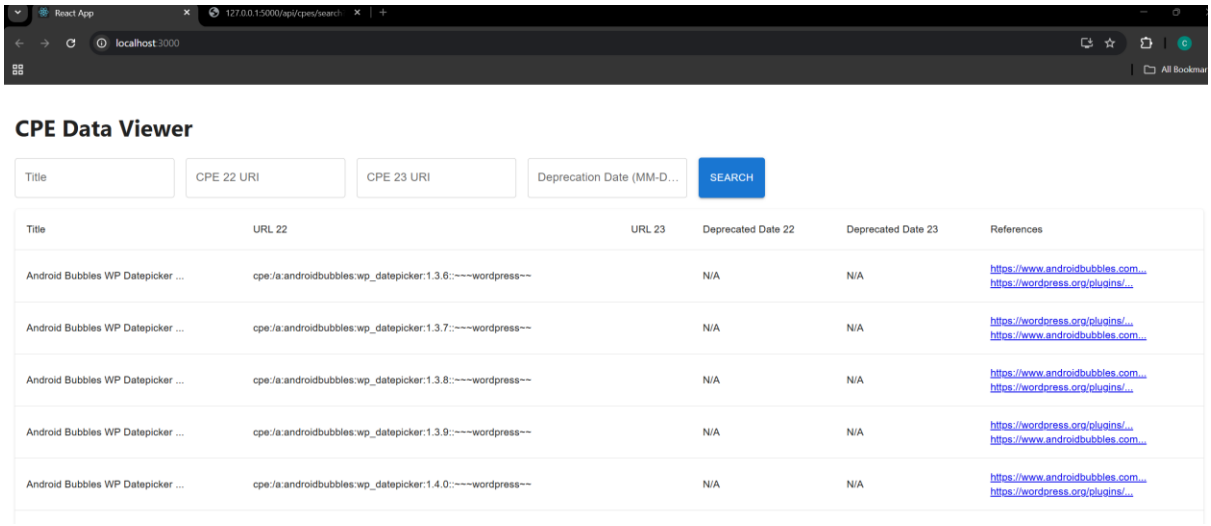
- **Backend Testing:**
    - Verified that data is correctly parsed and stored by querying the database directly.
    - Confirmed API functionality using Postman and browser-based tests.
    - Search functionality tested with various parameters and combinations.
- **Frontend Testing:**
    - Successfully retrieved and displayed data from the backend.
    - Verified filtering and pagination work as expected.
    - Tested popover feature for reference links and fallback message for no results.

5. Conclusion

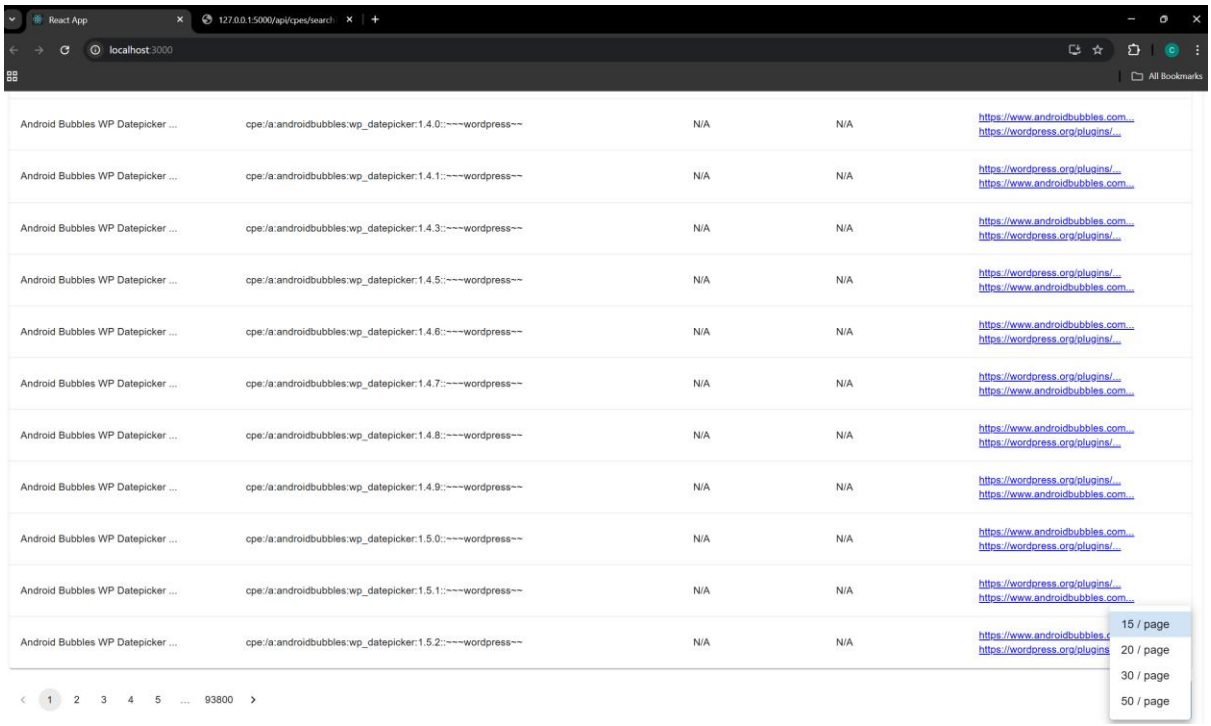
The project successfully meets all requirements outlined in the evaluation criteria. Both the backend and frontend are fully functional, and the system provides an efficient and user-friendly way to view and search CPE data. I have attached all screenshots to prove its working. I have almost tried and completed as you asked and most of them are also mentioned in Screenshot.

All for Frontend

1] Search filter



2] the page filer 15 to 50



3] Filter working

CPE Data Viewer

Title: microsoft | CPE 22 URI | CPE 23 URI | Deprecation Date (YYYY... | SEARCH

Title	URL 22	URL 23	Deprecated Date 22	Deprecated Date 23	References
Broadcom Unicenter Management ...	cpe:/a:broadcom:unicenter_management:4.0::microsoft_exchange		N/A	N/A	https://techdocs.broadcom.com/... https://www.ca.com/us.html
Broadcom Unicenter Management ...	cpe:/a:broadcom:unicenter_management:4.1::microsoft_exchange		N/A	N/A	https://techdocs.broadcom.com/... http://supportconnectw.ca.com/... +1 MORE
Broadcom Unicenter Management ...	cpe:/a:broadcom:unicenter_management_microsoft_exchange:-		N/A	N/A	https://www.broadcom.com/
Cisco NX-OS 5.2(1)sm3(2.1) for...	cpe:/o:cisco:nx-os:5.2%281%29sm3%282.1%29::~~~microsoft_hyper-v~~		N/A	N/A	https://www.cisco.com/c/en/us/... https://software.cisco.com/dow... +1 MORE
Dell OS Recovery Image for Mic...	cpe:/o:dell:os_recovery_image_for_microsoft_windows_10:-		N/A	N/A	https://www.dell.com/support/a...
Dell OS Recovery Image for Mic...	cpe:/o:dell:os_recovery_image_for_microsoft_windows_10:2019-12-20		N/A	N/A	https://www.dell.com/support/a...
Google Apps Migration For Micr...	cpe:/a:google:apps_migration_for_microsoft_exchange:2.2.756.1127		N/A	N/A	

CPE Data Viewer

Title | CPE 22 URI | CPE 23 URI | Deprecation Date (MM-DD-YYYY): 01-01-2024 | SEARCH

Title	URL 22	URL 23	Deprecated Date 22	Deprecated Date 23	References
No Data Found					

‹ › 15 / page

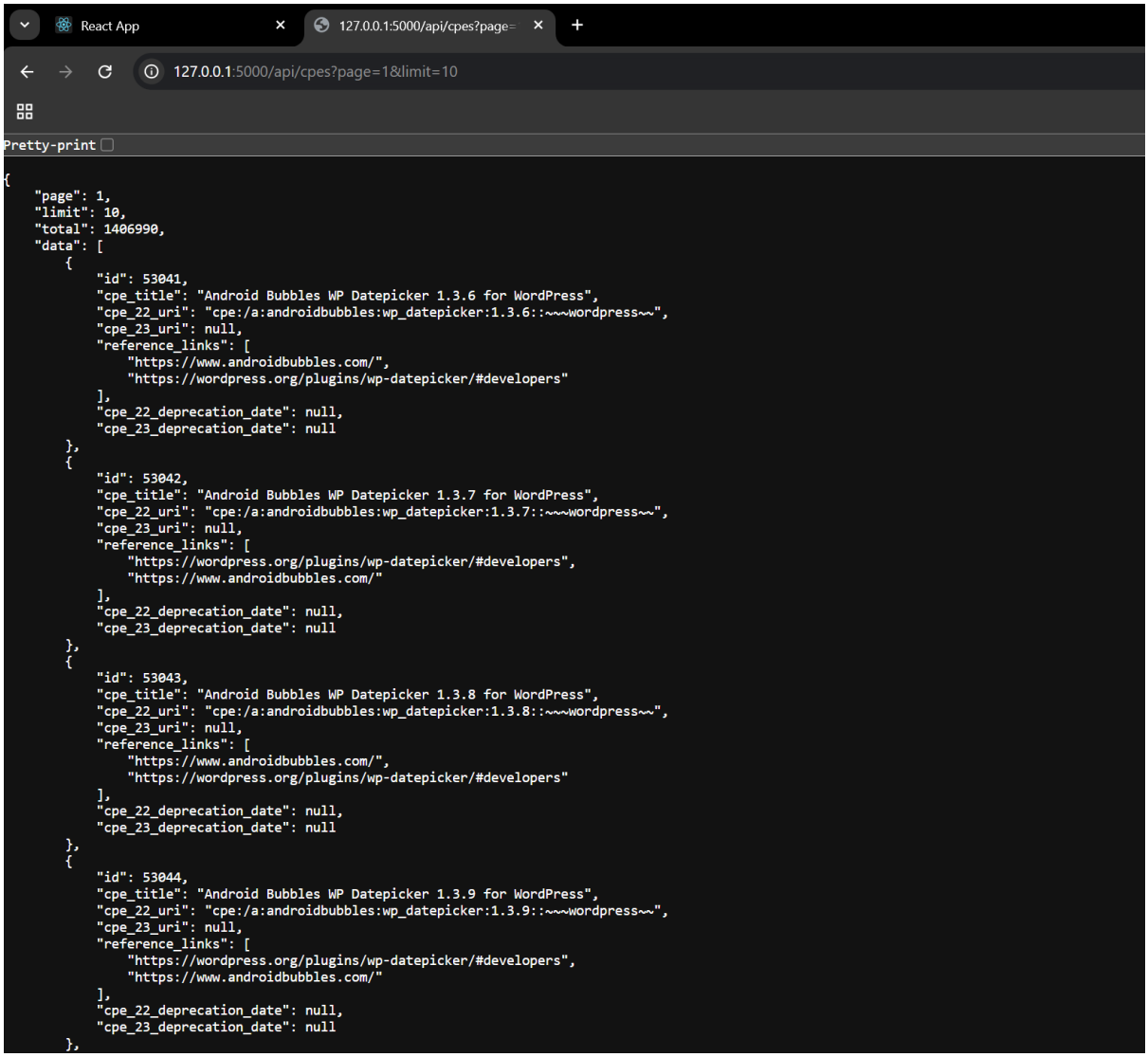
CPE Data Viewer

Title | CPE 22 URI | CPE 23 URI | Deprecation Date (MM-D... | SEARCH

Title	URL 22	URL 23	Deprecated Date 22	Deprecated Date 23	References
Android Bubbles WP Datepicker ...	cpe:/a:androidbubbles:wp_datepicker:1.3.6::~~~wordpress~~		N/A	N/A	https://www.androidbubbles.com... https://wordpress.org/plugins/...
Android Bubbles WP Datepicker ...	cpe:/a:androidbubbles:wp_datepicker:1.3.7::~~~wordpress~~		N/A	N/A	https://wordpress.org/plugins/... https://www.androidbubbles.com...
Android Bubbles WP Datepicker ...	cpe:/a:androidbubbles:wp_datepicker:1.3.8::~~~wordpress~~		N/A	N/A	https://www.androidbubbles.com... https://wordpress.org/plugins/...
Android Bubbles WP Datepicker ...	cpe:/a:androidbubbles:wp_datepicker:1.3.9::~~~wordpress~~		N/A	N/A	https://wordpress.org/plugins/... https://www.androidbubbles.com...
Android Bubbles WP Datepicker ...	cpe:/a:androidbubbles:wp_datepicker:1.4.0::~~~wordpress~~		N/A	N/A	https://www.androidbubbles.com... https://wordpress.org/plugins/...

Android Bubbles WP Datepicker 1.3.6 for WordPress

All for backend

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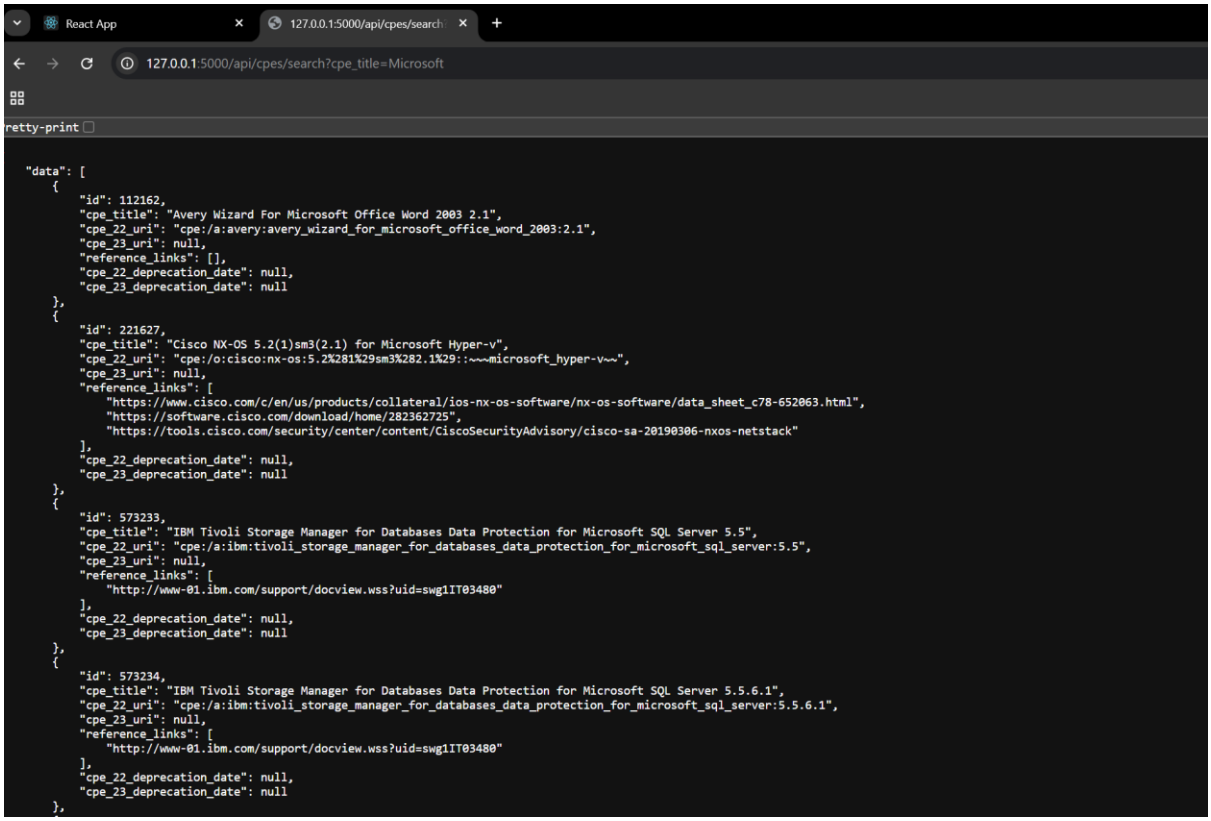


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            "https://software.cisco.com/download/home/282362725",
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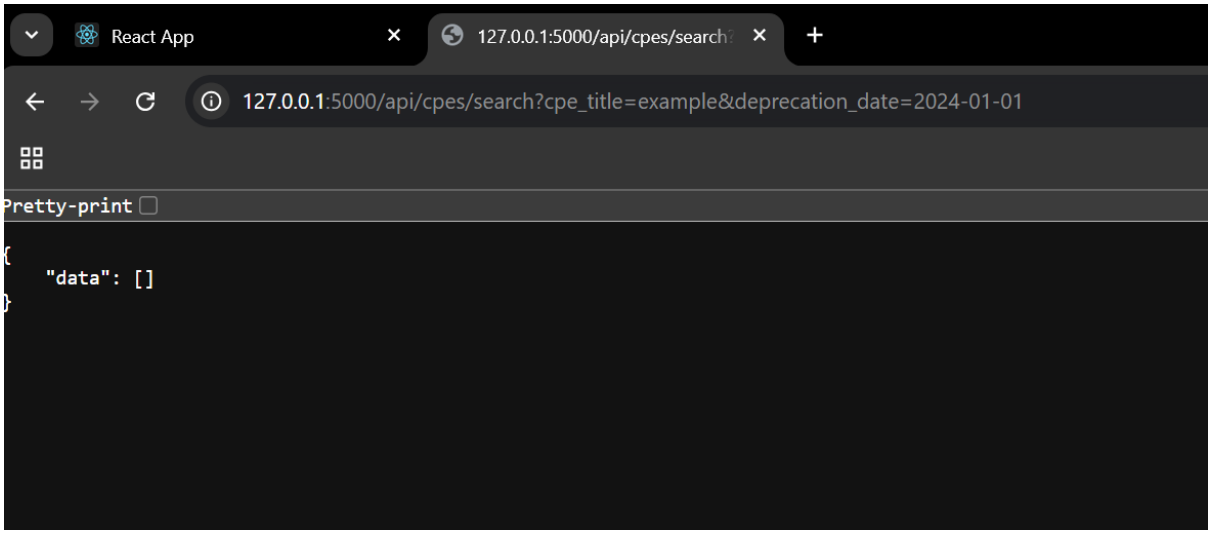


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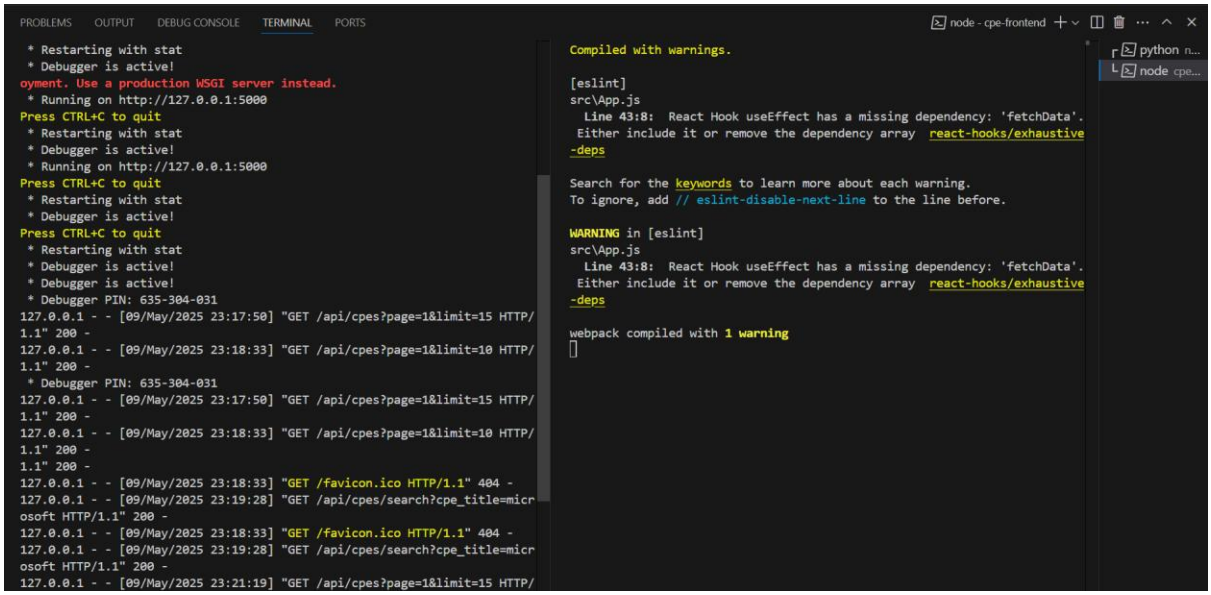
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
node - cpe-frontend
python n...
node cpe...
* Restarting with stat
* Debugger is active!
oyment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger is active!
* Debugger PIN: 635-304-031
127.0.0.1 - - [09/May/2025 23:17:50] "GET /api/cpes?page=1&limit=15 HTTP/
1.1" 200 -
127.0.0.1 - - [09/May/2025 23:18:33] "GET /api/cpes?page=1&limit=10 HTTP/
1.1" 200 -
* Debugger PIN: 635-304-031
127.0.0.1 - - [09/May/2025 23:17:50] "GET /api/cpes?page=1&limit=15 HTTP/
1.1" 200 -
127.0.0.1 - - [09/May/2025 23:18:33] "GET /api/cpes?page=1&limit=10 HTTP/
1.1" 200 -
1.1" 200 -
127.0.0.1 - - [09/May/2025 23:18:33] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - - [09/May/2025 23:19:28] "GET /api/cpes/search?cpe_title=micr
osoft HTTP/1.1" 200 -
127.0.0.1 - - [09/May/2025 23:18:33] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - - [09/May/2025 23:19:28] "GET /api/cpes/search?cpe_title=micr
osoft HTTP/1.1" 200 -
127.0.0.1 - - [09/May/2025 23:21:19] "GET /api/cpes?page=1&limit=15 HTTP/
Compiled with warnings.
[eslint]
src\App.js
Line 43:8: React Hook useEffect has a missing dependency: 'fetchData'.
Either include it or remove the dependency array react-hooks/exhaustive
-deps
Search for the keywords to learn more about each warning.
To ignore, add // eslint-disable-next-line to the line before.
WARNING in [eslint]
src\App.js
Line 43:8: React Hook useEffect has a missing dependency: 'fetchData'.
Either include it or remove the dependency array react-hooks/exhaustive
-deps
webpack compiled with 1 warning