

Serverless API Server

BAF675 금융 빅데이터 분석

이재훈, Week 10

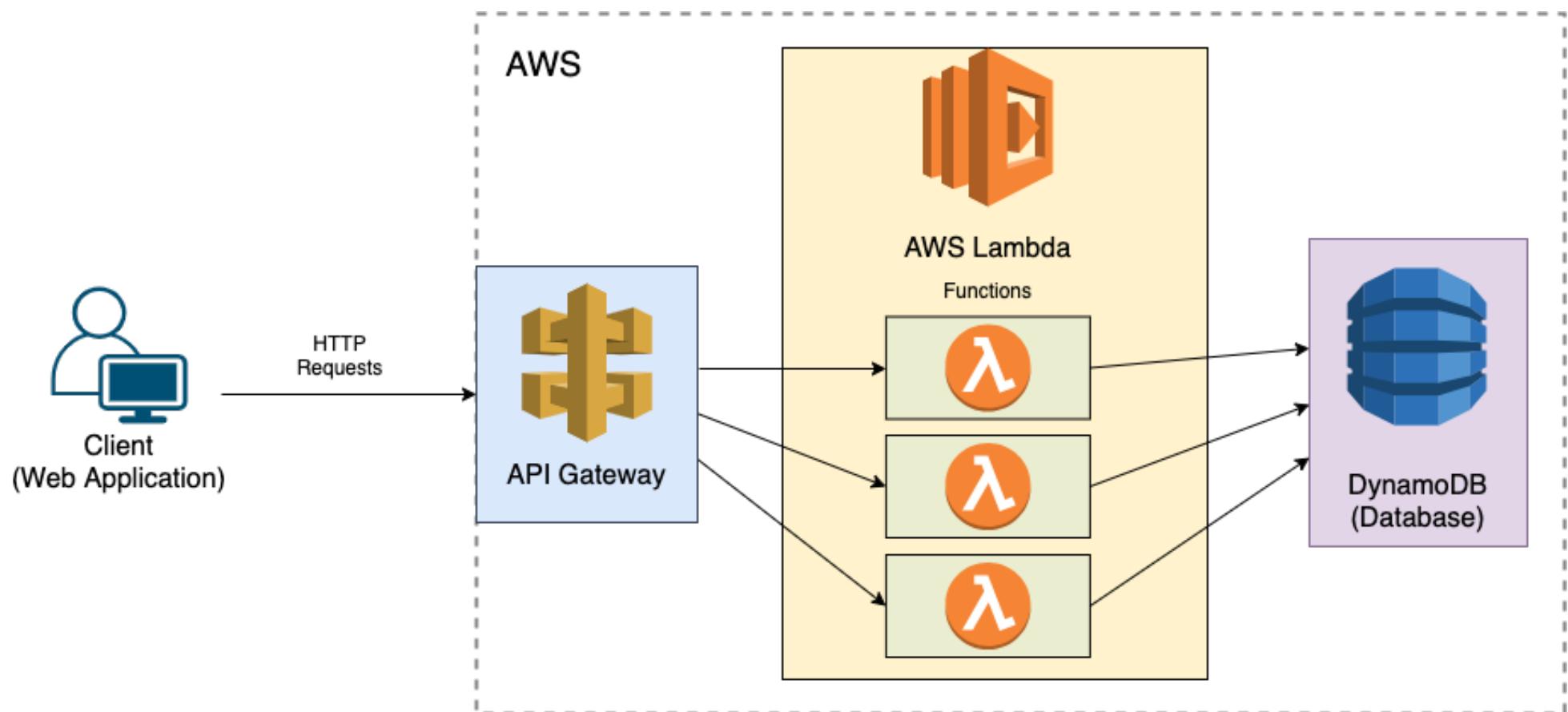
Serverless Backend

- 드디어 대망의 시간..!!
- AWS Lambda 로 backend service 만드는 법을 배워봅시다 🤖



AWS Lambda

Serverless Backend

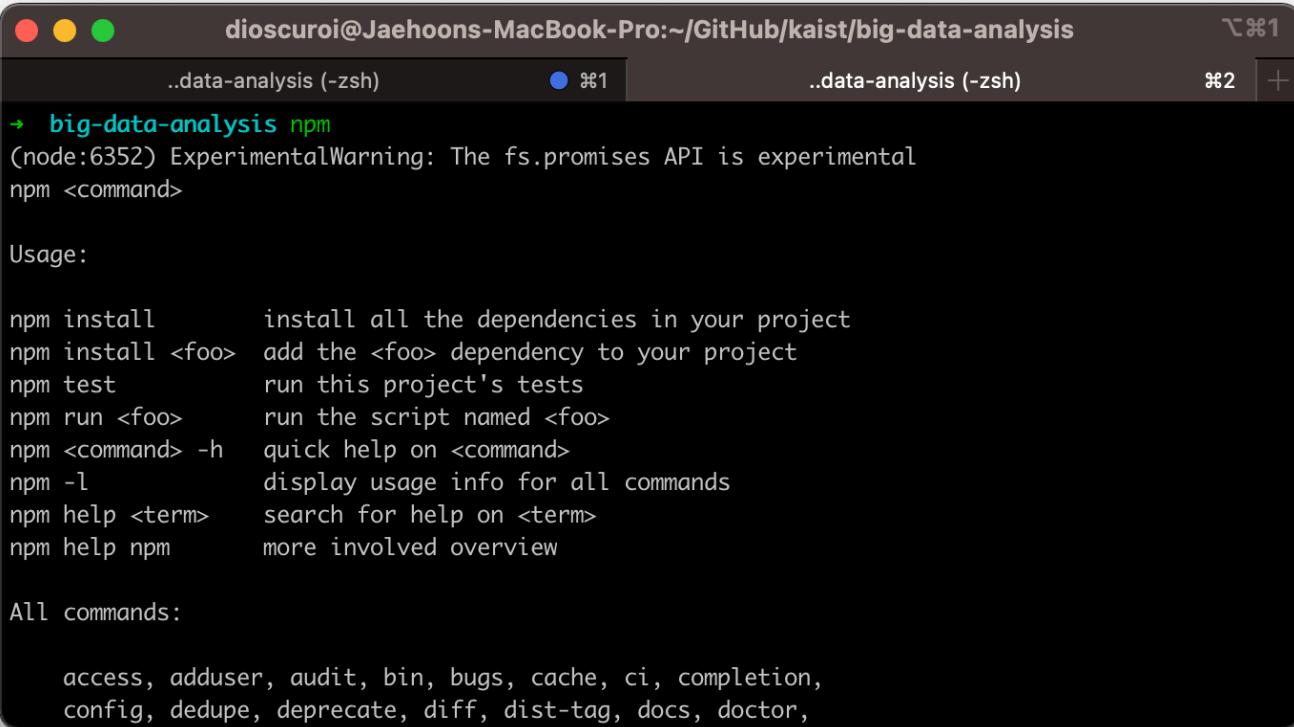


Serverless Backend

- AWS Management Console에서 API Gateway와 Lambda를 직접 하나하나 세팅해주면 관리가 너무 번거로워요.
- 특히 dev/prod/qa 등의 staging 관리를 하려면 너무 복잡해집니다.
- 따라서 우리는 node.js의 serverless plugin을 이용해서 programmatic하게 작성하고 관리하는 방법을 배우겠습니다.

Serverless 프로젝트 생성

- node.js 설치 여부 확인



```
dioscuroi@Jaehoons-MacBook-Pro:~/GitHub/kaist/big-data-analysis
```

```
..data-analysis (-zsh) ● ⌘1 ..data-analysis (-zsh) ⌘2 +
```

```
→ big-data-analysis npm
(node:6352) ExperimentalWarning: The fs.promises API is experimental
npm <command>

Usage:

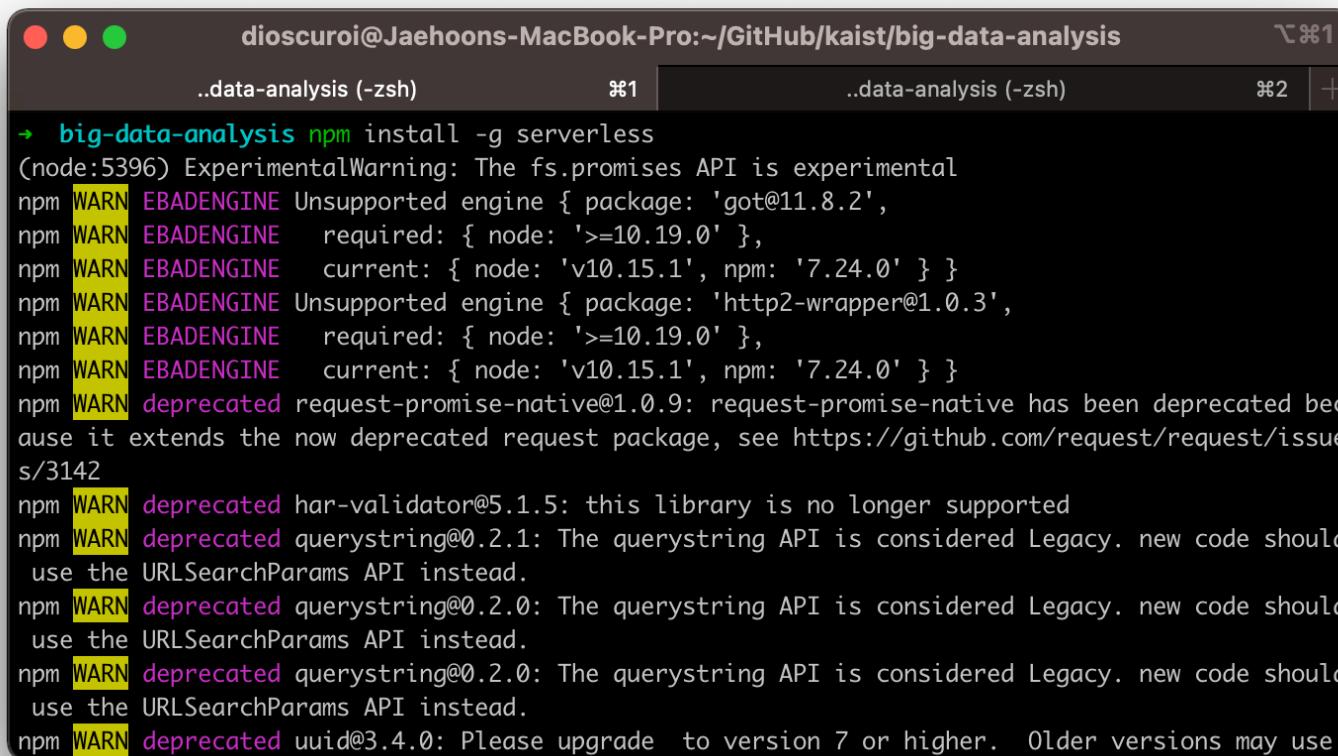
npm install      install all the dependencies in your project
npm install <foo> add the <foo> dependency to your project
npm test         run this project's tests
npm run <foo>   run the script named <foo>
npm <command> -h quick help on <command>
npm -l          display usage info for all commands
npm help <term> search for help on <term>
npm help npm    more involved overview

All commands:

access, adduser, audit, bin, bugs, cache, ci, completion,
config, dedupe, deprecate, diff, dist-tag, docs, doctor,
```

Serverless 프로젝트 생성

- Serverless plugin 설치



```
dioscuroi@Jaehoons-MacBook-Pro:~/GitHub/kaist/big-data-analysis
```

```
→ big-data-analysis npm install -g serverless
(node:5396) ExperimentalWarning: The fs.promises API is experimental
npm WARN EBADENGINE Unsupported engine { package: 'got@11.8.2',
npm WARN EBADENGINE   required: { node: '>=10.19.0' },
npm WARN EBADENGINE   current: { node: 'v10.15.1', npm: '7.24.0' } }
npm WARN EBADENGINE Unsupported engine { package: 'http2-wrapper@1.0.3',
npm WARN EBADENGINE   required: { node: '>=10.19.0' },
npm WARN EBADENGINE   current: { node: 'v10.15.1', npm: '7.24.0' } }
npm WARN deprecated request-promise-native@1.0.9: request-promise-native has been deprecated because it extends the now deprecated request package, see https://github.com/request/request/issues/3142
npm WARN deprecated har-validator@5.1.5: this library is no longer supported
npm WARN deprecated querystring@0.2.1: The querystring API is considered Legacy. new code should use the URLSearchParams API instead.
npm WARN deprecated querystring@0.2.0: The querystring API is considered Legacy. new code should use the URLSearchParams API instead.
npm WARN deprecated querystring@0.2.0: The querystring API is considered Legacy. new code should use the URLSearchParams API instead.
npm WARN deprecated uuid@3.4.0: Please upgrade to version 7 or higher. Older versions may use
```

Serverless 프로젝트 생성

- serverless 명령어 제대로 설치 되었는지 확인

```
dioscuroi@Jaehoons-MacBook-Pro:~/GitHub/kaist/big-data-analysis
..data-analysis (-zsh) ⌘1 ..data-analysis (-zsh) ⌘2 +
```

```
→ big-data-analysis serverless --help
(node:6488) ExperimentalWarning: The fs.promises API is experimental
(node:6488) ExperimentalWarning: The dns.promises API is experimental

Commands
* You can run commands with "serverless" or the shortcut "sls"
* Pass "--no-color" to disable CLI colors
* Pass "--help" after any <command> for contextual help

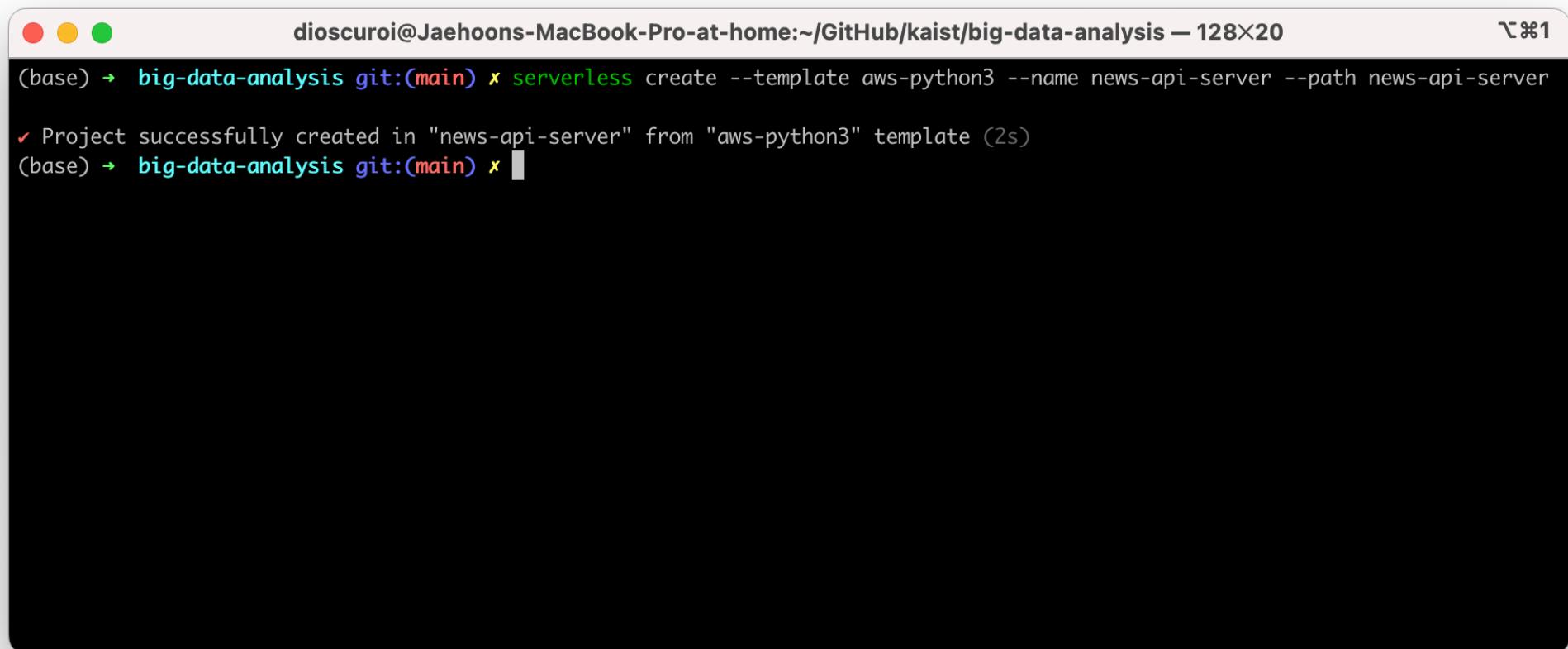
Interactive Quickstart
* Run serverless (or shortcut sls) without any arguments to initialize an interactive setup
  of functionalities related to given service or current environment
* Pass "--help-interactive" for contextual help on interactive CLI options

Serverless Components
* Run serverless (or shortcut sls) in context of a component service to initialize a components CLI
* Pass "--help-components" for contextual help on Serverless Components

Framework
* Documentation: http://slss.io/docs
```

Serverless 프로젝트 생성

- 새로운 serverless project 생성



```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis — 128×20
(base) ➔ big-data-analysis git:(main) ✘ serverless create --template aws-python3 --name news-api-server --path news-api-server
✓ Project successfully created in "news-api-server" from "aws-python3" template (2s)
(base) ➔ big-data-analysis git:(main) ✘
```

A screenshot of a macOS terminal window titled 'dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis — 128×20'. The window shows the command 'serverless create --template aws-python3 --name news-api-server --path news-api-server' being run. The output indicates that the project was successfully created in 'news-api-server' from the 'aws-python3' template in 2 seconds. The terminal has a dark theme with red, yellow, and green window controls.

Serverless 프로젝트 생성

- 생성된 프로젝트 파일 확인

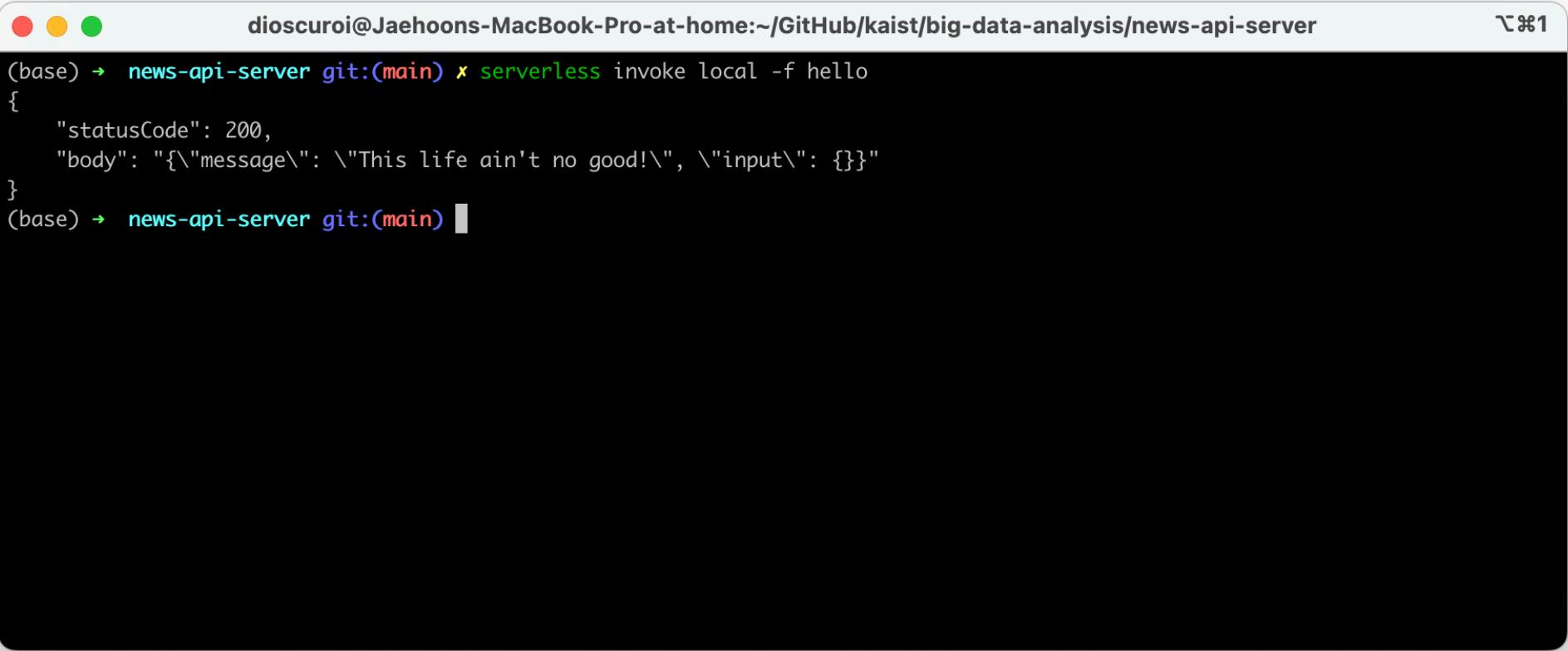
```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌘1
(base) ➜ big-data-analysis git:(main) ✘ cd news-api-server
(base) ➜ news-api-server git:(main) ✘ ll
total 16
-rw-r--r-- 1 dioscuroi  staff  497B  9 28 12:10 handler.py
-rw-r--r-- 1 dioscuroi  staff  3.2K 10  3 15:27 serverless.yml
(base) ➜ news-api-server git:(main) ✘
```

Serverless: Hello World

- serverless.yml 설정 변경
 - 주석 제거
 - stage, region 설정
 - http events 추가
- handler.py 파일 수정
 - 메시지 변경, 주석 제거

Serverless: Hello World

- invoke local



```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server
(base) ➜ news-api-server git:(main) ✘ serverless invoke local -f hello
{
  "statusCode": 200,
  "body": "{\"message\": \"This life ain't no good!\", \"input\": {}}"
}
(base) ➜ news-api-server git:(main)
```

A screenshot of a macOS terminal window. The title bar shows the user's name and the path: 'dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server'. The main pane of the terminal displays the command 'serverless invoke local -f hello' being run in a directory '(base)'. The output shows a JSON object with a statusCode of 200 and a body containing a message and an input object. The terminal has a dark theme with light-colored text.

Serverless: Hello World

- Deploy to AWS

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘1
(base) ➜ news-api-server git:(main) ✘ serverless deploy

Deploying news-api-server to stage dev (ap-northeast-2)

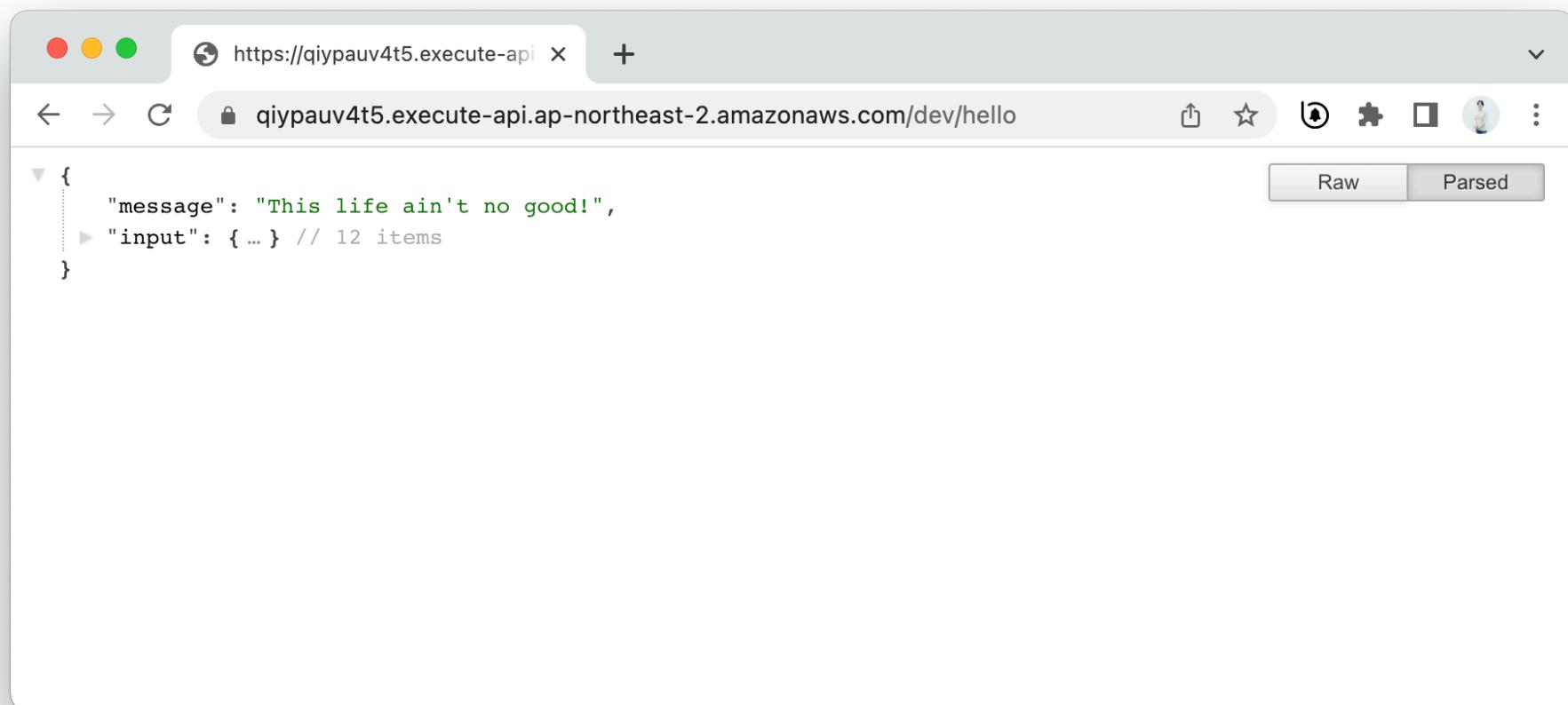
✓ Service deployed to stack news-api-server-dev (76s)

endpoint: GET - https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/hello
functions:
  hello: news-api-server-dev-hello (786 B)

Improve API performance – monitor it with the Serverless Dashboard: run "serverless"
(base) ➜ news-api-server git:(main) ✘
```

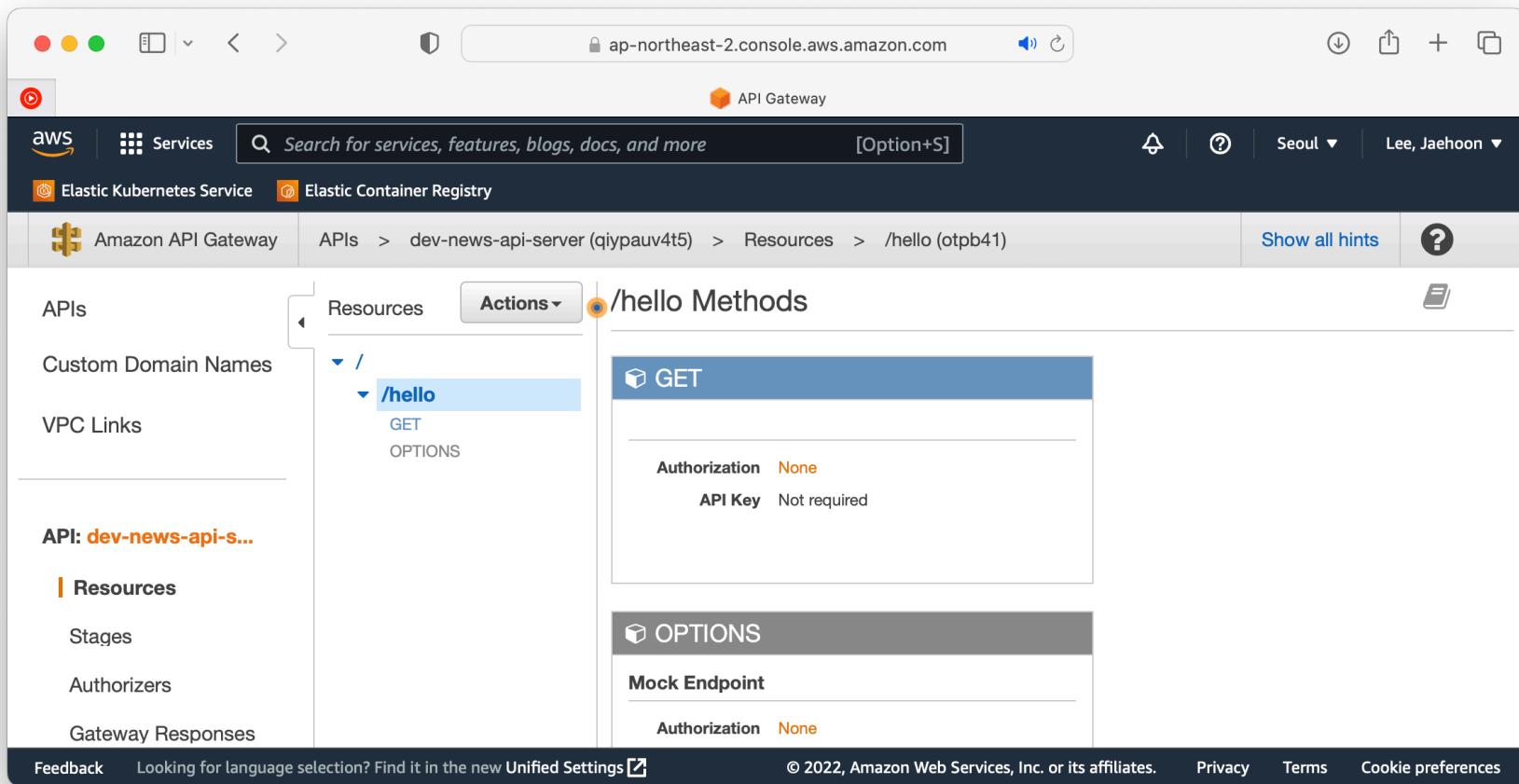
Serverless: Hello World

- 웹브라우저에서 호출 결과 확인



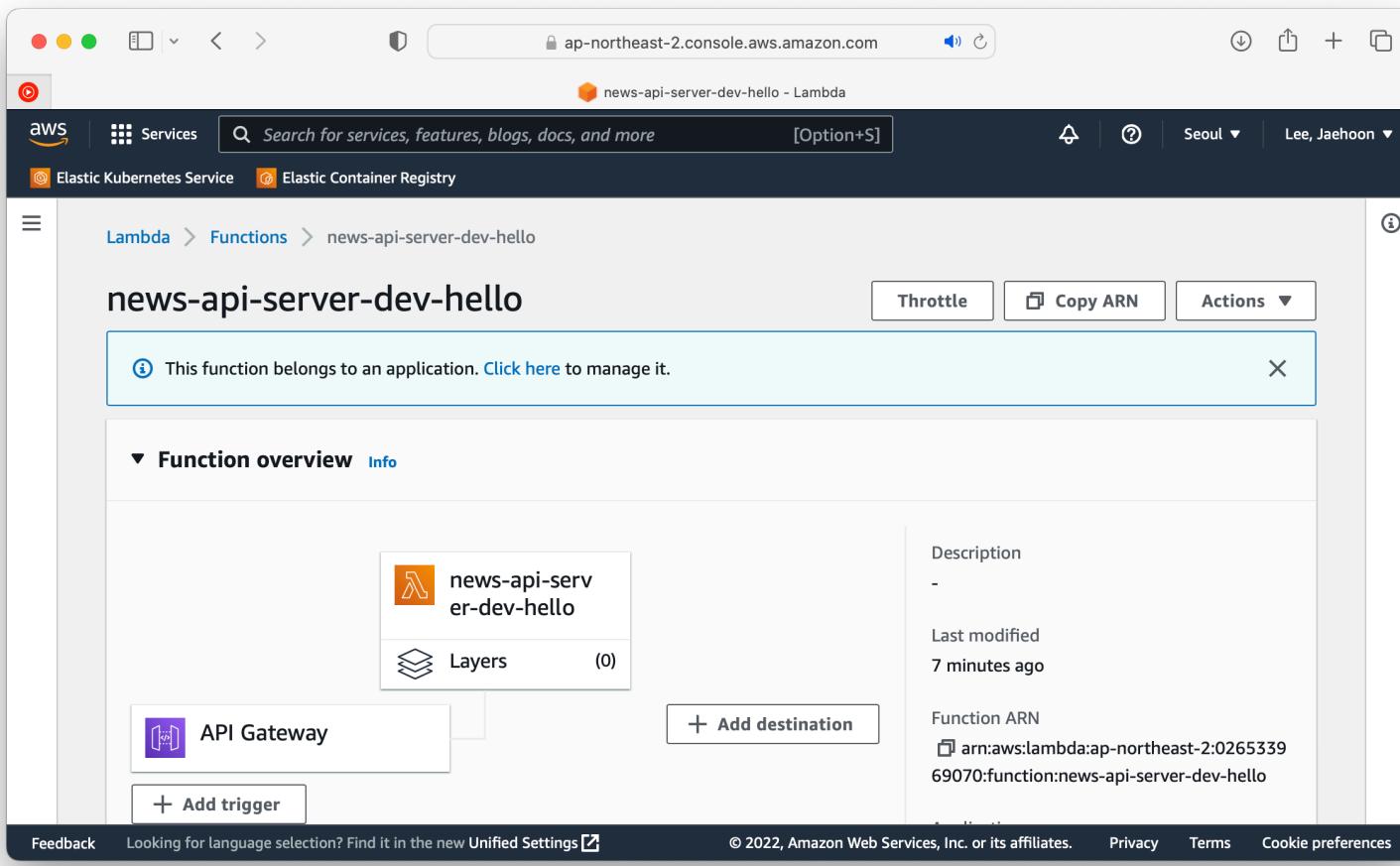
Serverless: Hello World

- AWS API Gateway



Serverless: Hello World

- AWS Lambda



뉴스 트렌드 조회 API

- services/__init__.py 생성
- services/news_trends.py 생성
 - 일단 검색 키워드 없이 전체 뉴스 트렌드 조회하도록 함수 작성
- serverless.yml - handler 추가

뉴스 트렌드 조회 API

- serverless invoke local -f news_trends

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘1
(base) → news-api-server git:(main) ✘ serverless invoke local -f news_trends
{
  "statusCode": 200,
  "body": "{\"trends\": [{\"date\": \"2022-08-01\", \"doc_count\": 5398}, {\"date\": \"2022-08-02\", \"doc_count\": 4939},
  {\"date\": \"2022-08-03\", \"doc_count\": 4992}, {\"date\": \"2022-08-04\", \"doc_count\": 5069}, {\"date\": \"2022-08-05\",
  \"doc_count\": 3919}, {\"date\": \"2022-08-06\", \"doc_count\": 680}, {\"date\": \"2022-08-07\", \"doc_count\": 1622}, {\"date\"
  : \"2022-08-08\", \"doc_count\": 5185}, {\"date\": \"2022-08-09\", \"doc_count\": 4867}, {\"date\": \"2022-08-10\",
  \"doc_count\": 5731}, {\"date\": \"2022-08-11\", \"doc_count\": 5516}, {\"date\": \"2022-08-12\", \"doc_count\": 237}]}"
}
(base) → news-api-server git:(main) ✘
```

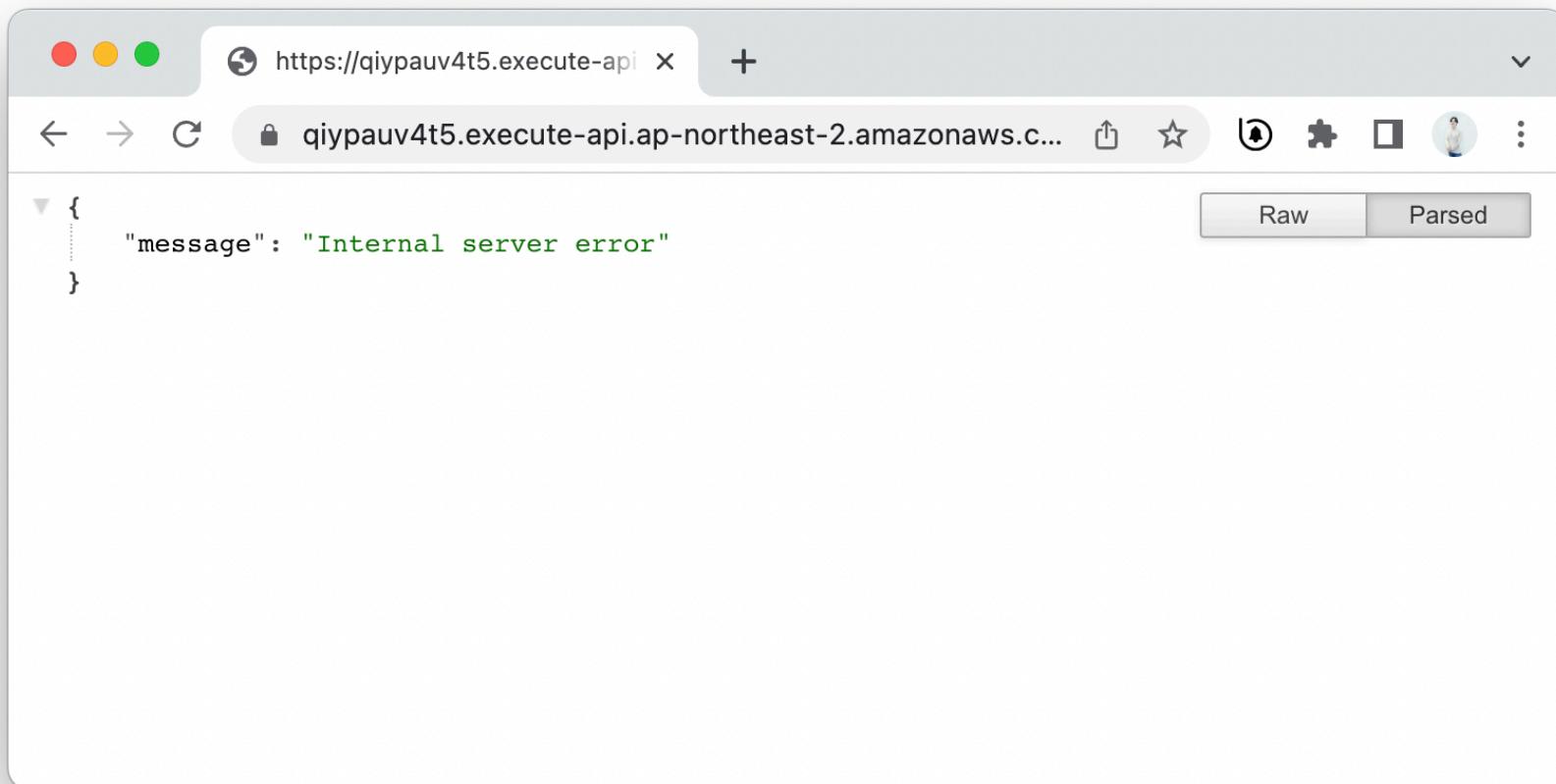
뉴스 트렌드 조회 API

- serverless deploy

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ✘ 1  
(base) ➜ news-api-server git:(main) ✘ serverless deploy  
  
Deploying news-api-server to stage dev (ap-northeast-2)  
  
✓ Service deployed to stack news-api-server-dev (60s)  
  
endpoints:  
  GET - https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/hello  
  GET - https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/news-trends  
functions:  
  hello: news-api-server-dev-hello (3.4 kB)  
  news_trends: news-api-server-dev-news_trends (3.4 kB)  
  
Toggle on monitoring with the Serverless Dashboard: run "serverless"  
(base) ➜ news-api-server git:(main) ✘
```

뉴스 트렌드 조회 API

- 하지만 API 를 요청하면 에러 발생..!!



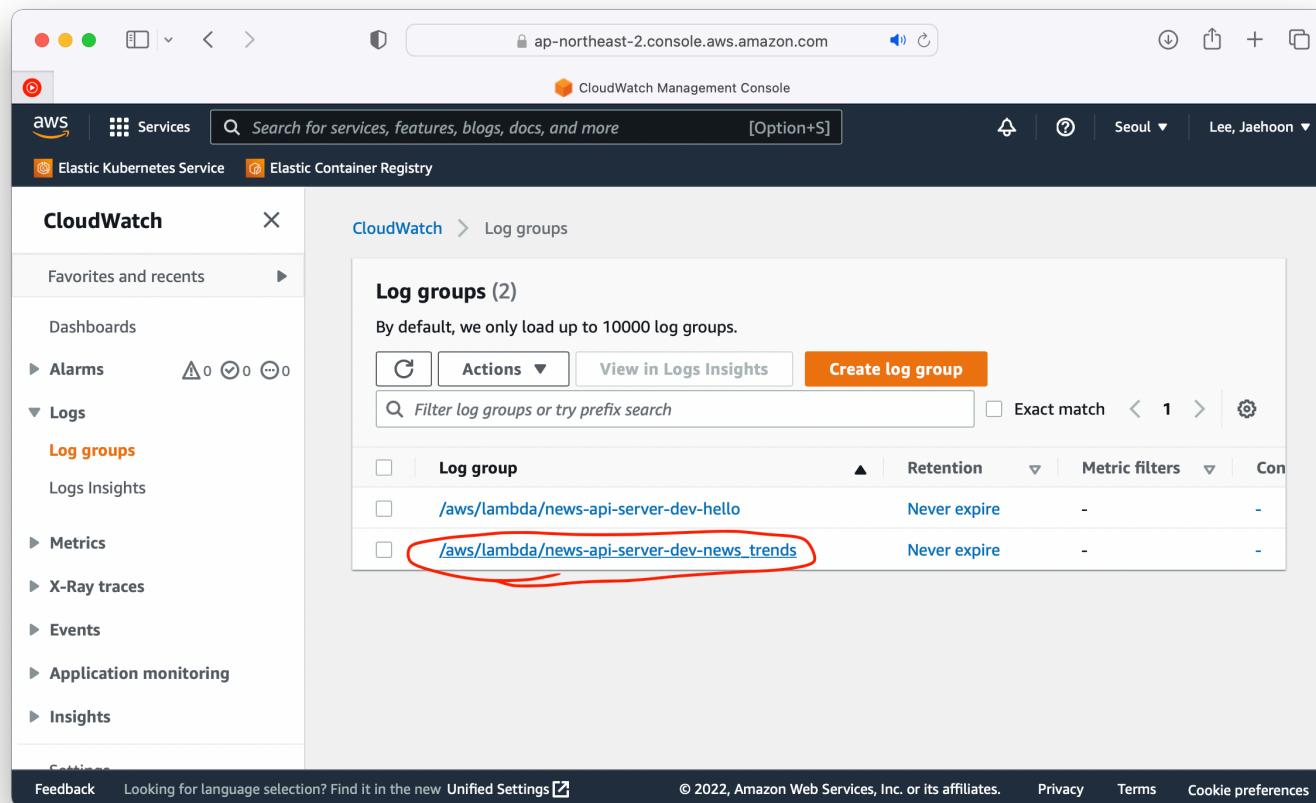
A screenshot of a web browser window displaying an API error response. The URL in the address bar is `https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com`. The page content shows a JSON object with a single key-value pair:

```
{  
  "message": "Internal server error"  
}
```

The browser interface includes standard navigation buttons (back, forward, search), a lock icon indicating a secure connection, and a status bar at the bottom.

뉴스 트렌드 조회 API

- AWS CloudWatch에서 에러 로그 확인



The screenshot shows the AWS CloudWatch Management Console interface. The left sidebar is titled "CloudWatch" and includes sections for Favorites and recents, Dashboards, Alarms, Logs (with Log groups selected), Metrics, X-Ray traces, Events, Application monitoring, and Insights. The main content area is titled "Log groups (2)" and displays two log groups: "/aws/lambda/news-api-server-dev-hello" and "/aws/lambda/news-api-server-dev-news_trends". The second log group is circled in red.

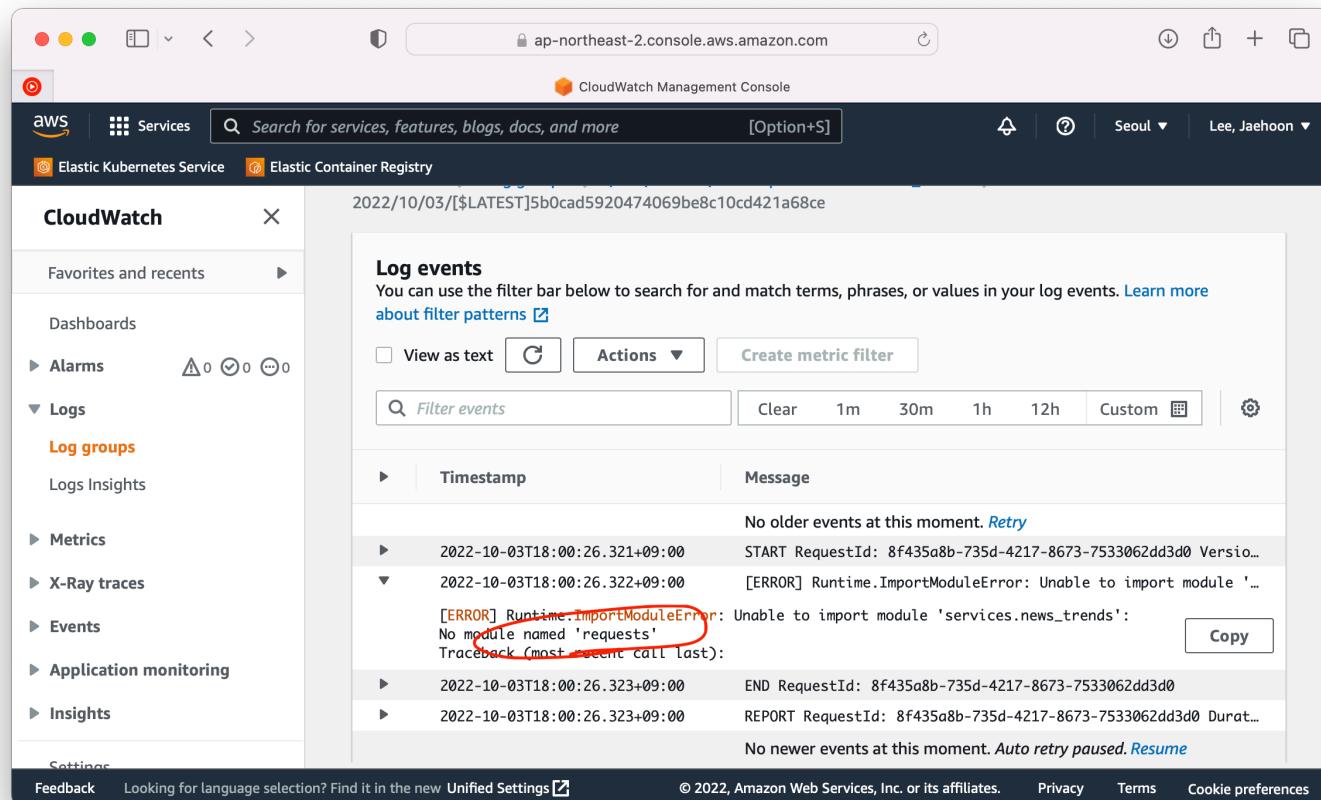
Log group	Retention	Metric filters	Con
/aws/lambda/news-api-server-dev-hello	Never expire	-	-
/aws/lambda/news-api-server-dev-news_trends	Never expire	-	-

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뉴스 트렌드 조회 API

- requests 모듈을 import 하지 못함!



The screenshot shows the AWS CloudWatch Management Console interface. On the left, there's a sidebar with options like Alarms, Logs (which is selected), Metrics, X-Ray traces, Events, Application monitoring, and Insights. The main area displays log events for the date 2022/10/03. The first event is a 'START' message. The second event is an 'ERROR' message where the application failed to import the 'requests' module, with the error message text circled in red. Subsequent events show the application ending and reporting.

Timestamp	Message
2022-10-03T18:00:26.321+09:00	START RequestId: 8f435a8b-735d-4217-8673-7533062dd3d0 Version: 1
2022-10-03T18:00:26.322+09:00	[ERROR] Runtime.ImportModuleError: Unable to import module 'requests'
	[ERROR] Runtime.ImportModuleError: Unable to import module 'services.news_trends': No module named 'requests' Traceback (most recent call last):
2022-10-03T18:00:26.323+09:00	END RequestId: 8f435a8b-735d-4217-8673-7533062dd3d0
2022-10-03T18:00:26.323+09:00	REPORT RequestId: 8f435a8b-735d-4217-8673-7533062dd3d0 Duration: 1 ms

Docker 컨테이너 생성

- 위 문제를 해결하기 위한 해결책
- 파이썬 스크립트를 바로 업로드 하지 말고 Docker 가상 머신 컨테이너로 업로드!!

Docker 컨테이너 생성

- conda env 생성

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘1
(base) → news-api-server git:(main) ✘ conda create -n news-api
Collecting package metadata (current_repodata.json): done
Solving environment: done

==> WARNING: A newer version of conda exists. <==
    current version: 4.12.0
    latest version: 22.9.0

Please update conda by running

$ conda update -n base conda

## Package Plan ##
```

Docker 컨테이너 생성

- env 제대로 생성된 것 확인 후 activate

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘1
(base) → news-api-server git:(main) ✘ conda env list
# conda environments:
#
base          * /Users/dioscuroi/miniforge3
news-api      /Users/dioscuroi/miniforge3/envs/news-api

(base) → news-api-server git:(main) ✘ conda activate news-api
(news-api) → news-api-server git:(main) ✘
```

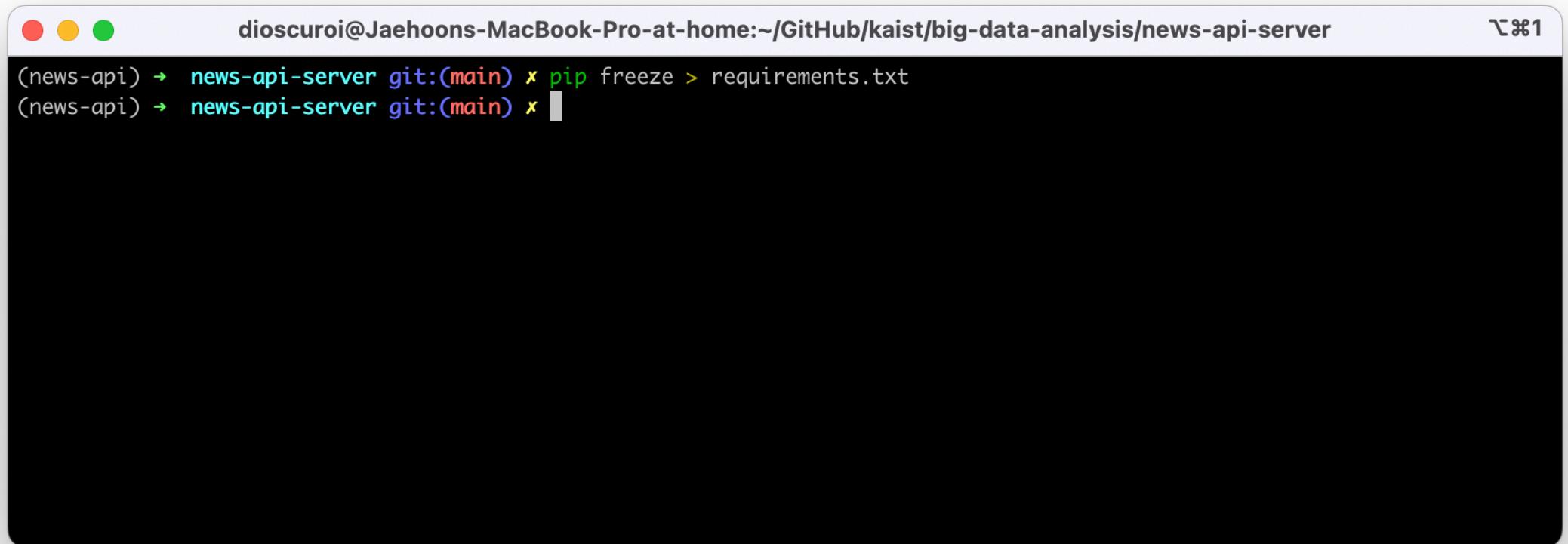
Docker 컨테이너 생성

- pip install requests pandas python-dotenv

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘1
(news-api) → news-api-server git:(main) ✘ pip install requests pandas python-dotenv
Collecting requests
  Using cached requests-2.28.1-py3-none-any.whl (62 kB)
Collecting pandas
  Using cached pandas-1.5.0-cp310-cp310-macosx_11_0_arm64.whl (10.8 MB)
Requirement already satisfied: python-dotenv in /opt/homebrew/lib/python3.10/site-packages (0.21.0)
Collecting urllib3<1.27,>=1.21.1
  Using cached urllib3-1.26.12-py2.py3-none-any.whl (140 kB)
Collecting charset-normalizer<3,>=2
  Using cached charset_normalizer-2.1.1-py3-none-any.whl (39 kB)
Collecting idna<4,>=2.5
  Using cached idna-3.4-py3-none-any.whl (61 kB)
Collecting certifi>=2017.4.17
  Using cached certifi-2022.9.24-py3-none-any.whl (161 kB)
Collecting numpy>=1.21.0
  Using cached numpy-1.23.3-cp310-cp310-macosx_11_0_arm64.whl (13.3 MB)
```

Docker 컨테이너 생성

- 설치된 필요 모듈 목록 파일로 추출



```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌘1
(news-api) ➔ news-api-server git:(main) ✘ pip freeze > requirements.txt
(news-api) ➔ news-api-server git:(main) ✘
```

Docker 컨테이너 생성

- env 안에서 invoke local 문제 없이 실행되는 것 다시 한번 확인

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘1
(news-api) ➔ news-api-server git:(main) ✘ serverless invoke local -f news_trends
{
  "statusCode": 200,
  "body": "{\"trends\": [{\"date\": \"2022-08-01\", \"doc_count\": 5398}, {\"date\": \"2022-08-02\", \"doc_count\": 4939},
  {\"date\": \"2022-08-03\", \"doc_count\": 4992}, {\"date\": \"2022-08-04\", \"doc_count\": 5069}, {\"date\": \"2022-08-05\",
  \"doc_count\": 3919}, {\"date\": \"2022-08-06\", \"doc_count\": 680}, {\"date\": \"2022-08-07\", \"doc_count\": 1622}, {\"date\"
  : \"2022-08-08\", \"doc_count\": 5185}, {\"date\": \"2022-08-09\", \"doc_count\": 4867}, {\"date\": \"2022-08-10\",
  \"doc_count\": 5731}, {\"date\": \"2022-08-11\", \"doc_count\": 5516}, {\"date\": \"2022-08-12\", \"doc_count\": 237}]}"
}
(news-api) ➔ news-api-server git:(main) ✘
```

Docker 컨테이너 생성

- npm init

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘1  
(news-api) ➔ news-api-server git:(main) ✘ npm init  
This utility will walk you through creating a package.json file.  
It only covers the most common items, and tries to guess sensible defaults.  
  
See `npm help init` for definitive documentation on these fields  
and exactly what they do.  
  
Use `npm install <pkg>` afterwards to install a package and  
save it as a dependency in the package.json file.  
  
Press ^C at any time to quit.  
package name: (news-api-server)  
version: (1.0.0)  
description:  
entry point: (index.js)  
test command:
```

Docker 컨테이너 생성

- npm install --save serverless-python-requirements

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘1
(news-api) → news-api-server git:(main) ✘ npm install --save serverless-python-requirements
npm WARN deprecated querystring@0.2.1: The querystring API is considered Legacy. new code should use the URLSearchParams API instead.
npm WARN deprecated querystring@0.2.0: The querystring API is considered Legacy. new code should use the URLSearchParams API instead.
npm WARN deprecated querystring@0.2.0: The querystring API is considered Legacy. new code should use the URLSearchParams API instead.
npm WARN deprecated appdirectory@0.1.0: Package no longer supported. Contact Support at https://www.npmjs.com/support for more info.
npm WARN deprecated superagent@7.1.6: Please downgrade to v7.1.5 if you need IE/ActiveXObject support OR upgrade to v8.0.0 as we no longer support IE and published an incorrect patch version (see https://github.com/visionmedia/superagent/issues/1731)

added 459 packages, and audited 460 packages in 24s

91 packages are looking for funding
```

Docker 컨테이너 생성

- 코드 커밋 전 node_modules 폴더를 .gitignore 파일에 추가

Docker 컨테이너 생성

- serverless.yml 파일 업데이트

```
3
4     plugins:
5         - serverless-python-requirements
6
7     custom:
8         pythonRequirements:
9             dockerizePip: non-linux
10
```

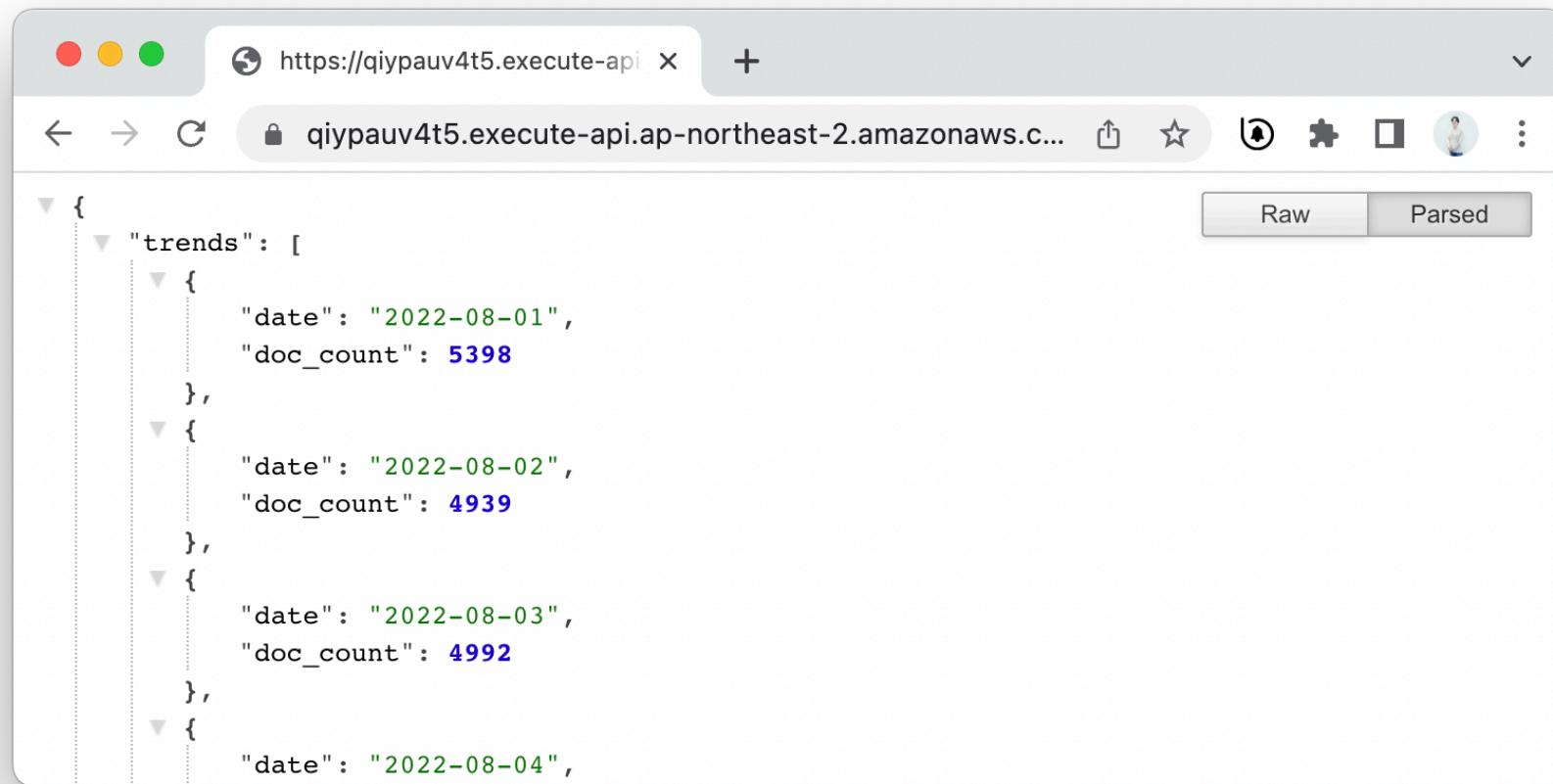
Docker 컨테이너 생성

- 서버 다시 배포 (처음 실행하면 5~10분 가량 소요)

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ✘ 1  
(news-api) ➔ news-api-server git:(main) ✘ serverless deploy  
Running "serverless" from node_modules  
  
Deploying news-api-server to stage dev (ap-northeast-2)  
  
✓ Service deployed to stack news-api-server-dev (390s)  
  
endpoints:  
  GET - https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/hello  
  GET - https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/news-trends  
functions:  
  hello: news-api-server-dev-hello (71 MB)  
  news_trends: news-api-server-dev-news_trends (71 MB)  
  
Toggle on monitoring with the Serverless Dashboard: run "serverless"  
(news-api) ➔ news-api-server git:(main) ✘
```

Docker 컨테이너 생성

- 이젠 제대로 실행되는 것 확인



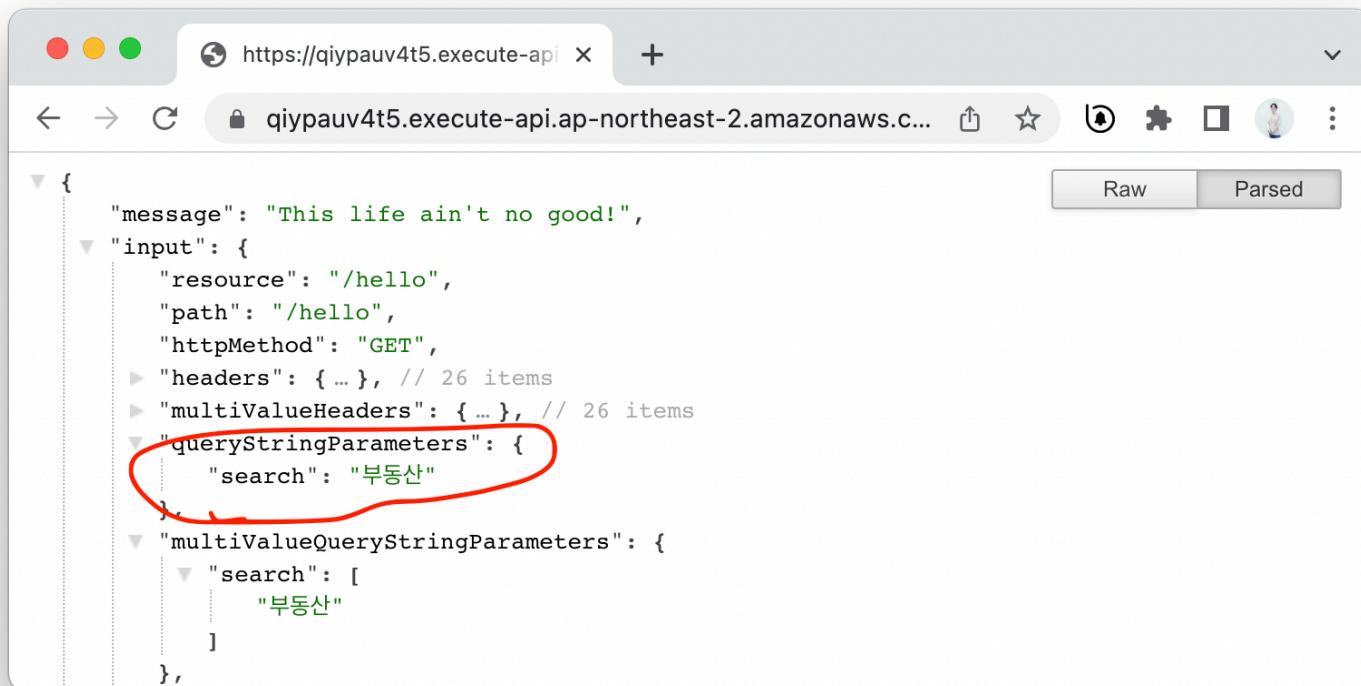
The screenshot shows a browser window displaying a JSON response from an AWS Lambda function. The URL in the address bar is `https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/`. The JSON data is structured as follows:

```
{  
  "trends": [  
    {  
      "date": "2022-08-01",  
      "doc_count": 5398  
    },  
    {  
      "date": "2022-08-02",  
      "doc_count": 4939  
    },  
    {  
      "date": "2022-08-03",  
      "doc_count": 4992  
    },  
    {  
      "date": "2022-08-04",  
      "doc_count": 5000  
    }  
  ]  
}
```

The browser interface includes standard navigation buttons (back, forward, search), a lock icon indicating a secure connection, and various extension icons. There are also 'Raw' and 'Parsed' buttons at the top right of the JSON viewer.

검색어 포함한 뉴스 트렌드 조회

- 아까 만들어놓은 /hello 사용
 - URL 뒤에 <?search=부동산> 추가



```
{
  "message": "This life ain't no good!",
  "input": {
    "resource": "/hello",
    "path": "/hello",
    "httpMethod": "GET",
    "headers": { ... }, // 26 items
    "multiValueHeaders": { ... }, // 26 items
    "queryStringParameters": {
      "search": "부동산"
    },
    "multiValueQueryStringParameters": {
      "search": [
        "부동산"
      ]
    }
  }
}
```

검색어 포함한 뉴스 트렌드 조회

- services/news_trends.py 파일 수정
 - URL query parameter로 들어오는 값 사용
- mocks/news_trends.json
 - 테스트로 사용할 가짜 request 생성

검색어 포함한 뉴스 트렌드 조회

- invoke local 실행 결과 확인

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘1
(news-api) ➔ news-api-server git:(main) ✘ serverless invoke local -f news_trends -p mocks/news_trends.json
Running "serverless" from node_modules
{
  "statusCode": 200,
  "body": "{\"trends\": [{\"date\": \"2022-08-01\", \"doc_count\": 22}, {"date\": \"2022-08-02\", \"doc_count\": 34}, {"date\": \"2022-08-03\", \"doc_count\": 47}, {"date\": \"2022-08-04\", \"doc_count\": 15}, {"date\": \"2022-08-05\", \"doc_count\": 10}, {"date\": \"2022-08-06\", \"doc_count\": 4}, {"date\": \"2022-08-07\", \"doc_count\": 17}, {"date\": \"2022-08-08\", \"doc_count\": 17}, {"date\": \"2022-08-09\", \"doc_count\": 19}, {"date\": \"2022-08-10\", \"doc_count\": 28}, {"date\": \"2022-08-11\", \"doc_count\": 26}, {"date\": \"2022-08-12\", \"doc_count\": 5}]}"
}
(news-api) ➔ news-api-server git:(main) ✘
```

검색어 포함한 뉴스 트렌드 조회

- 서버 배포하고 제대로 동작하는지 확인
 - “부동산” 검색 키워드가 들어갔을 때 결과값 갯수가 확연히 줄어들어야함

```
{  
  "trends": [  
    {  
      "date": "2022-08-01",  
      "doc_count": 22  
    },  
    {  
      "date": "2022-08-02",  
      "doc_count": 34  
    },  
    {  
      "date": "2022-08-03",  
      "doc_count": 47  
    },  
    {  
      "date": "2022-08-04",  
      "doc_count": 22  
    }  
  ]  
}
```

Sentiment Trends API

- services/sentiment_trends.py 작성
 - 이전 시간에 만들었던 sentiment_trends.ipynb 를 참고해서 작성

Sentiment Trends API

- serverless invoke local -f sentiment_trends

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌂⌘2
{
  "statusCode": 200,
  "body": "{\"trends\": [{\"neutral\": 733, \"positive\": 299, \"negative\": 98, \"date\": \"2022-08-01\", \"sentiment\": 0.17787610619469027}, {"neutral": 614, \"positive\": 245, \"negative\": 103, \"date\": \"2022-08-02\", \"sentiment\": 0.14760914760914762}, {"neutral": 651, \"positive\": 251, \"negative\": 92, \"date\": \"2022-08-03\", \"sentiment\": 0.15995975855130784}, {"neutral": 655, \"positive\": 248, \"negative\": 83, \"date\": \"2022-08-04\", \"sentiment\": 0.16734279918864098}, {"neutral": 517, \"positive\": 191, \"negative\": 108, \"date\": \"2022-08-05\", \"sentiment\": 0.1017156862745098}, {"neutral": 95, \"positive\": 10, \"negative\": 15, \"date\": \"2022-08-06\", \"sentiment\": -0.04166666666666664}, {"neutral": 279, \"positive\": 61, \"negative\": 36, \"date\": \"2022-08-07\", \"sentiment\": 0.06648936170212766}, {"neutral": 653, \"positive\": 272, \"negative\": 73, \"date\": \"2022-08-08\", \"sentiment\": 0.19939879759519039}, {"neutral": 82, \"positive\": 24, \"negative\": 20, \"date\": \"2022-08-09\", \"sentiment\": 0.031746031746031744}]}",
  "headers": {
    "Content-Type": "application/json",
    "Access-Control-Allow-Origin": "*",
    "Access-Control-Allow-Credentials": true
  }
}
(base) ➜ news-api-server git:(main) ✘
```

Sentiment Trends API

- serverless deploy

```
dioscuroi@Jaehoons-MacBook-Pro-at-home:~/GitHub/kaist/big-data-analysis/news-api-server ⌘2
(base) ➜ news-api-server git:(main) serverless deploy
Running "serverless" from node_modules

Deploying news-api-server to stage dev (ap-northeast-2)

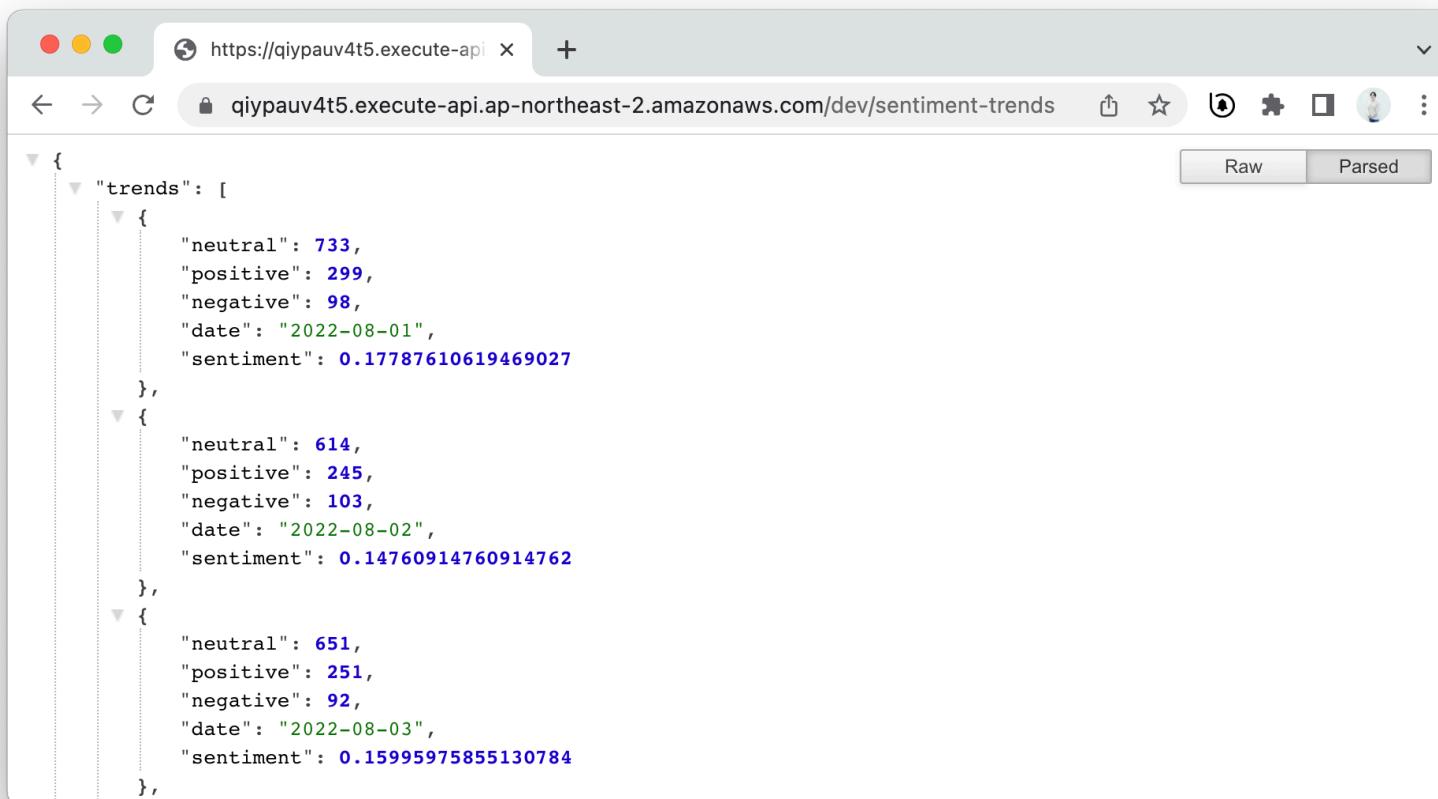
✓ Service deployed to stack news-api-server-dev (100s)

endpoints:
  GET - https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/hello
  GET - https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/news-trends
  GET - https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/sentiment-trends
functions:
  hello: news-api-server-dev-hello (71 MB)
  news_trends: news-api-server-dev-news_trends (71 MB)
  sentiment_trends: news-api-server-dev-sentiment_trends (71 MB)

Improve API performance – monitor it with the Serverless Dashboard: run "serverless"
(base) ➜ news-api-server git:(main) █
```

Sentiment Trends API

- 서버 배포 결과 확인



The screenshot shows a browser window displaying the JSON response from a sentiment analysis API. The URL in the address bar is `https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/sentiment-trends`. The response is a parsed JSON object with three trends:

```
{ "trends": [ { "neutral": 733, "positive": 299, "negative": 98, "date": "2022-08-01", "sentiment": 0.17787610619469027 }, { "neutral": 614, "positive": 245, "negative": 103, "date": "2022-08-02", "sentiment": 0.14760914760914762 }, { "neutral": 651, "positive": 251, "negative": 92, "date": "2022-08-03", "sentiment": 0.15995975855130784 } ] }
```

The browser interface includes standard navigation buttons (back, forward, search), a lock icon indicating a secure connection, and a tab labeled `qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/sentiment-trends`. There are also tabs for `Raw` and `Parsed` views.

Sentiment Trends API

- “부동산” 으로 검색했을 때 sentiment trends 확인



The screenshot shows a browser window displaying the results of a POST request to the sentiment-trends API. The URL in the address bar is `https://qiypauv4t5.execute-api.ap-northeast-2.amazonaws.com/dev/sentiment-trends?search=부동산`. The response is a JSON object with the following structure:

```
{  
  "trends": [  
    {  
      "neutral": 3,  
      "negative": 1,  
      "date": "2022-08-01",  
      "positive": 0,  
      "sentiment": -0.25  
    },  
    {  
      "neutral": 6,  
      "negative": 0,  
      "date": "2022-08-02",  
      "positive": 2,  
      "sentiment": 0.25  
    },  
    {  
      "neutral": 8,  
      "negative": 0,  
      "date": "2022-08-03",  
      "positive": 1,  
      "sentiment": 0.1111111111111111  
    }  
  ]  
}
```

The browser interface includes standard navigation buttons (back, forward, search), a tab bar, and a toolbar with icons for refresh, stop, and other functions. The JSON response is displayed in a collapsible tree view, with the "Parsed" tab selected.