

# ODSQL & API v2.1 Tutorial 2024

This document explains how to use the API of City of Melbourne Open Data (CoM). Only the HTTP (GET) method is supported, all API endpoints return JSON. Endpoints use [ODSQL](#).

## Explore API v2.1 OAS3

/api/explore/v2.1/swagger.json

The Opendatasoft Explore API v2 is organized around REST. It provides access to all the data available through the platform in a coherent, hierarchical way.

Only the HTTP **GET** method is supported.

All API endpoints return JSON.

Endpoints are organized in a hierarchical way describing the relative relationship between objects.

All responses contain a list of links allowing easy and relevant navigation through the API endpoints.

All endpoints use the [Opendatasoft Query Language \(ODSQL\)](#). This means that, most of the time, parameters work the same way for all endpoints.


While the **records** endpoint is subject to a **limited number of returned records**, the **exports** endpoint has no limitations.



## Note

- These instructions only apply to **API v2.1** and the [City of Melbourne Open Data](#).
- **'records'** endpoint is subject to a [limited number of returned records](#)
- **'exports'** endpoints has no limitations!
- Each organization's API settings are different!

*Some parts of the documentation, such as loop acquisition. The government may ban it in subsequent updates, and it does not apply to team' API keys with advanced permissions. For commercial enterprises, loop acquisition is likely to be disabled and may be defaulted by the system as an attack or illegal request.*

## Explore Datasets



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**549,976 records**

No active filters

**Filters**

Search records...

**Sensor\_Name**

Swa295_T	7,515
Flis_T	7,513
RMIT_T	7,511
FLDep5_T	7,502
Bou688_T	7,484
Swa31	7,472

> More

**SensingDateTime(Hour)**

2024	148,499
2023	401,477

**LocationID**

3	7,515
6	7,513
59	7,511

**Pedestrian Counting System (counts per hour)**

Share this dataset via: [X](#) [f](#) [in](#) [e](#)

**Information** **Table** **Map** **Analyze** **Export** **API**

This dataset contains hourly pedestrian counts since 2009 from pedestrian sensor devices located across the city. The data is updated on a monthly basis and can be used to determine variations in pedestrian activity throughout the day. The sensor\_id column can be used to merge the data with the [Pedestrian Counting System - Sensor Locations](#) dataset which details the location, status and directional readings of sensors. Any changes to sensor locations are important to consider when analysing and interpreting pedestrian counts over time.

**Importants notes about this dataset:**

- Where no pedestrians have passed underneath a sensor during an hour, a count of zero will be shown for the sensor for that hour.
- Directional readings are not included, though we hope to make this available later in the year. Directional readings are provided in the [Pedestrian Counting System - Past Hour \(counts per minute\)](#) dataset.

The [Pedestrian Counting System](#) helps to understand how people use different city locations at different times of day to better inform decision-making and plan for the future. A representation of pedestrian volume which compares each location on any given day and time can be found in our [Online Visualisation](#).

**Related datasets:**

[Pedestrian Counting System - Past Hour \(counts per minute\)](#)

[Pedestrian Counting System - Sensor Locations](#)

**Dataset Identifier** `pedestrian-counting-system-monthly-counts-per-hour`

Dataset [Pedestrian Counting System \(counts per hour\)](#)

## Appy for Personal API Key

**Do not share your API key, keep it secret.**

[Instructions on applying for a API key](#)

## API Keys

```
API_KEY = os.environ.get('MELBOURNE_API_KEY', input("Please enter your API key: "))
BASE_URL = 'https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets/'
```

**DO NOT EXPOSE YOUR API KEY – IT IS A SECURITY RISK!**

*Option 1. Remove API KEY Before Publishing (leave as empty string)*

**Risky you could forget!**

```
#Function to collect data
def collect_data(dataset_id):
    base_url = 'https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets/'
    apikey = "" #use if use datasets require API key permissions
    dataset_id = dataset_id
    format = 'csv'

    url = f'{base_url}{dataset_id}/exports/{format}'
    params = {
        'select': '*',
        'limit': -1, # all records
        'lang': 'en',
        'timezone': 'UTC',
        'api_key': apikey #use if use datasets require API key permissions
    }
```

*Option 2. Pull API key from Separate File (Locally or GitHub)*



```
1 # Dependencies
2 import warnings
3 warnings.filterwarnings("ignore")
4 pd.set_option('display.max_columns', None)
5
6 import requests
7 import numpy as np
8 import pandas as pd

Cloud or Local IDE (Run notebook/ script)

To collect API from directory located in Google Collab

1 from google.colab import drive
2 drive.mount('/content/drive')
3 with open('/content/drive/My Drive/SIT378/h.txt', 'r') as file:
4     api_key = file.read().strip()
5
6 import os
7 api_key = os.getenv(api_key)

Mounted at /content/drive
```

Load Dependencies and load Cloud (Google Collab)

### Option 3. Using Google Cloud Secret Manager

```
1 from google.cloud import secretmanager
2 client = secretmanager.SecretManagerServiceClient()
3 name = "projects/your-project-id/secrets/your-secret-name/versions/latest"
4 response = client.access_secret_version(request={"name": name})
5 api_key = response.payload.data.decode("UTF-8")
```

### Pre-fill parameters (Optional: filtering)

Opendatasoft Query Language (ODSQL) allows you to filter datasets or records and build aggregations.

[https://help.opendatasoft.com/apis/ods-explore-v2/#section/Opendatasoft-Query-Language-\(ODSQL\)](https://help.opendatasoft.com/apis/ods-explore-v2/#section/Opendatasoft-Query-Language-(ODSQL))

Using the Console you can prefill your parameters and create a GET curl request, you can then use Python HTTP Request (Import requests) library to call API by interacting via HTTP methods.

<https://data.melbourne.vic.gov.au/api/explore/v2.1/console>

**Catalog** API to enumerate datasets

GET /catalog/datasets - Query external datasets

GET /catalog/exports - List export formats

GET /catalog/exports/{format} - Export a catalog

GET /catalog/exports/{key} - Export a catalog in CSV

GET /catalog/exports/{id}({id\_as\_format}) - Export a catalog in PDF/XLS/DOC/RTF

GET /catalog/exports - List export formats

GET /catalog/datasets/{dataset\_id} - Show dataset information

Returns a list of available endpoints for the specified dataset, with metadata and endpoints.

The response includes the following links:

- The **dataset** endpoint
- The **records** endpoint
- The **links** endpoint

**Parameters**

**dataset\_id** - The identifier of the dataset to be queried.

**select** - A list of fields to be returned. You can find it in the 'Information' tab of the dataset page or in the dataset URL, right after **/dataset/**.

**include\_links** - If set to **true**, this parameter will add HATEOAS links in the response.

**include\_app\_metadata** - If set to **true**, this parameter will add application metadata to the response.

**lang** - A language value.

**timezone** - Set the timezone for datetime fields.

**include\_links** - If set to **true**, this parameter will add HATEOAS links in the response.

**include\_app\_metadata** - If set to **true**, this parameter will add application metadata to the response.

**Execute** **Clear**

The ODSQL is split into five different kinds of clauses:

- The **select** clause allows choosing the returned fields, giving them an alias, manipulating them with functions like count, sum, min, max, etc.
- The **where** clause acts as a filter for the returned datasets or records, thanks to boolean operations, filter functions, arithmetic expressions, etc.
- The **group by** clause allows aggregating rows together based on fields, numeric ranges, or dates.
- The **order by** and **limit** clauses allow choosing the order and quantity of rows received as a response.

**Include links** - If set to **true**, this parameter will add application metadata to the response.

**Include app metadata** - If set to **true**, this parameter will add application metadata to the response.

**Execute** **Clear**

**Response**

**curl**

```
curl -X GET https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets/your-dataset-name/versions/latest?select=your-select-statement
```

**Response**

```
{
  "dataset": {
    "name": "your-dataset-name",
    "description": "your-dataset-description",
    "links": {
      "dataset": "https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets/your-dataset-name/versions/latest",
      "records": "https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets/your-dataset-name/versions/latest/records",
      "links": "https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets/your-dataset-name/versions/latest/links"
    }
  }
}
```

**API response**

**Code** **Docs**

CoM API endpoints: To interact with a data catalog.

- Endpoints allow you to enumerate datasets
- List export formats
- Export data
- List facet values
- Manage individual dataset records

Catalog API

- GET [/catalog/datasets](#)
- Purpose To list all the datasets available in the catalog
  - Used to get an overview of the datasets available in the system
- GET [/catalog/exports](#)
- Purpose To list all export formats that the catalog supports
  - Useful for understanding what formats the data can be exported (CSV, JSON)
- GET [/catalog/exports/{format}](#)
- Purpose To export the entire catalog in a specific format
  - Used when you want to download the entire catalog in one of the supported formats
- GET [/catalog/exports/csv](#)
- Purpose Specifically for exporting the catalog in CSV format.
  - A direct endpoint for exporting data in a common, easily usable format.
- GET [/catalog/exports/dcat{dcat\\_ap\\_format}](#)
- Purpose To export the catalog in RDF/XML format using DCAT
  - Exporting data in a format that's suitable for integrating with other data catalogs or systems following the DCAT standard
- GET [/catalog/facets](#)
- Purpose To list all the facet values available in the catalog
  - Facets are used to filter or categorize datasets/ helps understand the categorization
- GET [/catalog/datasets/{dataset\\_id}](#)
- Purpose To show detailed information about a specific dataset
  - When you need metadata or details about a particular dataset

Dataset API

- GET [/catalog/datasets/{dataset\\_id}/records](#)
- Purpose To query records within a specific dataset
  - To retrieve the data entries or records from a specific dataset
- GET [/catalog/datasets/{dataset\\_id}/exports](#)
- Purpose To list the export formats available for a specific dataset
- Understands in what formats you can export the data from this dataset
- GET [/catalog/datasets/{dataset\\_id}/exports/{format}](#)
- Purpose To export a specific dataset in a specified format
  - To download data from a specific dataset in a particular format
- GET [/catalog/datasets/{dataset\\_id}/exports/csv](#)
- Purpose To export a specific dataset in CSV format
  - Direct endpoint for exporting dataset data in CSV, a commonly used data format
- GET [/catalog/datasets/{dataset\\_id}/exports/gpx](#)
- Purpose To export a specific dataset in GPX format
  - Useful for datasets related to geographical data, which GPX format is well-suited for
- GET [/catalog/datasets/{dataset\\_id}/facets](#)
- Purpose To list the facets for a specific dataset
  - To get an understanding of the different dimensions or categories within a dataset
- GET [/catalog/datasets/{dataset\\_id}/attachments](#)
- Purpose To list attachments for a specific dataset
  - When datasets have additional files or documents attached, this endpoint lets you enumerate them
- GET [/catalog/datasets/{dataset\\_id}/records/{record\\_id}](#)
- Purpose To read a specific record within a dataset
  - To get detailed information about a particular entry or record in a dataset



## 1. exports API (Endpoint)

\*Preferred method by CoM as it has no limitations

Example: Single Request for CSV file

GET/Catalog/exports

`GET <https://data.melbourne.vic.gov.au/api/catalog/datasets/pedestrian-counting-system-monthly-counts-per-hour>`

*This can take a little while as you are pulling the whole dataset*

Feel free to add a [progress bar](#) etc

GET/catalog/exports/catalog/datasets/

- ODSQL Function Export CSV or json\_format
- Read response directly into dataframe
- `response.content.decode('utf-8')` converts binary response into UTF-8 string (encoded)
- Data uses a delimiter (;)



```
# **Preferred Method**: Export Endpoint
import requests
import pandas as pd
from io import StringIO

#Function to collect data
def collect_data(dataset_id):
    base_url = 'https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets/'
    #apikey = "" #use if use datasets require API key permissions
    dataset_id = dataset_id
    format = 'csv'

    url = f'{base_url}{dataset_id}/exports/{format}'
    params = {
        'select': '*',
        'limit': -1, # all records
        'lang': 'en',
        'timezone': 'UTC',
        #'api_key': apikey #use if use datasets require API key permissions
    }

    # GET request
    response = requests.get(url, params=params)

    if response.status_code == 200:
        # StringIO to read the CSV data
        url_content = response.content.decode('utf-8')
        dataset = pd.read_csv(StringIO(url_content), delimiter=';')
        return dataset
    else:
        print(f'Request failed with status code {response.status_code}')
```

Call function to collect specific dataset, check import worked

```
# Set dataset_id to query for the API call dataset name
dataset_id = 'pedestrian-counting-system-monthly-counts-per-hour'
# Save dataset to df variable
df = collect_data(dataset_id)
# Check number of records in df
print(f'The dataset contains {len(df)} records.')
# View df
df.head(3)
```

✓ 3m 31.0s

Python

The dataset contains 549976 records.

	sensor_name	timestamp	locationid	direction_1	direction_2	total_of_directions	location
0	SprFli_T	2023-04-24T21:00:00+00:00	75	36	17	53	-37.81515276, 144.97467661
1	SprFli_T	2023-04-25T00:00:00+00:00	75	28	50	78	-37.81515276, 144.97467661
2	SprFli_T	2023-04-25T01:00:00+00:00	75	63	63	126	-37.81515276, 144.97467661

## Additional examples exports endpoint

**Catalog (API to enumerate datasets) or Dataset (API to work on records)**

Example: Catalog API to enumerate datasets

GET/Catalog/datasets

GET <https://data.melbourne.vic.gov.au/api/catalog/datasets>

Limit 10, this can be commented out

```
1 import requests
2 url = 'https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets'
3 params = {
4     'select': '*',
5     'limit': 10,
6     'offset': 0,
7     'timezone': 'UTC',
8     'include_links': 'false',
9     'include_app_metadata': 'false'
10 }
11 headers = {
12     'accept': 'application/json; charset=utf-8'
13 }
14
15 # GET request
16 response = requests.get(url, headers=headers, params=params)
17
18 if response.status_code == 200: # Status code Check
19     # Successful
20     print(response.json())
21 else:
22     # Error
23     print(f'Request failed with status code {response.status_code}')
24
```

```
{'total_count': 228, 'results': [{'availability': 'domain', 'dataset_id': 'city-of-melbourne-floor-space-forecasts-by-small-area-2020-2040', 'dataset_uid': 'ds_wvdwug', 'has_records': True}]}
```

Example: Show dataset Information

GET/Catalog/datasets/{dataset\_id}

GET <https://data.melbourne.vic.gov.au/api/catalog/datasets/pedestrian-counting-system-monthly-counts-per-hour>

```

131 1 # dataset_id
2 # https://data.melbourne.vic.gov.au/explore/dataset/pedestrian-counting-system-monthly-counts-per-hour/information/
3 dataset_id = 'pedestrian-counting-system-monthly-counts-per-hour'

1 import requests
2 url = 'https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets/' + dataset_id
3 # or use full URL
4 # https://data.melbourne.vic.gov.au/explore/dataset/pedestrian-counting-system-monthly-counts-per-hour/information/
5
6 params = {
7     'select': '+',
8     'lang': 'en',
9     'timezone': 'UTC',
10    'include_links': 'false',
11    'include_app_metas': 'false'
12 }
13 headers = {
14     'accept': 'application/json; charset=utf-8'
15 }
16
17 # Make the GET request
18 response = requests.get(url, headers=headers, params=params)
19 if response.status_code == 200:
20     # Successful
21     print(response.json())
22 else:
23     # Error
24     print(f'Request failed with status code {response.status_code}')
25
{'visibility': 'domain', 'dataset_id': 'pedestrian-counting-system-monthly-counts-per-hour', 'dataset_uid': 'da_3k8lps', 'has_records': True, 'features': ['gen', 'analyse', 'timeserie'],

```

Limit parameter controls the number of records or datasets returned in the response.

Example: Check Available export formats for dataset

GET/Catalog/exports

GET <https://data.melbourne.vic.gov.au/api/catalog/datasets/pedestrian-counting-system-monthly-counts-per-hour>

```

141 1 import requests
2 url = 'https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/exports'
3 params = {
4     'select': '+',
5     'lang': 'en',
6     'timezone': 'UTC',
7     'include_links': 'false',
8     'include_app_metas': 'false'
9 }
10 headers = {
11     'accept': 'application/json; charset=utf-8'
12 }
13
14 # Make the GET request
15 response = requests.get(url, headers=headers, params=params)
16 if response.status_code == 200:
17     # Successful
18     print(response.json())
19 else:
20     # Error
21     print(f'Request failed with status code {response.status_code}')
22
', 'href': 'https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/exports/daat', 'rel': 'rss', 'href': 'https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/exports/rss'),

```

## 2. records API (Endpoint)

*\*Not preferred by CoM as it has limitations < 10000 records*

*Example: Function to iterate over data chunks using API until max offset reached*

*{dataset}/records?limit={num\_records}&offset={offset}*

Records Endpoint

Function `fetch_data` paginates iterates over data in chunks (`num_records` and `offset`) until all records are retrieved or a maximum offset is reached.

- This endpoint is subjected to a limited number of returned records: <10000

```

1 import requests
2 import pandas as pd
3 def fetch_data(base_url, dataset, api_key, num_records=99, offset=0):
4     all_records = []
5     max_offset = 9900
6
7     while True:
8         if offset > max_offset:
9             break
10
11         filters = f'{dataset}/records?limit={num_records}&offset={offset}'
12         url = f'{base_url}{filters}&api_key={api_key}'
13
14         try:
15             result = requests.get(url, timeout = 10)
16             result.raise_for_status()
17             records = result.json().get('results')
18         except requests.exceptions.RequestException as e:
19             raise Exception(f'API request failed: {e}')
20         if records is None:
21             break
22         all_records.extend(records)
23         if len(records) < num_records:
24             break
25
26         offset += num_records
27
28     df = pd.DataFrame(all_records)
29     return df
30
31 BASE_URL = 'https://data.melbourne.vic.gov.au/api/explore/v2.1/catalog/datasets/'
32 API_KEY = api_key

```

```

1 # data set name
2 SENSOR_DATASET = 'on-street-parking-bay-sensors'
3 df = fetch_data(BASE_URL, SENSOR_DATASET, API_KEY)
4 df

```

	lastupdated	status_timestamp	zone_number	status_description	kerbsideid	location
0	2023-10-25T01:44:02+00:00	2023-10-25T01:07:05+00:00	7556.0	Present	5730	('lon': 144.9680525765466, 'lat': -37.81058233...
1	2023-10-25T01:44:02+00:00	2023-10-25T00:57:43+00:00	7556.0	Present	5729	('lon': 144.9681094607273, 'lat': -37.81058562...
2	2023-10-25T01:44:02+00:00	2023-10-25T01:12:46+00:00	7556.0	Present	5750	('lon': 144.9681371221672, 'lat': -37.81055767...

## Author

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