
Lab Ten

Web APIs

CS1103, 2021F

Learning Outcomes

At the conclusion of the lab, students should be able to

- Read data from a JSON document (file)
- Use a ReST API and returned JSON documents to get information from a database on the web

Web APIs allows programmatic access to a host's services, facilitated by creating and sending URL queries and receiving data in either XML or JSON formats. Specifically, ReST APIs use the http (web) protocol's CRUD functionality (Post, Get, Put, Delete) to interact with web applications, using the URL (web address) to specify details of the request.

In this lab, we'll formulate queries for Get requests and examine the resulting data returned in JSON format.

URLs

For our purposes, we'll consider only the portions of a URL that are pertinent to solving our problem. Consider the following URL: <https://api-iwls.dfo-mpo.gc.ca/swagger-ui/index.html?configUrl=/v3/api-docs/swagger-config>, which breaks down into the following elements:

- `https` - the protocol the request uses (the secure version of the http protocol, hence the 's')
- `api-iwls.dfo-mpo.gc.ca` - the name of the server on the internet to contact
- `/swagger-ui/index.html` - the path on that machine to the file to contact
- `configUrl=/v3/api-docs/swagger-config` - a query string for the web server to use in the the request

Each of these has a separator string to allow parsing of each element by the server.

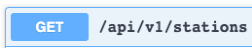
Using Swagger to Explore a ReST API

Swagger is a software tool that uses a description of the server's functionality and specifications (in JSON) taken from the server to present a query-able web page. It shows the available URLs (termed endpoints), example data inputs (if any) as well as outputs, enabling easy exploration of the API's functionality.

The URL presented earlier, <https://api-iwls.dfo-mpo.gc.ca/swagger-ui/index.html?configUrl=/v3/api-docs/swagger-config> takes us to a Swagger interface to the Canadian Hydrographic Service's API for the Integrated Water Level System.

The page is broken up thematically (data, stations, benchmarks...) showing functionality, followed by Schemas for the data used (TimeseriesDefinition, TideTable, Station...) Clicking on any of these will expand to give more information about the functionality or the schema.

Getting Some Station Data

- Click on the Station schema
 - List the names of the values stored in it.
- Click on  and examine the parameters and responses sections.
 - Which section uses the Station schema?
- Click on "Try it out", specify "ATL" for the chs-region-code parameter and click "Execute" and when the operation has completed, scroll down to see the results. Notice that there is now a server response listed and a response body.
 - What is the id value for the station with an officialName of "Charlottetown" with an operating value of "true"?
- Open another browser tab and copy the Request URL value into it. What does it return?

Accessing Water Level Data

We're going to use the station data we've discovered to look at water levels of different kinds for a range of time.

- We need to specify a time series type.
 - How do we find that?
 - What are the code values for "Water level official value" and "High and Low Tide Predictions"?
- We need to specify date in ISO 8601 format UTC
 - Use web search to discover what this is and give a short (maximum two sentence) description.
 - Specify the value for the start of today's lab in this format.

Using the endpoint under the data functionality, retrieve the data for the Charlottetown station for "Water level official value" from noon until the start of the lab.

- What is the URL that was used?
- Take a screenshot of the Response body

Using the endpoint under the data functionality, retrieve the data for the Charlottetown station for "High and Low Tide Predictions" for the entire day of 25 December, 2021.

- What is the URL that was used?

- Take a screenshot of the Response body

Submission

Before the due date for this lab, students should submit online to the lms a pdf file containing the answers to the questions.