Article

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Reading JSON

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Product Type
FME Desktop

FME Version
2022.0

Tutorial: Tutorial: Getting Started with JSON (/s/article/tutorial-getting-started-with-json) | **Next:** Extracting Location from JSON (/s/article/converting-from-json-to-a-spatial-format-gis)

Introduction

This article covers reading JSON data. FME has a few ways to read JSON data into your workspace. Each has different scenarios where they are more useful. Some are specifications of JSON and have their own reader formats, including GeoJSON, Esri JSON, and IMDF, summarized in this table:

Method	Common Scenario	Tutorial
JSON Reader	Reading JSON from a known file path or URL	This page

FeatureReader	Reading JSON from a known or attribute-based file path or URL in the middle of a translation	The FeatureReader Transformer (/s/article/the-featurereader-transformer)
JSON transformers (JSONExtractor, JSONFlattener and JSONFragmenter)	Reading JSON directly into a transformer from a file path or URL, controlling how it is turned into FME features	Transforming JSON using the JSONExtractor, JSONFlattener, and JSONFragmenter (/s/article/json-transformations)
HTTPCaller	Reading JSON from an API call	Tutorial: Getting Started with APIs (/s/article/getting-started-with-apis-1)
GeoJSON Reader	The source JSON data follows the GeoJSON specification	GeoJSON Reader/Writer Documentation (https://docs.safe.com/fme/html/FME_Desktop_Documentation/FME_ReadersWriters/geojson/geojson.htm)
Esri JSON Reader	The source JSON data follows the Esri JSON specification	Esri-JSON Reader/Writer Documentation (https://docs.safe.com/fme/html/FME_Desktop_Documentation/FME_ReadersWriters/esrijson/esrijson.htm?)
IMDF Reader	The source JSON data follows the IMDF GeoJSON specification	IMDF Reader/Writer Documentation (https://docs.safe.com/fme/html/FME_Desktop_Documentation/FME_ReadersWriters/imdf/imdf.htm)

This article shows how to read JSON directly into your workspace using the JSON reader. It shows two different reader Schema Scan Modes: Automatic and JSON Query. For other scenarios, see the links above.

Content Overview

Step-by-Step Instructions

Part 1: Inspect the Data

We access the FAA Airport Status Web Service API in this tutorial. You can access the API documentation at SwaggerHub (https://app.swaggerhub.com/apis/FAA/ASWS/1.2.0#/FAA%20Airport%20Status%20Service/getAirportStatus). FAA-airport-status-example.json is a sample extract of the data in case the API is unavailable.

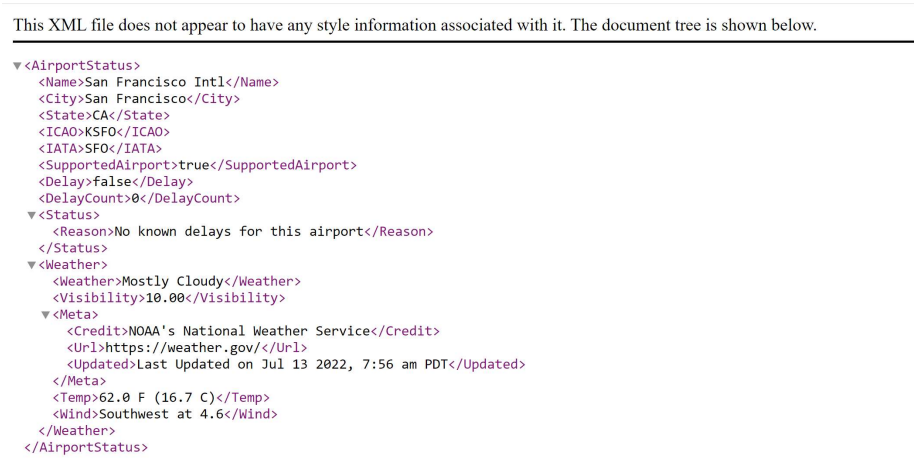
Note: if the URL for this API changes, you can just view the attached example data instead, which is available in the files section of this article.

1. View JSON Data from a URL

Let's start by taking a look at our source JSON data. The example data contains status information about a US airport, including attributes such as the current visibility and weather. We want to read this live data feed for the San Francisco airport (code SFO), which is available from:

```
https://soa.smext.faa.gov/asws/api/airport/status/SFO (https://soa.smext.faa.gov/asws/api/airport/status/SFO)
```

If you open this URL in a browser, you'll see you receive an XML response, as this API provides XML by default. If you wanted to receive JSON, you have to request it in an HTTP header.

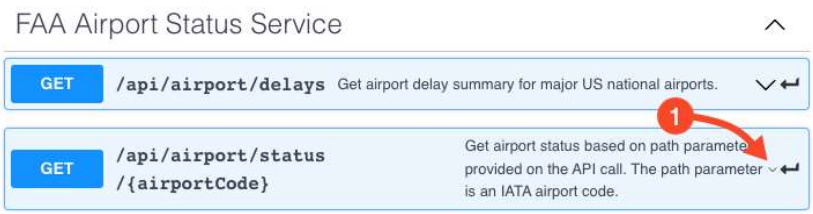


2. View JSON Data from an HTTP Request with Headers

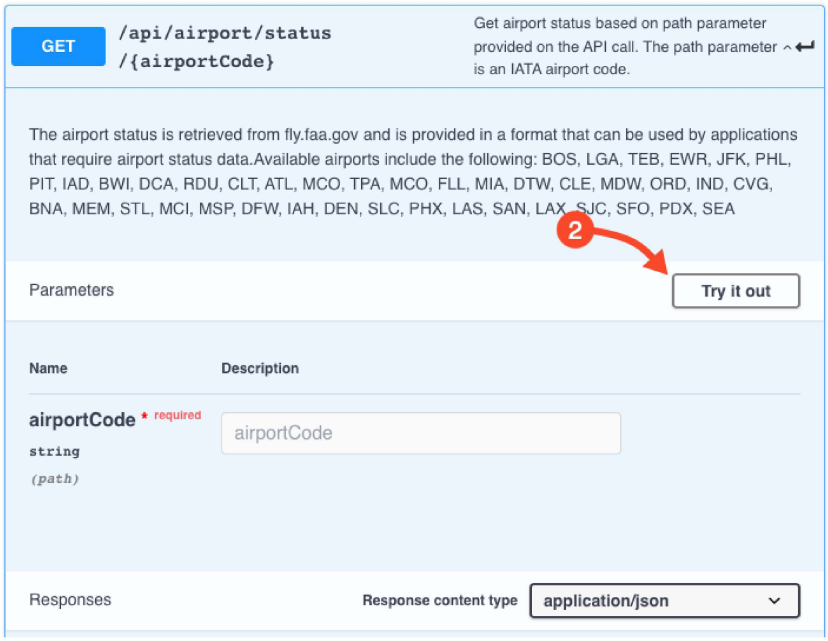
We can make a proper HTTP request with headers requesting JSON in the browser by using SwaggerHub (https://app.swaggerhub.com/apis/FAA/ASWS/1.1.0), which is an API platform used by the FAA to design and document their API.

Go to the API's getAirportStatus operation on SwaggerHub (https://app.swaggerhub.com/apis/FAA/ASWS/1.2.0#/FAA%20Airport%20Status%20Service/getAirportStatus). Note that it may take a while to load. Then:

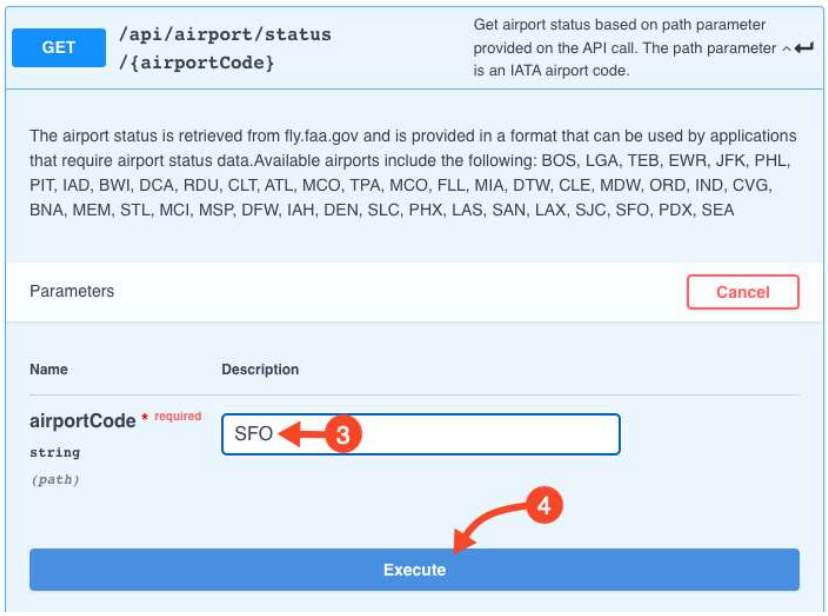
(1) Expand the GET /api/airport/status/{airportCode} section



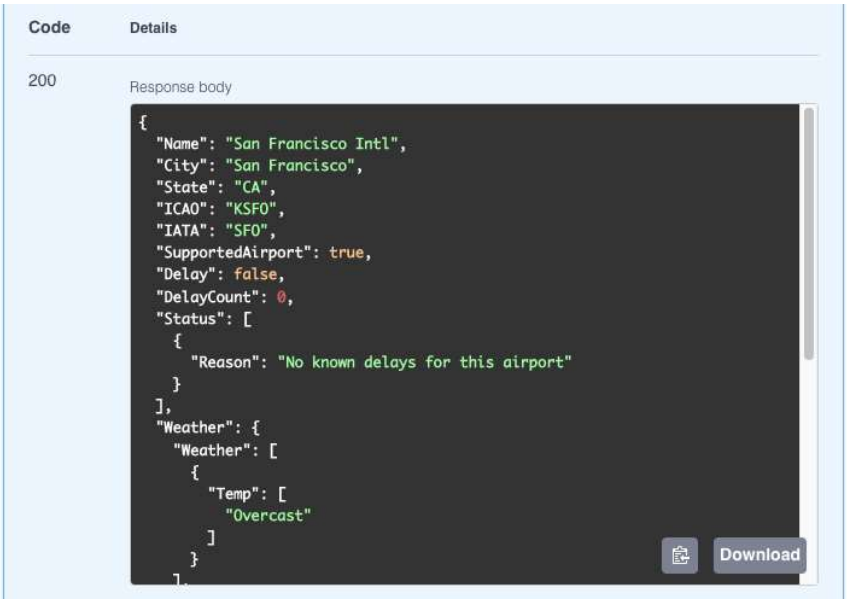
(2) Click the "**Try it Out**" button, which lets you provide parameters to the getAirportStatus operation.



(3) Type "SFO" into the airportCode parameter field. (4) Click the "Execute" button, which will make an API request using the entered parameter. Note that the default value for "Response content type" is "application/json," meaning that this API request will provide a header requesting JSON as the response.



After clicking “Execute,” you will see some JSON appear under the response body for the HTTP 200 code:



This JSON is the data about SFO’s status we’ll be using in the exercise. It should look something like this:

```
{
  "Name": "San Francisco Intl",
  "City": "San Francisco",
  "State": "CA",
  "ICAO": "KSFO",
  "IATA": "SFO",
  "SupportedAirport": true,
  "Delay": false,
  "DelayCount": 0,
  "Status": [
    {
      "Reason": "No known delays for this airport"
    }
  ],
  "Weather": {
    "Weather": [
      {
        "Temp": [
          "Fair"
        ]
      }
    ],
    "Visibility": [
      10
    ],
    "Meta": [
      {
        "Credit": "NOAA's National Weather Service",
        "Url": "http://weather.gov/" (http://weather.gov/)",
        "Updated": "Last Updated on Jul 7 2022, 6:56 am PDT"
      }
    ],
    "Temp": [
      "53.0 F (11.7 C)"
    ],
    "Wind": [
      "West at 11.5"
    ]
  }
}
```


JSON Code example

Part 2: The JSON Reader Auto Mode

1. Open FME Workbench and add a JSON Reader

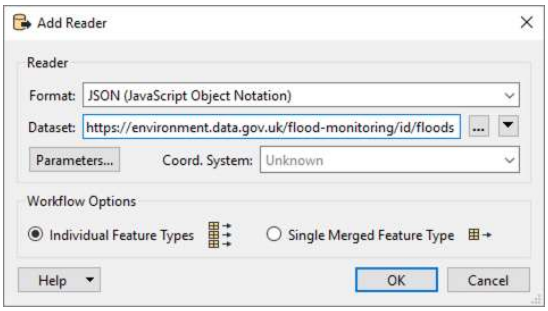
In FME Workbench, start a new workspace. Click Reader > Add Reader. Choose JSON (JavaScript Object Notation) as the Format.

You can supply a path to a local file (example available in the Files) or a URL for the Dataset parameter.

This article will assume you are using a URL. Paste the following URL into the Dataset Parameter:

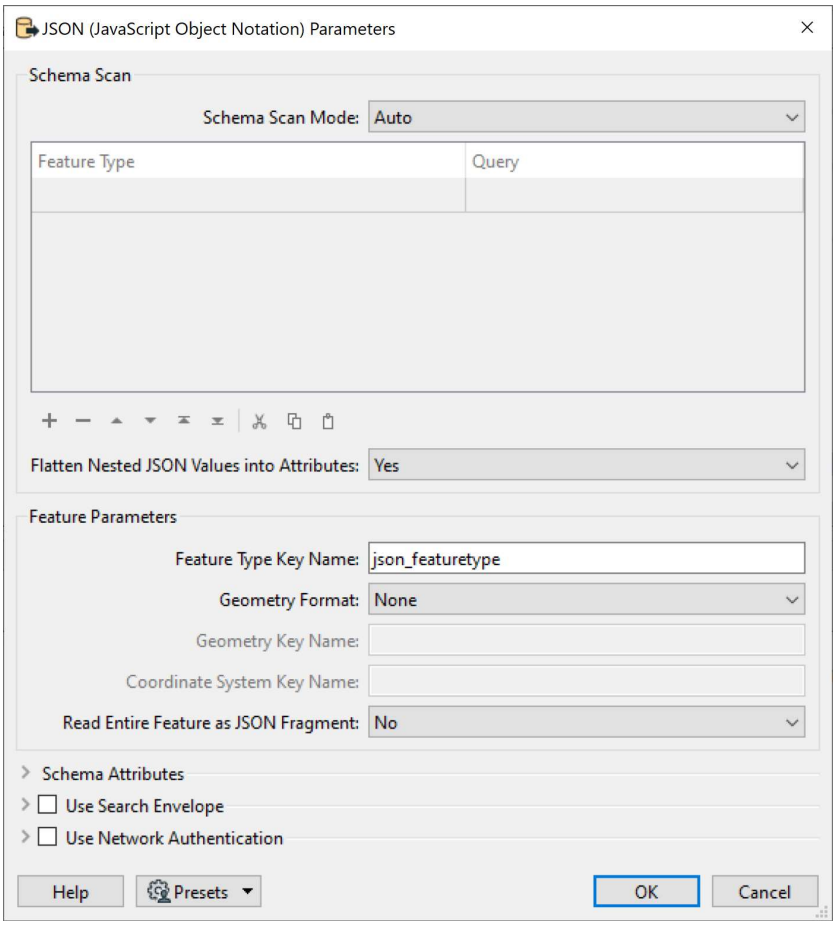
```
https://soa.smext.faa.gov/asws/api/airport/status/SFO (https://soa.smext.faa.gov/asws/api/airport/status/SFO)
```

Although we know this URL responds with XML, FME will automatically include the correct headers to request JSON when using the JSON Reader.



Click the Parameters button. Setting JSON reader parameters lets you control how FME turns the nested structure of JSON into features. There are two options for Schema Scan Mode: Auto and JSON Query. Auto mode simply takes the JSON parent attributes and turns those into FME attributes and turns the rest of the nested structure into FME list attributes. JSON Query mode, which we will examine later in the article, lets you write a JSON Query to pick which part of the JSON data structure you wish to use as the top level to define FME attributes.

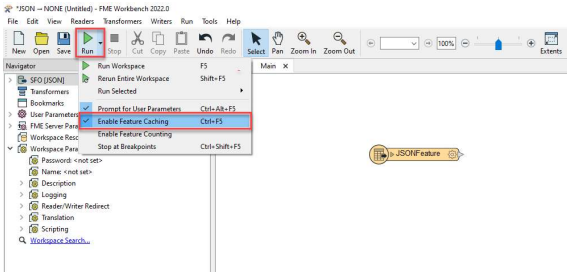
For now, make sure that Schema Scan Mode is set to Auto.



Click OK twice to add the reader.

3. Run Workspace

Ensure that Feature Caching is enabled then click the Run button to run the workspace and create a local feature cache of the JSON data.



4. Inspect the JSON Using Visual Preview

Click on the JSON reader feature type (or its green cache icon) to inspect it using the Table View of Visual Preview. You should see that the JSON data has been flattened into a table, with all of the top-level JSON attributes becoming FME attributes: Name, City, State, etc.

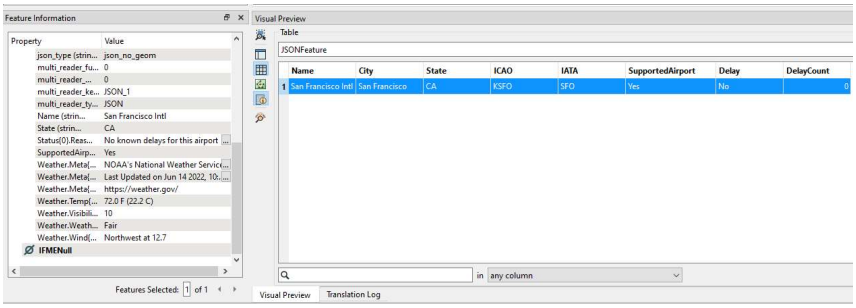
	Name	City	State	ICAO	IATA	SupportedAirport	Delay	DelayCount
1	San Francisco Intl	San Francisco	CA	KSFO	SFO	Yes	No	0

You will notice that no attributes with children are included, like “Status” and “Weather.” These attributes are still available on FME features, but because of the nested structure of JSON, they are read as lists.

Note: if you have not worked with unexposed attributes or lists in FME before, working with JSON might be challenging. You can read Tutorial: Getting Started with List Attributes (/s/article/working-with-list-attributes-tutorial) for a quick introduction to these topics.

5. View Features in the Feature Information Window

To find these unexposed attributes, click on the single feature in the Table View to select it. Then look in the Feature Information Window in Visual Preview. You can see all the attributes with children are stored on the feature as lists. They use dot notation (https://codeburst.io/javascript-quickie-dot-notation-vs-bracket-notation-333641c0f781) where their children are attributes and FME list bracket notation where there is more than one attribute-value pair in the array:



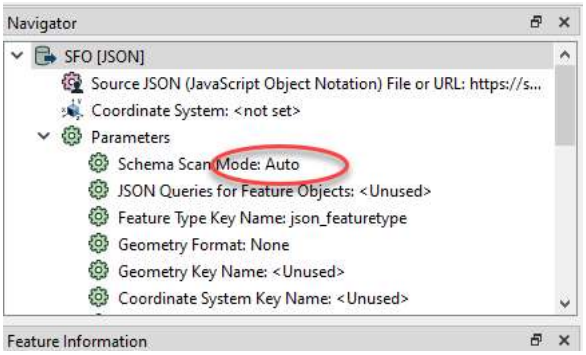
In the next part of this article, you will learn how the JSON structure becomes FME features.

Part 3: The JSON Reader JSON Query Mode

1. Change JSON Reader Schema Scan Mode to JSON Query

Now let’s try reading in JSON using a JSON Query.

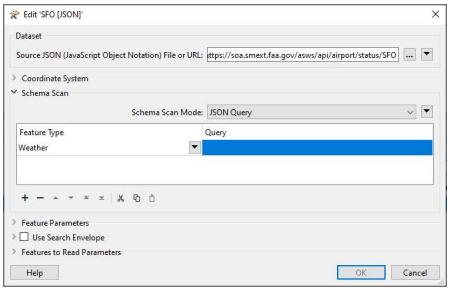
Expand the JSON Reader in the Navigator window, then Parameters, then double-click Schema Scan Mode



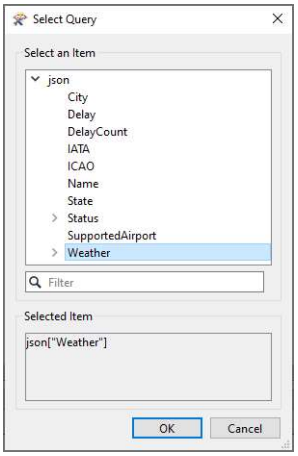
2. Create a JSON Query

To construct a JSONQuery:

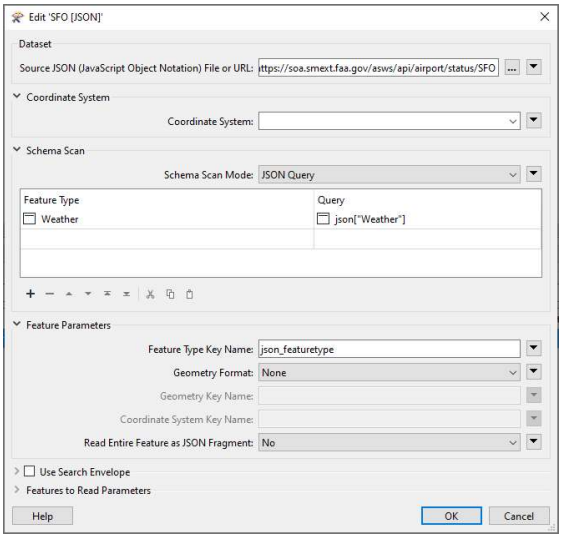
1. Change Schema Scan Mode to JSON Query.
2. In the table under Feature Type, type "Weather"



3. Then click in the space under Query and then click on the ellipses button. This button opens the JSON data's nested structure, which you can use to build the query.
4. Click on the arrows that contain the nested list objects. Select Weather from the list; the Query will then display json["Weather"].

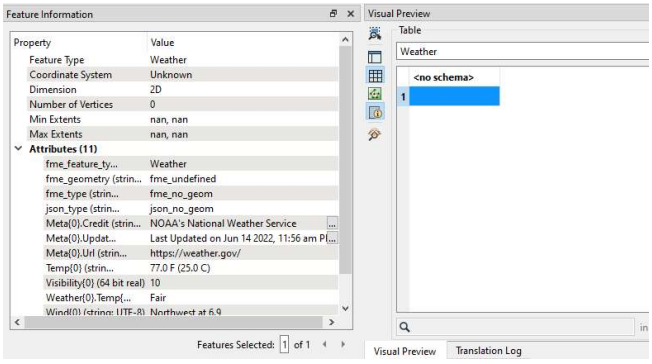


5. Click OK. You may have to confirm the Query by clicking any blank spaces in the dialog, for the OK button to enable. The parameters should look as follows:



3. Run Workspace

Run the workspace and then inspect the new feature cache. The Table View will report the data has no schema, but using the Feature Information Window reveals list attributes. Only the child data of weather and not the parent data such as Airport, City, etc., are included:



Continue to the next article: Extracting Location from JSON (https://community.safe.com/s/article/converting-from-json-to-a-spatial-format-gis).

Data Attribution

The data used in this article come from the Federal Aviation Administration (https://www.faa.gov/)'s Airport Status Web Service (ASWS) API (https://app.swaggerhub.com/apis/FAA/ASWS/1.1.0), which is licensed Creative Commons 0 (CC0) (https://creativecommons.org/publicdomain/zero/1.0/legalcode).

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Safe Software respectfully acknowledges that we live, learn and work on the traditional and unceded territories of the Kwantlen, Katzie, and Semiahmoo First Nations.