

Australian Statistics API Specification

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1. The context

We are a company specialising in wide array of trading related services. We are developing a complex system to provide an analytics platform for our traders. We wish to open our system to third party software houses, offering them ability to “plug-in” independent software modules that implement particular functions. We therefore request all interested companies to provide an independent software module that implements an API as specified in the rest of this document.

2. Functions of the API

2.1 Retail Trade API

For certain functionalities of our platform, we require industry data, statistics related to different areas – specifically the monthly retail turnover by various industry groups or monthly value of various commodities that are exported. Further we may want data for various regions of Australia.

Australian Statistics API will receive a request from a third party software specifying an area of statistics, a list of regions, a list of categories (industries or commodities) and a period of time specified by start and end date. The API should return the statistics according to the area of statistics. For this application there are two main areas: “Retail” and “MerchandiseExports”.

- If user requests “Retail”, the API should return the monthly retail turnover of each region and each category, for the specified period of time.
- If the user requested “MerchandiseExports” as the statistics area, monthly value of each commodity listed in the categories, for each region and for defined time period, should be returned.

Figure 1 shows how a system would interact with the Australian Statistics API.

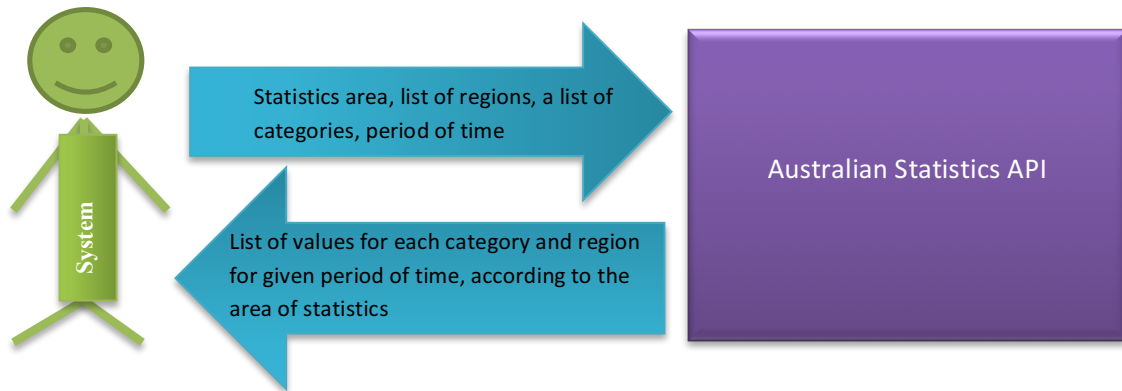


Figure 1 - High level view

The programming language in which the module is to be written is not important as long as there is some way to invoke it from our system. The output of the Australian Statistics API should be a JSON file containing data in the format specified below. It is important that the module can be used without its source code being revealed.

3. Input Parameters for API

The API we develop should be able to take four inputs as defined by following table.

Parameter	Arguments and Formats
StatisticsArea	A string which can take value "Retail" or "MerchandiseExports".
State	A list of one or more regions (AUS, NSW, WA, SA, ACT, VIC, TAS, QLD, NT) separated by ",".
Category	<p>If StatisticsAria is "Retail", a list of one or more industry (Total, Food, HouseholdGood, ClothingFootwearAndPersonalAccessory, DepartmentStores, CafesResturantsAndTakeawayFood, Other) separated by ",".</p> <p>OR</p> <p>If StatisticsAria is "MerchandiseExports", a list of one or more commodities of interest from (Total,FoodAndLiveAnimals, BeveragesAndTobacco, CrudMaterialAndInedible, MineralFuelLubricentAndRelatedMaterial, AnimalAndVegitableOilFatAndWaxes, ChemicalsAndRelatedProducts, ManufacutedGoods, MachineryAndTransportEquipments, OtherManuacuredArticles, Unclassified) separated by ",".</p>
startDate	In the format of YYYY-MM-DD
endDate	In the format of YYYY-MM-DD

4. Output Specification for the API

4.1 For Retail Statistics Area

The module should return a json file with data requested by user, in the format defined in Appendix 6.2.

The format of output data types should be as follows:

Output Parameter	Data Format
RetailIndustry	String value from (Total, Food, HousholdGood, ClothingFootwareAndPersonalAccessory, DepartmentStores, CafesResturantsAndTakeawayFood, Other)
State	String value from (AUS, NSW, WA, SA, ACT, VIC, TAS, QLD)
Date	Last day of each month in YYYY-MM-DD format.
Turnover	A floating point value

4.2 For Merchandise Export Area

The module should return a json file with data requested by user, in the format defined in Appendix 6.3.

The format and data types of output data types should be as follows:

Parameter	Data Type
Commodity	String value from (Total,FoodAndLiveAnimals, BeveragesAndTobacco, CrudMaterialAndInedible, MineralFuelLubricentAndRelatedMaterial, AnimalAndVegitableOilFatAndWaxes, ChemicalsAndRelatedProducts, ManufacutedGoods, MachineryAndTransportEquipments, OtheranucacturedArticles, Unclassified)
State	String value from (AUS, NSW, WA, SA, ACT, VIC, TAS, QLD, NT)
Date	Last day of each month in YYYY-MM-DD format.
Value	A floating point value

Another output of the API is a log file must contain the following information:

- Developer team
- Module name and version
- Parameters passed
- An indication if execution has been successful or there is an error
- If error, indicate the nature of the error
- If successful, need to supply
 - Start date and time of execution
 - End date and time of execution
 - Elapsed time

- Output file name

5. Acquiring the data for the API

To fulfil the user request about retail trades, you will need to have a data source. For this, you should use the REST API provided by Australian Bureau of Statistics (ABS)

(<http://stat.data.abs.gov.au/#>).

5.1 Retail Data

Among the various data sets they provide, the API needs the *Monthly Retail Turnover by Industry Group*. ABS provide different mechanisms of filtering and acquiring the data – as excel files, csv files or over a REST API URL. You should use the REST API URL in the application, to filter and acquire data dynamically, to match with the parameters provided.

To understand the API and data sets you can visit page (<http://stat.data.abs.gov.au/#>) and navigate to **INDUSRTY-> Retail and Wholesale Trade -> Retail -> Retail Trade -> Monthly Retail Turnover by Industry Group**

The screenshot shows the ABS.Stat interface for 'Retail Trade'. The 'Selection' dropdown menu is open, showing the following options: Region [1 / 9], Data Type [2 / 4], Retail Industry [7 / 22], Adjustment Type [3 / 5], and Time & Frequency [12]. The main table displays monthly retail turnover data from Jan-2016 to Mar-2016, categorized by industry groups: household goods retailing, clothing, footwear and personal accessory retailing, department stores, other retailing, and cafes, restaurants and takeaway food services. The table includes columns for 'Type' (Original, Seasonally Adjusted) and 'Time' (Month-Year).

Type	Time	household goods retailing	clothing, footwear and personal accessory retailing	department stores	other retailing	cafes, restaurants and takeaway food services
Original	Jan-2016	24 753.1	10 244.9	4 376.7	1 875.7	1 519.2
	Feb-2016	22 734.9	9 556.9	3 979.6	1 598.7	1 155.8
	Mar-2016	24 517.3	10 354	4 097.4	1 780.6	1 451.5
	Apr-2016	23 975.9	9 727.9	4 064.9	1 924.6	1 451
	May-2016	24 143.5	9 815.2	4 052.5	1 926.7	1 449.7
	Jun-2016	24 165.3	9 516.5	4 357.3	1 967.1	1 596.1
	Jul-2016	24 563.7	9 928.5	4 225.1	1 876.1	1 468.3
	Aug-2016	24 591.3	10 041.9	4 239.4	1 806.3	1 293.9
	Sep-2016	25 063.6	10 005.7	4 469	1 896.8	1 393.5
	Oct-2016	25 974.6	10 482.6	4 696.8	1 937.8	1 497.4
	Nov-2016	26 781.1	10 435.7	4 874.4	2 057.1	1 664.3
	Dec-2016	33 100.2	12 230.1	5 782.3	3 330.5	2 850.4
Seasonally Adjusted	Jan-2016	24 957.9	10 033.4	4 407.9	1 938.5	1 593.5
	Feb-2016	25 000.5	10 051.2	4 419.7	1 945.5	1 695.2
	Mar-2016	26 096.7	10 083.4	4 425.9	1 960.3	1 690.4

You can customize the data set by changing various parameters at Selection tab as shown in figure above.

According to the parameters you change, the URL can be generated at Export **Tab-> Developer API tab -> Generate API Query button**

URL: Export -> Developer API tab -> Generate API Query button

For our API, we are interested in the Region, Retail Industry Type and Time and Frequency Parameters. Other parameters can be left as follows:

Data Type: Current Prices (\$Million)

Adjustment Type: Original

For further clarifications, given below is a sample URL:

<http://stat.data.abs.gov.au/sdmx-json/data/RT/0+1+2.2.41+42+43.10.M/all?startTime=2015-01&endTime=2015-12&dimensionAtObservation=allDimensions>

The highlighted part of the URL can be used to pass parameters to the ABS API. If we consider the part “0+1+2.2.41+42+43.10.M”, each **category of parameter is separated by “.”** In the order of indexes of the Region, Index of data type, ID for retail industry, ID of adjustment type and Time & Frequency indicator. “+” sign is used to separate a list of attributes passed to one parameter. Following table explains the parameters passed in the example URL. Explore the parameters further by exploring the web page.

Parameter	Referred Meaning
0+1+2	Request data for three regions (0: Australia, 1: New South Wales, 2: Victoria). You can use from 0 to 8 numbers.
2	Refer to the data type (2-Current Prices (\$Million)). You can keep this as default.
41+42+43	Refer to a list of IDs for retail industry (20- Total, 41- Food Retailing, 42-Household Good Retailing). Explore further in web page.
10	Refer to the Adjustment type (10-Original). You can keep this as default.
M	Request Monthly data
startTime=2015-01&endTime=2015-12	Used to define the duration, for which data is requested.

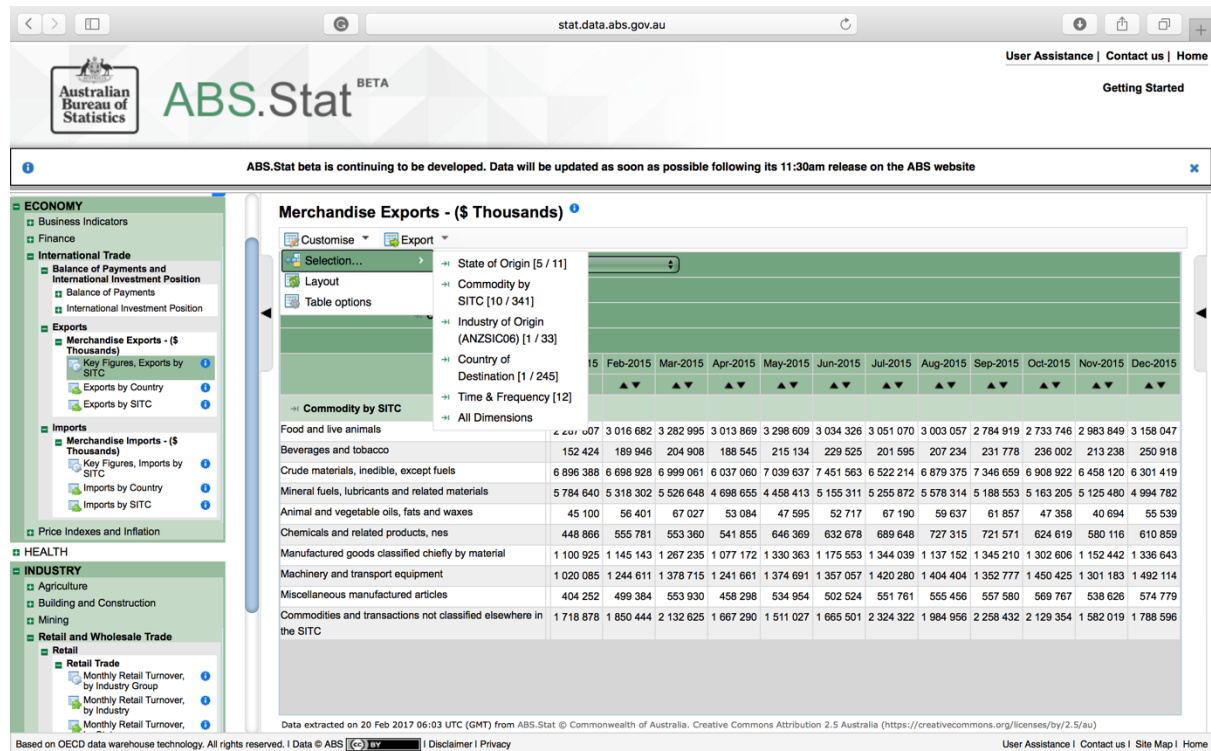
The ABS API will return dataset as JSON file, each data value indexed according to the parameters. The indexing is described at the end of the JSON file. You can type the above given URL on the browser and observe the output format. The data structure can be found in following link :

<http://stat.data.abs.gov.au/restsdmx/sdmx.ashx/GetDataStructure/RT>

5.2 Merchandise Export Data

For Merchandise Export, the API needs the *Monthly Value of Exports by Commodity*. ABS provide different mechanisms of filtering and acquiring the data – as excel files, csv files or over a REST API URL. You should use the REST API URL in the application, to filter and acquire data dynamically, to match with the parameters provided.

To understand the API and data sets you can visit page (<http://stat.data.abs.gov.au/#>) and navigate to **ECONOMY -> International Trade -> Exports -> Merchandise Exports -> Key Figures, Exports by SITC**



You can customize the data set by changing various parameters at Selection tab as shown in figure above.

According to the parameters you change, the URL can be generated at **Export Tab-> Developer API tab -> Generate API Query button**

For our API, we are interested in the State Of Origin, Commodity by SITC and Time and Frequency Parameters. Other parameters can be left as follows:

Industry of origin - Total
Country of destination – Total

For further clarifications, given below is a sample URL:

http://stat.data.abs.gov.au/sdmx-json/data/MERCH_EXP/+1+2+9+F.0+1+2+3+4+5+6+7+8+9.-1.-.M/all?startTime=2015-01&endTime=2015-12&dimensionAtObservation=allDimensions

The highlighted part of the URL can be used to pass parameters to the ABS API. If we consider the part “-+1+2+9+F.0+1+2+3+4+5+6+7+8+9.-1.-.M”, each category of parameter is separated by “.” In the order of IDs for list of State of Origin, List of Commodity by SITC, List of Industry of Origin, List of Country of Destination and Time & Frequency indicator. “+” sign is used to separate a list of attributes passed to one parameter.

Following table explains the parameters passed in the example URL. Explore the parameters further by exploring the web page.

Parameter	Referred Meaning
-+1+2	Request data for State of Origin (- : total, 1 : New South Wales) Find IDs for other states using the ABS web site.
-1+0	Refer to the commodity by SITC (-1:Total, 0 - Food and Live Animals) Find IDs for other commodities using the ABS web site.

-1	Refer to the industry of origin. Keep -1 as default to consider all the industries.
-	Refer to the country of destination. Keep - as default to indicate total of exports.
M	Request Monthly data
startTime=2015-01&endTime=2015-12	Used to define the duration, for which data is requested.

The ABS API will return dataset as JSON file, each data value indexed according to the parameters. The indexing is described at the end of the JSON file. Example file type the given URL in the browser and observe the results returned.

6. Appendix

6.1 Additional Information:

Teams have the choice of running their system on two different platforms:

- Standalone Program
 - ♣ PC running Windows
 - ♣ Unix/Linux platform
- Web service (accessible via a REST interface)

Throughout the workshop, each team will need to have a Web page. As a minimum, the page is showing:

- The team name and members
- Consecutive releases of their module. Each release page must include a link to download the module and information about:
 - The date and version of the release
 - What has been implemented so far
 - Differences with previous version
 - Clear instructions on how to run the module in standalone mode
 - Guidelines on how to integrate the module with other systems
 - Any test software or data

6.2 Sample Output Format for Retail

```
{
  "MonthlyRetailData": [
    {"RetailIndustry":<>,
     "RegionalData":[
       { State:<>,
         Data:[
           {"Date":<>,
            "Turnover":<>}
           {"Date":<>,
            "Turnover":<>}
         ]}
       { State:<>,
         Data:[
           {"Month":<>,
            "Turnover":<>}
           {"Month":<>,
            "Turnover":<>}
         ]}
     ]
    }
  {"RetailIndustry":<>,
   "RegionalData":[
     { State:<>,
       Data:[
         {"Date":<>,
          "Turnover":<>}
         {"Date":<>,
          "Turnover":<>}
       ]}
     { State:<>,
       Data:[
         {"Date":<>,
          "Turnover":<>}
         {"Date":<>,
          "Turnover":<>}
       ]}
     ]
   }
 ]}
}
```

6.3 Sample Output Format for Merchandise Export

```
{
  "MonthlyCommodityExportData": [
    {
      "Commodity": <>,
      "RegionalData": [
        {
          State: <>,
          Data: [
            {
              Date: <>,
              Value: <>
            },
            {
              Date: <>,
              Value: <>
            }
          ]
        },
        {
          State: <>,
          Data: [
            {
              Date: <>,
              Value: <>
            },
            {
              Date: <>,
              Value: <>
            }
          ]
        }
      ]
    },
    {
      "Commodity": <>,
      "State": [
        {
          Region: <>,
          Data: [
            {
              Date: <>,
              Value: <>
            },
            {
              Date: <>,
              Value: <>
            }
          ]
        },
        {
          State: <>,
          Data: [
            {
              Date: <>,
              Value: <>
            },
            {
              Date: <>,
              Value: <>
            }
          ]
        }
      ]
    }
  ]
}
```

6.4 References:

[1] ABS.Stat : <http://stat.data.abs.gov.au/#>