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.

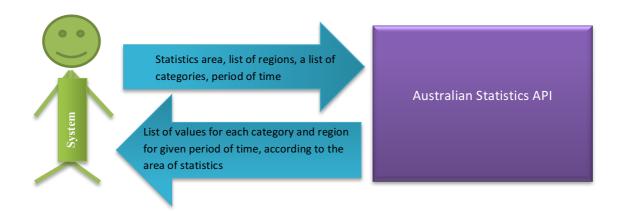


Figure 1 - High level view

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	If StatisticsAria is "Retail", a list of one or more industry (Total,
	Food, HouseholdGood,
	ClothingFootwareAndPersonalAccessory, DepartmentStores,
	CafesResturantsAndTakeawayFood, Other) separated by ",".
	OR
	If StatisticsAria is "MerchandiseExports", a list of one or more commodities of interest from (Total,FoodAndLiveAnimals,
	BeveragesAndTobacco, CrudMaterialAndInedible,
	MineralFuelLubricentAndRelatedMaterial,
	AnimalAndVegitableOilFatAndWaxes,
	ChemicalsAndRelatedProducts, ManufacutedGoods,
	MachineryAndTransportEquipments, OtherManucacturedArticles,
	Unclassified) separated by ",".
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) (<u>http://stat.data.abs.gov.au/#)</u>.

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 (<u>http://stat.data.abs.gov.au/#)</u> and navigate to INDUSRTY-> Retail and Wholesale Trade -> Retail -> Retail Trade -> Monthly Retail Turnover by Industry Group

Australian Bureau of Statistics ABS	S.Stat	TA							User Assistance Contact us Getting Star
)	ABS.Stat beta is continu	ing to be d	eveloped. D	ata will be upda	ted as soon as	possible following its 11:30am relea	ise on the ABS	website	
ta by theme	Retail Trade	0							
d in Themes Q Reset	Customise *	Export	*						
Themes ᅌ	Selection	- capon			1000			-	
CONOMY			→ Region						
Business Indicators	Layout		Data Ty		•				
Finance	Table options	riequency	 Retail Ir 	ndustry [7 / 22]					
International Trade		requercy	Adjustr	nent Type [3 / 5]	hald and he		Desertment	0.0	0.4
Price Indexes and Inflation Retail Industry			+ Time &	Frequency [12]	hold goods Clothing, footwear and personal stalling accessory retailing		Department stores	Other retailing	Cafes, restaurants and takeaway food services
IEALTH			+ All Dim	ensions	, and y	accessory recailing	010100	. Stanning	00111000
Agriculture	→ Adjustment	⇒⊨ Time							
Building and Construction	Туре								
Mining	Original	Jan-2016	24 753.1	10 244.9	4 376.7	1 875.7	1 519.2	3 304.9	3 431.8
Retail and Wholesale Trade		Feb-2016	22 734.9	9 556.9	3 979.6	1 598.7	1 155.8	3 257	3 186.9
Retail Retail Trade		Mar-2016	24 517.3	10 354	4 097.4	1 780.6	1 451.5	3 398.6	3 435.2
Monthly Retail Turnover,		Apr-2016	23 975.9	9 727.9	4 064.9	1 924.6	1 451	3 355.8	3 451.7
by Industry Group		May-2016	24 143.5	9 815.2	4 092.5	1 926.7	1 449.7	3 428.5	3 431
by Industry		Jun-2016	24 145.3	9 516.5	4 357.3	1 967.1	1 596.1	3 414.4	3 313.9
Monthly Retail Turnover, 0		Jul-2016						3 414.4	
Quarterly Retail Turnover, 0			24 563.7	9 928.5	4 225.1	1 876.1	1 468.3		3 573
Quarterly Retail Turnover, 0		Aug-2016	24 591.3	10 041.9	4 239.4	1 806.3	1 293.9	3 562.3	3 647.5
by State		Sep-2016	25 063.6	10 005.7	4 469	1 896.8	1 393.5	3 602.3	3 696.3
Technology and Innovation		Oct-2016	25 974.6	10 482.6	4 696.8	1 937.8	1 497.4	3 643.2	3 716.6
Tourism and Transport		Nov-2016	26 781.1	10 435.7	4 874.4	2 057.1	1 684.3	4 051.1	3 678.5
ABOUR		Dec-2016	33 100.2	12 230.1	5 782.3	3 330.5	2 850.4	4 859.6	4 047.3
PEOPLE	Seasonally Adjusted	Jan-2016	24 957.9	10 033.4	4 407.9	1 938.5	1 593.5	3 538.2	3 446.3
CENSUS		Feb-2016	25 000.5	10 051.2	4 419.7	1 945.5	1 595.2	3 546.9	3 442.1
SNAPSHOTS OF AUSTRALIA		Mar-2016	25,066,2	10 083 4	4 425.9	1960.3	1 580.4	3 563 1	3 453 1

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 & Frequence 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 (<u>http://stat.data.abs.gov.au/#</u>) and navigate to ECONOMY -> International Trade -> Exports -> Merchandise Exports -> Key Figures, Exports by SITC

Australian Burgau of Statistics ABS	S.:	Stat										Use	ər Assistai	nce Cont Getti	ng Starte
	ABS.	Stat beta is continuing to be de	veloped. Data will b	e updated	as soon a	s possible	following	its 11:30a	ım release	on the A	3S website	e			
CONOMY Business Indicators	Π	Merchandise Exports	- (\$ Thousand	s) ⁰											
Finance		Customise * Export	*												
International Trade Balance of Payments and International Investment Position	h	Selection >	State of Origin [5 Commodity by	/ 11]		\$									
Balance of Payments		Table options	SITC [10 / 341]												
International Investment Position		map	Industry of Origin												
Exports Merchandise Exports - (\$ Thousands)			(ANZSIC06) [1 / 3	3]											
Key Figures, Exports by OSITC			 Country of Destination [1 / 24 		Feb-2015	Mar-2015	Apr-2015	May-2015	Jun-2015	Jul-2015	Aug-2015	Sep-2015	Oct-2015	Nov-2015	
Carl Exports by Country 0 Carl Exports by SITC 0		- I Commodity by SITC	Time & Frequency	/ [12]	•	••	••	••	••	••	••	••	••	••	••
Imports		Food and live animals	All Dimensions	07	3 016 682	3 292 005	2 012 860	3 209 600	2 024 226	3 051 070	3 003 057	2 784 010	2 722 746	2 082 840	3 159 047
Merchandise Imports - (\$ Thousands)		Beverages and tobacco													
Key Figures, Imports by		Crude materials, inedible, except fu	ole	152 424	189 946 6 698 928		188 545		229 525	201 595	207 234			6 458 120	250 918
SITC		Mineral fuels, lubricants and related			5 318 302										
Kimports by SITC 0		Animal and vegetable oils, fats and													
Directory and toffetter				45 100		67 027	53 084	47 595	52 717	67 190	59 637	61 857	47 358	40 694	55 539
Price Indexes and Inflation		Chemicals and related products, ne		448 866		553 360	541 855	646 369	632 678	689 648	727 315	721 571	624 619	580 116	610 859
ALTH		Manufactured goods classified chie		1 100 925	1 145 143	1 267 235	1 077 172	1 330 363	1 175 553	1 344 039	1 137 152	1 345 210	1 302 606	1 152 442	1 336 643
DUSTRY		Machinery and transport equipment		1 020 085	1 244 611	1 378 715	1 241 661	1 374 691	1 357 057	1 420 280	1 404 404	1 352 777	1 450 425	1 301 183	1 492 114
Agriculture Building and Construction		Miscellaneous manufactured article	s	404 252	499 384	553 930	458 298	534 954	502 524	551 761	555 456	557 580	569 767	538 626	574 779
Vining		Commodities and transactions not	classified elsewhere in	1 718 878	1 850 444	2 132 625	1 667 290	1 511 027	1 665 501	2 324 322	1 984 956	2 258 432	2 129 354	1 582 019	1 788 596
Retail and Wholesale Trade		the SITC													
Retail Retail Trade Monthly Retail Turnover, Monthly Retail Turnover, Monthly Retail Turnover,															
by Industry			UTC (GMT) from ABS.St												

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
 - \circ $\;$ Clear instructions on how to run the module in standalone mode $\;$
 - \circ $\;$ 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":<>}]}] }]}

{
"MonthlyCommodityExportData": [
{"Commodity":<>,
"RegionalData":[
{ State:<>,
Data:[
{"Date":<>,
"Value":<>}
{"Date":<>,
"Value":<>}
]}
{ State:<>,
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{"Date":<>,
"Value":<>}
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6.3 Sample Output Format for Merchandise Export

6.4 References:

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