Reading XML & SDMX Data with SAS

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SDMX – Statistical Data and Metadata eXchange

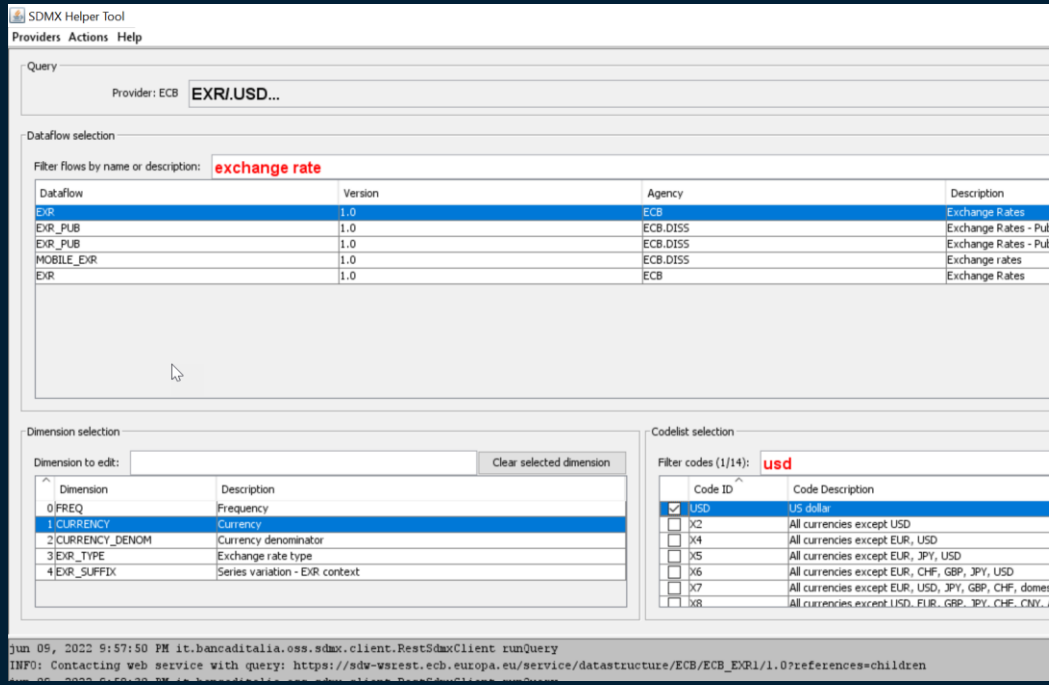
Sdmx.org

- ISO Standard to describe statistical data and metadata
- ISTAT offers a SDMX helper and %gettimeseries() macro to retrieve SDMX data from different providers
- SAS Econometrics provides libname several engines
- SDMX-ML allows retrieval of SDMX timeseries in XML and JSON format

Reading SDMX Data

with SDMX Helper and %gettimeseries()

- https://github.com/amattioc/SDMX
- SDMX Helper: select Data Provider
- Data Flow and Dimensions of the Time Series like currency=USD
- Actions Menu: Build Commands
- The command in SAS uses the %gettimeseries () macro call:



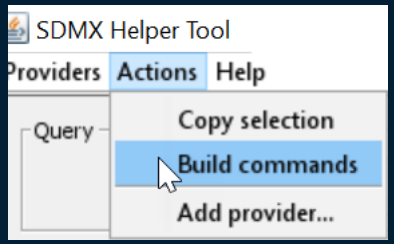
Reading SDMX Data

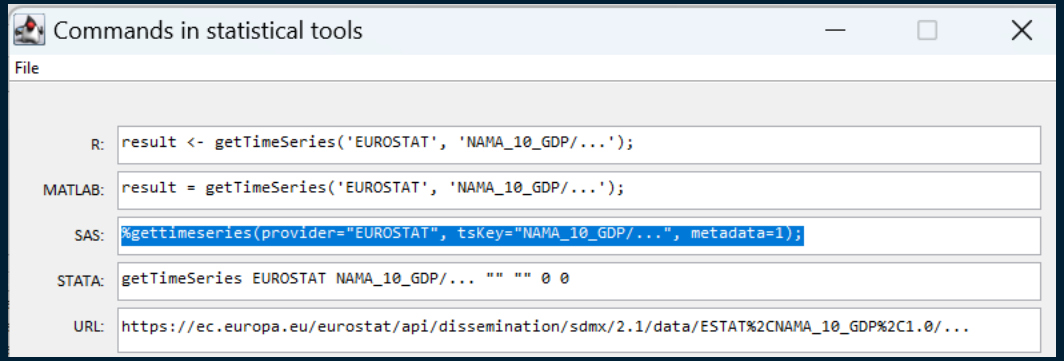
with SDMX Helper and %gettimeseries()

- https://github.com/amattioc/SDMX

Actions Menu: Build Commands

The command in SAS uses the %gettimeseries () macro call:





Reading SDMX Data

with SDMX Helper and %gettimeseries()

```
/*create the SDMX folder in the home directory of the user*/
%let homedir=%sysget(HOME);
%let path=&homedir;
options dlcreatedir;
libname data "&path/SDMX";

/*clone the SDMX git repository to a local folder*/
data _null_;
RC = GITFN_CLONE("https://github.com/amattioc/SDMX.git",
"&path/SDMX");
run;
/* example Getting Exchange Rates from ECB data provider*/
%gettimeseries(provider="ECB", tsKey="EXR.A.USD.EUR.SP00.A",
metadata=1);
```

Reading SDMX Data

using SAS ETS Data Access engines

- IMF data (14742 series) & ECB (13 series) can be read using SASEFRED engine
  - FRED website here: "https://fred.stlouisfed.org/tags/series?t=imf"
  - The SASEFRED Interface Engine
- ECB data (13 series) can be read using SASEFRED engine- see FRED website here: "https://fred.stlouisfed.org/tags/series?t=ecb"
- ECB data (212,000 series) can be read using SASEQUAN engine.
  - Using the NASDAQ api , see the following documentation page: https://data.nasdaq.com/data/ECB-european-central-bank/documentation
- Retrieving OECD Data using SASEOECD engine
  - https://documentation.sas.com/doc/en/etsug/15.2/etsug_saseoecd_examples01.htm

Reading SDMX Data

using SASEFRED for IMF series

- IMF data (14742 series) & ECB (13 series) can be read using SASEFRED engine
  - FRED website here: "https://fred.stlouisfed.org/tags/series?t=imf"
  - The SASEFRED Interface Engine
- Create an account + create API key
- Select time series

Reading SDMX Data

Using SASEFRED libname engine

```
title 'Retrieve Balance of Payment Data for the Exports and Imports';
libname _all_ clear;
libname fred sasefred "&path\viyawhatsnew\sdmx_query\freddata"
OUTXML=fredex01 AUTOMAP=replace
MAPREF=MyMap XMLMAP= "&path\viyawhatsnew\sdmx_query\freddata\fredex01.map"
APIKEY='399eb04a24a59583574beeaa2248db31'
IDLIST='bopxgs,bopmgs'
START='1997-01-01' END='2011-01-01'
FREQ='a' OUTPUT=1 AGG='avg' FORMAT=xml;
data export_import;
set fred.fredex01 ;
run;
proc contents data=export_import; run;
proc print data=export_import; run;
```

Reading SDMX Data

using SASEQUAN

- ECB data (212,000 series) can be read using SASEQUAN engine.
  - Using the NASDAQ api , see the following documentation page: https://data.nasdaq.com/data/ECB-european-central-bank/documentation
  - Create an account + create API key
- Data Organization
- https://data.nasdaq.com/data/{Time-Series_Code}.
- For a complete list of Time-Series Codes included in this data feed, use:
- https://data.nasdaq.com/api/v3/databases/ECB/metadata?api_key=mSqQTwCPgzkiy2KxUjzM

Reading SDMX Data

Using SASEFRED libname engine

```
title 'Historical Prices for Oil India Limited';
libname _all_ clear;
libname mylib "C:/workshop/viyawhatsnew/sdmx_query/quan/doc";
libname myQoil sasequan "C:/workshop/viyawhatsnew/sdmx_query/quan/test"
   apikey='mSqQTwCPgzkiy2KxUjzM'
   idlist='NSE/OIL'
   format=XML outXml=oil
   automap=replace mapref=MyMap
   xmlmap="C:/workshop/viyawhatsnew/sdmx_query/quan/oil.map"
   start='2013-09-01'
   end='2013-11-05'
   freq='daily'
   collapse='daily'
   ;
data mylib.oilall;
   set myQoil.oil;
run;
```

Reading SDMX Data

using SAS ETS Data Access engines

- Retrieving OECD Data using SASEOECD engine
  - https://documentation.sas.com/doc/en/etsug/15.2/etsug_saseoecd_examples01.htm

Reading SDMX Data

Using SASEOECD libname engine

```
libname oecddata base "&path/sdmx_query/oecddata";
data keylist0;
   length key0 $8;
   key0='EA17'; output; /* country is euro area; 17 countries */
run;
data keylist1;
   length key1 $8;
   key1='B1_GA'; output; /* transaction is GDP; output approach */
run;
data keylist2;
   length key2 $2;
   key2='C'; output;     /* measure is current prices */
run;
title 'Request GDP for EA_17 in Current Prices';
LIBNAME myLib saseoecd "&path/sdmx_query/oecddata"
   setid=SNA_TABLE1_SNA93
   inset0=keylist0 inset1=keylist1
   inset2=keylist2 out=gstart
   ;
```

```
data myGDP;
   set myLib.gstart ;
run;
proc print data=myGDP; run;
```

Reading SDMX Data

SDMX-ML and SAS XMLV2 Engine

- Retrieving OECD Data using SASEOECD engine
  - https://documentation.sas.com/doc/en/etsug/15.2/etsug_saseoecd_examples01.htm
- OECD Statistics

Reading SDMX Data

Using OECD XML Rest Api and XMLV2 libname engine

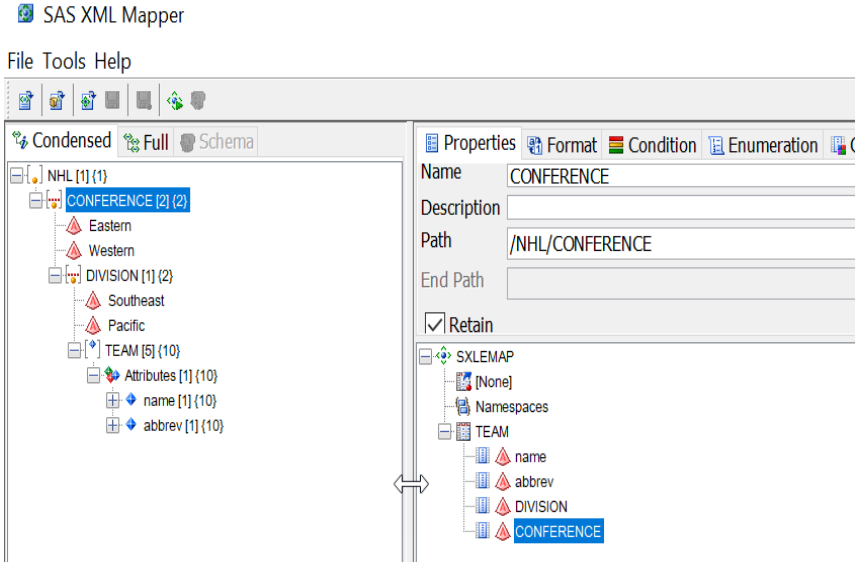
```
%let homedir=%sysget(HOME);
%let path=&homedir/viyawhatsnew;
%let xmlpath = &path/sdmx_query/;

filename map "&xmlpath.map.txt";
filename resp "&xmlpath.resp.txt";
proc http

URL="https://stats.oecd.org/restsdmx/sdmx.ashx/GetData/QNA/AUS+AUT.GDP+B1_GE.CU
R+VOBARSA.Q/all?startTime=2009-Q2&endTime=2011-Q4&format=compact_v2"
    METHOD="GET"
    OUT=resp;
run;quit;

libname resp XMLv2 automap=REPLACE xmlmap=map;
proc datasets;
copy out=WORK in=resp;
run;quit;
```

Using XMLV2 Automap to automatically read XML

3 ways to Create XML MAPS

SAS XML Mapper	XMLV2 Automap=replace option	Manually Code XML Map using XPATH syntax
Based on XML File or XML Schema	Base on XML File (no XML Schema support	
Automatic XML Map Creation	Automatic XML Map Creation	No Automatic all Manual
Drag and Drop Custom XML Map (single table)	No option to create single table	
Modify column Attributes	Modify column attributes manually Using XMLMAP XPATH Syntax	Modify column attributes manually Using XMLMAP XPATH Syntax

Using XML Mapper




```
/*REading xml as one sas dataset*/
%let
path=c:\workshop\git\sasstudiogs;
filename nhl
"&path\xmlfiles\nhl.xml"; /*1*/
filename map
"&path\xmlfiles\nhl.map"; /*2*/

libname nhl xmlv2 xmlmap=map;
/*3*/

proc print data=nhl.teams; /*4*/
run;
```

Using XMLV2 Automap

```
/*Using Automap to Generate an XMLMap*/

filename nhl "&path\xmlfiles\nhl.xml"; /**/
filename map "&path\xmlfiles\nhlgenerate.map"; /**/
libname nhl xmlv2 automap=replace xmlmap=map; /**/
proc print data=nhl.team; run;
proc print data=nhl.conference; run;
/*Combine 3 tables */
proc sql;
create table work.allnhl as
select * from nhl.division natural join nhl.conference
natural join nhl.team;
quit;
```

Manually Modifying XML Maps

```
/*Step 3: Adjust the Entity CreationDate to Char*/
/*Table Entity:
<COLUMN name="EntityCreationDate">
            <PATH
syntax="XPathENR">/{2}LEIData/{2}LEIRecords/{2}LEIRecord/{2}Entity
/{2}EntityCreationDate</PATH>
            <TYPE>character</TYPE>
            <DATATYPE>string</DATATYPE>
            <LENGTH>29</LENGTH>
            <FORMAT width="29">$CHAR</FORMAT>
            <INFORMAT width="29">$CHAR</INFORMAT>
        </COLUMN>
```

Tips and Tricks

- Run SDMXHelper from ISTAT:

SAS has builtin SASPrivateJavaRuntimeEnvironment:

following command:

- "C:\Program Files\SASHome\SASPrivateJavaRuntimeEnvironment\9.4\jre\bin\java" -classpath c:\workshop\viyawhatsnew\sdmx_query\SDMX.jar it.bancaditalia.oss.sdmx.helper.SDMXHelper

Tips and Tricks

For the XMLV2 Engine Automap option, you need to allow the SAS JRE to allocate more memory: -xmx2048m instead of the default 128m

```
/*  Options used when SAS is accessing a JVM for JNI processing  */
-JREOPTIONS=(
        -Xms512m
        -Xmx2048m
        )
```

sas.com