SAS/ETS® 14.1 User's Guide

The SASEFRED Interface Engine

This document is an individual chapter from *SAS/ETS® 14.1 User's Guide*.

The correct bibliographic citation for this manual is as follows: SAS Institute Inc. 2015. *SAS/ETS® 14.1 User's Guide*. Cary, NC: SAS Institute Inc.

SAS/ETS® 14.1 User's Guide

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July 2015

Chapter 48
The SASEFRED Interface Engine

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Overview: SASEFRED Interface Engine

The SASEFRED interface engine enables SAS users to retrieve economic data from the FRED website, which is hosted by the Economic Research Division of the Federal Reserve Bank of St. Louis. FRED stands for Federal Reserve Economic Data. The FRED databases contain more than 61,000 economic data time series from 48 national and international sources, both public and private. These time series are updated at annual, quarterly, monthly, weekly, and daily intervals. The economic time series on the FRED website contain observation or measurement periods that are associated with data values.

The SASEFRED interface engine uses the LIBNAME statement to enable you to specify how to subset your FRED data and how to aggregate the selected time series at the same update frequency. You can then use the SAS DATA step to perform further subsetting and to store the resulting time series in a SAS data set. You can perform more analysis (if desired) either in the same SAS session or in a later session.

The SASEFRED interface engine supports 64-bit Windows and Linux X64 (LAX) platforms.

Note that the SASEFRED engine uses the FRED API, but it is not endorsed or certified by the Federal Reserve Bank of St. Louis, and that by using the SASEFRED interface, you are agreeing to comply with the FRED terms of use, which are described on the web page at the following URL: **http://api.stlouisfed.org/terms_of_use.html**.

Getting Started: SASEFRED Interface Engine

You can query the Federal Reserve Economic Data (FRED) databases to retrieve the observations or data values for a list of economic time series by specifying the series ID of each time series that you want to read into SAS and by specifying your unique FRED API key. To obtain your own unique API key, visit the FRED website at the following URL:

http://api.stlouisfed.org/api_key.html

The FRED API key is a 32-character alphanumeric lowercase string, such as 'abcdefghijklmnopqrstuvwxyz123456', and is represented by 'XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX' in the APIKEY= option in the following example. In addition, the example URLs in this section and in the section "Details: SASEFRED Interface Engine" on page 3391 use the same FRED API key as the argument *your_fred_apikey*.

After you have your assigned FRED API key and you have agreed to the terms of use, before downloading any copyright-protected data series, be aware that you are solely responsible for obtaining copyright permissions for any copyright-protected time series that you download (other than for personal use). To obtain a list of the copyright-protected data series, visit the web page at the following URL:

http://api.stlouisfed.org/fred/series/search?search_text=copyright&api_key=your_fred_apikey

Now that your are informed about the terms of use of the FRED data, you can use your FRED API key to access the FRED data, as shown in the following example.

The following statements enable you to access the exports of goods and services time series data from January 1, 1960, to January 1, 2012, on an annual basis. The observations are sorted by the time ID variable DATE.

```
options validvarname=any;
title 'Retrieve Data for the Exports of Goods and Services';
libname _all_ clear;

libname fred sasefred "%sysget(FRED)"
   OUTXML=exportgs
   XMLMAP="%sysget(FRED)exportgs.map"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST='bopxgsa';

data export_gsa;
   set fred.exportgs ;
run;

proc contents data=export_gsa; run;
proc print data=export_gsa(obs=15); run;
```

Figure 48.1 Getting Started with Exports of Goods and Services: export_gsa(obs=15)

Retrieve Data for the Exports of Goods and Services

Obs	date	realtime_start	realtime_end	BOPXGSA
1	1960-01-01	2015-03-19	2015-03-19	25.940
2	1961-01-01	2015-03-19	2015-03-19	26.403
3	1962-01-01	2015-03-19	2015-03-19	27.722
4	1963-01-01	2015-03-19	2015-03-19	29.620
5	1964-01-01	2015-03-19	2015-03-19	33.341
6	1965-01-01	2015-03-19	2015-03-19	35.285
7	1966-01-01	2015-03-19	2015-03-19	38.926
8	1967-01-01	2015-03-19	2015-03-19	41.333
9	1968-01-01	2015-03-19	2015-03-19	45.543
10	1969-01-01	2015-03-19	2015-03-19	49.220
11	1970-01-01	2015-03-19	2015-03-19	56.640
12	1971-01-01	2015-03-19	2015-03-19	59.677
13	1972-01-01	2015-03-19	2015-03-19	67.222
14	1973-01-01	2015-03-19	2015-03-19	91.242
15	1974-01-01	2015-03-19	2015-03-19	120.897

The XML data that the FRED website returns are placed in a file named by the OUTXML= option, in this case, EXPORTGS.xml. Note that the XML file extension is excluded from the filename given in the OUTXML= option. This XML data file resides in the location given inside the string enclosed in double quotation marks in the SASEFRED LIBNAME statement. So, in the preceding example, if the FRED environment variable is set to:

```
C:\freddata\
```

then the downloaded XML file is located at

```
C:\freddata\EXPORTGS.xml
```

An equivalent LIBNAME statement that does not use any environment variables could be as follows:

```
Libname fred sasefred "C:\freddata\"
   OUTXML=exportgs
   XMLMAP="C:\freddata\exportgs.map"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST='bopxgsa';
```

You could also use either a SAS macro variable or a system environment variable to store the value of your FRED API key so that the key does not appear explicitly in your SAS code. The XML map that is created is assigned the full pathname specified by the XMLMAP= option. The IDLIST= option specifies the list of time series that you want to retrieve. This option accepts a string, enclosed in single quotation marks, that denotes a list of one or more time series that you select (keep) in the resulting SAS data set. The result, Export_gsa, is named in the DATA step and is shown in Figure 48.1. It is more efficient to use the DATA step to store your FRED data in a SAS data set and then refer to the SAS data set directly in your PROC PRINT or PROC GPLOT statement, but you can also refer to the SASEFRED libref directly, as in the following statement:

```
proc print data=fred.exportgs; run;
```

This statement uses the member name, exportgs, in the PROC PRINT statement; this usage corresponds to specifying the OUTXML=EXPORTGS option. Although using this statement might seem easier, it is not as efficient, because every time you use the SASEFRED libref, the FRED interface reads the entire XML file again into SAS. It is best to refer to the SAS data set repeatedly rather than invoking the interface engine repeatedly. For another example that uses more SASEFRED LIBNAME statement options, see the section "Reading Price Data by Using Indices" on page 3395.

Syntax: SASEFRED Interface Engine

The SASEFRED interface engine uses standard engine syntax to read the observations or data values for one or more economic time series. Table 48.1 summarizes the options that the SASEFRED engine uses. In addition, there is one required option: API_KEY='*fred_api_key*'.

Table 48.1 Summary of LIBNAME *libref* SASEFRED Options

Option	Description
APIKEY=	Specifies the required FRED access key that enables you to access the data that the FRED website provides.
AUTOMAP=	Specifies whether or not to overwrite the existing XML map file.
IDLIST=	Specifies a list of time series IDs for accessing FRED data. To select more than one time series, list the unique time series IDs, separated by commas.
PROXY=	Specifies the proxy server to use (if you cannot connect otherwise)
START=	Specifies the start date for the observation period (YYYY-MM-DD formatted string, optional; the default is 9999-12-31 (latest available))
END=	Specifies the end date for the observation period (YYYY-MM-DD formatted string, optional; the default is 1776-07-04 (earliest available))
RTSTART=	Specifies the real-time start date for the observation period (YYYY-MM-DD formatted string, optional; the default is today.)
RTEND=	Specifies the real-time end date for the observation period (YYYY-MM-DD formatted string, optional; the default is today.)
FREQ=	Specifies the reporting frequency of the selected data (lower frequency to aggregate values to): ‘m’ for monthly, ‘d’ for daily. The FRED frequency aggregation feature converts higher-frequency data series to lower-frequency time series (such as converting a monthly time series to an annual time series). See Table 48.2 for the complete list of frequencies.
AGG=	Specifies the aggregation method used for frequency aggregation. The valid aggregation arguments are ’avg’, ’sum’, and ‘eop’; the default is ‘avg’.
LIMIT=	Specifies the maximum number of observations (rows) to return (integer between 1 and 100,000, optional; the default is 100,000)
OFFSET=	Specifies the number of rows (observations) to skip in the returned data set.
SORT=	Specifies the order of the results in ascending or descending observation_date order. The valid sort arguments are ‘asc’ and ‘desc’; the default is ‘asc’.
UNITS=	Specifies a data value transformation. The valid units arguments are ‘lin’, ‘chg’, ‘ch1’, ‘pch’, ‘pc1’, ‘pca’, ‘cch’, ‘cca’, and ‘log’; the default is ‘lin’. See Table 48.3 for more information about units.
VINTAGE=	Specifies one or more dates in history. Vintage dates are used to download data as they existed on that specific date in history (YYYY-MM-DD formatted string, optional; by default no vintage dates are set). You can request one or many vintage dates at a time; dates are in YYYY-MM-DD format and are separated by commas (no blanks allowed). For multiple vintage dates, specify OUTPUT=2 for all observations or OUTPUT=3 for only new or revised observations.
OUTPUT=	Specifies an output type. The valid output arguments are ‘1’ for Observations by Real-Time Period; ‘2’ for Observations by Vintage Date, All Observations; ‘3’ for Observations by Vintage Date, New and Revised Observations Only; and ‘4’ for Observations, Initial Release Only (integer, optional; the default is ‘1’).
FORMAT=	Specifies a file extension that indicates the type of file to retrieve. Only XML is supported for the SASEFRED interface engine in SAS/ETS 13.1 (SAS 9.4).
URL=	Specifies a URL from which to request useful information about available releases, vintage dates, tags, categories, sources, and series. The information is downloaded from the specified URL and stored in the XFREDTPU data set (a temporary utility data set), which can then be saved or renamed to a permanent SAS data set.

The LIBNAME *libref* SASEFRED Statement

LIBNAME *libref* **SASEFRED** '*physical-name*' *options* **;**

The LIBNAME statement assigns a SAS library reference (libref) to the physical path of the directory of FRED data files in which the downloaded FRED XML data are stored.

You must specify the following arguments:

"*physical name*"
specifies the location of the folder where your FRED XML data reside. Enclose the *physical name* in double quotation marks, and end it with a backslash if the folder is in a Windows environment or a forward slash if it is in a UNIX environment.

APIKEY='*fred_apikey*'
specifies the FRED access key that enables you to access the data provided by the FRED website. The FRED access key is a 32-character alphanumeric lowercase string. You can request your *fred_apikey* by visiting the website at the following URL:

http://api.stlouisfed.org/api_key.html

IDLIST=*'fred_idlist'*
specifies the list of time series to be included in the output SAS data set. This list is comma delimited and must be enclosed in single quotation marks.

You can also specify the following *options*.

AGG='AVG' | 'EOP' | 'SUM'
specifies the aggregation method used for frequency aggregation. You can specify the following values:

'AVG' aggregates by averaging the frequencies.

'EOP' aggregates by summing the frequencies.

'SUM' aggregates by using the end of the period.

By default, AGG='AVG'. This option has no effect if the frequency option (FREQ=) is not specified.

AUTOMAP=REPLACE | REUSE
specifies which XMLmap file to use. You can specify the following values:

REPLACE overwrites the existing XMLmap file and uses the most current XMLmap that is generated by the SASEFRED engine and named in the XMLMAP= option.

REUSE uses a preexisting XMLmap file that is named in the XMLMAP= option.

END=*'fred_enddate'*
specifies the end date for the time series in the format YYYY-MM-DD. The default is 9999-12-31 (latest available).

FORMAT=*fred_xmlformat*

specifies the format of the file to be received from the FRED website. Although FRED can report data in many formats, the SASEFRED engine for 9.4 supports the XML format (default).

FREQ=*'fred_frequency'*

specifies a lower frequency to aggregate values to. The FRED frequency aggregation feature converts higher-frequency time series to lower-frequency time series (such as converting a daily time series to a monthly time series). In FRED, the highest frequency is daily, and the lowest frequency is annual. There is no default value for no frequency aggregation. The valid frequency arguments are presented in Table 48.2.

NOTE: An error is returned if you specify a frequency that is higher than the native frequency of the series. For example, if a series has the native frequency 'Annually', it is not possible to aggregate the series to the higher 'Monthly' frequency by using the frequency parameter value 'm'. To find the native frequency of an economic time series, enter the following URL in your web browser. The output includes the 'Frequency' field, which shows native frequency of that time series.

```
http://api.stlouisfed.org/fred/series?series_id=DJCA&api_key=your_fred_apikey
```

NOTE: When a single time series is specified in the IDLIST= option and the FREQ= option is not specified or is an empty string, then the native frequency of that time series is used as the reporting frequency. When multiple time series are specified in the IDLIST= option, then the 'Annual' frequency is used as the reporting frequency unless the reporting frequency is specified in the FREQ= option. If any time series in the IDLIST= option list have a lower native frequency than the requested frequency, then those time series are dropped from the list and excluded from the output.

Table 48.2 FRED Frequency Codes

Frequency Code	Description
d	Displays data on a daily basis
w	Displays data on a weekly basis
bw	Displays data on a biweekly basis
m	Displays data on a monthly basis
q	Displays data on a quarterly basis
sa	Displays data on a semiannual basis
a	Displays data on an annual basis
wef	Displays data on a weekly (ending Friday) basis
weth	Displays data on a weekly (ending Thursday) basis
wew	Displays data on a weekly (ending Wednesday) basis
wetu	Displays data on a weekly (ending Tuesday) basis
wem	Displays data on a weekly (ending Monday) basis
wesu	Displays data on a weekly (ending Sunday) basis
wesa	Displays data on a weekly (ending Saturday) basis
bwew	Displays data on a biweekly (ending Wednesday) basis
bwem	Displays data on a biweekly (ending Monday) basis

LIMIT=*fred_limit*

specifies the maximum number of rows (time series observations) to return, where *fred_limit* is an integer between 1 and 100,000. LIMIT= is optional, and the default is LIMIT=100000.

MAPREF=*fred_xmlmapref*

specifies the fileref used for the map assignment. For an example of the SASEFRED engine that uses the MAPREF= and the XMLMAP= options in the FILENAME statement to assign a filename, as in the following, see the section "Reading Price Data by Using Indices" on page 3395:

```
FILENAME MyMap "U:\fred\test\gstart.map";
```

You can use the MAPREF= and XMLMAP= options to control where the map resides, what you name the map, and how you refer to it with a fileref. You can use the OUTXML= option to name your XML data file. It is placed in the folder designated by 'physical-name', and you can reference it by using the myLib libref in your SASEFRED LIBNAME statement. This is shown in the section "Getting Started: SASEFRED Interface Engine" on page 3382, inside the DATA step in the SET statement. The SET statement reads observations from the input data set myLib.gstart and stores them in a SAS data set named Company_pvol.

OFFSET=*fred_offset*

specifies the number of rows (time series observations) to skip before reading the time series observations from the FRED database, where *fred_offset* is an optional nonnegative integer. If you specify both the OFFSET= and LIMIT= options, the number of rows specified in the OFFSET= option is skipped before the count begins of the number of rows (specified in the LIMIT= option) that are returned. By default, OFFSET=0.

OUTPUT= 1 | 2 | 3 | 4

specifies the type of the file to be received from the FRED website. You can specify the following values:

1 specifies the type Observations by Real-Time Period.

2 specifies the type Observations by Vintage Date, All Observations.

3 specifies the type Observations by Vintage Date, New and Revised Observations Only.

4 specifies the type Observations, Initial Release Only.

If OUTPUT=1 and UNITS='lin', then you must specify a START= date that is later than the series observation start date, Obs_Start. If OUTPUT=3 or OUTPUT=4, then you must specify UNITS='lin'.

OUTXML=*fred_xmlfile*

specifies the name of the file where the XML data that are returned from the FRED website are stored. By default, OUTXML=FRED, which creates a file named *FRED1.xml*.

PROXY="*fred_proxyserver***"**

specifies the proxy server to use when a connection-refused error or a connection-timed-out error occurs. For *fred_proxyserver*, specify the server's HTTP address followed by a colon and the port number, and enclose that string with double quotation marks. For example, PROXY="http://inetgw.unx.sas.com:8118".

RTEND=*'fred_rtenddate'*
specifies the real-time end date for the time series in the format YYYY-MM-DD. When you use the OUTPUT=4 option, it is important to specify RTSTART='1776-07-04' and RTEND='9999-12-31'to get the available observations for the initial release of the data. Failure to do so can result in no observations being returned for the requested series. The default is today.

RTSTART=*'fred_rtstartdate'*
specifies the real-time start date for the time series in the format YYYY-MM-DD. When you use the OUTPUT=4 option, it is important to specify RTSTART='1776-07-04' and RTEND='9999-12-31'to get the available observations for the initial release of the data. Failure to do so can result in no observations being returned for the requested series. The default is today.

SORT='ASC' | 'DSC'
specifies the order of the time series observations. You can specify the following values:

'ASC' specifies that the time series observations are in ascending order.

'DSC' specifies that the time series observations are in descending order.

By default, SORT='ASC'.

START=*'fred_startdate'*
specifies the start date for the time series in the format YYYY-MM-DD. The default is 1776-07-04 (earliest available). When you use the OUTPUT=1 option (observation by real-time period) and the UNITS='chg' option, it is important to specify a date in the START= option that is later than the series observation start date, Obs_Start. Failure to do so forces the SASEFRED interface engine to change UNITS='chg' to UNITS='lin'.

UNITS=*'fred_units'*
specifies the data value transformation. The valid units arguments are 'lin', 'chg', 'ch1', 'pch', 'pc1', 'pca', 'cch', 'cca', and 'log'. the default is UNITS='lin' (for no transformation). The details of the arguments and the corresponding formulas are presented in Table 48.3. When you specify UNITS='chg' and OUTPUT=1 (observation by real-time period), it is important to specify a date in the START= option that is later than the series observation start date, Obs_Start. Failure to do so forces the SASEFRED interface engine to change UNITS='chg' to UNITS='lin'.

Table 48.3 FRED Transformation UNITS Codes

Units Code	Description	Formula
chg	Change	$x_t - x_{t-1}$
ch1	Change from one year ago	$x_t - x_{t-N}$
pch	Percentage change	$(\frac{x_t}{x_{t-1}} - 1) \times 100$
pc1	Percentage change from one year ago	$(\frac{x_t}{x_{t-N}} - 1) \times 100$
pca	Compounded annual rate of change	$(\frac{x_t}{x_{t-1}})^N - 1) \times 100$
cch	Continuously compounded rate of change	$(ln(x_t) - ln(x_{t-1})) \times 100$
cca	Continuously compounded annual rate of change	$((ln(x_t) - ln(x_{t-1}))100) \times N$
log	Natural log	$ln(x_t)$

x_t is the value of series x at time period t. N is the number of observations per year that differs by frequency: daily (N=260), annual (N=1), monthly (N=12), quarterly (N=4), biweekly (N=26), and weekly (N=52).

URL=*"fred_url_link/< query_type***?***< query_option=value > >*< **LIMIT=***limit > "*

queries for useful information (such as categories, tags, groups, and releases) and stores the information in a temporary utility data set named XFREDTPU. Specify the following fields within double quotation marks:

fred_url_link/

specifies the FRED URL that you want to use for the *fred_url_link*. All the examples in this chapter use the following URL:

```
http://api.stlouisfed.org/fred/
```

*query_type***?***query_option*

specifies the type of information that you want to query. You can specify the following *query_types* and *query_options*:

series/vintagedates?series_id=*series_id*

requests the vintage dates for the specified *series_id*, which you must also specify in the IDLIST= option. For an example of this type of query, see Example 48.7.

release/series?release_id=*release*

requests a list of the available series for the specified *release*. For an example of this type of query, see Example 48.8.

source/releases?

source/releases?source_id=*source_id*

requests a list of the releases available today or available for a specified *source_id*. For an example of this type of query, see Example 48.14.

You can also narrow this type of query by specifying the *source_id*; then only the releases that are available for the specified source are stored in the XFREDTPU data set. For an example of this type of query, see Example 48.11.

tags/series?tags_names=*value-list*

requests a list of the series that are available and whose tag names match the specified *value-list*. For an example of this type of query, see Example 48.9.

category/series?category_id=*category_id*

requests a list of the series that are available and whose category ID matches the specified *category_id*. For an example of this type of query, see Example 48.12.

sources?

requests a list of the sources available for today's date. For an example of this type of query, see Example 48.13.

series/categories?series_id=*series_ID*

requests a list of the categories available for a specified *series_ID*. For an example of this type of query, see Example 48.10.

LIMIT=*limit*

limits the number of query results that are returned, where *limit* must be an integer between 1 and 100,000, inclusive. By default, LIMIT=1000 for releases and release date requests and LIMIT=100,000 for time series requests.

VINTAGE=*'fred_vintage_date1,fred_vintage_date2,...,fred_vintage_dateN'*
specifies one or more vintage dates in history. The *fred_vintage_dates* are represented in YYYY-MM-DD format and are used to download the data for a time series as it existed on that specific date in history. The dates in the list are separated by commas (no blanks are allowed). When requesting multiple vintage dates, specify OUTPUT=2 to retrieve all observations or OUTPUT=3 to retrieve only new or revised observations. The default setting is no vintage dates.

Archival Federal Reserve economic data (ALFRED) enable you to retrieve vintage versions of economic data that were available on specific dates in history. To retrieve vintage versions of various time series, enter the following URL in your web browser:

http://alfred.stlouisfed.org/

To see a list of available vintage dates for each series, refer to the FRED documentation at the web page with the following URL:

http://api.stlouisfed.org/docs/fred/series_vintagedates.html

XMLMAP=*fred_xmlmapfile*
specifies the fully qualified name of the location where the XMLmap file is automatically stored. By default, XMLMAP=Fred.map.

Details: SASEFRED Interface Engine

The SASEFRED interface engine enables SAS users to access both ArchivaL Federal Reserve Economic Data (ALFRED) and FRED data that are provided by the FRED website. Normal use is called the *FRED mode*, for which the real-time period is the current day (today). In FRED mode, you are using the current facts: the information about the past that is available today. Economic data sources, releases, series, and observations can change their names or their observation data values over time. The real-time period marks when facts were true or when information was known until it changed. Economic data sources, releases, series, and observations are all assigned a real-time period. For most URL requests, the default real-time period is today. This can be thought of as FRED mode—what information about the past is available today. ALFRED users can change the real-time period to retrieve information that was known as of a point in history. ALFRED uses vintage dates, which are release dates for a series, excluding the release dates when the data values did not change.

Available Sources That Provide FRED Time Series Data

To obtain a list of the available sources of economic data, enter the following URL in your web browser. Table 48.4 shows some of the sources available.

http://api.stlouisfed.org/fred/sources?api_key=your_fred_apikey

Table 48.4 Some Available Sources of Economic Data

ID	Name
1	Board of Governors of the Federal Reserve System
3	Federal Reserve Bank of Philadelphia
4	Federal Reserve Bank of St. Louis
6	Federal Financial Institutions Examination Council
11	Dow Jones & Company
13	Institute for Supply Management
15	The White House: Council of Economic Advisers
16	The White House: Office of Management and Budget
17	U.S. Congress: Congressional Budget Office
18	U.S. Department of Commerce: Bureau of Economic Analysis
19	U.S. Department of Commerce: Census Bureau
21	U.S. Department of Housing and Urban Development

You can use the URL= option to store today's available sources (and associated information about the sources) in a SAS data set. For more information, see the sources query option. For an example see Example 48.13.

You can also use the URL= option to store today's available releases (and associated information about the releases) in a SAS data set. For more information, see the releases query option. For an example see Example 48.14.

FRED API Key

The API key that is used in these examples,'abcdefghijklmnopqrstuvwxyz123456', is for demonstration purposes only. To successfully download data from the FRED website, use your own FRED API key, which is a 32-character alphanumeric lowercase string. You can request your own API key by visiting the website at the following URL:

http://api.stlouisfed.org/api_key.html

Available Releases for Each Source That Provides FRED Time Series Data

Each of the FRED sources might have several releases. To get a list of the releases for a specific source, enter the following URL in your web browser and specify the ID that corresponds to that source. For example, the response to this request retrieves a list of all releases for Dow Jones & Company (source_ID=11).

http://api.stlouisfed.org/fred/source/releases?source_id=11&api_key=your_fred_apikey

Table 48.5 shows the list of releases for Dow Jones & Company.

Table 48.5 Releases for Dow Jones & Company

Release ID	Name	URL
72	Daily Treasury Inflation-Indexed Securities	--
102	Wall Street Journal	http://online.wsj.com/public/us
197	Dow Jones Averages	http://www.djaverages.com

Available Time Series for Each Release ID

Each release of economic sources contains several time series. To get the list of time series for a specific release, enter the following URL in your web browser and specify the ID that corresponds to that release. For example, the following URL retrieves a list of all time series for the Dow Jones Averages release (release_ID=197):

`http://api.stlouisfed.org/fred/release/series?release_id=197&api_key=your_fred_apikey`

Table 48.6 shows all the time series that are included in the Dow Jones Averages release.

Table 48.6 Time Series for the Release of Dow Jones Averages

Series ID	Title	Start	End	Frequency
DJCA	Dow Jones Composite Average	1934-01-02	2012-11-23	Daily
DJIA	Dow Jones Industrial Average	1896-05-26	2012-11-23	Daily
DJTA	Dow Jones Transportation Average	1896-10-26	2012-11-23	Daily
DJUA	Dow Jones Utility Average	1929-01-02	2012-11-23	Daily

You can use the URL= option to store the list of available time series for a particular release in a SAS data set. For more information, see the release/series query option.

Available Native Frequency for Each Series ID

To find the native frequency of an economic time series, enter the following URL in your web browser. The output includes the "Frequency" field, which shows the native frequency of that time series.

`http://api.stlouisfed.org/fred/series?series_id=DJCA&api_key=your_fred_apikey`

The response to the preceding request follows. As the response shows, the native frequency of the Dow Jones Composite Average (DJCA) time series is Daily (frequency=Daily).

<series id="DJCA" realtime_start="2012–11–26" realtime_end="2012–11–26" title="Dow Jones Composite Average" observation_start="1934–01–02" observation_end="2012–11–23" ***frequency="Daily, Close"*** *frequency_short="D" units="Index" units_short="Index" seasonal_adjustment="Not Seasonally Adjusted" seasonal_adjustment_short="NSA" last_updated="2012–11–26 09:05:12–06" popularity="48">*

Vintage Dates for Each Series ID

Vintage dates are the release dates for a time series, excluding those releases in which the data did not change. To obtain a list of vintage dates for a particular series, you can enter the following URL in your web browser and specify the series ID of the series that you are interested in. For example, the following URL retrieves a list of all vintage dates for the MICH series, showing the median expected price change (the next 12 months from the Survey of Consumers):

`http://api.stlouisfed.org/fred/series/vintagedates?series_id=MICH&api_key=your_fred_apikey`

The resulting list of observations is too long to show here—172 vintage dates, ranging from 1999-02-26 to 2013-05-31. You can get only the vintage dates that you want by specifying the VINTAGE= option.

You can use the URL= option to store the list of available vintage dates for a particular time series in a SAS data set. For more information, see the series/vintagedates query option.

SAS Output Data Set

You can use the SAS DATA step to write the selected FRED data to a SAS data set. This enables you to use SAS software to easily analyze the data. If you specify the name of the output data set in the DATA statement, the engine supervisor creates a SAS data set that has the specified name in either the SAS Work library or, if specified, the User library.

The contents of the SAS data set include the date of each observation and the series name of each series that is read from the FRED data source.

The SASEFRED interface engine maintains the sort order, so the time series are sorted in the resulting SAS data set by the order specified in the SORT= option, by date (time ID), and by variable (time series item name).

You can use the PRINT and CONTENTS procedures to print your output data set and its contents. Alternatively, you can view your SAS output observations by opening the desired output data set in a SAS Explorer window. You can also use the SQL procedure with your SASEFRED libref to create a custom view of your data.

SAS OUTXML File

The SAS XML (XML format) data that are returned from the FRED website are placed in a file named by the OUTXML= option. The SAS XML data file is placed in the location that is specified by the *physical-name* in your LIBNAME *libref* SASEFRED statement, which is described in the section "The LIBNAME *libref* SASEFRED Statement" on page 3386.

SAS XML Map File

The XML map that (by default) is automatically created is assigned the full pathname given by the XMLMAP= option in your LIBNAME *libref* SASEFRED statement. The map file is either reused (not overwritten) if you specify AUTOMAP=REUSE or overwritten by a new map if you specify AUTOMAP=REPLACE (the default). The SASEFRED engine invokes the XMLV2 engine to create the map and to read the data into SAS.

XFREDTPU SAS Data Set

You can use the URL= option to query for useful information such as categories, tags, groups, and releases and store the information in a temporary utility data set named XFREDTPU. After you have this information, you can use it for selecting the data you want to include in a subsequent SASEFRED *libref* statement. For more information about the seven possible types of XFREDTPU contents, see the URL= option.

Reading Price Data by Using Indices

The following statements enable you to access the S&P 500 Stock Price Index (IDLIST=SP500) and the Wilshire 5000 Price Index (IDLIST=WILL5000PR) on a monthly basis:

```
options validvarname=any;
title 'FRED Data: SP500 Stock Index and Wilshire 5000 Price Index';
LIBNAME myLib sasefred "%sysget(FRED)"
   OUTXML=gstart
   AUTOMAP=replace
   MAPREF=MyMap
   XMLMAP="%sysget(FRED)gstart.map"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST='sp500,will5000pr'
   START='2011-01-01'
   END='2012-01-01'
   FREQ='m'
   FORMAT=xml
   ;

data stock_price;
   set myLib.gstart ;
run;

proc contents data=stock_price; run;
proc print data=stock_price; run;
```

Figure 48.2 FRED Data: stock_price

FRED Data: SP500 Stock Index and Wilshire 5000 Price Index

Obs	date	realtime_start	realtime_end	SP500	WILL5000PR
1	2011-01-01	2015-03-19	2015-03-19	1282.62	13368.14
2	2011-02-01	2015-03-19	2015-03-19	1321.12	13772.27
3	2011-03-01	2015-03-19	2015-03-19	1304.49	13610.85
4	2011-04-01	2015-03-19	2015-03-19	1331.51	13920.50
5	2011-05-01	2015-03-19	2015-03-19	1338.31	13967.83
6	2011-06-01	2015-03-19	2015-03-19	1287.29	13441.17
7	2011-07-01	2015-03-19	2015-03-19	1325.18	13848.15
8	2011-08-01	2015-03-19	2015-03-19	1185.31	12296.04
9	2011-09-01	2015-03-19	2015-03-19	1173.88	12144.13
10	2011-10-01	2015-03-19	2015-03-19	1207.22	12459.48
11	2011-11-01	2015-03-19	2015-03-19	1226.41	12684.75
12	2011-12-01	2015-03-19	2015-03-19	1243.32	12850.31
13	2012-01-01	2015-03-19	2015-03-19	1300.58	13465.23

The SASEFRED interface engine supports the XML format. The XML data that the FRED website returns are placed in a file named by the OUTXML= option. The XML map that is automatically created is assigned the full pathname specified by the XMLMAP= option, and the fileref that is used for the map assignment is specified by the MAPREF= option. In the preceding example, the SASEFRED engine uses the MAPREF= and XMLMAP= options in the FILENAME statement to assign a filename:

```
FILENAME MyMap "U:\fred\test\gstart.map";
```

You can use the MAPREF= and XMLMAP= options to control where the map resides, what you name the map, and how you refer to it with a fileref. You can use the OUTXML= option to name your XML data file; it is described in the section "SAS OUTXML File" on page 3394. The XML data file is placed in the folder designated by 'physical-name', which is described in the section "The LIBNAME *libref* SASEFRED Statement" on page 3386. You can refer to your data by using the myLib libref in your SASEFRED LIBNAME statement. The myLib libref is shown inside the DATA step in the SET statement. The SET statement reads observations from the input data set myLib.gstart and stores them in a SAS data set named stock_price, as shown in Figure 48.2. You can also use the SAS DATA step to perform further processing and to store the resulting time series in a SAS data set; this process is described in the section "SAS Output Data Set" on page 3394.

To specify the list of time series that you want to retrieve, use the IDLIST= option. This option accepts a string enclosed in single quotation marks that denotes a list of time series that you select for the resulting SAS data set. The series IDs are separated by commas, so valid time series IDs cannot contain embedded commas or quotes. The stock_price data set contains two time series variables, sp500 and will5000pr, as specified in the IDLIST= option, and the observation range is controlled by the START= and END= options. The stock_price data set contains observations that range from January 1, 2011, to January 1, 2012, as specified by the START= and END= options. The frequency of the data is monthly, as indicated by the 'm' in the FREQ= option.

NOTE: The '%20' is a special character for URL encoding of blanks. If the time series ID that you name in the IDLIST= option contains a blank, you must use the '%20' wherever the blank appears in the time series name. If the time series ID contains an underscore, then you must use an underscore in the time series name. The underscore and the blank are not equivalent in the FRED databases, so make sure that you use the '%20' (URL encoded space) to designate blank characters.

Examples: SASEFRED Interface Engine

Example 48.1: Retrieving Data for Multiple Time Series

This example shows how to use multiple time series IDs to retrieve the average balance of payment basis data for the exports (BOPXGS) and imports (BOPMGS) of goods and services for the last 15 years, starting 1997-01-01 and ending 2011-01-01, with an annual frequency.

```
title 'Retrieve Balance of Payment Data for the Exports and Imports';
libname _all_ clear;

libname fred sasefred "%sysget(FRED)"
   OUTXML=fredex01
   AUTOMAP=replace
   MAPREF=MyMap
   XMLMAP="%sysget(FRED)fredex01.map"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   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;
```

Output 48.1.1 Retrieve Balance of Payment Data for the Exports and Imports

Retrieve Balance of Payment Data for the Exports and Imports

Obs	date	realtime_start	realtime_end	BOPXGS	BOPMGS
1	1997-01-01	2015-03-19	2015-03-19	233.614	-260.682
2	1998-01-01	2015-03-19	2015-03-19	233.293	-274.829
3	1999-01-01	2015-03-19	2015-03-19	241.824	-306.479
4	2000-01-01	2015-03-19	2015-03-19	268.064	-361.193
5	2001-01-01	2015-03-19	2015-03-19	250.634	-341.011
6	2002-01-01	2015-03-19	2015-03-19	243.652	-348.391
7	2003-01-01	2015-03-19	2015-03-19	254.367	-377.839
8	2004-01-01	2015-03-19	2015-03-19	289.490	-441.961
9	2005-01-01	2015-03-19	2015-03-19	320.775	-499.336
10	2006-01-01	2015-03-19	2015-03-19	363.212	-553.641
11	2007-01-01	2015-03-19	2015-03-19	412.059	-588.403
12	2008-01-01	2015-03-19	2015-03-19	458.632	-635.814
13	2009-01-01	2015-03-19	2015-03-19	393.685	-489.628
14	2010-01-01	2015-03-19	2015-03-19	462.232	-585.896
15	2011-01-01	2015-03-19	2015-03-19	530.359	-667.515

Example 48.2: Retrieving Data by Using the Vintage Date

This example shows how to use the vintage date to retrieve data for exports of goods and services as they existed on that specific date in history. OUTPUT=3 retrieves the new and revised observations only, by the vintage date (VINTAGE=2012-06-14). If OUTPUT=3, then you must specify UNITS='lin'. In this example, the UNITS= option is not specified, so it assumes its default value, which is 'lin'. Specifying a different argument for the UNITS= option (such as 'chg') is invalid for OUTPUT= 3, so 'chg' is replaced by the default value ('lin').

```
title 'Retrieve Data for the Exports of Goods and Service by Using Vintage Date';
libname _all_ clear;

libname fred sasefred "%sysget(FRED)"
   OUTXML=fredex02
   AUTOMAP=replace
   MAPREF=MyMap
   XMLMAP="%sysget(FRED)fredex02.map"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST='bopxgsa'
   VINTAGE='2012-06-14'
   OUTPUT=3
   FORMAT=xml;

data export_vin;
   set fred.fredex02 ;
run;

proc contents data=export_vin; run;
proc print data=export_vin; run;
```

Output 48.2.1 Retrieve Data for the Exports of Goods and Services by Using the Vintage Date

Retrieve Data for the Exports of Goods and Service by Using Vintage Date

Obs	date	BOPXGSA_20120614
1	2009-01-01	1578.95
2	2010-01-01	1842.49
3	2011-01-01	2103.37

Example 48.3: Selecting Time Series When Native Frequency Is Less Than Requested Frequency

This example shows how to retrieve data for multiple time series that have different default frequencies. The time series are Domestic Financial Commercial Paper Outstanding (DFINCP), Domestic Nonfinancial Commercial Paper Outstanding (DNFINCP), Foreign Financial Commercial Paper Outstanding (FFINCP), Foreign Nonfinancial Commercial Paper Outstanding (FNFINCP), and Total Credit Market Assets Held by Domestic Financial Sectors (ABSITCMAHDFS). The native frequency of the first four time series is 'Weekly', and the native frequency of the last time series (ABSITCMAHDFS) is 'Quarterly'. Note that the requested frequency as it is specified by the FREQ= option is 'Weekly' (FREQ=w). The native frequency of the last time series (ABSITCMAHDFS) is lower than the requested frequency. Therefore, this time series is excluded from the list, and only the observations that correspond to the first four time series are presented. If you want to retrieve the observations for all five time series, then the value of the FREQ= option needs to be less than or equal to all the native frequencies (here, weekly and quarterly). In this case, the valid frequency parameters would be 'q', 'sa', and 'a'. See Example 48.4.

```
title 'Selecting Time Series When Native Frequency Is Less Than Requested Frequency';
libname _all_ clear;

libname fred sasefred "%sysget(FRED)"
   OUTXML=fredex03
   AUTOMAP=replace
   MAPREF=MyMap
   XMLMAP="%sysget(FRED)fredex03.map"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST='dfincp,dnfincp,ffincp,fnfincp,absitcmahdfs'
   START='2010-01-01'
   END='2010-05-20'
   FREQ='w'
   OUTPUT=1
   FORMAT=xml;

data diffNative_freqw;
   set fred.fredex03 ;
run;

proc contents data=diffNative_freqw; run;
proc print data=diffNative_freqw; run;
```

Output 48.3.1 Selecting Time Series When Native Frequency Is Less Than Requested Frequency

Selecting Time Series When Native Frequency Is Less Than Requested Frequency

Obs	date	realtime_start	realtime_end	DFINCP	DNFINCP	FFINCP	FNFINCP
1	2010-01-06	2015-03-19	2015-03-19	295.1	86.9	248.6	23.9
2	2010-01-13	2015-03-19	2015-03-19	315.0	90.1	241.6	25.8
3	2010-01-20	2015-03-19	2015-03-19	314.9	90.1	230.3	27.5
4	2010-01-27	2015-03-19	2015-03-19	370.0	83.0	232.7	31.3
5	2010-02-03	2015-03-19	2015-03-19	350.1	84.0	225.0	34.0
6	2010-02-10	2015-03-19	2015-03-19	363.9	81.3	223.7	36.2
7	2010-02-17	2015-03-19	2015-03-19	366.7	83.3	226.2	38.5
8	2010-02-24	2015-03-19	2015-03-19	385.8	77.1	231.8	39.0
9	2010-03-03	2015-03-19	2015-03-19	366.8	78.7	227.8	40.1
10	2010-03-10	2015-03-19	2015-03-19	380.1	79.2	229.3	40.1
11	2010-03-17	2015-03-19	2015-03-19	360.5	84.5	224.2	39.4
12	2010-03-24	2015-03-19	2015-03-19	355.1	82.7	218.5	39.8
13	2010-03-31	2015-03-19	2015-03-19	352.7	90.6	217.7	40.0
14	2010-04-07	2015-03-19	2015-03-19	335.2	95.8	217.6	40.0
15	2010-04-14	2015-03-19	2015-03-19	329.4	93.4	209.2	40.3
16	2010-04-21	2015-03-19	2015-03-19	326.8	93.1	211.8	41.6
17	2010-04-28	2015-03-19	2015-03-19	358.9	95.3	203.4	41.9
18	2010-05-05	2015-03-19	2015-03-19	353.8	91.3	200.8	43.4
19	2010-05-12	2015-03-19	2015-03-19	358.5	90.7	190.3	43.2
20	2010-05-19	2015-03-19	2015-03-19	330.0	92.4	180.5	40.9

Example 48.4: Selecting Time Series When Native Frequency Is Greater Than Requested Frequency

This example shows how to retrieve data for multiple time series that have different default frequencies. The time series are Domestic Financial Commercial Paper Outstanding (DFINCP), Domestic Nonfinancial Commercial Paper Outstanding (DNFINCP), Foreign Financial Commercial Paper Outstanding (FFINCP), Foreign Nonfinancial Commercial Paper Outstanding (FNFINCP), and Total Credit Market Assets Held by Domestic Financial Sectors (ABSITCMAHDFS). The native frequency of the first four time series is 'Weekly', and the native frequency of the last time series (ABSITCMAHDFS) is 'Quarterly'. The requested frequency as it is specified by the FREQ= option is 'Quarterly' (FREQ=q). The native frequency of all five time series is either greater than or equal to the requested frequency. Hence, the output includes the data for all time series.

```
title 'Selecting Time Series When Native Frequency Is Greater Than Requested Frequency';
libname _all_ clear;

libname fred sasefred "%sysget(FRED)"
   OUTXML=fredex04
   AUTOMAP=replace
   MAPREF=MyMap
   XMLMAP="%sysget(FRED)fredex04.map"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST='dfincp,dnfincp,ffincp,fnfincp,absitcmahdfs'
   START='2010-01-01'
   END='2010-05-20'
   FREQ='q'
   OUTPUT=1
   FORMAT=xml;

data diffNative_freqq;
   set fred.fredex04;
run;

proc contents data=diffNative_freqq; run;
proc print data=diffNative_freqq; run;
```

Output 48.4.1 Selecting Time Series When Native Frequency Is Greater Than Requested Frequency

Selecting Time Series When Native Frequency Is Greater Than Requested Frequency

Obs	date	realtime_start	realtime_end	DFINCP	DNFINCP	FFINCP	FNFINCP	ABSITCMAHDFS
1	2010-01-01	2015-03-19	2015-03-19	352.1	84.0	229.0	35	2552.98
2	2010-04-01	2015-03-19	2015-03-19	341.6	98.5	186.9	38	2424.03

Example 48.5: Specifying One Series ID with Multiple Vintage Dates for the OUTPUT=2 Option

This example demonstrates how to request the CBI time series, which show the change in private industries for three different vintage dates: 1947-08-17, 1966-08-11, and 1994-08-26. Using the early range of START='1942-01-01'and END='1947-04-01', you can get an idea of how the changes show up for each vintage date. If you specify OUTPUT=2, each time series is named by concatenating the series ID to the vintage date with an underscore.

```
title 'Specifying One Series ID with Multiple Vintage Dates for OUTPUT=2 Option';
libname _all_ clear;

libname fred sasefred "%sysget(FRED)"
   OUTXML=fredex05
   AUTOMAP=replace
   MAPREF=MyMap
   XMLMAP="%sysget(FRED)fredex05.map"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST='CBI'
   VINTAGE='1947-08-17,1966-08-11,1994-08-26'
   START='1942-01-01'
   END='1947-04-01'
   FREQ='q'
   OUTPUT=2
   UNITS='lin'
   FORMAT=xml;

data threeVinsCBI;
   set fred.fredex05;
run;

proc contents data=threeVinsCBI; run;
proc print data=threeVinsCBI; run;
```

Output 48.5.1 Specifying One Series ID with Multiple Vintage Dates for OUTPUT=2 Option

Specifying One Series ID with Multiple Vintage Dates for OUTPUT=2 Option

Obs	date	CBI_19470817	CBI_19660811	CBI_19940826
1	1942-01-01	3.9	.	.
2	1942-04-01	3.6	.	.
3	1942-07-01	-0.9	.	.
4	1942-10-01	-0.9	.	.
5	1943-01-01	-2.4	.	.
6	1943-04-01	-2.1	.	.
7	1943-07-01	1.1	.	.
8	1943-10-01	-1.5	.	.
9	1944-01-01	-2.4	.	.
10	1944-04-01	-3.2	.	.
11	1944-07-01	-1.0	.	.
12	1944-10-01	-1.3	.	.
13	1945-01-01	-2.8	.	.
14	1945-04-01	-1.5	.	.
15	1945-07-01	0.1	.	.
16	1945-10-01	-0.8	.	.
17	1946-01-01	2.3	5.9	5.7
18	1946-04-01	2.0	8.8	8.6
19	1946-07-01	4.9	6.1	5.9
20	1946-10-01	5.4	4.7	4.5
21	1947-01-01	2.7	0.4	0.4
22	1947-04-01	1.5	-1.0	-1.2

Example 48.6: Specifying Two Series IDs with Multiple Vintage Dates and Descending Sort Order

This example demonstrates how to request the ADJRES and ADJRESN time series, which show the St. Louis adjusted reserves, the first of which is seasonally adjusted and the second of which is not seasonally adjusted. The request is made for three different vintage dates, but only 2006-08-31 and 2013-06-13 yield data when you use the range of START='2004-01-01'and END='2012-12-01'. If you specify OUTPUT=2, each time series is named by concatenating the series ID to the vintage date with an underscore. For brevity, Output 48.6.1 shows only the first 10 and last 10 observations. The sort order is descending; that is why the dates start with the most recent observation and continue in biweekly (ending Wednesday) periods to the least recent.

```
title 'Specifying Two Series IDs with Multiple Vintage Dates and Descending Sort Order';
libname _all_ clear;

libname fred sasefred "%sysget(FRED)"
   OUTXML=fredex06
   AUTOMAP=replace
   MAPREF=MyMap
   XMLMAP="%sysget(FRED)fredex06.map"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST='ADJRES,ADJRESN'
   VINTAGE='2003-07-31,2006-08-31,2013-06-13'
   START='2004-01-01'
   END='2012-12-01'
   FREQ='bw'
   OUTPUT=2
   AGG='avg'
   SORT='desc'
   FORMAT=xml;

data fredPDD;
   set fred.fredex06;
run;

proc contents data=fredPDD; run;
title3 "First 10/Last 10 Obs, IDLIST=ADJRES,ADJRESN, and SORT=Descending";
%pri20nom(fredPDD);
title3;
```

Output 48.6.1 Specifying Two Series IDs with Multiple Vintage Dates and Descending Sort Order—First 10 and Last 10 Observations

Specifying Two Series IDs with Multiple Vintage Dates and Descending Sort Order

Obs	date	ADJRES_20130613	ADJRES_20060831	ADJRESN_20130613	ADJRESN_20060831
1	2012-11-28	1591.92	.	1583.96	.
2	2012-11-14	1583.90	.	1583.90	.
3	2012-10-31	1573.04	.	1568.32	.
4	2012-10-17	1563.23	.	1560.10	.
5	2012-10-03	1511.02	.	1518.58	.
6	2012-09-19	1587.55	.	1563.74	.
7	2012-09-05	1583.80	.	1594.89	.
8	2012-08-22	1618.63	.	1615.40	.
9	2012-08-08	1652.49	.	1639.27	.
10	2012-07-25	1620.07	.	1629.79	.
11	2004-05-12	95.89	95.871	94.74	94.720
12	2004-04-28	96.25	96.154	97.79	97.693
13	2004-04-14	93.38	93.293	93.38	93.293
14	2004-03-31	94.81	94.718	93.67	93.582
15	2004-03-17	94.28	94.146	93.91	93.769
16	2004-03-03	94.13	94.096	95.73	95.696
17	2004-02-18	92.05	92.001	93.24	93.197
18	2004-02-04	96.25	96.192	95.10	95.038
19	2004-01-21	96.54	96.511	97.60	97.573
20	2004-01-07	96.06	96.044	100.00	99.982

Example 48.7: Vintage Dates for a Specific Series with the URL= Option

The following statements demonstrate how to use the URL= option to obtain the VINTAGE_DATE and VINTAGE_DATES data sets for a specified series and how to create a permanent data set named *VINDAT1* in the MyLib SAS library. You must specify the series in both the URL= option and the IDLIST= option.

```
title 'Specifying the URL= Option to Create the VINTAGE_DATES Data Set';
libname _all_ clear;

libname mylib "U:\fred940\doc\";

libname fred1 sasefred "%sysget(FRED)"
   URL="http://api.stlouisfed.org/fred/series/vintagedates?series_id=N5005C1A027NBEA"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST= 'N5005C1A027NBEA'
   ;

data mylib.vindat1;
   set fred1.XFREDtpu;
run;

proc print
   data=mylib.vindat1;
run;

proc contents
   data=mylib.vindat1;
run;
```

The list of available vintage dates for the N5005C1A027NBEA series is read from the *XFREDtpu.xml* file that is downloaded by the SASEFRED engine. The contents are shown in Output 48.7.1. The engine automatically maps the data in the XML file and reads the data into the XFREDTPU data set when the SET statement is executed. When the DATA step runs, the data in the temporary utility data set are read and stored in the permanent data set named *vindat1.sas7bdat* in the MyLib library. A side effect of the DATA step is the automatic creation of two SAS data sets named *vintage_date.sas7bdat* and *vintage_dates.sas7bdat* in the FRED1 library's location.

Output 48.7.1 Specifying the URL= Option to Create the VINTAGE_DATES Data Set

Specifying the URL= Option to Create the VINTAGE_DATES Data Set

Obs	vintage_dates_ORDINAL	vintage_date_ORDINAL	vintage_date
1	1	1	2013-02-28
2	1	2	2013-03-28
3	1	3	2013-05-30
4	1	4	2013-07-31
5	1	5	2014-03-27
6	1	6	2014-05-29
7	1	7	2014-07-30

Example 48.8: Series for a Specific Release with the URL= Option

The following statements demonstrate how to use the URL= option to obtain the SERIES and SERIESS data sets for a specified release and how to create a permanent data set named SERIES2 in the MyLib SAS library:

```
title 'Specifying the URL= Option to Create the SERIES Data Set';
libname _all_ clear;

libname fred2 sasefred "%sysget(FRED)"
   URL="http://api.stlouisfed.org/fred/release/series?release_id=51"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   ;

data series2;
   set fred2.XFREDtpu;
run;

proc contents
   data=series2;
run;
title3 "First 5/Last 5 Obs, SERIES2 Data Set";
%pri10nom(series2);
title3;
```

The returned data are stored in the XFREDTPU data set and are copied to the permanent data set named *series2.sas7bdat* in the MyLib library. A side effect of the DATA step is the automatic creation of two SAS data sets named *series.sas7bdat* and *seriess.sas7bdat* in the FRED2 library's location. Fifty-seven series are returned for release_id=51; Output 48.8.1 shows the first and last five observations of the SERIES data set.

Output 48.8.1 Specifying the URL= Option to Create the SERIES Data Set—First 5 and Last 5 Observations

Specifying the URL= Option to Create the SERIES Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end
1	1	1	BOMTVLM133S	2015-03-19	2015-03-19
2	1	2	BOMVGMM133S	2015-03-19	2015-03-19
3	1	3	BOMVJMM133S	2015-03-19	2015-03-19

Obs	series_title	series_observation_start	series_observation_end	series_frequency	series_frequency_short
1	U.S. Imports of Services - Travel	1992-01-01	2015-01-01	Monthly	M
2	U.S. Imports of Services - U.S. Government Misc. Services (DISCONTINUED)	1992-01-01	2013-12-01	Monthly	M
3	U.S. Imports of Services - Direct Defense Expenditures (DISCONTINUED)	1992-01-01	2013-12-01	Monthly	M

Obs	series_units	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short
1	Million of Dollars	Mil. of $	Seasonally Adjusted	SA
2	Millions of Dollars	Mil. of $	Seasonally Adjusted	SA
3	Millions of Dollars	Mil. of $	Seasonally Adjusted	SA

Obs	series_last_updated	series_popularity	series_notes
1	2015-03-06 07:56:13-06	0	
2	2014-10-20 09:27:37-05	0	BEA has introduced new table presentations, including a new presentation of services, as part of a comprehensive restructuring of BEA's international economic accounts.For more information see http://www.bea.gov/international/revision-2014.htm.
3	2014-10-20 09:26:44-05	0	BEA has introduced new table presentations, including a new presentation of services, as part of a comprehensive restructuring of BEA's international economic accounts.For more information see http://www.bea.gov/international/revision-2014.htm.

Output 48.8.1 *continued*

Specifying the URL= Option to Create the SERIES Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end
4	1	4	BOMVMPM133S	2015-03-19	2015-03-19
5	1	5	BOMVOMM133S	2015-03-19	2015-03-19
6	1	53	ITXMARM133S	2015-03-19	2015-03-19

Obs	series_title	series_observation_start	series_observation_end	series_frequency	series_frequency_short
4	U.S. Imports of Services - Passenger Fares	1992-01-01	2015-01-01	Monthly	M
5	U.S. Imports of Services - Other Private Services (DISCONTINUED)	1992-01-01	2013-12-01	Monthly	M
6	U.S. Exports of Services: Maintenance and Repair Services, not included elsewhere	1999-01-01	2015-01-01	Monthly	M

Obs	series_units	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short
4	Million of Dollars	Mil. of $	Seasonally Adjusted	SA
5	Million of Dollars	Mil. of $	Seasonally Adjusted	SA
6	Millions of Dollars	Mil. of $	Seasonally Adjusted	SA

Obs	series_last_updated	series_popularity	series_notes
4	2015-03-06 07:56:13-06	0	
5	2014-10-20 09:25:54-05	0	BEA has introduced new table presentations, including a new presentation of services, as part of a comprehensive restructuring of BEA's international economic accounts.For more information see http://www.bea.gov/international/revision-2014.htm.
6	2015-03-06 08:16:02-06	0	

Output 48.8.1 *continued*

Specifying the URL= Option to Create the SERIES Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end
7	1	54	ITXOBSM133S	2015-03-19	2015-03-19
8	1	55	ITXTAEM133S	2015-03-19	2015-03-19
9	1	56	ITXTCIM133S	2015-03-19	2015-03-19
10	1	57	ITXTRAM133S	2015-03-19	2015-03-19

Obs	series_title	series_observation_start	series_observation_end	series_frequency	series_frequency_short
7	U.S. Exports of Services: Other Business Services	1999-01-01	2015-01-01	Monthly	M
8	U.S. Exports of Services: Travel (for All Purposes Including Education)	1999-01-01	2015-01-01	Monthly	M
9	U.S. Exports of Services: Telecommunications, Computer, and Information Services	1999-01-01	2015-01-01	Monthly	M
10	U.S. Exports of Services: Transport	1999-01-01	2015-01-01	Monthly	M

Obs	series_units	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short
7	Millions of Dollars	Mil. of $	Seasonally Adjusted	SA
8	Millions of Dollars	Mil. of $	Seasonally Adjusted	SA
9	Millions of Dollars	Mil. of $	Seasonally Adjusted	SA
10	Millions of Dollars	Mil. of $	Seasonally Adjusted	SA

Obs	series_last_updated	series_popularity	series_notes
7	2015-03-06 08:16:02-06	0	
8	2015-03-06 08:16:02-06	0	
9	2015-03-06 08:16:02-06	0	
10	2015-03-06 08:16:02-06	0	

Example 48.9: Series for Specific Tags with the URL= Option

The following statements demonstrate how to use the URL= option to obtain the SERIES and SERIESS data sets for specified tag names and how to create a permanent data set named TAGS_SERIES4 in the MyLib SAS library:

```
title 'Specifying the URL= Option to Create the TAGS_SERIES4 Data Set.';
libname _all_ clear;
libname mylib "U:\fred940\doc\";

libname fred4 sasefred "U:\fred940\test\"
   debug=on
   URL="http://api.stlouisfed.org/fred/tags/series?tag_names=slovenia;food;oecd"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   ;

data mylib.tags_series4;
   set fred4.XFREDtpu;
run;


proc print
   data=mylib.tags_series4(obs=2);
run;

proc contents
   data=mylib.tags_series4;
run;
```

The returned data are stored in the XFREDTPU data set and are copied to the permanent data set named *tags_series4.sas7bdat* in the MyLib library. A side effect of the DATA step is the automatic creation of two SAS data sets named *series.sas7bdat* and *seriess.sas7bdat* in the FRED4 library's location. Eighteen series are returned for the specified tag names; the OBS=2 option in the DATA statement in the PROC PRINT step prints only two of them. Output 48.9.1 shows the first two observations of the TAGS_SERIES4 data set.

Output 48.9.1 Specifying the URL= Option to Create the TAGS_SERIES4 Data Set

Specifying the URL= Option to Create the TAGS_SERIES4 Data Set.

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end
1	1	1	CPGDFD02SIA657N	2015-03-19	2015-03-19
2	1	2	CPGDFD02SIA659N	2015-03-19	2015-03-19

Obs	series_title	series_observation_start	series_observation_end	series_frequency	series_frequency_short
1	Consumer Price Index: Total Food Excluding Restaurants for Slovenia©	1996-01-01	2014-01-01	Annual	A
2	Consumer Price Index: Total Food Excluding Restaurants for Slovenia©	1996-01-01	2014-01-01	Annual	A

Obs	series_units	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short
1	Growth Rate Previous Period	Growth Rate Previous Period	Not Seasonally Adjusted	NSA
2	Growth Rate Same Period Previous Year	Growth Rate Same Period Previous Yr.	Not Seasonally Adjusted	NSA

Obs	series_last_updated	series_popularity	series_notes
1	2015-02-03 15:27:27-06	0	OECD descriptor ID: CPGDFD02 OECD unit ID: GP OECD country ID: SVN All OECD data should be cited as follows: OECD, "Main Economic Indicators - complete database", Main Economic Indicators (database),http://dx.doi.org/10.1787/data-00052-en (Accessed on date) Copyright, 2014, OECD. Reprinted with permission.
2	2015-02-03 15:27:27-06	0	OECD descriptor ID: CPGDFD02 OECD unit ID: GY OECD country ID: SVN All OECD data should be cited as follows: OECD, "Main Economic Indicators - complete database", Main Economic Indicators (database),http://dx.doi.org/10.1787/data-00052-en (Accessed on date) Copyright, 2014, OECD. Reprinted with permission.

Example 48.10: Categories for a Specific Series with the URL= Option

The following statements demonstrate how to use the URL= option to obtain the CATEGORY and CATEGORIES data sets and how to create a permanent data set named SERIES_CAT7 in the MyLib SAS library:

```
title 'Specifying the URL= Option to Create the SERIES_CAT7 Data Set';
libname _all_ clear;
libname mylib "U:\fred940\doc\";

libname fred7 sasefred "U:\fred940\test\"
   debug=on
   URL="http://api.stlouisfed.org/fred/series/categories?series_id=EXJPUS"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   IDLIST='EXJPUS'
   ;

data mylib.series_cat7;
   set fred7.XFREDtpu;
run;

proc print
   data=mylib.series_cat7;
run;

proc contents
   data=mylib.series_cat7;
run;
```

The returned data are stored in the XFREDTPU data set and are copied to the permanent data set named *series_cat7.sas7bdat* in the MyLib library. A side effect of the DATA step is the automatic creation of two SAS data sets named *category.sas7bdat* and *categories.sas7bdat* in the FRED7 library's location. Two categories are returned for the specified series ID, as shown in Output 48.10.1.

Output 48.10.1 Specifying the URL= Option to Create the SERIES_CAT7 Data Set

Specifying the URL= Option to Create the SERIES_CAT7 Data Set

Obs	categories_ORDINAL	category_ORDINAL	category_id	category_name	category_parent_id
1	1	1	95	Monthly Rates	15
2	1	2	275	Japan	158

Example 48.11: Categories for a Specific Source with the URL= Option

The following statements demonstrate how to use the URL= option to obtain the RELEASE and RELEASES data sets for a specific source and how to create a permanent data set named REL8 in the MyLib SAS library:

```
title 'Specifying the URL= Option to Create the REL8 Data Set';
libname _all_ clear;
libname mylib "U:\fred940\doc\";

libname fred8 sasefred "U:\fred940\test\"
   debug=on
   URL="http://api.stlouisfed.org/fred/source/releases?source_id=11"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   ;

data mylib.rel8;
   set fred8.XFREDtpu;
run;

proc print
   data=mylib.rel8;
run;

proc contents
   data=mylib.rel8;
run;
```

Output 48.11.1 Specifying the URL= Option to Create the REL8 Data Set

Specifying the URL= Option to Create the REL8 Data Set

Obs	releases_ORDINAL	release_ORDINAL	release_id	release_realtime_start
1	1	1	72	2015-03-19
2	1	2	102	2015-03-19

Obs	release_realtime_end	release_name	release_press_release	release_link
1	2015-03-19	Daily Treasury Inflation-Indexed Securities	false	
2	2015-03-19	Wall Street Journal	true	http://online.wsj.com/public/us

Example 48.12: Series for a Specific Category with the URL= Option

The following statements demonstrate how to use the URL= option to obtain the SERIES data set for a specific category and how to create a permanent data set named SERIES_CAT5 in the MyLib SAS library:

```
title 'Specifying the URL= Option to Create the SERIES_CAT5 Data Set';
libname _all_ clear;
libname mylib "U:\fred940\doc\";

libname fred5 sasefred "U:\fred940\test\"
   debug=on
   URL="http://api.stlouisfed.org/fred/category/series?category_id=125"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   ;

data mylib.series_cat5;
   set fred5.XFREDtpu;
run;

proc print
   data=mylib.series_cat5;
run;

proc contents
   data=mylib.series_cat5;
run;
```

The returned data are stored in the XFREDTPU data set and are copied to the permanent data set named *series_cat5.sas7bdat* in the MyLib library. A side effect of the DATA step is the automatic creation of two SAS data sets named *series.sas7bdat* and *seriess.sas7bdat* in the FRED5 library's location. Forty-five series are returned for the specified category ID, as shown in Output 48.12.1.

Output 48.12.1 Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
1	1	1	BOPBCA	2015-03-19	2015-03-19	Balance on Current Account (Discontinued Series)
2	1	2	BOPBCAA	2015-03-19	2015-03-19	Balance on Current Account (Discontinued Series)
3	1	3	BOPBCAN	2015-03-19	2015-03-19	Balance on Current Account (Discontinued Series)
4	1	4	BOPBGS	2015-03-19	2015-03-19	Balance on Goods and Services (Discontinued Series)

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
1	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
2	1960-01-01	2013-01-01	Annual	A	Billions of Dollars
3	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
4	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
1	Bil. of $	Seasonally Adjusted	SA	2014-06-18 08:41:28-05
2	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:28-05
3	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:28-05
4	Bil. of $	Seasonally Adjusted	SA	2014-06-18 08:41:28-05

Obs	series_popularity	series_notes
1	57	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
2	34	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
3	28	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
4	28	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.

Output 48.12.1 *continued*

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
5	1	5	BOPBGSA	2015-03-19	2015-03-19	Balance on Goods and Services (Discontinued Series)
6	1	6	BOPBGSN	2015-03-19	2015-03-19	Balance on Goods and Services (Discontinued Series)
7	1	7	BOPBII	2015-03-19	2015-03-19	Balance on Investment Income (Discontinued Series)
8	1	8	BOPBIIA	2015-03-19	2015-03-19	Balance on Investment Income (Discontinued Series)

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
5	1960-01-01	2013-01-01	Annual	A	Billions of Dollars
6	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
7	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
8	1960-01-01	2013-01-01	Annual	A	Billions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
5	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:28-05
6	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:28-05
7	Bil. of $	Seasonally Adjusted	SA	2014-06-18 08:41:27-05
8	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:27-05

Obs	series_popularity	series_notes
5	14	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
6	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
7	7	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
8	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.

Output 48.12.1 *continued*

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
9	1	9	BOPBIIN	2015-03-19	2015-03-19	Balance on Investment Income (Discontinued Series)
10	1	10	BOPBM	2015-03-19	2015-03-19	Balance on Merchandise Trade (Discontinued Series)
11	1	11	BOPBMA	2015-03-19	2015-03-19	Balance on Merchandise Trade (Discontinued Series)
12	1	12	BOPBMN	2015-03-19	2015-03-19	Balance on Merchandise Trade (Discontinued Series)

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
9	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
10	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
11	1960-01-01	2013-01-01	Annual	A	Billions of Dollars
12	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
9	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:27-05
10	Bil. of $	Seasonally Adjusted	SA	2014-06-18 08:41:27-05
11	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:27-05
12	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:27-05

Obs	series_popularity	series_notes
9	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
10	18	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
11	7	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
12	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.

Output 48.12.1 *continued*

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
13	1	13	BOPBSV	2015-03-19	2015-03-19	Balance on Services (Discontinued Series)
14	1	14	BOPBSVA	2015-03-19	2015-03-19	Balance on Services (Discontinued Series)
15	1	15	BOPBSVN	2015-03-19	2015-03-19	Balance on Services (Discontinued Series)
16	1	16	BOPCAT	2015-03-19	2015-03-19	Capital Account Transactions, Net (Discontinued Series)

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
13	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
14	1960-01-01	2013-01-01	Annual	A	Billions of Dollars
15	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
16	1989-10-01	2014-01-01	Quarterly	Q	Billions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
13	Bil. of $	Seasonally Adjusted	SA	2014-06-18 08:41:27-05
14	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:27-05
15	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:27-05
16	Bil. of $	Seasonally Adjusted	SA	2014-06-18 08:41:26-05

Obs	series_popularity	series_notes
13	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
14	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
15	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
16	23	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.

Output 48.12.1 *continued*

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
17	1	17	BOPCATA	2015-03-19	2015-03-19	Capital Account Transactions, Net (Discontinued Series)
18	1	18	BOPCATN	2015-03-19	2015-03-19	Capital Account Transactions, Net (Discontinued Series)
19	1	19	BOPG	2015-03-19	2015-03-19	Unilateral Transfers, Net (Discontinued Series)
20	1	20	BOPGA	2015-03-19	2015-03-19	Unilateral Transfers, Net (Discontinued Series)

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
17	1989-01-01	2013-01-01	Annual	A	Billions of Dollars
18	1989-10-01	2014-01-01	Quarterly	Q	Billions of Dollars
19	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
20	1960-01-01	2013-01-01	Annual	A	Billions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
17	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:26-05
18	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:26-05
19	Bil. of $	Seasonally Adjusted	SA	2014-06-18 08:41:26-05
20	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:25-05

Obs	series_popularity	series_notes
17	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
18	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
19	27	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
20	7	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.

Output 48.12.1 *continued*

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
21	1	21	BOPGN	2015-03-19	2015-03-19	Unilateral Transfers, Net (Discontinued Series)
22	1	22	BOPGSTB	2015-03-19	2015-03-19	Trade Balance: Goods and Services, Balance of Payments Basis
23	1	23	BOPGTB	2015-03-19	2015-03-19	Trade Balance: Goods, Balance of Payments Basis
24	1	24	BOPSTB	2015-03-19	2015-03-19	Trade Balance: Services, Balance of Payments Basis
25	1	25	IEABC	2015-03-19	2015-03-19	Balance on current account

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
21	1960-01-01	2014-01-01	Quarterly	Q	Billions of Dollars
22	1992-01-01	2015-01-01	Monthly	M	Millions of Dollars
23	1992-01-01	2015-01-01	Monthly	M	Millions of Dollars
24	1992-01-01	2015-01-01	Monthly	M	Millions of Dollars
25	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
21	Bil. of $	Not Seasonally Adjusted	NSA	2014-06-18 08:41:25-05
22	Mil. of $	Seasonally Adjusted	SA	2015-03-06 07:56:13-06
23	Mil. of $	Seasonally Adjusted	SA	2015-03-06 07:56:14-06
24	Mil. of $	Seasonally Adjusted	SA	2015-03-06 07:56:14-06
25	Mil. of $	Seasonally Adjusted	SA	2015-03-19 08:36:18-05

Obs	series_popularity	series_notes
21	0	This series has been discontinued as a result of the comprehensive restructuring of the international economic accounts (http://www.bea.gov/international/modern.htm). For a crosswalk of the old and new series in FRED see: http://research.stlouisfed.org/CompRevisionReleaseID49.xlsx.
22	65	
23	40	
24	21	
25	43	Calculated by subtracting the imports of goods and services and income payments (debits) from the exports of goods and services and income receipts (credits)

Output 48.12.1 *continued*

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
26	1	26	IEABCA	2015-03-19	2015-03-19	Balance on current account
27	1	27	IEABCG	2015-03-19	2015-03-19	Balance on goods
28	1	28	IEABCGA	2015-03-19	2015-03-19	Balance on goods
29	1	29	IEABCGN	2015-03-19	2015-03-19	Balance on goods
30	1	30	IEABCGS	2015-03-19	2015-03-19	Balance on goods and services

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
26	1999-01-01	2014-01-01	Annual	A	Millions of Dollars
27	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
28	1999-01-01	2014-01-01	Annual	A	Millions of Dollars
29	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
30	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
26	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:56:09-05
27	Mil. of $	Seasonally Adjusted	SA	2015-03-19 08:36:18-05
28	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:56:09-05
29	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:36:18-05
30	Mil. of $	Seasonally Adjusted	SA	2015-03-19 08:36:17-05

Obs	series_popularity	series_notes
26	24	Calculated by subtracting the imports of goods and services and income payments (debits) from the exports of goods and services and income receipts (credits)
27	11	Calculated by subtracting the imports of goods from the exports of goods
28	0	Calculated by subtracting the imports of goods from the exports of goods
29	11	Calculated by subtracting the imports of goods from the exports of goods
30	22	Calculated by subtracting the imports of goods and services from the exports of goods and services

Output 48.12.1 *continued*

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
31	1	31	IEABCGSA	2015-03-19	2015-03-19	Balance on goods and services
32	1	32	IEABCGSN	2015-03-19	2015-03-19	Balance on goods and services
33	1	33	IEABCN	2015-03-19	2015-03-19	Balance on current account
34	1	34	IEABCP	2015-03-19	2015-03-19	Balance on capital account
35	1	35	IEABCPA	2015-03-19	2015-03-19	Balance on capital account

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
31	1999-01-01	2014-01-01	Annual	A	Millions of Dollars
32	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
33	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
34	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
35	1999-01-01	2014-01-01	Annual	A	Millions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
31	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:56:08-05
32	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:36:17-05
33	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:36:17-05
34	Mil. of $	Seasonally Adjusted	SA	2015-03-19 08:36:17-05
35	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:56:08-05

Obs	series_popularity	series_notes
31	0	Calculated by subtracting the imports of goods and services from the exports of goods and services
32	0	Calculated by subtracting the imports of goods and services from the exports of goods and services
33	24	Calculated by subtracting the imports of goods and services and income payments (debits) from the exports of goods and services and income receipts (credits)
34	35	Calculated by subtracting the capital transfer payments and other debits from the capital transfer receipts and other credits
35	30	Calculated by subtracting the capital transfer payments and other debits from the capital transfer receipts and other credits

Output 48.12.1 *continued*

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
36	1	36	IEABCPI	2015-03-19	2015-03-19	Balance on primary income
37	1	37	IEABCPIA	2015-03-19	2015-03-19	Balance on primary income
38	1	38	IEABCPIN	2015-03-19	2015-03-19	Balance on primary income
39	1	39	IEABCPN	2015-03-19	2015-03-19	Balance on capital account
40	1	40	IEABCS	2015-03-19	2015-03-19	Balance on services

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
36	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
37	1999-01-01	2014-01-01	Annual	A	Millions of Dollars
38	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
39	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
40	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
36	Mil. of $	Seasonally Adjusted	SA	2015-03-19 08:36:17-05
37	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:56:08-05
38	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:36:17-05
39	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:36:17-05
40	Mil. of $	Seasonally Adjusted	SA	2015-03-19 08:36:17-05

Obs	series_popularity	series_notes
36	7	Calculated by subtracting the primary income payments from the primary income receipts
37	14	Calculated by subtracting the primary income payments from the primary income receipts
38	7	Calculated by subtracting the primary income payments from the primary income receipts
39	20	Calculated by subtracting the capital transfer payments and other debits from the capital transfer receipts and other credits
40	11	Calculated by subtracting the imports of services from the exports of services

Output 48.12.1 *continued*

Specifying the URL= Option to Create the SERIES_CAT5 Data Set

Obs	seriess_ORDINAL	series_ORDINAL	series_id	series_realtime_start	series_realtime_end	series_title
41	1	41	IEABCSA	2015-03-19	2015-03-19	Balance on services
42	1	42	IEABCSI	2015-03-19	2015-03-19	Balance on secondary income
43	1	43	IEABCSIA	2015-03-19	2015-03-19	Balance on secondary income
44	1	44	IEABCSIN	2015-03-19	2015-03-19	Balance on secondary income
45	1	45	IEABCSN	2015-03-19	2015-03-19	Balance on services

Obs	series_observation_start	series_observation_end	series_frequency	series_frequency_short	series_units
41	1999-01-01	2014-01-01	Annual	A	Millions of Dollars
42	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
43	1999-01-01	2014-01-01	Annual	A	Millions of Dollars
44	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars
45	1999-01-01	2014-10-01	Quarterly	Q	Millions of Dollars

Obs	series_units_short	series_seasonal_adjustment	series_seasonal_adjustment_short	series_last_updated
41	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:56:08-05
42	Mil. of $	Seasonally Adjusted	SA	2015-03-19 08:36:17-05
43	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:56:08-05
44	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:36:17-05
45	Mil. of $	Not Seasonally Adjusted	NSA	2015-03-19 08:36:17-05

Obs	series_popularity	series_notes
41	0	Calculated by subtracting the imports of services from the exports of services
42	0	Calculated by subtracting the secondary income (current transfer) payments from the secondary income (current transfer) receipts
43	0	Calculated by subtracting the secondary income (current transfer) payments from the secondary income (current transfer) receipts
44	0	Calculated by subtracting the secondary income (current transfer) payments from the secondary income (current transfer) receipts
45	0	Calculated by subtracting the imports of services from the exports of services

Example 48.13: Sources for Today's Date with the URL= Option

The following statements demonstrate how to use the URL= option to obtain the first 10 sources (LIMIT=10) for the SOURCES6 data set for today's date and how to create a permanent data set named SOURCES6 in the MyLib SAS library:

```
title 'Specifying the URL= Option to Create the SOURCES6 Data Set';
libname _all_ clear;
libname mylib "U:\fred940\doc\";

libname fred6 sasefred "U:\fred940\test\"
   debug=on
   URL="http://api.stlouisfed.org/fred/sources?limit=10"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   ;

data mylib.sources6;
   set fred6.XFREDtpu;
run;

proc print
   data=mylib.sources6;
run;

proc contents
   data=mylib.sources6;
run;
```

The returned data are stored in the XFREDTPU data set and are copied to the permanent data set named *sources6.sas7bdat* in the MyLib library. A side effect of the DATA step is the automatic creation of two SAS data sets named *source.sas7bdat* and *sources.sas7bdat* in the FRED6 library's location. Sixty-eight sources could be returned for today's date, but the LIMIT=10 option obtains only the first 10 sources, as shown in Output 48.13.1.

Output 48.13.1 Specifying the URL= Option to Create the SOURCES6 Data Set

Specifying the URL= Option to Create the SOURCES6 Data Set

Obs	sources_ORDINAL	source_ORDINAL	source_id	source_realtime_start	source_realtime_end
1	1	1	1	2015-03-19	2015-03-19
2	1	2	3	2015-03-19	2015-03-19
3	1	3	4	2015-03-19	2015-03-19
4	1	4	6	2015-03-19	2015-03-19
5	1	5	11	2015-03-19	2015-03-19
6	1	6	13	2015-03-19	2015-03-19
7	1	7	14	2015-03-19	2015-03-19
8	1	8	15	2015-03-19	2015-03-19
9	1	9	16	2015-03-19	2015-03-19
10	1	10	17	2015-03-19	2015-03-19

Obs	source_name	source_link
1	Board of Governors of the Federal Reserve System (US)	http://www.federalreserve.gov/
2	Federal Reserve Bank of Philadelphia	http://www.philadelphiafed.org/
3	Federal Reserve Bank of St. Louis	http://www.stlouisfed.org/
4	Federal Financial Institutions Examination Council (US)	http://www.ffiec.gov/
5	Dow Jones & Company	http://www.dowjones.com
6	Institute for Supply Management	http://www.ism.ws/
7	Thomson Reuters/University of Michigan	https://customers.reuters.com/community/university/default.aspx
8	Council of Economic Advisers (US)	http://www.whitehouse.gov/cea/
9	US. Office of Management and Budget	http://www.whitehouse.gov/omb/
10	US. Congressional Budget Office	http://www.cbo.gov/

Example 48.14: Releases Available for Today's Date with the URL= Option

The following statements demonstrate how to use the URL= option to obtain the first 10 observations (LIMIT=10) of the REL3 data set for today's date and how to create a permanent data set named REL3 in the MyLib SAS library:

```
title 'Specifying the URL= Option to Create the REL3 Data Set';
libname _all_ clear;
libname mylib "U:\fred940\doc\";

libname fred3 sasefred "U:\fred940\test\"
   debug=on
   URL="http://api.stlouisfed.org/fred/releases?limit=10"
   APIKEY='XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   ;

data mylib.rel3;
   set fred3.XFREDtpu;
run;

proc print
   data=mylib.rel3;
run;

proc contents
   data=mylib.rel3;
run;
```

The returned data are stored in the XFREDTPU data set and are copied to the permanent data set named *rel3.sas7bdat* in the MyLib library. A side effect of the DATA step is the automatic creation of two SAS data sets named *release.sas7bdat* and *releases.sas7bdat* in the FRED3 library's location. More than 200 available releases could be returned for today, but the LIMIT=10 option obtains only the first 10 releases, as shown in Output 48.14.1.

Output 48.14.1 Specifying the URL= Option to Create the REL3 Data Set

Specifying the URL= Option to Create the REL3 Data Set

Obs	releases_ORDINAL	release_ORDINAL	release_id	release_realtime_start	release_realtime_end
1	1	1	9	2015-03-19	2015-03-19
2	1	2	10	2015-03-19	2015-03-19
3	1	3	11	2015-03-19	2015-03-19
4	1	4	13	2015-03-19	2015-03-19
5	1	5	14	2015-03-19	2015-03-19
6	1	6	15	2015-03-19	2015-03-19
7	1	7	17	2015-03-19	2015-03-19
8	1	8	18	2015-03-19	2015-03-19
9	1	9	19	2015-03-19	2015-03-19
10	1	10	20	2015-03-19	2015-03-19

Obs	release_name	release_press_release	release_link
1	Advance Monthly Sales for Retail and Food Services	true	http://www.census.gov/retail/
2	Consumer Price Index	true	http://www.bls.gov/cpi/
3	Employment Cost Index	true	http://www.bls.gov/ncs/ect/
4	G.17 Industrial Production and Capacity Utilization	true	http://www.federalreserve.gov/releases/g17/
5	G.19 Consumer Credit	true	http://www.federalreserve.gov/releases/g19/
6	G.5 Foreign Exchange Rates	true	http://www.federalreserve.gov/releases/g5/
7	H.10 Foreign Exchange Rates	true	http://www.federalreserve.gov/releases/h10/
8	H.15 Selected Interest Rates	true	http://www.federalreserve.gov/releases/h15/
9	H.3 Aggregate Reserves of Depository Institutions and the Monetary Base	true	http://www.federalreserve.gov/releases/h3/
10	H.4.1 Factors Affecting Reserve Balances	true	http://www.federalreserve.gov/releases/h41/

References

Federal Reserve Bank of St. Louis (2012). "Economic Research." Accessed November 7, 2012. http://research.stlouisfed.org/.

PostgreSQL Global Development Group (2013). "PostgreSQL 8.4.17 Documentation." http://www.postgresql.org/docs/8.4/static/queries-limit.html.

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