

FUSION REGISTRY

Data Store Management

FUSION REGISTRY
VERSION 9

Data Store Management

This guide is for Agency or Admin users who are setting up a Data Collection environment in Fusion Registry 9

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2 Overview

Fusion Registry 9 provides the facility of allowing Data Providers to report data. Data may be reported in a number of ways: by Registering the URL of a data File; by Registering the URL of a valid SDMX REST web service; by publishing a Dataset to a data store; by re-indexing a database which has data loaded by a process run outside of the Fusion Registry. The Fusion Registry can support any number of data collection methods, and each Dataflow may collect data in a number of ways, depending on the Data Provider. In this way, the Fusion Registry is able to operate as a Data Portal over any number of disparate data stores.

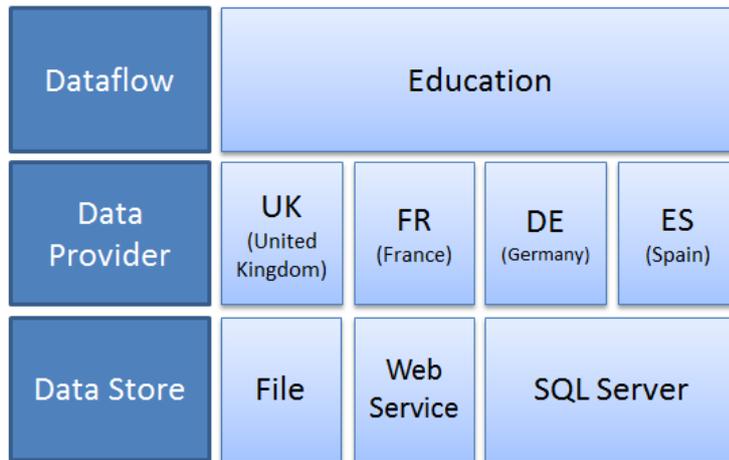


Figure 1 showing an example of how a Dataflow with multiple Data Providers can have data split across multiple Data Stores

The remainder of this document describes each data store type, how to set up connections to data stores, how to link a Data Provider to a data store, and how to manage reported data.

Note: The Data Reporting guide should be read for information on how to publish data and register the location of external files or web services.

3 Data Store Types

3.1 Overview

Data Stores can be split into two main types, Registry Managed Data Stores, and External Data Stores. A Registry Managed Data Store is a store for which the Fusion Registry is responsible for creating database tables, importing, managing and deleting content. Registry Managed stores includes the Fusion Data Store, and any MySQL or SQL Server database that has been configured to act as a Data Store. External stores include MySQL, SQL Server, or Oracle database which has its data managed by an external process, and SDMX web services or external files.

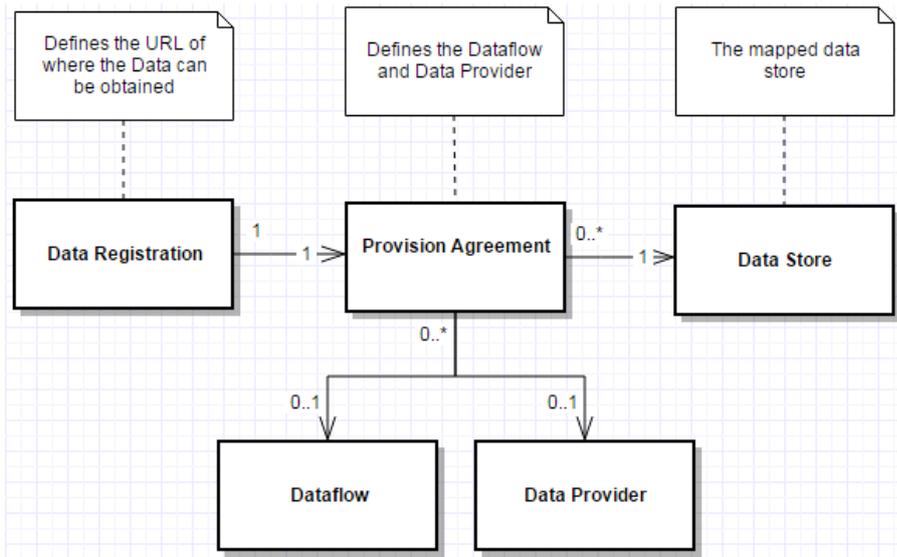
| Datasource | Registry Managed | | | External | | | | |
|-----------------|-------------------|---------------------|------------|---------------------|------------|--------|------|-------------|
| Data Store Type | Internal | Relational Database | | Relational Database | | | URL | |
| Data Store | Fusion Data Store | My SQL | SQL Server | My SQL | SQL Server | Oracle | File | Web Service |

Figure 2 showing the data stores supported by the Fusion Registry

The Fusion Registry creates and maintains the link between a data store and the SDMX Structural Metadata at the level of a Provision Agreement. The Provision Agreement defines which data store it is connected to, defaulting to any external URL (File or Web Service). Each data store can have zero to many Provision Agreements linked to it. As both Dataflows and Data Providers can be referenced by multiple Provision Agreements, it is therefore possible to split data for the same Dataflow or same Data Provider over multiple data store types.

The notion that data exists is maintained by the Data Registration. The Data Registration references the Provision Agreement and defines the URL of where the data can be retrieved for the Provision Agreement. For data source type which maps to an external File or Web Service URL, it is the responsibility of the Data Provider to supply the URL of the service or file. For all other data source types, the Fusion Registry is responsible for generating, updating, and deleting the Data Registration, where the URL of these Data Registrations is to the Fusion Registry’s own public web service.

The UML diagram below shows the relationship and cardinality between the SDMX Structures and the Fusion Registry data store types.



The remainder of this section describes each data store type in more detail.

3.2 Fusion Data Store

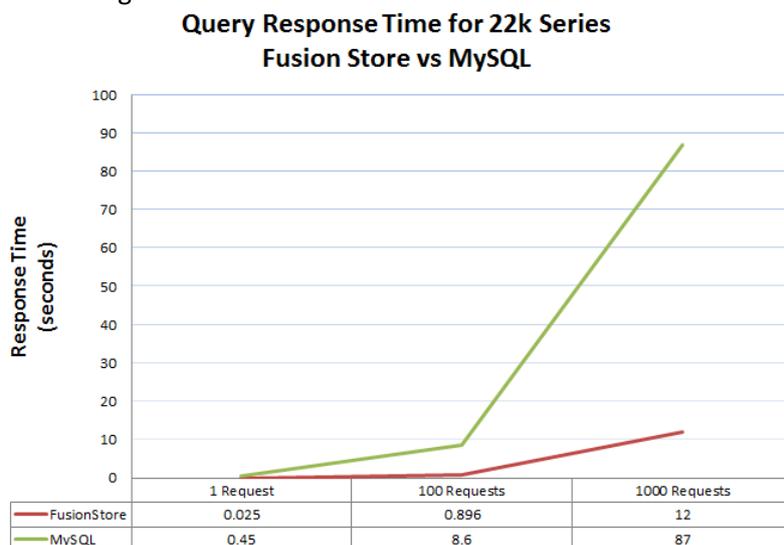
The Fusion Data Store provides a high-speed in-memory database pre-installed in the Fusion Registry. Data published to this store is persisted to the database that the Fusion Registry is connected to, however all data is served from memory using a highly efficient in memory model.

Metrics for the Fusion Data Store are shown below:

Dataset Size: 500Mb SDMX file with 2.1 Million Observations
Tomcat Max Memory: 2Gb
Data Load: 58 Seconds
Query 22k Observations:

| Num Requests | Concurrency | Time (s) | Requests Per Second |
|--------------|-------------|----------|---------------------|
| 1 | 1 | 0.025 | 40 |
| 100 | 10 | 0.872 | 114 |
| 100 | 50 | 0.896 | 111 |
| 1000 | 50 | 12 | 82 |

When benchmarked against the same query for a MySQL instance (on a desktop PC) the graph looks as follows. **Note:** All caching is disabled:



It should be noted that as the data queries are processed in memory, it is possible to horizontally scale the data tier by simply launching an additional Fusion Registry instance. Horizontally scaling the data tier ensures there is not a single point of failure, and increases the supported concurrency and therefore overall performance of the solution.

3.3 Fusion Registry Managed Relational Database

The Fusion Registry can be connected to any number of relational databases (MySQL or SQL Server) for the purpose of supporting data publishing. The Fusion Registry is responsible for building the database tables, which are built on demand when new data are published. Each Dataflow has its own database tables associated with it, and if they already exist when new data are published then the table is updated if required (if the DSD Concept, or Codelists change in a way which requires a modification).

The database tables in a Fusion Registry managed database are built based on the Data Structure Definition, and associated structures. Having database tables tailored to each data domain ensures the data load and retrieval is as efficient as possible.

The Fusion Registry managed database is not as fast as the Fusion Data Store and the performance is largely dependent on the database platform used (MySQL or SQL Server) and the installed hardware and network speed.

Unlike the Fusion Data store, the Fusion Registry managed database records modifications made to Observations values. These modifications are termed 'revisions' or 'vintages' and are made whenever an observation value is changed (revised) over time. As revisions are stored it is made available via the SDMX web services, using the 'includeHistory' parameter. This parameter is documented in the Registry Web Services Guide.

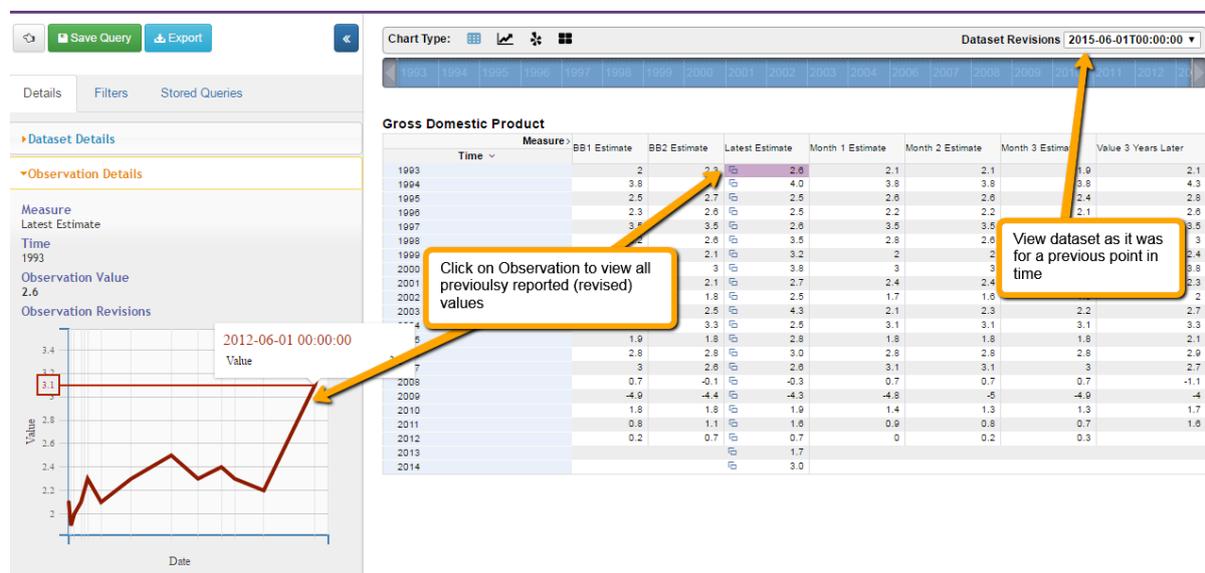


Figure 3 showing an example of how revised Observation values are displayed in the Data Browser. The dataset in this example is Gross Domestic Product data from the UK's Office for National Statistics

3.4 Externally Managed Relational Database

3.4.1 Overview

The Fusion Registry can connect to an Oracle, SQL Server or MySQL database in read-only mode. This can be used when data already exists in a database which is managed by a process or application other than the Fusion Registry.

The Fusion Registry is able to query the database tables or views, as long as they conform to the expected structure. The table or view name and the column names are derived from the Dataflow that is linking to the data store.

3.4.2 Table or View Name

When linking a Dataflow to use a plugin data store, the database must contain a table or view with the following naming structure:

[Dataflow Agency Id]_[Dataflow Id]_[Dataflow version]

The table name must be in upper case, and any '.' or '-' characters must be replaced with the underscore character '_'. For example:

| Dataflow Agency | Dataflow Id | Dataflow Version | Expected Table/View Name |
|------------------|-------------|------------------|--------------------------|
| WB | POVERTY | 1.0 | WB_POVERTY_1_0 |
| ONS.DEPT1 | GDP-DATA | 2.1.1 | ONS_DEPT1_GDP_DATA_2_1_1 |

3.4.3 Column Names

The database table or view is expected to contain a column for each of the Components of the Data Structure Definition that the Dataflow conforms to. For time series data, an additional column of type **Date** is required with the name **FR_OBS_DATE**, this column must store the date on the observation. Example:

| DSD Component ID | Component Type | Column Id | Column Type |
|---------------------|-----------------------|--------------|------------------------|
| FREQ | Dimension | FREQ | N/A |
| REF_AREA | Dimension | REF_AREA | N/A |
| SERIES | Dimension | SERIES | N/A |
| Series_Title | Series Attribute | SERIES_TITLE | N/A |
| OBS_VALUE | Observation Attribute | OBS_VALUE | N/A |
| OBS_CONF | Observation Attribute | OBS_CONF | N/A |
| OBS_VALUE | Observation Value | OBS_VALUE | N/A |
| TIME_PERIOD | Time Dimension | TIME_PERIOD | String (ISO-8601 Date) |
| - | - | FR_OBS_DATE | Date |

The FR_OBS_DATE column is used when performing data queries which have start and end date restrictions, the value in the TIME_PERIOD column must represent the same date, formatted according to the frequency. The following table shows an example of the observation frequency vs the expected date format.

| Frequency | Format | Example |
|------------------|----------------------|------------------|
| Annual | YYYY | 2010 |
| Daily | YYYY-MM-DD | 2010-01-01 |
| Date Time | YYYY-MM-DD-Thh:mm:ss | 2010-01T20:22:00 |
| Monthly | YYYY-MM | 2010-01 |
| Quarterly | YYYY-Qn | 2010-Q1 |
| Semester | YYYY-Sn | 2010-S1 |
| Trimester | YYYY-Tn | 2010-T1 |

The Provision Agreements page (as described in the Structural Metadata Management guide) can be used to generate the expected table structure. This is achieved by first selecting the appropriate Provision Agreement in the table and then using the controls underneath to Link to the Appropriate Data Source. This is shown in the image below.

| ID | Name | Data Source |
|-----|---------|--|
| IMF | NL_1UEM | Netherlands Unemployment |
| IMF | NL_1DI | Netherlands Coordinated Direct Investment Survey |
| IMF | NL_1PI | Netherlands Coordinated Portfolio Investment Survey |
| IMF | NL_BOP | Netherlands Balance of Payments |
| IMF | NL_CBS | Netherlands Central Bank Survey |
| IMF | NL_CGD | Netherlands Central government debt |
| IMF | NL_CGO | Netherlands Central government operations |
| IMF | NL_COF | Netherlands Currency Composition of Foreign Exchange ... |
| IMF | NL_CPI | Netherlands Consumer price indices |
| IMF | NL_DCS | Netherlands Depository Corporations Survey |

Showing 418 to 429 of 573 entries 1 row selected

Provision Agreement Details Compare View Provision Agreement Show Drafts

URN: urn:sdmx.org:sdmx:infomodel:registry:ProvisionAgreement=IMF:NL_1PI(1.0)

URL: https://www.fusionregistry.com/public/sdmxapi/rest/provisionagreement/IMF/NL_1PI/1.0

State: External Web Service

Revisions [1]: File, REST Web Service

Description: Registry Managed

Annotations: IMF_DATA, WORLD_BANK_DATA

Valid From: Read Only

Valid To: ORACLE_DATA

Reference Metadata: Dataflow=IMF:1PI(1.0)

Linked Data Source: File Apply

Figure 4 showing linking of a Provision Agreement to a Data Source

3.5 File Data Source

It is possible to define the data source for a Provision Agreement to be of type File. If a data source is set to 'file', then it is up to the Data Provider to Register the URL of the file location. This can be achieved by using the HTML User Interface to register a new data file, or by submitting a SDMX data Registration to the SDMX web service.

The file can be in any of the formats that are supported by the Fusion Registry. For more information on supported File Formats, please read the Registry Data Formats guide.

3.6 Web Service Data Source

It is possible to define the data source for a Provision Agreement to be of type Web Service. A Web Service data source expects the Data Provider to Register the URL of the web service entry point. This can be achieved by using the HTML User Interface to register a new data file, or by submitting a SDMX data Registration to the SDMX web service. The registered web service must conform to the SDMX REST specification, as documented in Section 7 of the SDMX specification. The Fusion Registry will index the web service on registration by performing an upfront query to the web service for all series keys for the given Dataflow. The upfront query will be a query for all data, with detail set to seriesKeysOnly. For example:

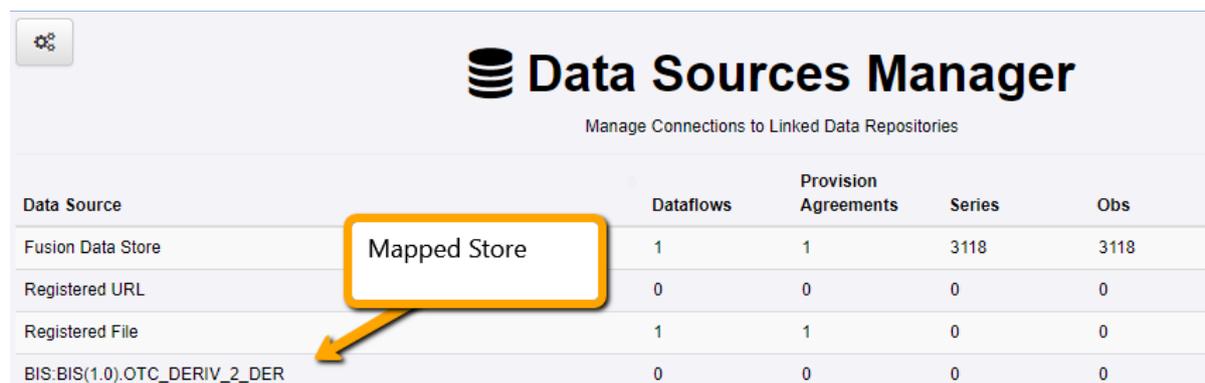
http://www.demoservice.org/ws/data/FLOW_ACY,FLOW_ID,FLOW_VERSION/all/DP_ACY,DP1?detail=seriesKeysOnly

The registered web service must be able to respond to this data query in order for the registration to succeed.

3.7 Mapped Data Store

A mapped Data Store is used when the data is stored conforming to one Data Structure Definition, but disseminated conforming to another Data Structure Definition. To make use of a Mapped Data Store, there must first be a definition of the mapping, the Structure Mapping documentation provides full details on structure maps, and should be read prior to this section.

Once a Structure Map is defined describing the relationship between a source and target Dataflow, it will appear in the list of available data source from the **Data Manager** page.



| Data Source | Dataflows | Provision Agreements | Series | Obs |
|------------------------------|-----------|----------------------|--------|------|
| Fusion Data Store | 1 | 1 | 3118 | 3118 |
| Registered URL | 0 | 0 | 0 | 0 |
| Registered File | 1 | 1 | 0 | 0 |
| BIS:BIS(1.0).OTC_DERIV_2_DER | 0 | 0 | 0 | 0 |

Figure 5 showing a mapped store. The Store Name is the Agency Id, Id, and version of the Structure Map which defines the mapping

A Structure Map defines a source and target Dataflow, for example:



If a Provision Agreement for the **POPULATION** Dataflow is linked to the Mapped Store, then the Fusion Registry will convert an incoming data query for **POPULATION** to conform to a data query for the **FAME_POP** Dataflow. The data query will be executed against the **FAME_POP** dataflow, and the data query response will be mapped on the way out to conform to the requested **POPULATION** data structure.

In this example, in order for the mapping to bring back data, the **FAME_POP** dataflow should be linked to a data store, and have data loaded. Each time a data registration occurs for the **FAME_POP** dataflow, the **POPULATION** dataflow will have its indexes updated. A data registration can occur as a result of loading data (if the store is Registry managed) or a manual data registration (if the store is not registry managed, i.e File or URL or external database).

When a provision agreement is using a mapped data store, the data itself will always reside in the target dataflow's store. The data will be mapped on-the-fly. An example workflow is shown in the image below.

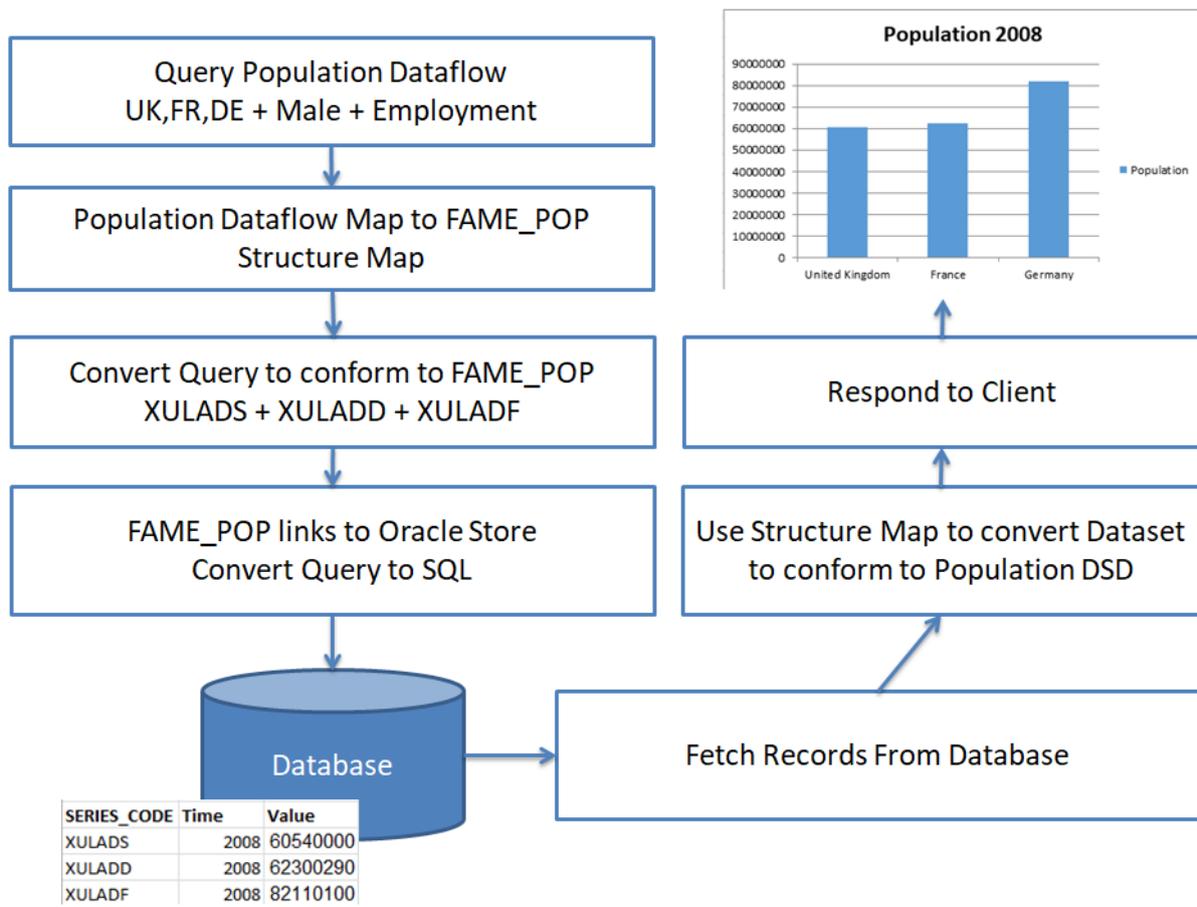


Figure 6 showing the mapping workflow from data query to data response where the Population Dataflow is linked to a mapped store, the target dataflow for the mapped store (defined by the associated structure map) is FAME_POP which itself links to a relational database. The client remains agnostic to the mapping, and can retrieve the data in any Fusion Registry supported data format.

4 Data Sources Manager

4.1 Overview

The Data Sources Manager is accessed by an Admin user in the Fusion Registry Web Interface. The Data Sources Manager provides information on the data located in File, Web Service, and the Fusion Data store. In addition it also provides the means to create a connection to both Registry Managed and External databases.

| Data Source | Dataflows | Provision Agreements | Series | Obs | Last Updated |
|-------------------|-----------|----------------------|--------|--------|----------------------|
| Registered File | 87 | 573 | 1 | 43 | 2018-01-23T15:05:38Z |
| WORLD_BANK_DATA | 4 | 4 | 19767 | 912219 | 2018-01-23T13:45:05Z |
| Fusion Data Store | 5 | 7 | 123 | 27785 | 2018-01-21T12:44:30Z |
| IMF_DATA | 75 | 500 | 0 | 0 | - |
| Registered URL | 0 | 0 | 0 | 0 | - |

Figure 7 showing data stores, including built in data stores and linked databases (IMF_DATA, WORLD_BANK_DATA)

The Data Sources Manager provides an overview of all the available data sources in the Fusion Registry along with a count of how many Provision Agreements are linked to the data source and a total count of available Series and Observations over all the Provision Agreements.

The Data Sources Manager provides the means to bulk add or remove the connection of Provision Agreements to Data Stores. Individual Series or Observations can be deleted from Registry Managed data stores, external URLs can be deleted in bulk.

The screenshot shows the 'Data Sources Manager' interface. At the top, there is a title 'Data Sources Manager' and a subtitle 'Manage Connections to Linked Data Repositories'. Below this is a table with columns: Data Source, Dataflows, Provision Agreements, Series, Obs, and Last Updated. The table contains the same data as Figure 7. A dropdown menu is open over the table, listing the following actions: 'Add Database Connection', 'Drop Database Connection', 'Link Provision Agreements', 'Delete All Data', and 'Delete Registrations'. The 'WORLD_BANK_DATA' row is highlighted in blue.

Figure 8 showing the actions available in the Data Sources Manager page

The remainder of this section describes the functionality of each of the actions in the image above.

4.2 Adding a New Database Connection

A database connection establishes a link to a Relational Database (MySQL, Oracle, SQL Server) for the purpose of exposing the data in a read only externally managed database, or creating a Registry Managed connection.

To create a new Database Connection, first click the Maintenance Button in the Data Sources Manager page as shown below.

Clicking on the Add button will open a form which must be completed to establish the database connection, this is shown in the image below.

Figure 9 showing the Add Data Source modal

The Connection Id is used entirely for identification purposes within the Registry itself, it must however contain no spaces and only consist of alphanumeric characters and underscores. The Connection Type refers to if the database connection is for the purpose of a Registry Managed database or an Externally Managed database. If it is Registry Managed then database tables are built on demand as data are loaded. If it is Externally Managed then database tables are expected to exist for any Provision Agreement which is linked to the Data Store.

The remainder of the form is used to establish the connection to the database. Single Sign On (SSO) is supported for SQL Server databases. SSO uses the authentication credentials of the user who launched the Tomcat server to authenticate with the SQL Server database. The Setup Guide provides more information about how to configure the Fusion Registry for SSO support.

4.3 Linking Provision Agreements

A Provision Agreement is linked to a Data Store to inform the Fusion Registry where the data for that Provision Agreement should be obtained from. If the Provision Agreement is linked to a Registry Managed data store then the action of linking allows data to be published to the data store. If there is already in the data store on link, then the data will be indexed and made available for query.

Note: If the Provision Agreement is linked to a read only relational database, then it will be indexed on link, and the data will be made available for query. Re-indexing a read only store is required when data is updated in the data store. Re-Indexing can be performed from the Data Dashboard page, by selecting the provision agreement and clicking the 'Re-Register' button. An automated process can be set up, by submitting a Data Registration to the web service. To generate a Data Registration SDMX file, click the 'Automate Registration' button in the Data Dashboard.

Linking to a Web Service or File data store allows Data Providers to register the URL of the data web service or file. All data publication and registration details are discussed in the Data Providers Guide.

Provision Agreements can be linked to a data store via the Dataflow Wizard, or via the Provision Agreement page, this is discussed in the Structural Metadata Manager Guide. The Data Source

Manager page allows multiple Provision Agreements to be linked to a data store in one action. A Provision Agreement can only link to one data store, so the action of linking a Provision Agreement to one data store will unlink it from another. The action of unlinking from a relational database (both registry managed and read only) will not delete the data from the database. The action of unlinking from web service or file stores will delete any Data Registrations made against the Provision Agreements and therefore relinking will require a re-registration. Unlinking from the Fusion Data Store will delete the data from the Fusion Data Store.

4.4 Data Rollback

If using the Fusion Data Store, data submissions can be rolled back to a previous state. The last 5 submissions are stored for each Provision Agreement.

To rollback data to a previous version, the Data Sources Manager page allows data submitted against a Fusion Data Store to be rolled back.

The screenshot shows the 'Data Sources Manager' interface. At the top, there is a header with the title 'Data Sources Manager' and a subtitle 'Manage Connections to Linked Data Repositories'. Below this is a table with columns: Data Source, Dataflows, Provision Agreements, Series, Obs, and Last Updated. The table lists three data sources: 'Fusion Data Store', 'Registered URL', and 'Registered File'. Below the table, there is a section for 'Data Source Dataflows' with a dropdown menu showing 'IMF:NAG_GNA(1.4) National Accou'. Below this is a table for 'Provision Agreement' with columns: Provision Agreement, #Series, and Last Updated. The table shows one entry: 'IMF:CH_NAG_1(1.0)' with 4 series and a last updated time of '2017-09-29T14:46:17Z'. Below this table are buttons for 'Edit Data' and 'Delete Data'. To the right of the 'Provision Agreement' table is a 'Data History for Provision' table with columns: Update Time, Action, and #Series. This table shows three entries, all with the action 'Replace'. Below the 'Data History for Provision' table are buttons for 'Rollback Data' and 'View Audit'.

Figure 10 showing the Data Sources Manager

Within the Data Sources Manager, selected the appropriate Provision Agreement and a table of updates will be displayed in the lower right of the screen. This will show the submission time, action and number of series in each data submission.

Rolling back the data submission will create a new submission of action “Replace” which will restore the data to the selected point in time. This makes it possible to roll back a roll-back.

Note: data rollbacks are only possible against data stored in a Fusion Data Store.

4.5 Drop Connection

Dropping a connection to a database will not delete any data in the database, however the stored connection details will be deleted and the active connection will be dropped. Data from the data store will no longer be accessible from the Fusion Registry user interface or web service.

Any Provision Agreement linked to the data store will be unlinked and linked to the data store type “Web Service or File”. The series count for each unlinked Provision Agreement will revert to zero.

Any Data Registrations for Provision Agreements linked to the data store, will be deleted.

4.6 Delete all Data

The Delete all data action is only possible for a Registry Managed data store. The effect of deleting all data in a data store will drop all database tables related to any linked Provision Agreements. The Provision Agreements will still be linked to the data store, however the series count will revert to zero.

Any Data Registrations for Provision Agreements linked to the data store, will be deleted.

4.7 Delete Registrations

The Delete Registrations action is only possible for a Web Service or File data store. On selecting this action a table will be displayed showing all Data Registrations against the store, with the option to select any number of Data Registrations to delete. The action of deleting a Data Registration will mean the series count indexes will be updated and the data which was accessible from the deleted Registrations, will no longer be available via the web service or user interface.

4.8 Edit Data

The Edit Data button opens a data query window as shown in the image below. On selecting an Observation cell in the data table that results from applying the query filter, the actions to delete series or observations will become available.

Private Sector and Trade
Series Average number of times firms spent in meetings with tax officials
Frequency Annual

| Reference Area | 2003 | 2009 | 2007 | 2005 | 2008 | 2012 | 2004 | 2002 |
|-----------------------|------|------|------|------|------|------|------|------|
| China | 14.4 | | | | | | | |
| Fiji | | 1.3 | | | | | | |
| Micronesia, Fed_ Sts_ | | 1.3 | | | | | | |
| Indonesia | 0.95 | 0.2 | | | | | | |
| Cambodia | 7.23 | | 1 | | | | | |
| Korea, Rep_ | | | | | 2.2 | | | |
| Lao PDR | | 4.4 | | | | 2.83 | 4.1 | |
| Mongolia | | | | | | | | 6.04 |
| Malaysia | | | | 2.1 | | | | 4.72 |
| Philippines | 3.22 | 1.5 | | | | | | |
| Thailand | | | | | | 1 | | 1.45 |
| Timor-Leste | | 0.9 | | | | | | |
| Tonga | | 0.3 | | | | | | |
| Vietnam | | 0.9 | | | 1.88 | | | |
| Vanuatu | | 1.8 | | | | | | |
| Samoa | | 1.1 | | | | | | |

Delete Selected Observation - or entire Series for Observation

Delete Selected Observation Delete Series Back

Figure 11 showing the delete Observation and Series functionality

5 Monitoring Data Publication Activity

5.1 Viewing Historical Data Registrations

It is possible to view historical Data Registrations in the Fusion Registry User Interface (UI). Authentication is not necessary to access the basic details via the UI, however if logged in as an Admin user extra details are available such as the username of the authenticated user who actioned the Data Registration, and the ability to view full request and response details including the associated server logs for the request.

It is important to note that a Data Registration event occurs each time data changes in the Fusion Registry, this may be due to a Data Provider registering the URL of an external data source, it may be due to data being imported or deleted from a Registry managed database, or the re-index of a read only data store.

To view Data Registration Activity click on the Activity menu item on the left hand menu, followed by Data Registrations, as shown below.

The screenshot displays the 'Data Registrations' page in the Fusion Registry. The left sidebar shows the 'Activity' menu item selected. The main content area is divided into two sections. The upper section shows a table of data registrations with columns for 'Id' and 'Version'. A dropdown menu is open over this table, showing options like 'Breakdown By Provision Agreement', 'Breakdown By Dataflow', and 'Breakdown By Data Provider'. The lower section shows a table of data registrations with columns for 'Date', 'Data URL', 'Action', 'Method', and 'Series'. Below this table is a 'Registration Details' section for a specific registration, showing fields like 'Data URL', 'Provision URN', 'Dataflow URN', 'Data Provider URN', 'Reporting Begin', and 'Reporting End'.

| Id | Version |
|-----------|---------|
| BOP6 | 1.0 |
| BOP_BPM6 | 1.0 |
| BOP_GBPM6 | 1.0 |
| IMF | 1.4 |
| IMF | 1.0 |

| Date | Data URL | Action | Method | Series |
|---------------------|--|---------|--------|--------|
| 2017-01-06 08:27:48 | http://webstat.banque-france.fr/fr/fmi/5384898 | Replace | GUI | 23 |
| 2016-12-16 11:34:32 | http://www.bnb.bg/bnbweb/groups/public/documents/bnb_sdmx/bop_bpm6.xml | Replace | GUI | 31 |
| 2016-12-14 13:31:50 | http://webstat.banque-france.fr/fr/fmi/5384898 | Replace | GUI | 23 |
| 2016-12-13 10:02:53 | http://www.cnb.cz/cs/statistika/sdds_plus/xml/bop.xml | Replace | GUI | 36 |

| Registration Details | |
|----------------------|---|
| Data URL | http://webstat.banque-france.fr/fr/fmi/5384898 |
| Provision URN | urn:sdmx:org.sdmx.infomodel.registry.ProvisionAgreement=IMFFR_BOP(1.0) |
| Dataflow URN | urn:sdmx:org.sdmx.infomodel.datastructure.Dataflow=IMF_BOP_GBPM6(1.4) |
| Data Provider URN | urn:sdmx:org.sdmx.infomodel.base.DataProvider=IMF_DATA_PROVIDERS(1.0).FR2 |
| Reporting Begin | 2008-01-01 00:00:00 |
| Reporting End | 2016-11-01 00:00:00 |

Figure 12 showing the Data Registration Activity page

Data Registration information can be broken down in different ways, the upper table contains the high level breakdown, and the lower table shows the Data Registrations, this is shown in the above image.

5.2 Subscribing to Changes

It is possible to subscribe to Data Registration events in the Fusion Registry, this can be achieved by clicking the 'subscribe to changes' button in the lower right of the user interface (in the footer). Subscriptions can be added for all Data Registration Events, or for specific Dataflows/Data Providers. An email address is required for a Subscription this email address is required to load the Subscription

for future maintenance, the Subscription Notification message can be sent to the same email address and/or can be POSTed via HTTP to a given URL.

Data Registration notifications include the SDMX Data Registration XML in the email, as well as the POST message.

5.3 RSS Feed

The Fusion Registry provides a RSS feed which is updated every time a structure or registration event occurs in the Fusion Registry. This includes creation, updates, and deletions. The RSS feed is linked to from the Fusion Registry home page by clicking on the RSS icon: .