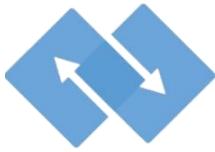




Collaborating on SDMX APIs and Open  
Source Software



## SDMX – the ISO Standard

- **Effective governance**

- Eight international organizations (sponsors)

- **Continuously evolving**

- SDMX 3.0 (latest release) – Improved support for micro/big/geo data

- **Collaborative evolution**

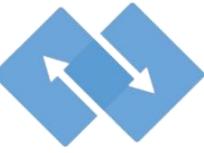
- working groups & task forces, involving national and international organisations (and independent consultants)
- [SDMX 2025 roadmap](#)

- **Comprised of a robust Information model + technical standard for modelling any data & implementing tools.**

- **SDMX in G20 DGI work ([Data Gaps Initiative](#))**

- International Data Cooperation / Data Sharing & Access
- Data Structure Definitions (DSDs) established for several domains





## SDMX – The Vision

- **Improve Quality**

- **Standardize and harmonize Data and Metadata exchange** through agreed formats, ensuring consistency and comparability
- **Robust information model** supporting the entire data lifecycle
- Foster Collaboration

- **Promote Efficiency**

- Enhance Data Sharing, ie **support production, exchange and dissemination of statistics** for public good
- Enable automated (machine to machine) data sharing and process automation

- **Drive Innovation**

- **Facilitate Data Use**

- Web services
- Connectors (Python, R, MS Power BI, ...)



## Web Services – the SDMX v2 API

- A RESTful API maintained by SDMX-TWG Task Force 4
  - 9 releases since 2011 (first released with SDMX 2.1)
- The 9<sup>th</sup> release (with SDMX 3.0 – Sep 2021) features:
  - Enhanced data queries and reference metadata support
  - Restructured resources (breaks backwards compatibility to v1.\*)
  - Metadata maintenance (additional HTTP verbs – POST, PUT, DELETE)
  - Schema query “allowed content” in more formats
- Improved clarity and documentation of the API
- Deprecated SOAP API



## The structure queries

- Re-organized and enriched
- Supports multiple instances of search terms, wildcarding

The unique identifier:

- Agency ID
- Artefact ID
- Version
- Item ID (for Item Schemes)

`https://host/structure/type/agency/id/version/item?detail&references`

Amount of information:

`allstubs, referencestubs,  
allcompletestubs,  
referencecompletestubs,  
referencepartial, raw,  
partialraw, full`

References to be returned:

`none, parents,  
parentsandsiblings,  
ancestors, children,  
descendants, all,  
a resource type`

The type of structure:

`datastructure, metadatastructure, categoryscheme,  
conceptscheme, codelist, hierarchy, hierarchyassociation,  
valuelist, agency scheme, dataproviderscheme,  
dataconsumerscheme, organisationunitscheme, dataflow,  
metadataflow, reportingtaxonomy, provisionagreement,  
structuremap, representationmap, conceptschememap,  
categoryschememap, organisationschememap, reportingtaxonomymap,  
process, categorisation, dataconstraint, metadataconstraint,  
structure, transformationscheme, rulesetscheme,  
userdefinedoperatorscheme, customtypescheme,  
namepersonalisationscheme, vtlmappingscheme`



# The data queries

The unique identifier of the context:

- Agency ID
- Artefact ID
- Version

`https://host/data/context/agency/id/version/key?c`

The context of data retrieval:  
datastructure, dataflow,  
provisionagreement

Key(s) of the series to be returned:  
eg M.GR.EUR.SP00

with wildcarding:  
eg M.\*.EUR.SP00

With support for multiple keys:  
eg M.GR.EUR.SP00, M.CY.EUR.SP00

Component-based filters (for any Dimension, Attribute or  
Measure):

eg `c[REF_AREA]=CH&c[CONF_STATUS]=F`

Support for operators:  
eg `c[ICP_ITEM]=sw:01&c[TIME_PERIOD]=ge:2015`

**&updatedAfter**  
**&firstNObservations**  
**&lastNObservations**  
**&attributes**  
**&measures**  
**&dimensionAtObservation**  
**&includeHistory**

eq Equal  
ne Not equal  
lt Less than  
le Less than or equal to  
gt Greater than  
ge Greater than or equal to  
co Contains  
nc Does not contain  
sw Starts with  
ew Ends with  
nd And  
or Or



## The data queries

`https://host/data/context/agency/id/version/key?c`

Retrieves what changed since supplied timestamp. Must be percent-encoded (e.g.: 2009-05-15T14%3A15%3A00%2B01%3A00)

Maximum number of observations starting from the first observation

Maximum number of observations counting back from the most recent observation

Id of the dimension at the observation level

The attributes to be returned:  
dsd, msd, dataset, series, obs, all, none, {attribute\_id}

The measures to be returned:  
all, none, {measure\_id}

Whether to return vintages

**&updatedAfter**

**&firstNObservations**

**&lastNObservations**

**&attributes**

**&measures**

**&dimensionAtObservation**

**&includeHistory**



## Other queries

- Data validity

```
https://host/schema/context/agency/id/version?dimensionAtObservation  
&explicitMeasure
```

- Data availability

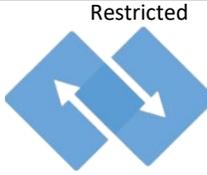
```
https://host/availability/context/agency/id/version/key/componentId?c  
&updatedAfter  
&references  
&mode
```

- Metadata

```
https://host/metadata/metadataset/provider/id/version?detail
```

```
https://host/metadata/metadataflow/agency/id/version/provider?detail
```

```
https://host/metadata/structure/type/agency/id/version/provider?detail
```



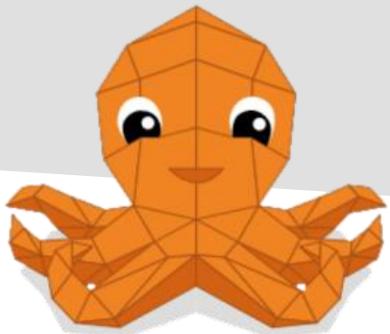
# SDMX 3.0 RESTful API v2.0.0

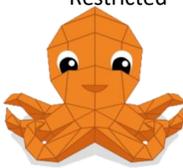
- The normative part of the specification, i.e. the [Open API definition](#)
- The [Developers' documentation](#), including a [cheat sheet](#)
- Request features and report issues on [GitHub](#)
- See the API spec on [SwaggerHub](#)
- The SDMX v2 API in [action](#)

The top screenshot shows a GitHub repository for 'sdmx-twg / sdmx-rest'. A pull request is visible, titled 'Remove superfluous nd operator' by user 'sosna', dated 2 years ago. The repository structure includes folders for 'api', 'doc', and 'test'. The middle screenshot displays a 'SDMX 3.0 RESTful web services cheat sheet, v2.0.0'. It lists structure queries such as 'type', 'data', 'availability', and 'schema', along with their parameters and response codes. The bottom screenshot shows the SwaggerHub interface for the 'sdmx-rest' API, version 2.0.0. The interface includes sections for 'Info', 'Tags', 'Servers', and 'Data queries'. The OpenAPI specification code is visible, showing the API title 'SDMX RESTful API, v2.0.0' and a list of endpoints with their response codes and descriptions.



[sdmx.io](https://sdmx.io)





## What is sdmx.io?

[sdmx.io](https://sdmx.io) is not a single project but an **ecosystem of open source tools, patterns, guidance, learning materials and other resources** like pre-configured containerised environments that make the software quick and simple to deploy.

- An **open-source SDMX software and resource portal**
  - Software releases (FMR, FusionXL, etc.)
  - E-learning courses and webinars
  - Knowledge and use-case articles
- **Governance in place, incl. Prioritisation and User Advisory Groups**
- **Officially public**, after the SDMX Sponsors approval

- Share software tools and components based on SDMX
- Complement existing tools in order to achieve statistical use-cases
- Interface SDMX with other standards or tools
- Promote reusability of SDMX software



## Collaboration partners and activities

- **IMF:** IMF SDMX Central is powered by FMR11 (since Sep 2023)
- **SIS-CC/Eurostat/BIS:** working closely on achieving SDMX 3.0 compliance
- **OECD/SIS-CC:** .Stat/FMR integration for the National Bank of Belgium (**NBB**) use case
  - FMR Workbench
  - .Stat Suite on sdmx.io
- **NBB:** Launch of FMR Workbench user group (targeting CBs and SIS-CC members)
- **Eurostat:** SDMX Reference Implementation for SDMX 3.0
  - sdmx-core evolution (Java/.Net)
- **Banca d'Italia:** VTL Engine & FMR → exploring the use cases
  - UNSD working with Bdl on the first use case
- **Meaningful Data:** SDMXthon & FMR → exploring the use cases



# The use-cases



Statistics production



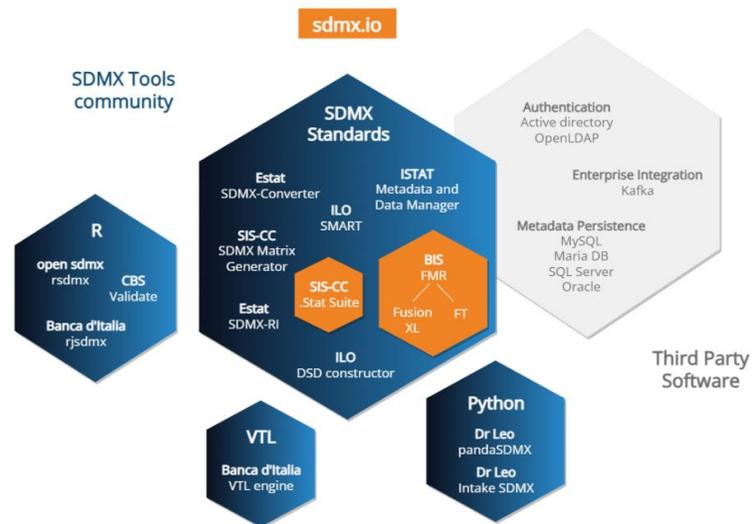
Statistics dissemination



Data domain modeling



Data collection



## eLearning Catalogue

sdmx.io's library of learning resources covers a diverse range of topics including how to use software tools, SDMX theory and data modelling best practice.

# FMR on GitHub

bis-med-it / fmr

bis-med-it

Overview Repositories Projects Packages Teams People Security Insights

Fusion Metadata Registry (FMR)

Updated yesterday

Filter cards

Add cards(1 new)

Wish list	To do	In progress	Unreleased	Done
<ul style="list-style-type: none"> <li>Exporting artefacts to formats not suitable for artefacts of that type fmr#121 opened by sosna BIS enhancement</li> <li>Cannot update a DSD used by a dataflow referenced in a StructureMap fmr#108 opened by sosna BIS enhancement mapping</li> <li>Advanced mapping/reading features fmr#101 opened by stratosn BIS enhancement mapping</li> <li>Prevent defining identical mappings in the same RepresentationMap fmr#104 opened by sosna BIS enhancement mapping</li> <li>Measure array support fmr#87 opened by glenntav BIS structure</li> <li>Remove Spring from fusion-core fmr#59 opened by glenntav BIS medium cost</li> <li>UI - new links field fmr#40 opened by glenntav low cost structure maintenance UI</li> <li>Geographic Codelists - syntax validation of GeoFeatureSet expressions fmr#43 opened by glenntav</li> </ul>	<ul style="list-style-type: none"> <li>Change the way large numbers of validation errors are handled to reduce memory pressure fmr#238 opened by glenntav enhancement OECD pain point</li> <li>Amend representation map documentation with additional examples fmr#176 opened by anastasias question</li> <li>Investigate issue with mapping in FMR10 fmr#493 opened by PL-MetaTech BIS</li> <li>Issue with response from dataflow query (MEDAL-related) fmr#369 opened by sosna BIS question REST API ver 11.6.1 ver 11.9.0</li> <li>Statistics Netherlands FMR pen test results - response needed to the user fmr#486 opened by glenntav security</li> <li>SDMX-JSON 3.0 data format (excluding hierarchical reference metadata) fmr#50 opened by glenntav data format Eurostat Global Registry phase 1 major enhancement OECD</li> <li>EU login / authentication support</li> </ul>	<ul style="list-style-type: none"> <li>SDMX-ML (XML) 3.0 data format (excluding hierarchical reference metadata) fmr#53 opened by glenntav data format Global Registry phase 1 major enhancement medium cost</li> <li>Mapping produces invalid output fmr#544 opened by cesbcalo BIS bug</li> <li>Mapping issues fmr#518 opened by stratosn BIS bug</li> <li>Agree and document FMR structure mapping behaviour fmr#421 opened by glenntav BIS</li> <li>Metadata time travel fmr#9 opened by HubertBIS BIS major enhancement</li> <li>SDMX Central - FMR Fusion Excel data format writer MVP fmr#510 opened by glenntav critical IMF UAT</li> <li>Problem with loading XLSX in 'Browse Registry' fmr#380 opened by etokel bug FusionXL</li> </ul>	<ul style="list-style-type: none"> <li>Structure - Metadata Constraint SDMX-JSON v2 fmr#31 opened by glenntav Global Registry phase 1 low cost structure</li> <li>Report error if publication table is queried for in sdmx-json format fmr#540 opened by agent96</li> <li>Using V2 Sdmx API, "saveAs" and Zip format creates empty output fmr#537 opened by PL-MetaTech bug</li> <li>Querying for StructureSet returns unhelpful error message fmr#539 opened by PL-MetaTech BIS</li> <li>Restore Fusion Security as Authentication Service Option fmr#553 opened by PL-MetaTech enhancement IMF ver 11.10.2</li> <li>Reference metadata in fusion-json fmr#509 opened by sosna BIS data format enhancement</li> <li>SDMX-JSON 2.0.0: Problem with structure of messages containing hierarchies fmr#507 opened by sosna BIS bug data format</li> </ul>	<ul style="list-style-type: none"> <li>Integration testing improvements (including incorporating format conversion, structure mapping, structure validation test suites) fmr#241 opened by glenntav BIS major enhancement</li> <li>SDMX-JSON 2.0.0: Wrong output for cube regions fmr#504 opened by sosna BIS bug data format</li> <li>FMR API Performance fmr#492 opened by sosna BIS data format performance REST API ver 11.10</li> <li>Constraints causing NullPointerException in FMR 11.10.0 fmr#538 opened by PL-MetaTech BIS critical ver 11.10.1</li> <li>Publish updates to metadata reports to a Kafka topic fmr#442 opened by sosna BIS enhancement ver 11.10</li> <li>Add new format option to Kafka producer fmr#451 opened by sosna BIS enhancement ver 11.10</li> <li>Add meta header to Fusion-JSON to</li> </ul>

- fmr** (Private)  
registry sdmx fmr  
JavaScript 0 stars 0 forks 174 updates
- fmr-cl** (Internal)  
Java 0 stars 0 forks 1 update on N
- fmr-core** (Private)  
registry sdmx fmr  
Java 0 stars 0 forks 0 updates yesterday
- fusion-core** (Private)  
Java 0 stars 0 forks 0 updates on N
- sdmx-core** (Private)  
sdmx reference-implementation  
Java 0 stars 3 forks 1 update 5 hours ago
- sdmx-core-bom** (Private)  
sdmx reference-implementation  
0 stars 0 forks 0 updates 4 days ago





Thank you!

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