The use of SDMX-based web services at the ECB

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Introduction
What are web services?

- Make resources published on the Internet available via an API
- XML used as representation
- Application-to-application interactions
- Main benefits:
  - Automated processes
  - Language- and OS-independent
  - Standardised protocols
  - Decentralised architecture with loosely-coupled components
What is the ECB Statistical Data Warehouse?

- Oracle database for statistical data and metadata
- Java web front-end
- “Open access”, offering
  - Web-based reports, charts and search facilities
  - Access from Office tools and specialised statistical and econometric packages
- Based on the SDMX information model
- 50,000 users
- 350,000 series
The SDW web services
Feature 1: Access to statistical data

• Possibility to
  – retrieve all statistical data stored in the SDW
  – retrieve all data or updates and revisions only
  – filter data by dataflows, dimensions, date ranges, etc.

• Data returned in
  – SDMX-ML Compact Data and
  – SDMX-ML Generic Data formats (v. 2)
Feature 2: Access to metadata

• Possibility to
  – retrieve data structure definitions, code lists and concept schemes
  – retrieve category schemes, organisation schemes and dataflow definitions (including constraints)
• Metadata returned in SDMX-ML Structure format
Feature 3: Subscription/notifications

- Possibility to receive notifications
  - via email and
  - via an HTTP request
Use case 1: Retrieve the category schemes (I)
Use case 1: Retrieve the category schemes (II)

• **Objective:** Retrieve data by browsing a list of subject matter domains.

• **Query (REST):**
  http://sdw-ws.ecb.europa.eu/CategoryScheme/
Use case 2: Retrieve a dataflow (I)
Use case 2: Retrieve a dataflow (II)

- **Objective:** Retrieve dataflow information and populate a filter box for data selection, taking constraints into account.
- **Query (REST):**
Use case 3: Retrieve the DSD (I)
Use case 3: Retrieve the DSD (II)

- **Objective:** Review the data structure definition used by the dataflow
- **Query (REST):**
  http://sdw-ws.ecb.europa.eu/KeyFamily/ECB_EXR1
Use case 4: Retrieve data (I)

![Image of data retrieval interface](image)

- **Available dataflows**
  - Exchange Rates - Bilateral exchange rates

- **Filter options**
  - **Frequency (4):** Annual, Daily
  - **Currency (47):** Argentine peso, Australian dollar

- **Selected series (4)**
  - A.AUD.EUR.SP00.A
  - D.AUD.EUR.SP00.A
  - M.AUD.EUR.SP00.A
  - Q.AUD.EUR.SP00.A

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**SDW economic concepts**
- Monetary operations
- Prices, output, demand and labour market
- Money, banking and financial markets
- Euro area accounts
- Government finance
- External transactions and positions

**Exchange rates**
- Bilateral
- Effective
- Payments and securities trading, clearing, settlement
- Banknotes and Coins
- Indicators of financial integration
Use case 4: Retrieve data (II)
Use case 4: Retrieve data (III)

- **Objective:** To use the dimension filters, to retrieve data
- **Query (REST):**
  
Using SDW web services: Requirements

- Knowledge of the SDMX information model and SDMX-ML
- Knowledge of XML web services technologies
- Basic clients can be generated from WSDL
- Simple: basic working prototypes developed in a few days.
Some concrete examples

- Update of internal systems (e.g.: exchange rates)
- Prototypes developed by central banks (emphasis on low cost)
- IMF developments for the PGI web site
In summary

• In a nutshell:
  – Possibility to retrieve statistical data
  – Possibility to retrieve statistical metadata
  – Possibility to be notified about data updates
• Ease of use but some investment required
• Functionality-rich
• Automated and efficient data updates
• Variety of clients that use the SDW as data source
SDMX 2.1 Web Services Guidelines
The SDMX web services group (I)

- Various issues affected SDMX 2.0 web services
- Around 20 experts, from the SDMX sponsor organisations, National Central Banks and the private sector
The SDMX web services group (II)

• Delivered:
  – SOAP API (+WSDL)
  – RESTful API (+WADL)
  – List of error codes
  – Harmonisation of SDMX registry and web service interfaces (Thanks to the registry group)

• Pending:
  – Security guidelines
  – Web services profile
Thank you!