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DIWAX

Data handling and forecasting based on National Accounts

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DIWAX in a nutshell

- Support for macroeconomic forecasting based on national accounting schemes
- Building blocks
 - Relational metadata base for organizing data along standard economic and statistical classifications
 - Resource-based project management for downloading and importing data from many different sources
 - Analytic interface for analyzing data and designing forecasts
 - Interface for macroeconomic models
 - Backbone for AI-based methods

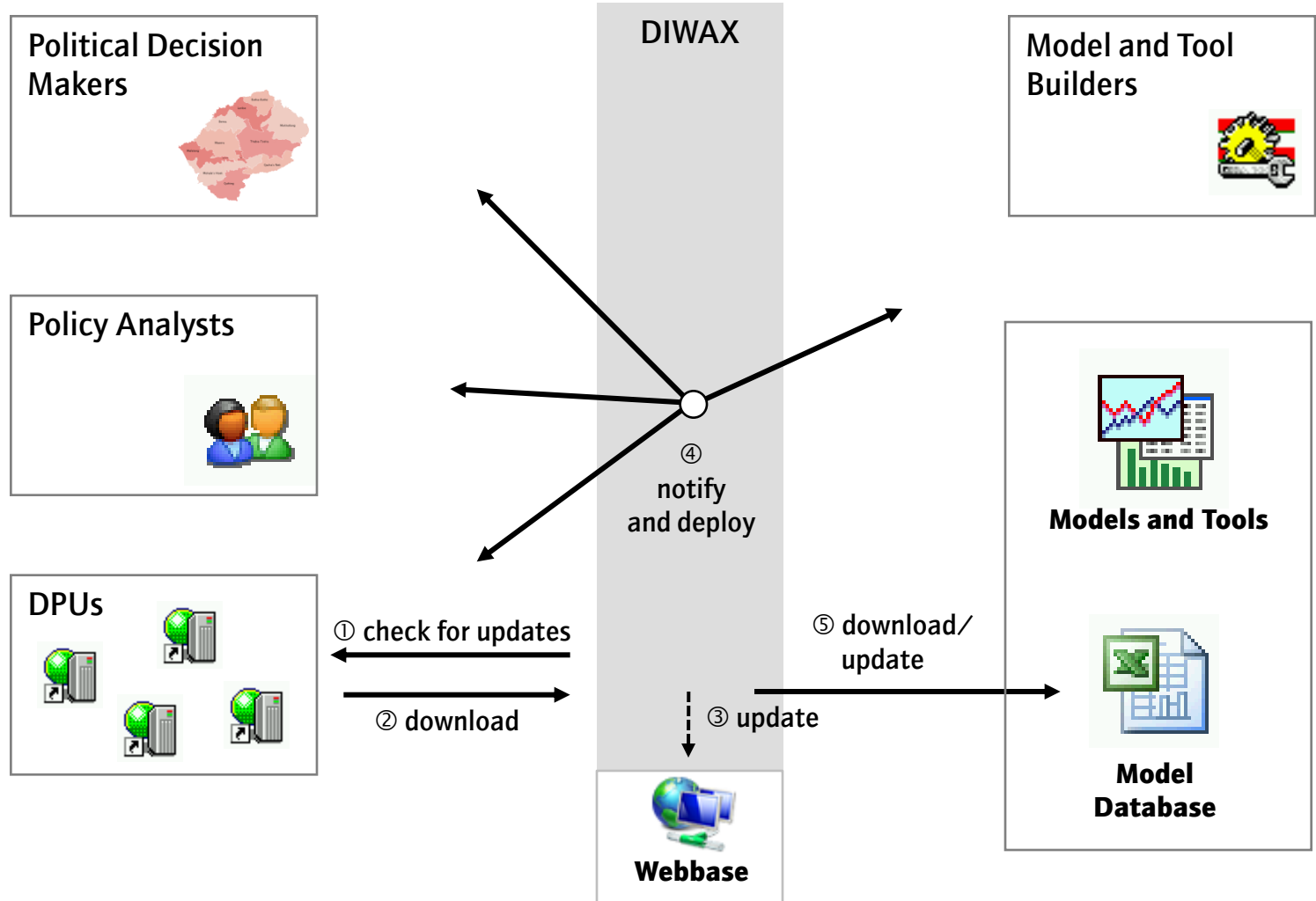
Four basic options

- **Ad hoc data compilation**
 - Getting data via informal channels more or less regularly
 - Copying and adapting data to specific needs manually
 - Lack of data integrity, muddling through
- **In-house database development**
- **Standard industry database**
 - Limited, not customized to macroeconomic needs (driven by business needs)
 - Typically difficult to adapt to developing-type country needs (e.g. model and tool integration)
- **Data network via common interface (DIWAX approach)**
 - Prestructured environment for macroeconomic analyses
 - Unrestricted data input

The DIWAX database philosophy

- DPU keep maximum of autonomy
 - Decision of how to organize data (table and file format) is up to the respective Data Producing Units (DPUs)
 - Commitment not to change chosen system without good reasons
 - Data integration via interface
 - Economic and technical data description following international standards and classifications (metadata)
 - Integrating DPU data files as resources
("Fishing the data out of the sea of tables that already exist.")
 - Providing data in user-, model-, and tool-compatible formats
 - Web-based data exchange and master-copy backup
- ⇒ **Virtualization of the database
(network of integrated resources)**

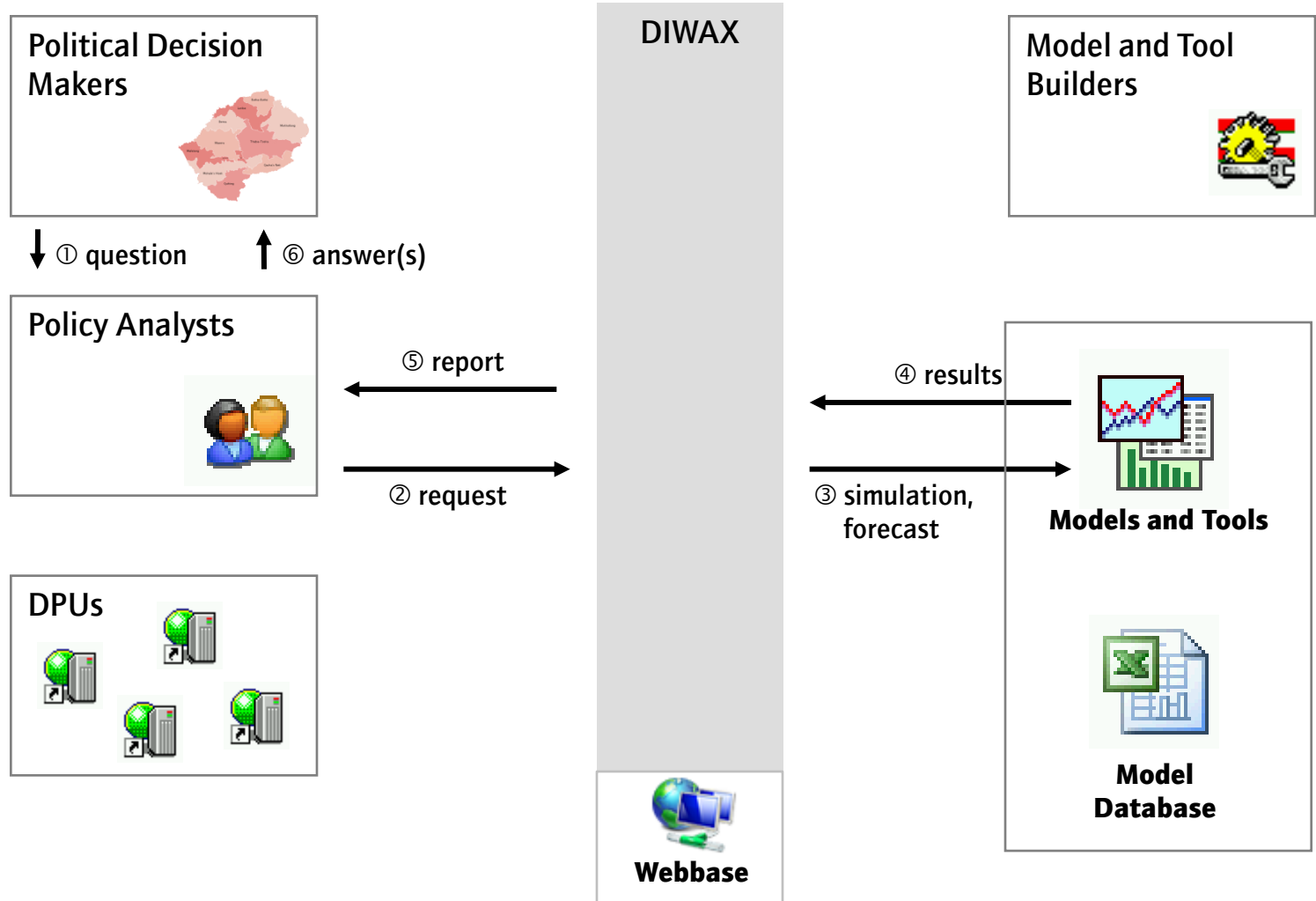
Integrating various data sources DIWAX as a database interface



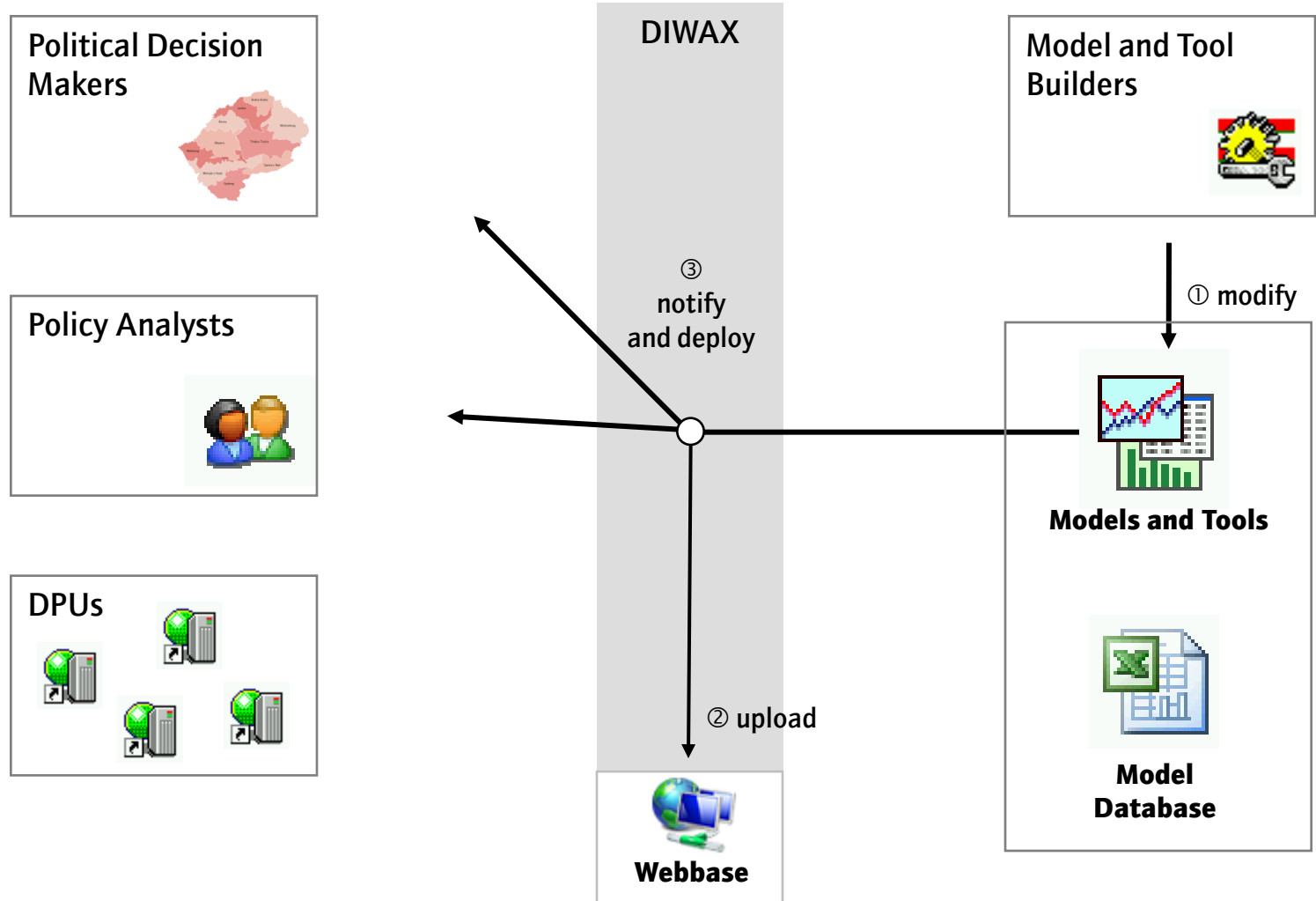
Model and tool interface

- Running models and using tools within the DIWAX user interface (e. g. remote control for EViews models)
- Managing scenarios through simulation wizards
- Report generator
- Model versioning and distribution

Using models and tools: DIWAX as a front-end (user-interface)



Modifying models and tools: Using DIWAX for notification and distribution



User Rights Management

- **Global Administrator**
- **Domain License Administrator (Master DPU)**
 - Domain-wide user registration
 - Management of metadata master copy
 - Resource organization
- **Data Publishing Users**
 - Reading rights according to authority status
 - Writing rights for specified resources
- **Standard Users**
 - Reading rights for public-domain resources
 - Writing rights for privately user-defined resources only

Data processing

- User interface for data retrieval, charting and editing
- Building accounting and data derivation schemes (economic framework for data analysis)
- Support for data integrity
 - detecting inconsistencies
 - checking for outliers
- Data transformation
 - Indexing, growth rates, frequency transformation
 - Price adjustment/unadjustment
 - Adjusting/unadjusting for seasonal and calendar effects (using external factors)
- Reprint (user-defined templates for charts, tables)

Handling data: The METADATA concept

- Focus of interest in economic analysis
 - Measuring the degree of **economic activity** (in a wide sense)
 - NOT: **time series** (just carrier of specific information)

- Data description
 - Primarily in an economically meaningful way
 - Secondarily in technically appropriate terms
 - ⇒ Metadata for time series description
 - Using international standard classifications where available (e.g. SNA, ISIC, NACE ...)
 - Extensible by user if necessary

An ITEM describes concrete economic activity

*Production
of consumer goods
by non-financial companies
within the textile industry
of Lesotho
in bn maluti*

Item

- Activity
- Product
- Sector
- Industry
- Area
- Unit
- ItemType
- ...

Items are the core data concept of DIWAX

Basic economic types of time series

- Basic economic types of time series (elements)
 - Nominal
 - Volume
 - Price
- Used by Items either individually or as a full combo
 - ItemType
 - **Nominal** only: Tax revenue
 - **Volume** only: Hours worked, Labor productivity
 - **Price** only: Interest rate, share index
 - **Combo** (having a generic deflator): Private consumption
- Relevant series types follow from economic description

Technical time series dimensions 1

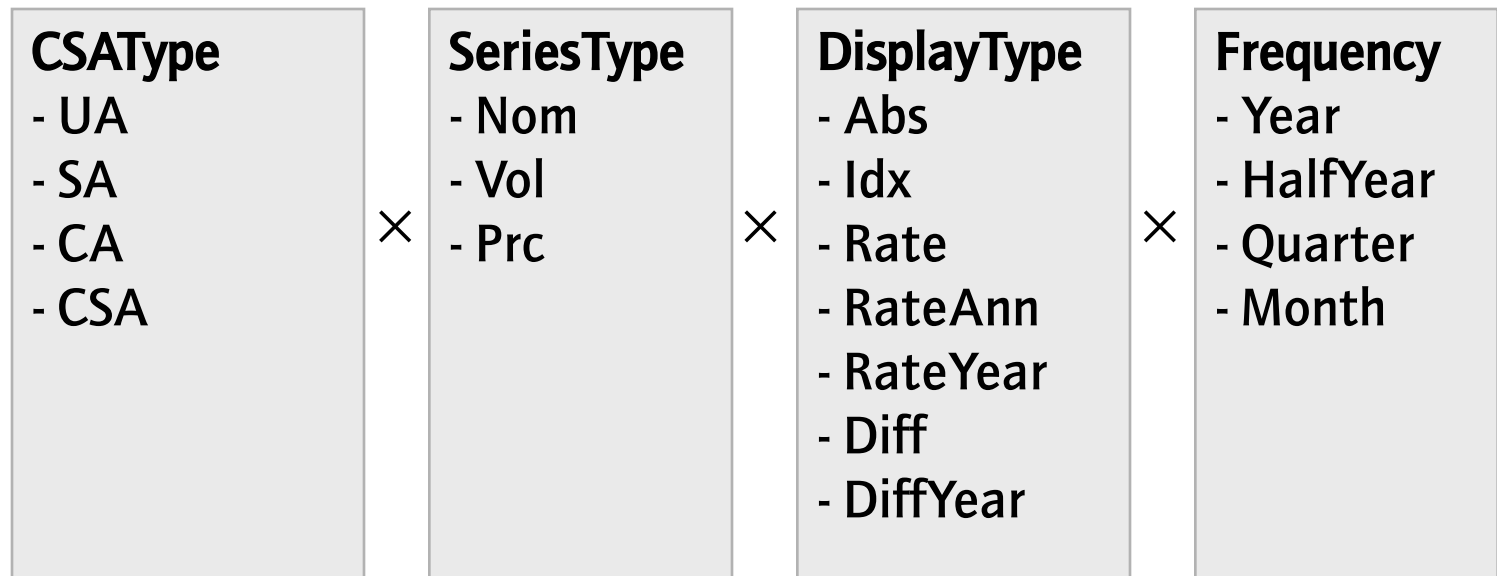
- **CSA type (calendar and seasonal adjustment)**
 - UA: unadjusted
 - SA: only seasonally adjusted
 - CA: only calendar (working-day) adjusted
 - CSA: calendar and seasonally adjusted
- **Display type**
 - Abs: Absolute
 - Idx: Index
 - Rate: Growth rate to previous period
 - RateAnn: Annualized growth rate to previous period
 - RateYear: Growth rate to previous year's period
 - Diff: Difference to previous period
 - DiffYear: Difference to previous year's period

Technical time series dimensions 2

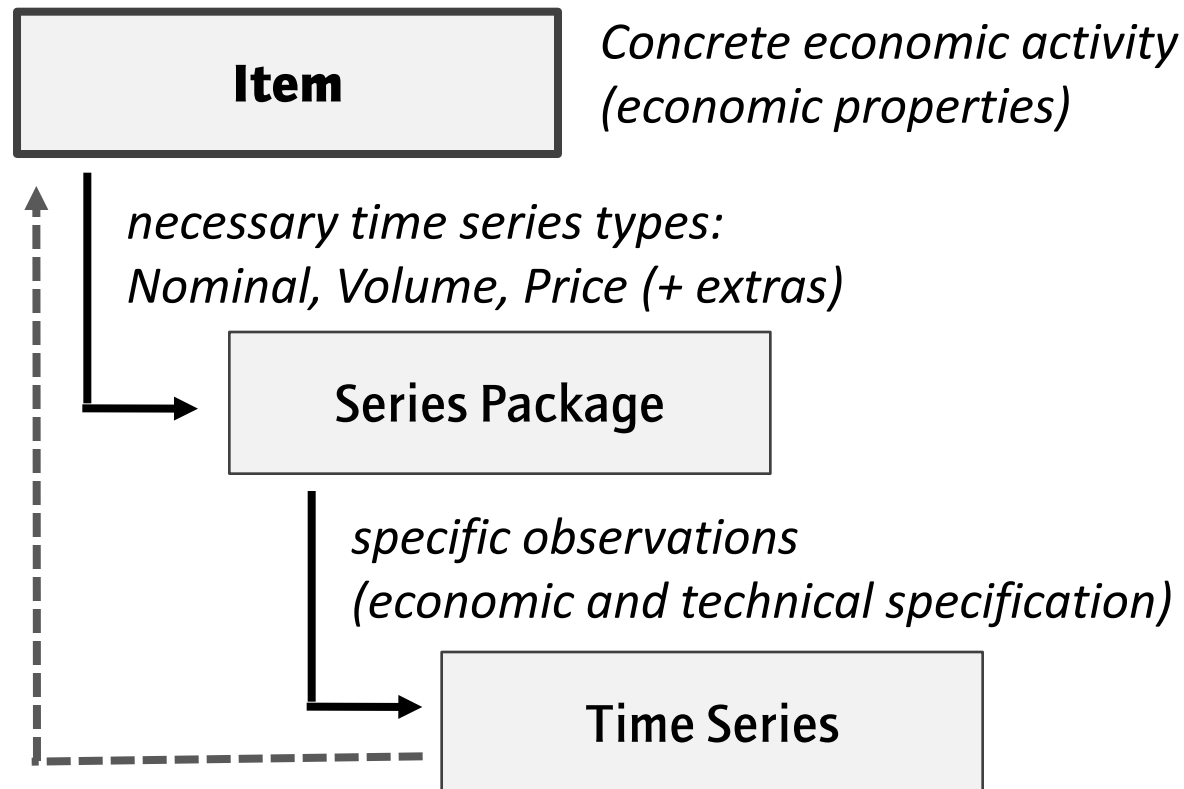
- Frequency
 - Year
 - Halfyear
 - Quarter
 - Month

Bundling time series: The SERIESPACKAGE concept

- Each Item holds all its time series in one container, called the SERIESPACKAGE
- Structure of time series within each SERIESPACKAGE



Items and time series revisited




Grouping and hierarching Items


- To make handling Items easier they can be grouped by THEMES, e.g.
 - GDP by expenditure and all its components
 - Distribution of income
 - Balance of payments
 - Government financial account

- Building hierarchies by indicating the relative position of one Item to another
 - Nodes reflect mathematical identities (definitional equations)
 - Allows to fully build the analytic framework and the flow of derivation schemes (definition of residual Items)

Linking data to ITEMS: The RESOURCE concept

- A resource ... 
 - ... holds one or more time series used by one or more items
 - ... is usually an Excel workbook or a text file
- When registering a resource with DIWAX ...
 - ... the file content is described using the metadata codes
 - ... data organization within each resource is stored (only once, if kept unchanged)
 - ... an identification code is given to each resource type
- Resource library
 - Has a subfolder for each resource type
 - Versioning according to last ex-post period
- Items assign resources to specific time series

Project administration

- Project: Common settings relevant to all ITEMS
- Project file (Excel-Workbook format) 
 - Project information
 - Project folder (one subfolder per project recommended)
 - Project name („Winter outlook 2007“)
 - Project code („WO-2007“)
 - Price adjustment method
 - Calendar and seasonal adjustment method
 - Time spans
 - Reference year (for indexing)
 - List of used resource files
 - All time series data (one worksheet per ITEM)

The DIWAX program technology

- DIWAX follows an agent-based approach
- Agents are programs within the overall program designed to fulfill specific tasks
 - ItemAgent
 - ProjctAgent
 - TimeAgent
 - ThemeAgent
 - DownloadAgent
 - ...
- DIWAX itself is the platform that hosts the agents and allows for their communication and collaboration
- The user interface of all agents is similar (know one, know all principle)

