Statistical Data Management

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1. Goals and Tasks

1.1 Overview

Prognoz is pleased to present an integrated solution for statistical data and metadata collection, processing, analysis and management: Prognoz Statistical Data Management (SDM).

Prognoz Statistical Data Management is designed to harness large amount of statistical data. It enables you to speed up and simplify data collection, validation, and analysis. It also provides a powerful toolkit to manage a statistical data warehouse, monitor and analyze desired information, generate reports, and deliver data to a wide range of users.

The proposed solution combines a full-featured desktop data management application; a Web-based module for statistical data collection, population surveys, and census; and a Web-based data visualization and analytics application available to external users.

Automation statistical data processing at all stages

- Data collection and loading
- Data validation, transformation, and analysis
- Visualization and reporting
- Data dissemination via the Web
Prognoz Statistical Data Management provides the following benefits.

**Collect and download statistical data in real time**
- Generate data templates for different respondents or specialists responsible for data collection
- Automatically disseminate data collection templates via a Web-based interface
- Manage a respondent base, define data collection templates, and specify terms
- Enable respondents and data collectors to fill out the data collection templates online or offline
- Load data and metadata of various formats (XLS, XLSX, MDB, XML, CSV, AREMOS, and FAME) from external sources to the data warehouse in compliance with the SDMX standard
- Monitor and collect data from external Web sites through robots

**Automatically extract, transform, and load data (ETL)**
- Create a process model and manage dataflow
- Automatically run ETL operations as per the task schedule
- Verify, transform, and aggregate data
- Use a variety of mathematical and statistical tools with the ability to switch user-defined functions
- Control and analyze different versions of one observation or data set

**Analyze data and generate automatic reports**
- OLAP: analyze and visualize data in real time, including data sorting, filtering, conditional formatting, calculation of totals, table configuration, and chart customization
- Prepare report templates, including parameterizable charts, tables, maps, and text blocks
- Generate and send regular reports automatically based on predefined templates
- Export data and reports of various formats in compliance with the SDMX standard

**Disseminate statistical data via the Internet**
- Distribute data through the Web portal, publish reports, sort and filter data, and customize transformations
- Search by data and metadata, and generate user queries
1.2 Proposed architecture

The following figure illustrates the architecture of Prognoz Statistical Data Management.

The solution is built on the basis of the following principles:

- **Modularity.** The solution is partitioned into self-contained functional modules:
  - Data Collection
  - Data Manager
  - Data Dissemination

  You are able to implement and maintain individual modules on a concurrent and independent basis.

- **Openness.** You can modify and add extra modules to the solution in the future using open architecture principles.

- **Reliability.** The solution provides robustness by ensuring continuous operation and data loss prevention.
2. Functionality

**Prognoz Statistical Data Management** enables you to capture all typical aspects of any data handling process, including data collection, exchange, analysis, manipulation, and dissemination:

- Statistical data collection
- Data visualization and analysis
- Report generation engine
- Task automation
- Work collaboration
- Database design
- Data validation
- Data transformation
- Metadata management
- ETL module
- Statistical data distribution

## 2.1 Statistical data collection

Prognoz Statistical Data Management delivers a powerful toolkit for statistical data collection, customization of data collection templates, and parameterization of indicators of previous observations. The data collection templates represent reference indicators of previous years broken down by region or survey subject. The Data Collection module offers remote surveys and statistical data collection via the Internet, enabling you to:

- Distribute data collection templates automatically via email or the member area of the portal
- Support Microsoft Excel format when filling out a form
- Deploy a user-friendly interface to create and edit data collection templates and add reference indicators from the existing database
- Set up reference indicators of the data collection form per recipient
- Apply automatic logic and arithmetic control upon data delivery
- Import checked data automatically to the current database
- Adjust or add information to forms based on the results of automatic data control
The Template Constructor enables you to create rules for logic and arithmetic data control and set up reference statistical indicators of previous years. Once logic and arithmetic control and operator visualization check is executed, all collected information is automatically entered into the current database.
2.2 Database design

Prognoz Statistical Data Management provides powerful designer of indicator structure, including dictionaries and such attributes as indicator mnemonics, full descriptor, labels, and so on. You can add desired metadata for further data analysis, transformation, validation, and report generation. A global metadata environment enables you to build a common metadata dictionary across data sets from different sources.

Figure 4. Database design

The solution provides a common toolset and interface to support your diverse data and metadata/data warehouse needs. You can manage databases, collect, analyze, transform, validate, and disseminate data to both internal and external users.

Metadata support is a built-in feature of the data management system. All relevant statistical metadata (such as definition, data source, data quality, methodology, reference data that can be used for comparison or to provide context, and so on) on any given data item, data series, or database within SDM can be made accessible by any user. In particular, the solution delivers advanced functionality to:

- Support data capture at various frequencies or intervals: Annual, quarterly, monthly, weekly, or daily
- Specify custom metadata attributes
- Store data and metadata transformation history
- Support metadata hierarchies
- Edit, save, copy, and disseminate data
- Enable administrators to set and modify user permissions relating to the use and access to data and metadata
2.3 Data exchange

Import and export wizards facilitate your work between SDM and other applications, including Microsoft Excel, Microsoft Word, and other common formats. Metadata at the time series and observation level can be collected during data import as well.

The solution is equipped with a flexible, efficient, and reliable data exchange toolkit to collect data in different formats from various sources. Using SDM, data administrators and data experts can implement and automate their own data collection processes.

You can load data for the same indicator from multiple data sources and subsequently combine the most plausible data to create a set of consolidated, logical, and complete indicators required for analysis. Also, the solution enables you to collect metadata from external official sources and import them into SDM.

![Supported formats](image)

Data Import and Export tools and Excel Add-ins are readily available within our solution for an easy data-in and data-out process. The solution offers the following capabilities:

- Use various formats of input and output data, including Excel (XLS and XLSX), Access (MDB), XML, CSV, AREMOS, FAME, and so on
- Exchange data with other data providers and government agencies through the SDMX standard
- Generate data collection requests by specifying the data source, destination database to be populated with data and metadata, and the indicator comparison system, which reflects how source data and metadata correlate with the selected database environment
- Edit, save, duplicate, and share data source specifications and collection template specifications
- Collect data using predefined or user-defined data collection templates
- Apply database version control with the ability to revise and cancel changes
- Collect data automatically (in batch mode) or manually: On demand, on schedule, or upon the occurrence of a specific event
2.4 Data validation

The validation toolkit incorporates a set of logic engines, giving you the flexibility to identify data errors, inconsistencies, and even gaps in data made within a workflow. You can set up your own logic rules for specific datasets. Validation exceptions could be specified to create a richer dataset.

Figure 6. Data validation

Prognoz Statistical Data Management is built to support data quality assessment and monitoring processes by providing a set of robust tools for validating and analyzing large volumes of historical, current, and forecast data at various levels. Built-in data validation tools enable you to identify inconsistencies and discrepancies in the data, as well as to:

- Set up and apply validation filters to identify missing data, data discrepancies, statistical outliers, and inconsistencies in cross-frequency, cross-country, or cross-version data
- Set up and apply validation filters that make use of logical and comparison operators
- Associate a criticality level to each validation filter
- Run validation checks and view results in the form of diagnostic reports that include summary information for easy analysis
- Overlay results of one or multiple validation filters on top of a visual display of data
- Navigate through identified exceptions and view any documented explanations for them
- Document valid exceptions by providing additional explanatory metadata
- Edit, save, duplicate, and share validation filters and diagnostic reports
- Specify multiple groups of validation rules to run on different data sets
- Execute a specific data validation process manually or automatically (batch mode): On demand, on schedule, or upon the occurrence of a specific event
- Review previous validation results, which are automatically stored
2.5 Data transformation

A library of mathematical and statistical functions enables you to derive new series or modify existing series. By systematically creating data transformations, you can maintain best practices in monitoring how data series have been transformed. Calculations across databases and frequencies are both supported. A built-in aggregation engine makes it easy for users to aggregate data across industries, sectors, and regions.

In addition to providing in-depth data analysis capabilities, SDM supports the analytical editing and transformation of statistical data. A built-in data transformation engine and a library of statistical functions are made available through SDM to enable you to process data into high-quality derived data products. Using SDM, you will be able to:

- Edit data and metadata manually and effortlessly
- Access a set of built-in arithmetic, time series, and analytical functions supporting standard statistics, correlation, normalization, weighting, regression, interpolation, and extrapolation of the data
- Derive time series through transformation of time series components with derived data and metadata support
- View ad-hoc transformation results as well as input components in table and chart form
- Construct parameterized transformation routines that can be executed on demand, on schedule, or upon the occurrence of a specific event
- Make use of branching conditions (IF statements), repetition conditions, and nested functions to construct complex transformation routines
- Document all data and metadata transformations performed automatically, and monitor warning messages generated during the transformation process
- Trace the transformation history of any data element
- Step through and view standard transformations
- Perform debugging by suspending the execution of a transformation routine at breakpoints, viewing the affected data, and, if needed, performing manual edits to the data or metadata before resuming or aborting the execution
- Edit, save, duplicate, and share transformation routines
- Apply version control over transformation routines
2.6 Data analysis and visualization

SDM’s friendly user interface enables you to analyze data in real time, including calculations and validations. Data are presented in table format, accompanied by a live chart and summary statistics. The tool is flexible enough to display data from multiple sources across different frequencies or versions.

Figure 8. Data analysis

Designed to provide you with a superior means to interact with data and metadata and to assess the quality of data with a high degree of accuracy, SDM provides easy data access and visualization, including the following key features:

- Easy facet navigation through data sets and time series with data sorting options
- Coordinated table and chart data visualization
- The ability to view data from multiple data sets on the same table and chart

SDM is also equipped with a rich set of out-of-the-box data analysis tools for advanced data exploration, enabling you to:

- Perform cross-frequency and cross-version analysis of data across data sets
- Analyze the components of any built-in function or formula to identify anomalies or substantial revisions in the component data
- Work with the coordinated metadata and data display in table and chart form
- Make use of workbooks for convenient data viewing, sharing, and saving
- Print and export tables, maps, and charts to external formats
2.7 Report generation engine

The solution enables you to create your own live reports, including tables, charts, and graphs. Reports are print-ready, exportable to common formats, and publishable to the Web via the Web-based components.

SDM comes with a Report Designer with the following capabilities:

- Create pixel-perfect reports containing data tables, charts, and maps
- Work in an Excel-like interface with formula support
- Make use of parameterized reporting capabilities to design one report template that can work for multiple users (with report content driven by user-defined selections)
- Export to commonly used dissemination formats, including XLS and XLSX, DOC and DOCX, PPT and PPTX, HTML, and PDF.
- Generate and print multiple reports simultaneously on demand, on schedule, or upon the occurrence of a specific event

SDM enables advanced users to implement a set of predefined dashboards and reports for at-a-glance review of key statistics in convenient, presentation-ready tables, charts, and maps. These reports support predefined text and graphics that are dynamically linked to the data warehouse. As the application receives updated data, the information in the report refreshes itself accordingly. You can also print the reports directly from the application or export the reports to various popular formats for distribution purposes.

The following figures show just a few of the types of reports that can be included in SDM.
2.8 Task automation

The above-mentioned features can be set up as tasks for automatic execution on a routine basis, enabling you to generate the most current analysis based on updated data and metadata.

Daily tasks and business processes can be easily automated to reduce time-consuming routine work and facilitate collaboration across people and teams:

- Automated tasks can be used to import and export data, validate data, run transformation routines, and generate reports on regular basis according to a specified schedule, with or without human intervention.
The process engine enables you to define business-driven workflows, including different data management tasks and activities, and monitor the execution of these workflows.

The built-in process and task manager enables you to create a corporate model of data handling and populate it with custom tasks, branching conditions, and desired user interaction stages. Every time the model runs automatically, all tasks are performed according to the specified workflow, and users are notified at the predefined interaction stages, such as manual data input or visual control. Thus, the solution automates all data-handling tasks.

### 2.9 Metadata management

The SDM metadata module enables you to enrich data with metadata, which perform crucial categorization and management functions in analysis, transformation, validation, and reports. The global metadata environment enables you to build a common metadata dictionary across data sets from different sources.

![Metadata management](image)

The metadata engine provides the following features:

- Maintain a data dictionary with powerful capabilities to manage indicator attributes
- Manage metadata for different objects and layers of the data warehouse:
  - Metadata of indicator attributes
  - Metadata of individual attributes
  - Cross-attribute metadata
- Load data and metadata into the data warehouse from specific sources while supporting the SDMX standard
2.10 Work collaboration

SDM is a database management solution. Users can share information within or across departments, leveraging the collective intelligence of the agency while protecting confidential data through the solution’s security module. Backup, archiving, and rollback enable you to restore earlier versions of the database.

The security and administration module provides the following support:

- Security and permissions can be implemented as role-based management at the object level.
- Active directory integration is available for organizations that prefer a single-sign-on environment.
- Data-level security is supported, so that only users with the proper permissions to work on the data have access. This feature includes tools that enable advanced users or application administrator to grant or deny read and edit permissions across countries.
- The solution enables administrators to audit user access.

2.11 Data dissemination

The data dissemination module provides an integrated set of components for online statistical data dissemination. The module enables you to search, analyze, and export data via a single Web portal.

![Figure 13. Portal interface](image)

The SDM Data Dissemination module consists of four components:

- Dashboards
- Search and Explore
- OLAP Analysis
- Document Publications

You can specify any combination of the components for your data portal.

2.11.1 Dashboards

The Dashboards component grants online access to predefined dashboards. The dashboard designer displays information from multiple sources, enabling you to create combined data views. The dashboards represent user-defined data on a desired subject in chart, table, and map form.

You can easily select data from the list of specified subjects or countries and access key information in a visually compelling format direct from the Statistical Data Management warehouse.
The Dashboard component provides the following functionality:

- Table layout and cell merging
- Switching between pages via tabs
- Insertion of such objects as OLAP reports, regular reports, charts, maps, indicators, scorecards, images, text, HTML layouts, and controls
- Defining links between dashboard components
- Unified component setup through the property inspector
- Export to external formats, including XLS and XLSX, PDF, RTF, HTML, MHT, PPTX, JPG, PNG, and so on
- Social software and portal integration to Facebook, Twitter, LiveJournal, and LinkedIn
2.11.2 Search and Explore

The Search and Explore component enables you to search for time series across the data warehouse and visualize the results in a user-friendly format.

The Search and Explore component enables you to:

- Create Google-like queries
- Search by indicator, name, metadata, and portal document
- Visualize time series in a table, or display data or a time slice on the map
- Open data for OLAP analysis

2.11.3 OLAP Analysis

The OLAP Analysis component is designed for online analysis of indicator dynamics over time.

This component enables you to:

- Analyze data via the browser
Display data in table and chart form
- Work with several workbooks and ranges of time series at once
- Group and sort time series attributes
- Apply arithmetical and mathematical transformation, data aggregation, smoothing, forecasting, and regression
- Calculate statistical characteristics
- Edit and save data
- Perform conditional formatting and filtering
- Import and export data
- Save workbooks
- Perform integration with social software and portals, including Facebook, Twitter, LiveJournal, and LinkedIn

2.11.4 Documents Publications

The Documents Publications component is designed to publish documents, tables, and files of any format on the portal.

Figure 17. Data publication

Statistical Data 1995-2002 Publication

The component enables you to:

- Easily publish documents of any size and format
- Generate publication pages automatically
- Use the page template editor
- Add descriptions, images, and tabs to the publication page
3. Prognoz Platform

Prognoz Statistical Data Management runs atop the Business Intelligence toolkit of the Prognoz Platform.

The Prognoz Platform is an integrated platform for developing BI and Decision Support Systems. The platform facilitates the use of cutting-edge data warehouses, reporting and OLAP tools, and monitoring and forecasting tools.

The key objective of the Prognoz Platform is to provide you with a flexible and easy-to-use toolkit for BI application development.

The Prognoz Platform includes the following functional modules:

- Dashboards
- Reports
- Analytical Queries (OLAP)
- Time Series Analysis
- Modeling and Forecasting

![Prognoz Platform Diagram]

Figure 18. Prognoz Platform
4. Hardware and software requirements

The proposed solution is a multiuser system that requires the deployment of client and server components.

To ensure the continuous operation of SDM, your hardware and software should satisfy the following requirements.

The recommended workstation profile for the desktop Statistical Data Management application is as follows:

- Processor: 2.90 GHz, Quad core CPU or more
- RAM: 2 GB or more
- Disk space: 10 GB
- Display: 1024 × 768 or higher resolution monitor
- O/S: Microsoft Windows XP SP3/Vista/7
- Network speed: 1 Gbps network connection or higher
- Other: Microsoft .NET Framework 4.0; Prognoz Platform; Microsoft Office and Adobe PDF (for working with data outside the application)

The recommended workstation profile for the Web portal and the Excel Add-in is as follows:

- Processor: 2 GHz or more
- RAM: 512 MB or more
- Disk space: 10 GB
- Display: 1024 × 768 or higher resolution monitor
- O/S: Microsoft Windows XP/Vista/7
- Network speed: 100 Mbps or higher
- Other: Microsoft .NET Framework 4.0; Prognoz Platform; Microsoft Office and Adobe PDF (for working with data outside the application); Internet Explorer 7+, Mozilla Firefox 3+, Safari 5+, or Google Chrome 10+

The recommended DBMS server profile is as follows:

- Processor: 2.90 GHz, Quad core CPU or more
- RAM: 16 GB or more
- Network speed: 1 Gbps network connection or higher
- Other: Microsoft SQL Server 2008/2008 R2 Standard Edition (64-bit)

The recommended Web application server profile is as follows:

- Processor: 3.0 GHz, Quad core CPU or more
- RAM: 16 GB or more
- O/S: Microsoft Windows Server 2008/2008 R2 Enterprise Edition (64-bit)
- Network speed: 1 Gbps network connection or higher
- Other: Microsoft Internet Information Server (IIS), Microsoft ASP.NET Ajax Extensions
5. Development and implementation schedule

If you acquire only the Data Manager module of Prognoz Statistical Data Management, you can install it without the assistance of our team. For step-by-step installation and setup instructions, see the Prognoz Statistical Data Management Installation, Maintenance, and Troubleshooting Guide.

For installation of the complete SDM solution, Prognoz experts upgrade and implement the components based on the Data Collection, Data Manager, and Data Dissemination modules. System development and implementation includes the following stages:

<table>
<thead>
<tr>
<th>Stage</th>
<th>Deliverable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarification of requirements</td>
<td>Detailed project plan, assignment of work to members of the project team</td>
</tr>
<tr>
<td>System design</td>
<td>Presentation of solution concept, including clarified technical specifications, fully realized design concepts, and detailed functionality descriptions</td>
</tr>
<tr>
<td>System development</td>
<td>Demonstration of alpha version</td>
</tr>
<tr>
<td>Implementation preparation</td>
<td>Demonstration of final version, including documentation and user and administrator training</td>
</tr>
<tr>
<td>Testing and implementation</td>
<td>System implementation and delivery of all deliverables</td>
</tr>
</tbody>
</table>

Prognoz Statistical Data Management can be implemented only if your IT infrastructure satisfies the hardware and software requirements (see section 4).

Shown below is an indicative project schedule. Deadlines for all stages will be established after the approval of terms of reference.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Work schedule by months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Clarification of requirements</td>
<td></td>
</tr>
<tr>
<td>System design</td>
<td></td>
</tr>
<tr>
<td>System development</td>
<td></td>
</tr>
<tr>
<td>Implementation preparation</td>
<td></td>
</tr>
<tr>
<td>Testing and implementation</td>
<td></td>
</tr>
</tbody>
</table>
## 5.1 Consulting and system enhancement

Within the implementation of Prognoz Statistical Data Management, the Data Collection, Data Manager, and Data Dissemination modules can be enhanced per customer requirements. The total cost and duration of work will be defined after the development of the terms of reference.

The following module enhancement options are available.

### Data Collection enhancement

<table>
<thead>
<tr>
<th>Work</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Connection and automatic update of</td>
<td>Connection to the free and private data sources of external data providers,</td>
</tr>
<tr>
<td>external data sources</td>
<td>automatic data loading and update</td>
</tr>
</tbody>
</table>

### Data Manager enhancement

<table>
<thead>
<tr>
<th>Work</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Implementation of the publication</td>
<td>Technical definition of your process of statistical data processing,</td>
</tr>
<tr>
<td>generation process</td>
<td>customization of data transformation and validation procedures, creation of a</td>
</tr>
<tr>
<td></td>
<td>model for data and publication generation, automation of the selected process</td>
</tr>
<tr>
<td>2  Customization and automation of</td>
<td>Creation of a standard form for regular reports and publications, setup of</td>
</tr>
<tr>
<td>publications and regular reports</td>
<td>report templates, automation of routine report generation</td>
</tr>
<tr>
<td>3  System integration with external data</td>
<td>Support of additional data import and export formats, integration with third-</td>
</tr>
<tr>
<td>formats according to specifications</td>
<td>party applications and systems</td>
</tr>
<tr>
<td>4  System integration on the database</td>
<td>Integration with industrial DBMS not supported by the standard version</td>
</tr>
<tr>
<td>level</td>
<td></td>
</tr>
<tr>
<td>6  Customization for mobile devices</td>
<td>Portal adaptation to mobile devices, development of application for data</td>
</tr>
<tr>
<td></td>
<td>access via mobile operating systems</td>
</tr>
</tbody>
</table>

### Data Dissemination enhancement

<table>
<thead>
<tr>
<th>Work</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Customization for mobile devices</td>
<td>Portal adaptation to mobile devices, development of application for data</td>
</tr>
<tr>
<td></td>
<td>access via mobile operating systems</td>
</tr>
<tr>
<td>2  System integration on the database</td>
<td>Integration with industrial DBMS not supported by the standard version</td>
</tr>
<tr>
<td>level</td>
<td></td>
</tr>
</tbody>
</table>
5.2 Scope of technical support services

Technical support is provided for one year, except otherwise stipulated by the technical support agreement. Please consult the following table for the cost of technical support services.

<table>
<thead>
<tr>
<th>Service description</th>
<th>Technical support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration of service requests for bug fixes, modifications, and system upgrades</td>
<td>✓</td>
</tr>
<tr>
<td>Access to information on the progress, status, and processing history of registered requests</td>
<td>✓</td>
</tr>
<tr>
<td>Access to our online forum, which connects users with experts on system functionality</td>
<td>✓</td>
</tr>
<tr>
<td>Access to current operating documents for the system</td>
<td>✓</td>
</tr>
<tr>
<td>Access to system updates: Bug fixes within one system version</td>
<td>✓</td>
</tr>
<tr>
<td>Advice to the customer on the use of the system (provided per preliminary order after agreement on time and method: Telephone-based advice, via Web conference, and so on)</td>
<td>✓</td>
</tr>
<tr>
<td>Access to promotional and informational materials on system functionality</td>
<td>✓</td>
</tr>
</tbody>
</table>
6. Our experience

Prognoz Statistical Data Management in the International Monetary Fund

One of the objectives of the International Monetary Fund is to collect and publish international economic and financial statistics. IMF’s flagship publication is the World Economic Outlook (WEO), published twice a year. The WEO contains economic analysis of countries and regions across the globe. IMF was in need of advanced tools for routine automation that support complex publication algorithms to harness large volumes of information and speed up data processing.

IMF selected Prognoz to design the software that would become Statistical Data Management. The IMF-specific version, known as EcOS, covers various aspects of the WEO process, including data collection, validation, transformation, visualization, and data collaboration, to automate much of the work required to produce this highly influential publication.

EcOS enables users to work with time series and metadata in a single interface. Users can easily create and configure multiple metadata dictionaries, element groups and hierarchies, databases, and time series. The application supports two data display modes: time series representation and multidimensional data representation.

Using a step-by-step wizard, users have access to a variety of data sources and consumers, ensuring quick import and export of data and metadata. The solution supports concurrent data and metadata imports. Process-oriented collection and consolidation of reliable data from different sources and external applications ensure the efficient production of the WEO publication.

All data are automatically validated and checked for consistency. The powerful EcOS toolkit enables users to create new validation rules, set rule priority, and configure custom validation filters.

The solution also provides upgraded data transformation tools to calculate a variety of derived indicators in real time for publication purposes. The user-friendly data transformation and modeling toolkit comes with both graphical and command-driven user interfaces. The modeling engine is tailored to create multiple calculation chains of any complexity. With the visually compelling data processing methods built into the solution, users can immediately detect and correct errors in data and track changes in data via business graphics.

IMF’s reports are powered by rich visualization tools and design templates and types, offering the ability to combine tables, charts, and maps for customized data representation, printing, and export to different formats, including RTF, XLS, PPT, PDF, and HTML.

Prognoz Statistical Data Management is the direct result of our extensive development of EcOS for IMF.