


PROGNOZ

Business Analytics...Made Simple



Prognoz State Budget Analysis
Description

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1. Goals and tasks

Prognoz Company is pleased to present its comprehensive solution for effective public financial management – **Prognoz State Budget Analysis**.

Prognoz State Budget Analysis provides tool support of **crucial management tasks to:**

- **Monitor and analyze** information on national, regional, and municipal budget execution
- **Collect, process, and consolidate** data on budgeting from different sources
- **Record, analyze, and plan** public debt
- **Carry out statistical and correlation analysis** of income receipt dynamics
- **Rank and cluster** regions by levels of budget execution
- **Make probabilistic risk analysis** of non-achievement of revenue goals
- **Perform variant forecasting** of budget revenue receipts
- **Prepare presentations and analytical reports** on the condition of the budgetary system

Our solution is customized for a **wide range of users**, including:

- **Executives** of financial authorities of a country or region
- **Executives and specialists** of ministries and agencies
- **Specialists** of analytical, planning, and budgetary divisions

The implemented solution will promptly enable your company to:

- **Improve budget transparency and publicity**
- **Increase accuracy** and facilitate timely collection of data needed to plan, analyze, and coordinate public financial, budgetary, and tax policies
- **Enhance budgeting control** due to rich forecasting and analytical capabilities
- **Simplify planning** of state budgets
- **Increase effectiveness** of public spending
- **Reduce time and effort** of quality analysis in financial authorities of a country or region

2. Proposed architecture

Prognoz State Budget Analysis is a powerful toolkit for critical public financial management tasks.

Figure 1 below represents functional and technological architecture of Prognoz State Budget Analysis.

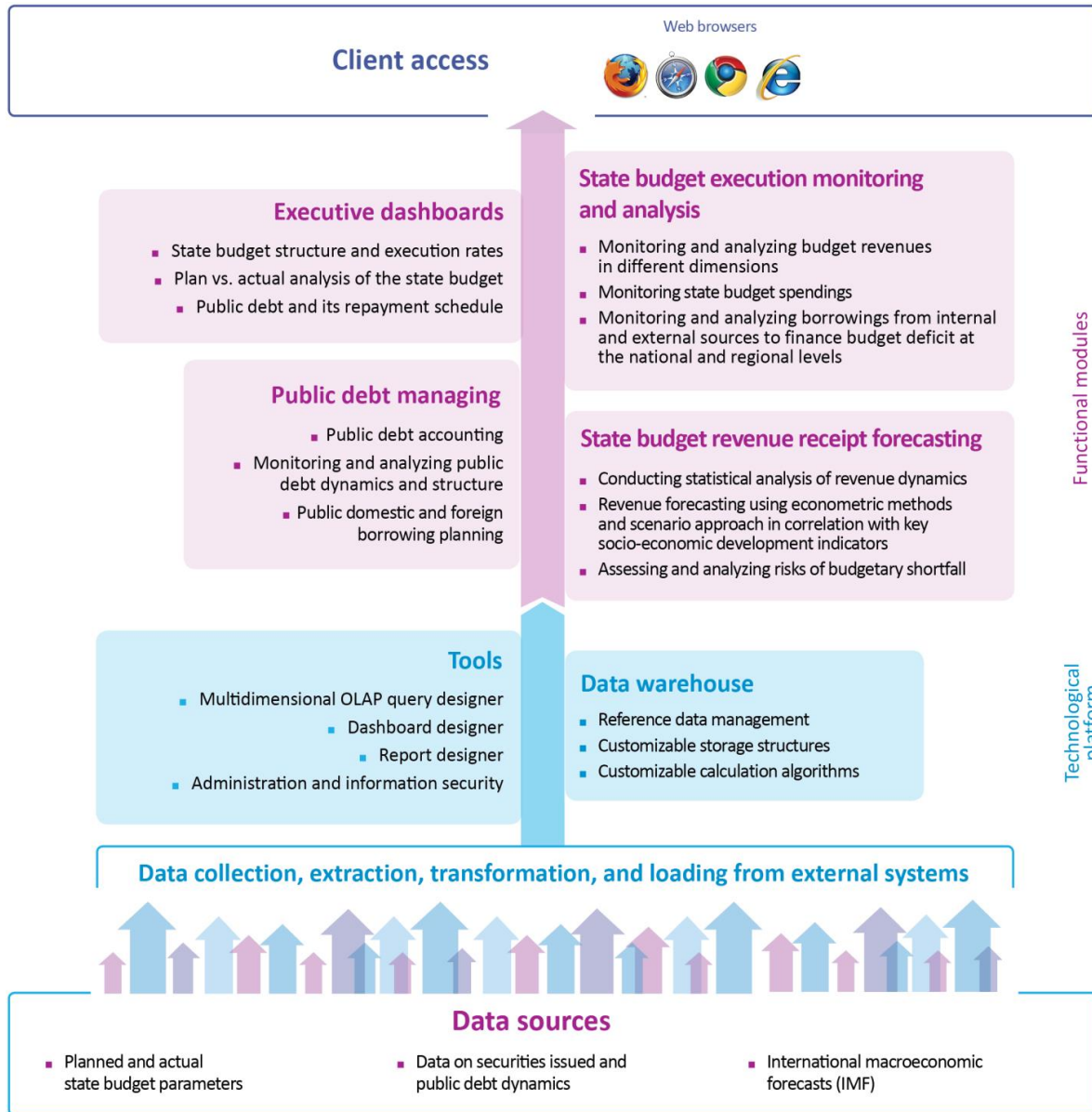


Figure 1. Architecture of Prognoz State Budget Analysis

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

- **Modularity.** The system is divided into functionally independent modules, i.e., inclusion or removing of a module from system architecture will not affect operation of other modules of Prognoz State Budget Analysis, that allows simultaneously and independently implement and support system components.
- **Openness.** The system uses open principles of information system design (including capability to further modify and expand system with additional modules), openness, architecture transferability, and scalability.

- **Adaptability.** The system allows improving, enhancing functionality, and developing methodology, taking into account changes in organizational structure, data exchange forms, indicator calculation algorithms, and data processing rules.
- **Tools for information interaction** with external sources and data recipients on the basis of customized import and export procedures.
- **Different types of access** to systems (client applications, Web access, integration with corporate portals, and mobile access).

3. Functionality

Prognoz State Budget Analysis contains the following functional modules:

- Monitoring and Analysis of State Budget Execution
- Public Debt Management
- Forecasting of Budget Revenue Receipts

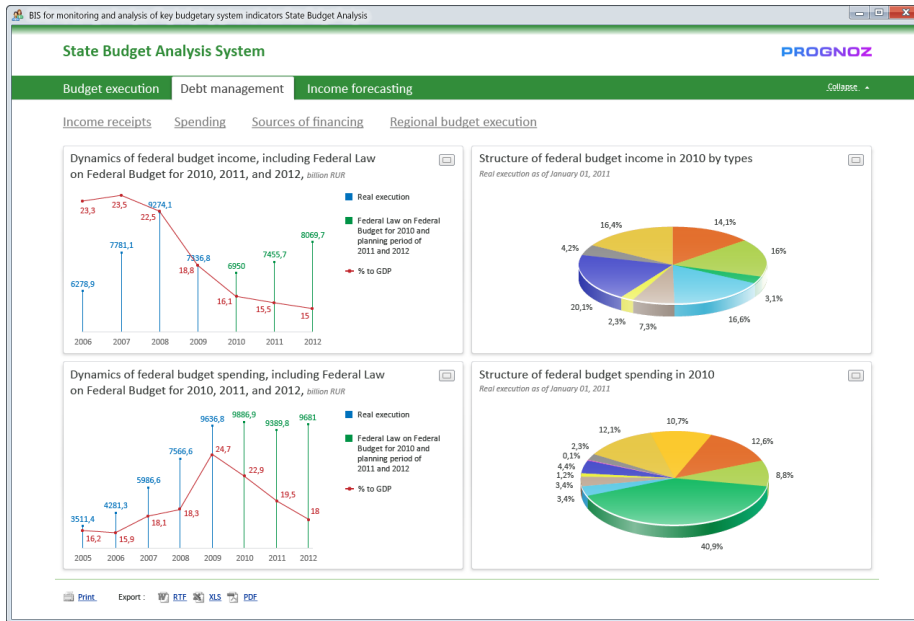


Figure 2. Prognoz State Budget Analysis

3.1. Monitoring and Analysis of State Budget Execution

Monitoring and Analysis of State Budget Execution module provides monitoring and analysis of income receipt and public spending, as well as different sources of financing for the state budget deficit.

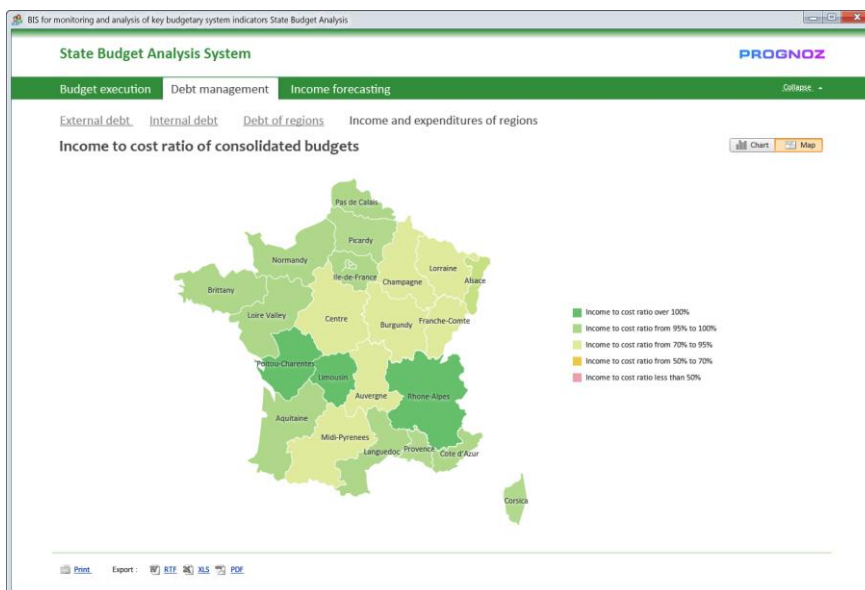


Figure 3. Monitoring and analysis of state budget execution

The module will enable users to:

- Monitor and analyze the budget revenue receipt broken down by different profiles:
 - Monitor budget revenue receipts by income type, budget system levels, and key income administrators
 - Perform structural and dynamic analysis (calculate indicators such as % to total income, % to previous period, % to law, % to average for a country, and so on)
- Monitor public spending:
 - Monitor spending by budgetary system levels of a state
 - Analyze budget execution by costs broken down by budget administrators, regions, budget classification codes, and other categories
- Monitor and analyze the process of attracting domestic and foreign sources of financing for the state budget deficit:
 - Provide tool and information support for retrospective analysis of attracting and use of sources of financing for the deficit by budgetary system levels of a country

3.2. Public Debt Management

The **Public Debt Management** module solves many challenges of data collection, monitoring, and analysis of public debt dynamics and structure as well as the planning of domestic and foreign borrowings.

The module will enable users to:

- Record data on public internal and external debt:
 - Provide information and tool support to record data on public internal and external debt
 - Compare periodic reporting using data visualized in the form of texts, charts, and spreadsheets

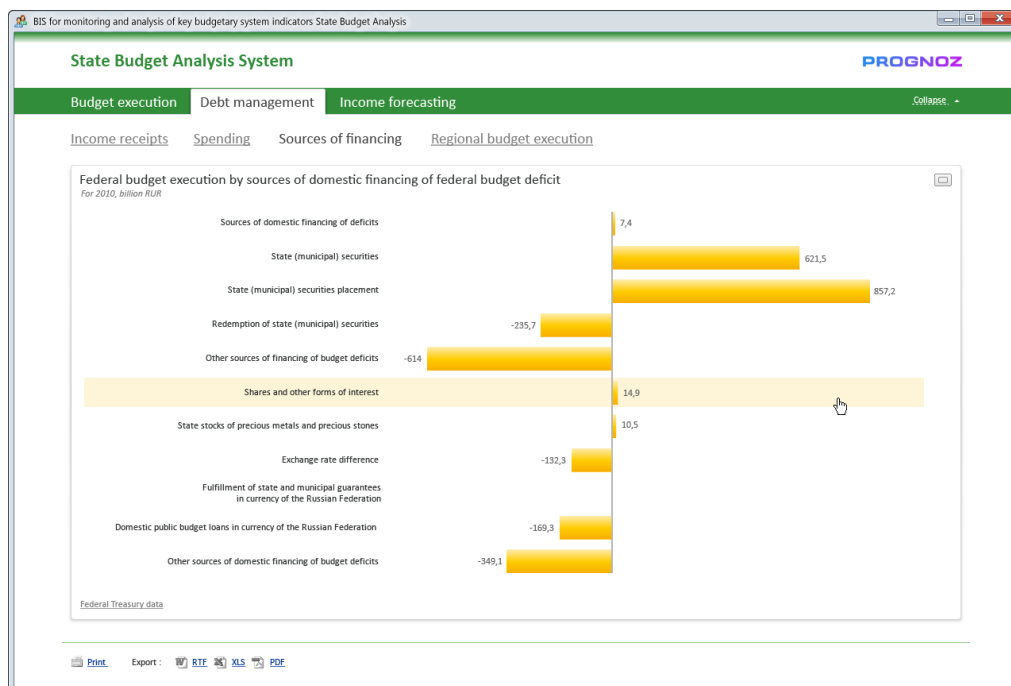


Figure 4. Sources of financing for the federal budget deficit in 2010

- Monitor and analyze dynamics and structure of public debt:
 - Perform dynamic analysis of amount of public internal and external debt
 - Analyze changes in structure of internal and external debt by liability types
 - Prepare analytical materials on the basis of periodic reporting
- Plan public domestic and foreign borrowings:
 - Provide tool support to develop and use methods and algorithms of domestic and foreign borrowing planning
 - Calculate schedule of domestic and foreign borrowings with due account of specified planning criteria (cut costs for servicing public debt, adjust payment schedule, save amount of public debt, and so on)
 - Make multivariant calculations of the schedule of public domestic and foreign borrowings using various scenario conditions

3.3. Forecasting of Budget Revenue Receipts

Forecasting of Budget Revenue Receipts module provides statistical analysis of revenue receipt dynamics, forecasts receipts through econometric methods, and assesses risks of revenue shortfall in the state budget.

Applied modern mathematical and statistical methods for revealing dependencies will ensure a high validity of developed models and improve forecasting capabilities of assessments received.

The module will enable users to:

- Make statistical analysis of dynamics of budget revenue receipts:
 - Reveal stable trends in specific tax and fee receipts to the budgets
 - Define the seasonal component and random factors through cutting-edge mathematical and statistical methods of analysis
 - Perform factor analysis of the impact of socioeconomic indicators on revenue receipt dynamics
- Forecast state budget income through econometric methods in relation to the key socio-economic development indicators:
 - Tools that enable you to create mathematical models, which account for socioeconomic development indicators and changes in tax, customs, and budgetary policy, as well as trends in global economy dynamics, and, based on these models, make multivariant scenario calculations of budget revenue receipts
- Assess and analyze risks of revenue shortfall in the state budget:
 - Assess dynamics of the key macroeconomic indicators and parameters of budgetary system through probabilistic analysis methods

Probabilistic analysis is based on multifactor regression models, taking account of the impact of external factors on indicators. Model calculation results will provide values of probability of implementing the state budget revenue plan under the specified ranges of factor values.

4. Toolkit

The system toolkit is based on the cutting-edge technologies of Prognoz, which are today used by more than 350 clients worldwide: international organizations, manufacturing and financial corporations, and public authorities.

Prognoz State Budget Analysis includes the following groups of **tools**:

- Data collection and loading
- Data storage and processing
- Tools for customization of user applications
- Administration and data security tools

System features provides the following **capabilities**:

- **Data integration tools** enable users to design and populate data warehouse from different information sources
- **Modeling and forecasting tools** enable users to perform in-depth analysis of data and forecast dynamics of a situation or to choose an optimal management, based on received results
- **Online application development tools** enable users to enhance system functionality and customize it according to specific customer requirements
- **Received results are available via Web browsers** and Microsoft Office applications
- **Open architecture** of the toolkit ensures interaction with software products of other vendors and the capability to enhance it

4.1. Data collection and loading tools

Data collection and loading tools were designed to collect data via Internet, as well as to extract, transform, and load data from external systems to the data warehouse.

Data extraction, transformation, and loading tools

The solution provides access to external data sources, such as:

- Planned and real parameters of the state budget
- Data on securities issue and public debt dynamics
- International macroeconomic forecasts (IMF)

The user can load data from international sources, containing macroeconomic and specialized information, into the data warehouse:

- Key socioeconomic development indicators
- Data on execution of budgets of various levels
- Data on public debt status
- Key indicators of tax, customs, and budgetary policies

4.2. Data storage tools

Reference data management tools

Reference data management tools were designed to:

- Create dictionaries
- Support unlimited number of dictionary attributes
- Support linear and hierarchical dictionaries
- Support compound dictionaries built on the basis of other dictionaries
- Parameterize dictionary elements (dependency of dictionary content on parameter values)
- Support customization of the unique keys for dictionaries
- Filter, group, and search for elements under different conditions

Tools for customizing data storage structures

These tools were designed to build data warehouse for analytical reporting, including:

- Describe indicators
- Manage coefficients for recalculation to various units of measure
- Describe analytical profiles of indicators and their relations with dictionaries
- Support indicators with different time periods
- Aggregate and consolidate data
- Form object-oriented data sets (data marts)

Calculation algorithm customization tools

Calculation algorithm customization tools were designed to:

- Customize algorithms to calculate values of the data warehouse indicators (including indicators of scheduled reports, planning, and budget documents)
- Customize schemes of indicator calculation
- Calculate customized schemes

Prognoz State Budget Analysis toolkit enables users to express schemes of indicator calculation through a graphical interface (including formation of scheduled reports, planning, and budgetary documents) as series of calculation blocks.

4.3. Tools for customization of user applications

Multidimensional Query Designer (OLAP)

OLAP customization and viewing tools provide on-the-fly multidimensional data analysis.

Key capabilities:

- Simultaneous analysis of data from many sources (including mixed-size cubes)
- Capability to structure OLAP queries by analytical headings and sections

- Visualization of data in charts and spreadsheets
- User-friendly and advanced analytical functions (sorting, filtering, conditional highlighting, aggregation, Pareto-analysis, data highlighting, computable values)
- Export to external files (HTML, PDF, XLS, RTF) and printing

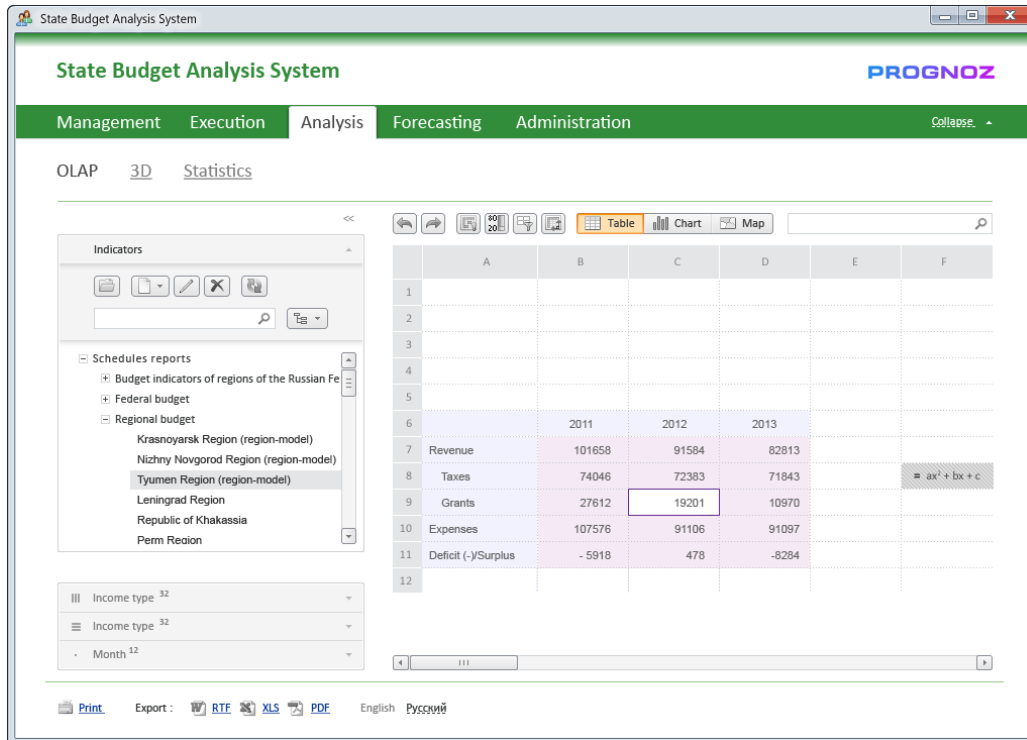


Figure 5. OLAP customization and viewing tools

Dashboard Designer

Dashboard customization and viewing tools visualize data in analysis-ready form.

Key capabilities:

- Build dashboards in a visual interface without programming
- Place different types of information objects on dashboard, including: text, hyperlink, Flash, maps, charts, as well as scheduled reports
- Online features of working with dashboards, including: remove, add, delete dashboards, maximize specific dashboards, manage all dashboards from one dashboard, and so on
- Customize arrangement of information objects on one dashboard and provide advanced features to design dashboard and its objects
- Use business graphics (charts and graphs), mapping (spreadsheets of territories), and 3D scenes (visualization and simultaneous analysis as 3D scenes of up to four source data attributes)
- Two operating modes: design (report building) and execution (report view), reducing the time and resources required for report creation

Report Designer

Document form customization and viewing tools were designed to customize and visualize scheduled reports, plans, and budgets in tables based on information from the data warehouse.

Document form is based on the multidimensional structure, which enables users to display data in various analytical profiles (periods, budget items, goods, currency, business units, scenarios, and so on). Dictionary content (structure and architecture of elements) is filled from the unified classifier according to the planned period and other parameters (such as the list of goods depending upon the business unit).

Key capabilities:

- Develop reports generated on regular basis, according to the customer’s requirements to structure and design
- Build analytical notes: reports combining text, tables and business graphics (charts, maps, indicators, speedometers, and so on)
- Unified Excel-like interface
- Wide range of mathematical, statistical, and financial functions
- Rich design capabilities
- Export to external formats (HTML, XLS, PDF, RTF, ODF) and print

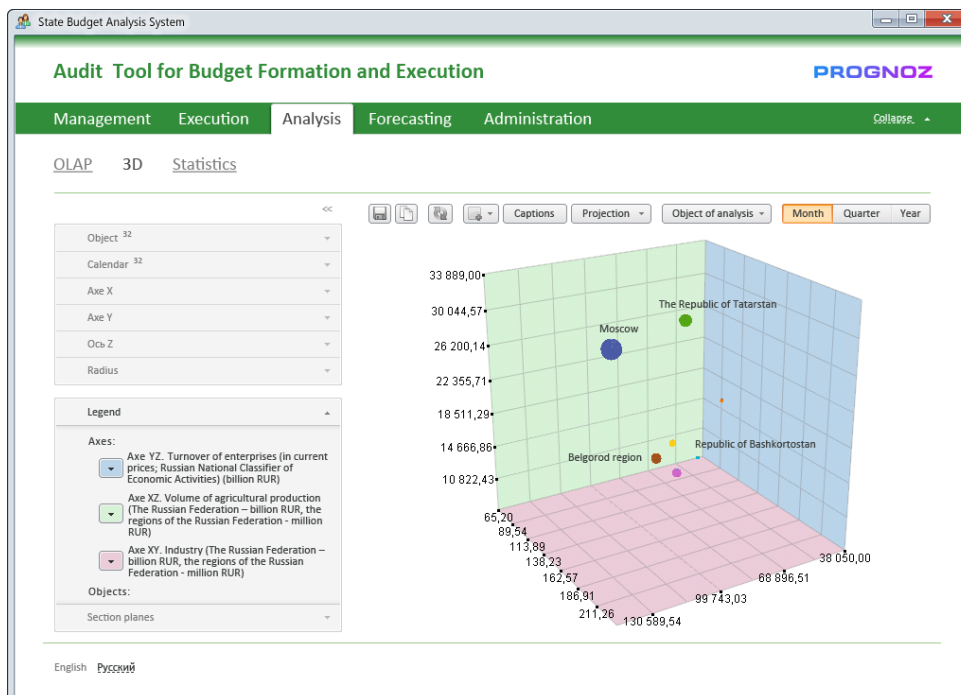


Figure 6. Report Designer

4.4. Administration and data security tools

These tools enable users to delimit access to information resources and functionality of Prognoz State Budget Analysis, as well as to log access.

Key capabilities:

- With regard to delimitation of access to information resources and functionality:
 - Manage the list of users and user groups
 - Manage access rights to information resources and functionality
 - Control access rights to information resources and functionality
- With regard to the access logging:
 - Log access to information resources and functionality
 - View protocol of access to information resources and functionality

5. Technical requirements

5.1. Hardware requirements

Prognoz State Budget Analysis components are installed on the following server equipment:

- System database server
- System Web applications server

Recommended characteristics of the database server:

- Processor: 1GHz
- Random-access memory: 1GB
- Disk memory: at least 10GB

Recommended characteristics of the web-application server:

- Processor: Intel Core Quad 2 GHz or greater
- 64-bit operating system
- Random-access memory: 8GB
- Disk memory: at least 20GB

Database and Web application are compatible within one server.

Recommended characteristics of the client equipment:

- Processor: at least 1.5 GHz
- Random-access memory: at least 512MB
- Disk memory: at least 2GB

5.2. Software requirements

Applied software includes the following components:

- System data warehouse
- Back-end system Web application
- Front-end system Web application
- Prognoz Platform

The data warehouse operates on the platform, which includes the following software features:

- Operating system: Microsoft Windows
- DBMS: MS SQL Server

The front-end Web application operates on the platform, which includes the following software features:

- Operating system: Microsoft Windows 2003 Server SP2, Windows Server 2008, or Windows Server 2008 R2 (Enterprise Edition), with a total number of user not over 250
- Application server: Internet Information Services 6.0 or higher
- The back-end Web application operates on the platform, which includes the following software features:
- Operating system: Microsoft Windows

- Internet Explorer 7.0 or higher
- Flash Player 9.0. or higher

The Prognoz Platform operates on the platform, which includes the following software features:

- Operating system: Microsoft Windows

6. Competitive advantage

Prognoz State Budget Analysis provides a range of advantages:

- **Basic methods and methodologies** to analyze and forecast key parameters of the state budget
- **Flexible tool for automating collection and consolidation of data** from budgeting participants
- **Integration into existing IT infrastructure:** Oracle, MSSQL, Microsoft, and so on
- **Hallmark tools for forecasting** and business intelligence
- **User-friendly visualization** and flexible functional settings
- **One-stop-shop principle**, combining data and functionality in a single interface
- **Access via internet**, including mobile devices such as PDAs, iPhone, and iPad

7. Proven results

International company Prognoz has been working in the IT market since 1991 and **is one of the top companies in developing systems designed to monitor, analyze, and forecast** economic, financial, and industrial processes. Prognoz forecasting and analytical systems improve efficiency of industrial enterprises, federal and subnational authorities, banks, and financial entities.

Prognoz has offices in Perm, Moscow, some of the regions of Russia, and abroad: in the United States (Washington), China (Beijing), Belgium (Brussels), Kazakhstan (Astana), and Belarus (Minsk). The company employs over 1,500 professionals.

Fundamental scientific approaches combined with cutting-edge information technologies allow Prognoz to develop world-class software products that meet the needs of a wide range of customers. Prognoz has successfully implemented **over 1,500 projects** around the world. Among Prognoz customers are International Monetary Fund, the World Bank, World Health Organization, Organization for Economic Cooperation and Development, Asian Development Bank, African Development Bank, The Coca-Cola Company, 3M, Bayer, China Ocean Shipping Company (COSCO), Abu Dhabi Terminals, State Grid Corporation of China, Gazprom, Sberbank, ministries and agencies of various countries, including Presidential Executive Offices of Russia and Kazakhstan, customs services of Russia and Belarus, U.S. Department of Agriculture, and Joint Research Centre under the European Commission.

Prognoz is ranking high in IT ratings over several years. The international analytical and consulting company IDC reports that Prognoz is the leading player on the Russian custom software market.

Prognoz is the Gold Certified Partner of Microsoft, Gold Business Partner of Oracle, and IBM Partner. The quality management system of Prognoz meets the ISO 9001:2008 standard requirements. The company is a proud owner of SAP AG certificate, confirming that the Prognoz Platform meets the requirements for integration with SAP NetWeaver Business Warehouse.