SOME OF THE IFMIS APPLICATION SOFTWARE SOLUTIONS

Introduction

The original version of this document has been developed by a consultant firm (CJSC Avicomp Services, Russia) as an annex to the System Design report prepared during the design of Public Financial Management System (PFMS) in Moldova for the Ministry of Finance (MoF) in December 2005. The purpose of this study was to better understand the capabilities of some of the application software (ASW) modules (commercial-off-the-shelf software packages) in order to assess the level of customization needed to meet the MoF technical requirements while implementing an integrated Financial Management Information System (IFMIS) in Moldova. This study shows that all ASW solutions can provide the desired core Treasury (budget execution) functions with minimal customization. Additional PFM functions can be supported through custom developed software and be integrated with these software packages to provide the full PFMS functionality. In 2006, the MoF kindly agreed to share this annex with other public sector organizations and related specialists for their internal use while designing or studying the PFM systems. This document is intended to present the functional modules of several available ASW solutions which were implemented in similar projects in Europe and Central Asia (ECA) region of the World Bank.

A summary of PFMS functions vs modules of selected ASW is presented below:

- FreeBalance eFinancials (FreeBalance Software, Canada)
- Oracle E-Business Suite (Oracle Corporation, USA)
- SAP R/3 (SAP AG, Germany)

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- Technology Platform

| Web based application support | expected in 2007                                    | Yes                                      | Yes |
| Web services support          | Yes                                              | Yes                                      | Yes |
| Operating System              | Windows                                          | Windows, Linux, UNIX                     | Windows, Linux, UNIX   |
| Hardware                      | x86 architecture                                  | All                                      | All |
| Databases                     | Oracle, MS SQL                                   | Oracle                                   | Oracle, SAP, DB2, Informix, MS SQL |

Several other ASW solutions available in PFM domain can be listed as follows:

- FinancialOne (TechnologyOne, Australia)
- MS Dynamics NAV (Navision) (Microsoft Corp., USA)
- 1C:Enterprise (1C, Russian Federation)

The consultant report presents the functional capabilities of four ASW packages identified by the MoF (FreeBalance, Navision, Oracle, and SAP) based on various sources of the vendors as published in late 2005. Latest versions of these ASW modules can be found in related web sites.
1. LIST OF ANALYZED ASW

This summary was generated based on the open and available information on the considered Information Systems and vendors.

The summary contains the most well-known specialized software that is designed for automated accounting of Treasury budget execution, as well as the most well-known ERP-systems (Enterprise Resource Planning) that can be relatively easily customized to realize the requirements of particular accounting tasks.

It must be noted that the direct comparison of specialized ASW and ERP-systems is not fully correct as both systems classes have their advantages and drawbacks. Specialized systems are superior to ERP-systems in meeting the specific functional requirements but are usually greatly inferior to the latter in terms of overall system realization. ERP-systems implementation entails lesser financial risks due to greater financial stability of such SW manufacturers. The quality of maintenance offered by ERP-systems manufacturers is usually higher due to developed network of branches and authorized centers in various countries.

Analyzed specialized ASW:

- FreeBalance eFinancials (FreeBalance Software).

List of analyzed ERP-systems:

- Microsoft Navision (Microsoft Corporation);
- Oracle E-Business Suite (Oracle Corporation);
- SAP R/3 (SAP AG).

2. ASW OVERVIEW

2.1. FreeBalance eFinancials

2.1.1. Brief Description

FreeBalance eFinancials is the financial management integrated application designed with regard to specific character of financial management in public sector. eFinancials provides unified budget execution system based on GAAP accounting principles.

Software developing company FreeBalance was founded in 1994 in Canada and currently is a large vendor of commercial off-the-shelf software for automation of business processes and state financial functions.

2.1.2. Functional Composition

The standard delivery of FreeBalance eFinancials software product comprises modules necessary to realize financial management functions. eFinancials basis are eFinancials Controls and eFinancials General Ledger modules that together realize standard functionality. Integrally with eFinancials Appropriations and eFinancials Expenditures they form the foundation for the whole system. Additional modules are eFinancials Purchasing, eFinancials Revenues and eFinancials Fixed Assets that can be added, if necessary, to create a scalable solution providing the wide range of functions for corporate accounting and management.

eFinancials Controls

eFinancials Controls module is intended for management of system business rules that are customized to provide the required administrative rules and procedures. The module supports the following functionality:

- Setting COA to determine the details level for appropriations accounting and General Ledger records;
- Setting up user-defined data tables for production and accounting information storage;
- Support of functions for operations with financial periods; and
- Import data from external systems into the single data warehouse for generating reports.

eFinancials General Ledger

eFinancials General Ledger module provides the required financial reporting in compliance with GAAP. All transactions input into the system are automatically registered in the General Ledger. This module offers full-scale presentation of financial information by online query of the accounts and financial reporting status. eFinancials General Ledger offers:

- Double entry accounting with an option to generate the balance sheet;
- Capability to register initial documents in interactive and batch modes;
− COA support which can comprise up to 10 user-defined segments each with the length of up to 12 characters. This coding system ensures detailed and aggregated reports formulation to support analysis; and
− Generation of consolidated reporting at each classification level.

eFinancials Appropriations

eFinancials Appropriations module ensures the distribution and control at the level of planned data, revenues, expenses/expenditures and liabilities (commitments). The control levels can be adjusted to support the changing financial needs of the organization. System parameters can be configured to maintain either prohibitive or preventive control.

eFinancials Appropriations module supports:
− Up to 3 user-defined budget management levels;
− Capability to account for various appropriations types;
− User-defined budget control levels by programs, projects, functional sphere of organization’s activity;
− Mechanisms for input and amendment of budget information minimizing manual input;
− Maintaining complex and multi-year liabilities; and
− Cash management mechanisms.

eFinancials Expenditures

eFinancials Expenditures module allows making expenses/expenditures both in the local and foreign currency regarding related liabilities (commitments). eFinancials Expenditures module offers:
− Possibility to track expenses/expenditures executed both based on invoices and without them;
− Distribution of funds among checks that allows to ascertain whether the appropriate control procedures have been performed at all levels;
− Calculation of exchange rates differences resulting from exchange rates changes and exchange transactions;
− Close integration with Purchasing module (e.g., generating spending authority based on order); and
− Maintaining schedule of payments.

eFinancials Revenues

eFinancials Revenues module provides the functionality for customer accounts maintenance and receipts accounting, as well as processing Accounts Receivable. The module realizes the following functions:
− Creating and servicing accurate and detailed customer accounts and reports;
− Tracking cash sales and recording cash receipts;
− Generating and printing statements on bank accounts status;
− Calculating interest on outstanding customer accounts;
− Generating and printing payment demand letters; and
− Creating customer details for administrative purposes.

eFinancials Purchasing

eFinancials Purchasing module provides purchasing management functionality enabling orders and invoices processing. The module is capable to process complex details and delivery orders within several financial years, track all received or returned goods in accordance with related delivery orders and commitments. The module offers the following functions:
− Generating delivery orders based on one request, several requests, or without any;
− Option to perform delivery orders in foreign currency;
− Option to add standard or non-standard conditions of the contract for individual orders;
− Automated generation of commitments for related orders by the system;
− Rejecting orders for damaged or misdelivered goods and tracking creditor status;
− Automated generation of adjusting record for returned goods and decrease for the status of records on executed orders within the current year.
eFinancials Fixed Assets

*eFinancials Fixed Assets* module enables to track fixed assets status, their acquisition, depreciation and disposal. This integrated module allows recording and tracking the attributes of each asset and management of wide range of variables, including the update of the contractual terms, insurance policy, warranty periods, services rendered on software installation and licensing. The respective functions comprise:

- Control and servicing current and historical status of fixed assets, such as office furniture, laboratory equipment and computer equipment;
- Fixed assets registration using the templates to increase the unification at the description level;
- Prompt execution of queries on fixed assets item search by means of a powerful search engine;
- Calculating depreciation using straight-line and diminishing balance methods;
- Dividing the depreciation process into two phases: making the request for depreciation calculation and confirmation of request for reflecting the updated assets status as depreciation transaction result;
- Checking fixed assets records using optic devices for bar code reading; and
- Creating inventory records for loading into other systems.

2.1.3. Experience in Creating Financial Accounting Systems

FreeBalance solutions operate in over 100 public organizations of USA and Canada. In particular, FreeBalance is used by the Federal Court of Canada, Canada Center for Financial Transactions and Reporting, Canada Immigration and Refugee Council, USA Department of Defense, USA Department of Education, etc.

2.1.4. Experience of Application in Public Finance Management Sphere

FreeBalance implementations in the sphere of public finance management comprise realized functions of Treasury in the Ministry of Finance of Afghanistan, Kosovo Central Financial Department, and East Timor Financial Department.

2.1.5. Functional Requirements Compliance Analysis

Budget Preparation and Approval, Budget Appropriations Management

*eFinancials Appropriations* module is intended for budget appropriations management. Two levels of control over non-exceeding of appropriations is supported – prohibitive and preventive. Appropriations and planned data on different budgets revenues (up to 3 levels) can be registered in the system. The module realizes the capability for appropriations maintenance within several years.

Commitments Management, Payments and Receipts Management

*eFinancials Purchasing* and *eFinancials Expenditures* modules are designed for commitments and payments management. *eFinancials Purchasing* module enables to record legal and financial commitments. Based on input commitments *eFinancials Expenditures* module generates payments. This module supports the capability to track expenses/expenditures both invoiced and not. Receipts management function is realized by *eFinancials Revenues* module intended for customer accounts maintenance, accounts payable processing and receipts accounting. Outstanding customer accounts interest calculation is supported. Receipts analysis regarding previously registered planned data is provided.

Functions to operate with banks are integrated in modules *eFinancials Revenues* and *eFinancials Expenditures*. *eFinancials Revenues* module generates statements on bank account status. The system supports bank interaction interface.

Cash Management

*eFinancials Appropriations* and *eFinancials Expenditures* modules realize cash planning functions. Schedule of payments and funds spending authorization mechanisms are supported.

Fiscal Reporting

FreeBalance eFinancials modules contain a large number of standard reports. To develop additional reports the report writers Crystal Reports and Cognos Impromptu are used.

FreeBalance provides multi-dimensional data analysis using OLAP technology realized on the basis of Cognos PowerPlay.
Accounting Functions

The system supports COA that may comprise up to 10 user-defined segments (with analytical characteristics, e.g., budget classifications) each with the length of up to 12 characters. Such coding system ensures reports generation at various levels of aggregate data.

eFinancials General Ledger module realizes accounting functions. All transactions input into the system are automatically registered in the General Ledger.

The module allows accounting execution in compliance with double entry principle with an option to promptly generate the balance sheet. Capability to register initial documents in interactive and batch modes is supported.

2.1.6. Technological Requirements Compliance Analysis

FreeBalance eFinancials system is a modular easy solution developed for optimization of government financial control and reporting. FreeBalance eFinancials was designed using multi-level architecture.

FreeBalance eFinancials can only operate on Intel hardware platform under Windows Server operating systems. It is also planned to transfer the solution onto UNIX and LINUX. Oracle, MS SQL Server, Solid Server DBMS are supported.

FreeBalance can support users operation with the connection to central database.

The producer declares multilingual support capability.

2.2. Microsoft Navision

2.2.1. Brief Description

Microsoft Business Solutions-Navision (hereinafter Microsoft Navision) software product is an integrated management system for small and midsize enterprises of various economic activity sectors.

Microsoft Business Solutions-Navision software developer is Microsoft Corporation, one of world leaders in the software development sphere. The line of activity regarding the delivery of integrated solutions for enterprise automation is relatively new for the company, however is currently rapidly growing.

2.2.2. Functional Composition

Microsoft Business Solutions-Navision solution for public sector comprises the following principal modules:

Finances

Provides COA maintenance and contains functional tools to maintain management and accounting records. Provides financial transactions registration in the General Ledger using the wide range of analytical characteristics, as well as formation of wide specter of reports. Finances module is integrated with other system modules. Finances module includes the following main sub-modules:

- **Budgets** – allows budget data registration with the use of pre-determined set of analytical characteristics to support the required details of budget data.
- **Debtors and creditors settlements** – provides debtors and creditors data maintenance, allows debtors and creditors accounts registration, automatic creation of offers to pay for creditors accounts and other financial documents.
- **Bank/cash** – provides bank accounts maintenance in different currencies and comprises the required accounts management tools from generating payment documents to bank statement processing including reconciliation and control of bank account fund balance.
- **Fixed assets** – supports accounting for fixed assets, depreciation in compliance with various calculation algorithms and other fixed assets management functions.

General Ledger

Provides for the General Ledger accounting entries to be posted according to double entry method and generation of the regulated accounting reporting.

Purchases and Suppliers

Provides procurement process management, supplier bills/invoices recording, as well as inventories management, including receipt, movement and usage of materials, goods and finished products sale to buyers, etc.
Microsoft Navision software product also includes the following modules: Sale and Customers, Human Resources, Marketing and Sales, Customer Relations Management, Production Management, E-commerce and Cooperation.

Generating Reporting and Output Documents

Microsoft Navision software product includes the following tools for writing reports:

- **Standard Reports.** The software product contains over 30 standard reports enabling actual data analysis, comparison of planned and actual data, of actual data for different periods, etc. To generate standard reports a possibility to use report parameters input forms is provided that allows to specify data selection periods, to set the details level for reporting data, etc.

- **Analytical Reports.** This module is included into Finances module and allows setting up new reports for financial and budget data analysis by analytical characteristics. The use of this tool enables the reports to be generated by various analytical characteristics, to determine data selection screens, reports columns composition, their contents, etc. Moreover, the system provides the possibility to generate the reports with an option to view the initial documents serving as basis for calculation of total figure in the report.

- **Report Designer.** Allows developing new programs for writing reports of any format using specialized programming language.

2.2.3. Experience in Creating Financial Accounting Systems

Microsoft Navision is one of the most popular ERP systems for midsize business. More than 260,000 customers operate it all over the world. International selling network comprises more than 4,500 partners and approximately 3,800 employees in 132 countries.

2.2.4. Experience of Application in Public Finance Management Sphere

The data on implementation of the systems comparable to GFMIS dimensions in public finance management on the basis of Microsoft Navision solution was not found in open sources.

2.2.5. Functional Requirements Compliance Analysis

Budget Preparation and Approval, Budget Appropriations Management

Budget Appropriations can be registered in the system by means of Budgets sub-module functionality. Budget data storage structure represents a multidimensional table for planning by periods in the context of several analytical characteristics. The system allows budget formation of various structures and specification level in compliance with the applied analytical characteristics. Organizational units (e.g. Ministries and agencies, budget institutions ), budget classification codes, etc. can be used as analytical characteristics. Budget data can be registered in the system manually or imported from Excel electronic tables.

The system supports inputting changes into the registered budget data including data transfer between organizational units, budget classification codes, and financial periods. Provides budget data amendments history maintenance.

Actual budget execution is reflected in the form of accounting entries in the General Ledger. Using identical analytical characteristics in budget structure and General Ledger provides planned and actual data comparability.

Commitments Management, Receipts and Payments Management

Recording legal commitments on contracts with the suppliers of goods, works, and services can be realized by Purchases and Suppliers module. The system will be able to provide the capability for commitments data registration including all the required information on the suppliers of goods, works, and services.

On acceptance of budget commitments for accounting the system provides visual control option for budget commitment amount not to exceed the amounts of available appropriations balances. The realization of the automatic commitments control will require additional development.

No information has been found in the open sources to confirm that the realization of Receipts Management functional process is possible using the standard modules of Microsoft Navision.

Interaction with the bank payment system can be organized by means of Bank/Cash module functionality. The system allows generating payment documents based on suppliers’ bills/invoices, as well as processing bank statements with simultaneous reconciliation of statement data against system-registered data.

The system comprises the reports allowing the analysis of bank accounts status. New reports of the required formats can be developed if necessary.
Cash management

No information has been found in the open sources to confirm that the realization of Cash Management functional process is possible using the standard modules of Microsoft Navision.

Financial Reporting

The system functionality supports generation of a number of standard reports. The system also has the toolbox for random analytical reporting and report designer that allows developing the regulated reports missing in the system. The system provides for reports to be exported into Excel format.

Accounting Functions

Finances and Accounting modules are used for realization of the functional process. The use of these modules ensures the fulfillment of the following functions:

- Accounting for financial transactions in local and foreign currency;
- Applying analytical characteristics for accounts specification;
- Accounting transactions journals that are set up according to given requirements;
- Automatic generations of accounting entries in accordance with the specified rules, including automatic closing of accounts and rollover of accounts balances to the following year;
- Accounting reports consolidation for several organizational units.

2.2.6. Technological Requirements Compliance Analysis

Microsoft Navision-based solution can operate on various hardware only under Microsoft operating systems. The system can only use Navision or MS SQL Server DMBS.

Microsoft Navision has modular structure. The modules, in turn, comprise sub-modules and objects. The system structure allows modification of any individual object without changing others, thus supporting the simplicity and efficiency of system configuration and functioning. Settings flexibility and open development environment allows sectoral solutions creation for use in the respective fields of activity, as well as individual solutions realizing specific enterprise requirements.

Microsoft Navision has tools for data loading into ASCII text files (with separators or fixed length fields), as well as into Excel format.

2.3. Oracle E-Business Suite

2.3.1. Brief Description

Oracle E-Business Suite software product is a full-functional complex of integrated software applications ensuring all aspects of enterprise activity management.

Oracle Corporation is one of the world largest corporate software vendors. With annual sales turnover of over 10 billion USD the company offers full complex of technologies for IT-infrastructure build-up and enterprise management. Overall number of Oracle E-Business Suite and its previous version Oracle Applications implementations is above 13,000 worldwide.

2.3.2. Functional Composition

Oracle E-Business Suite solution for the public sector is based on the following functional modules:

Oracle General Ledger

Is a standard component and comprises central warehouse of system accounting information. Transaction results from other system modules are transferred into the General Ledger in the form of accounting entries. The General Ledger is founded upon a unified COA with segmented structure. Budget maintenance function providing budget data registration and their reflection in the General Ledger is an integral part of Oracle General Ledger module.

Oracle Procurement

Oracle Procurement module is aimed to automate the procurement process. It provides the capabilities for input and processing of various documents from requests for purchase of goods, works, or services to contracts registration. Oracle Procurement module is closely integrated with Oracle General Ledger module in the part of budget control and funds provisioning.
Oracle Payables

*Oracle Payables* module is closely integrated with *Oracle Procurement* module and used for payments execution. The payments are generated on the basis of registered invoices. In turn, invoices registered in the system are matched against the procurement documents data from *Oracle Procurement* module. *Oracle Payables* module enables to manage payment documents schedule based on payment priorities and dates. If necessary the payment can be postponed (suspended) by blocking the invoice. The information on payments made is transferred into the General Ledger.

Oracle Receivables

*Oracle Receivables* module together with *Oracle Cash Management* module is used for invoices and other sales documents formation, as well as for receipts processing. Receipts information is transferred to the General Ledger.

Oracle Cash Management

*Oracle Cash Management* module is closely integrated with *Oracle Payables*, *Oracle Receivables*, *Oracle General Ledger* modules and supports bank accounts register maintenance. Enterprise financial flows’ management and bank statement processing is realized on the basis of *Oracle Cash Management* module. The module allows processing electronic bank statement, showing bank statement processing results in the General Ledger, as well as performing automatic process of statement reconciliation against payment documents registered in the system.

Oracle Financial Analyzer

*Oracle Financial Analyzer* module is a powerful planning and budgeting tool. It is closely integrated with the General Ledger and allows using central warehouse of accounting and financial information for multidimensional analysis.

Generating Reporting and Output Documents

Oracle comprises complete standard toolset required for writing reports of different complexity. Each module contains large number of standard reports. In addition the system allows developing additional ad hoc reports that cannot be realized by standard report writing tools.

2.3.3. Experience in Creating Financial Accounting Systems

*Oracle E-Business Suite* product has been used for creation of distributed financial and accounting systems operating on hundreds of geographically-distributed sites and servicing thousands of users. The product has high scalability characteristics, is capable to support bulk of transactions and thousands of concurrent users under the installation on one computer complex.

Among Oracle Customers there are over 4,300 government institutions in 50 countries. This sector brings the company 24 % of its profits.

2.3.4. Experience of Application in Public Finance Management Sphere

Currently *Oracle E-Business Suite* is being implemented in Bosnia and Herzegovina, Uganda, and Ghana Treasuries under World Bank projects. The description of some projects on automated systems creation in government structures based on *Oracle E-Business Suite*, which in broad terms is compliant with the present evaluation, is provided below.

As examples of employing *Oracle E-Business Suite* system for realization of public finance management functions Kazakhstan Treasury and Melbourne Financial Department (Australia) can be named.

2.3.5. Functional Requirement Compliance Analysis

Budget Preparation and Approval, Budget Appropriations Management

Standard budget management function of *Oracle General Ledger* module allows creating and storing appropriations on the basis of COA maintained in the system. The use of segmented structure of the COA enables to form a structured COA in the context of various analytical characteristics (budget classification items, organizational units, etc).

To streamline the efficiency of operation with budget data the Electronic Tables Integrator can be used for initial loading of planned appropriations. The integrator supports the capability for budget formulation in Excel format and loading it into the system.
Introduction of changes into planned appropriations is reflected in budget journals, which allows auditing all budget changes. The system also provides the tools to lock budget data from changing and viewing by certain groups of users.

Budget control and liabilities (commitments) recording functions of Oracle General Ledger allow realizing the control mechanism over budget funds spending within the limits of approved appropriations using standard facilities.

Commitments Management, Receipts and Payments Management
For registration and recording of commitments with and without contracts with the suppliers the functionality on contract or request maintenance of Oracle Procurement module can be used. There is an option of attaching to every Procurement document its electronic copy or any other electronic document (act, bill of lading, etc). The contract may be input manually or created automatically based on previously entered procurement request.
To ensure control that commitments amounts do not exceed planned appropriations amounts the system provides procurement documents control. The check is executed by budget expense classification codes, spending units, etc. The system envisages 3 control levels: prohibitive, preventive and no control.
Oracle Payables module functionality can be used for registration of Payment Requests in the system.
To account for budget receipts and revenues refunds the functionality of Oracle Receivables and Oracle General Ledger modules can be used. However, it will require significant refinements related to peculiarities of accounting for payments into the budget and the necessity to interact with STI information system.
For processing of unclassified receipts additional development will be required to provide data on periods the payment stays in uncertain payments schedule, to ensure automatic allotment of overdue uncertain payments into budget revenues, and to form the required set of reports.

Bank Management
The system provides payment documents formation and bank statement processing for interaction with the bank payment system. Bank statement processing is possible in manual and automatic modes. Tools for automatic loading of the bank statement are available.
For management of outgoing payment documents it is suggested to use the functionality of Oracle Payables module providing generation of payment documents schedules together with the budget control of Oracle General Ledger module and bank statement reconciliation performed by Oracle Cash Management module.
The required reporting on incoming and outgoing payments can be realized by means of General Ledger Financial Reports Generator. Formulation of the regulated reporting can be realized by usage of additional developments.

Cash Management
Cash planning function can be realized by means of several system tools. Standard budget management function of Oracle General Ledger module allows for forecasts versions creation as working versions of the budget. The system provides for creation of comparative reports on planned and actual data for the specified periods, as well as for generating the reports on budget execution outcomes for current year and previous periods in detailed and summarized form. Oracle Cash Management module allowing payments and receipts forecasting based on General Ledger actual and budget data, outstanding debtors and creditors bills/invoices, unexecuted contracts and procurement requests can be used for financial flows forecasting.

Financial Reporting
Each Oracle E-Business Suite module contains a variety of standard reports enveloping various aspects of enterprise or organization activity.
Oracle General Ledger contains also a powerful tool for writing financial statements of various complexity levels – Financial Documents Generator. The tool does not require knowledge of complex programming languages command and can be used directly by system users for writing own reports.
If presentation format or content of system-proposed reports are inadequate the additional refinement to the existing types or the development of new reporting types can be performed.

Accounting Functions
Oracle General Ledger module is the central warehouse of accounting and management data receiving transaction data from other modules.
COA account structure comprising a set of segments allows supporting different extent of analytical accounting. COA structure supports up to 30 segments of additional analysis, where each segment record length is up to 25
characters. Subsidiary ledgers (sub-ledger) used for additional analysis, e.g., suppliers analysis, etc. can be maintained for the respective General Ledger accounts.

_Oracle General Ledger_ module ensures the observance of double entry principle and enables obtaining current balance sheet at any moment. Flexible calendar system allows operation in several periods concurrently and assignment of special periods for closing of the financial year. Transactions providing automatic accounts closing and balance rollover to the following year are supported.

General Ledger supports various types of accounting entries including periodic, reversed, and statistical. Foreign currency entries posting is possible. The process on generation of accounting entries is fully automated. Transactions on initial documents in all system modules can be set up to a particular pattern for creating accounting entries. Entries resulting from transactions registration in different system modules are transferred into the General Ledger in batch mode.

### 2.3.6. Technological Requirements Compliance Analysis

_Oracle E-Business Suite_-based solution can operate on a large range of hard- and software computing platforms. The system is capable to use a large number of server equipment and Linux, Microsoft, Unix, Sun Solaris operating systems. Only Oracle DB DMBS is supported.

_Oracle E-Business Suite_ has modular expandable structure that can be adapted to the specific requirements. All modules are closely integrated between each other and operate using a unified database. Moreover the system possesses standard tools providing _Oracle E-Business Suite_ integration with other applications, as well as development tools in order to realize any lacking functionality. _Oracle E-Business Suite_ supports users operation with the connection to centralized database regardless of user territorial remoteness. Each user workplace can be configured with the consideration of his authorities and access rights to the system data and functions. _Oracle E-Business Suite_ has the tools for data export into text files, MS Excel, and other formats.

### 2.4. SAP R/3

#### 2.4.1. Brief System Description

_SAP R/3_ software product represents an integrated system for activity management of organizations from various economy sectors. _SAP R/3_ solution is a set of integrated customizable modules that form a unified information environment required for efficient work. _SAP R/3_ software developer is SAP Company, which has been established in 1972 in Germany and is one of the largest vendors of software solutions for automation of organizations in the world. SAP software operates in more than 18,000 organizations in 120 countries.

#### 2.4.2. Functional Composition

A standard set of the delivered system implies the usage of the following main system modules:

**Financials (FI)**

*Financials (FI)* module is one of the key system modules and comprises the following key functions:

- **Maintaining General Ledger (FI-GL)** – provides maintaining COA, recording accounting entries and generating the balance sheet. As part of the functionality on maintaining the GL there is a possibility to maintain several COAs and General Ledgers. Maintenance of analytical accounting is achieved by means of expandable list of analytical characteristics.

- **Settlements of accounts payable and receivable (FI-AP, FI-AR)** – provides maintenance of creditors and debtors registers, registration of the prepared and received bills/invoices, registration of demands for payment and advance payment, mass and single generation of payment documents, analysis on the status of settlements for the prepared and received bills/invoices.

- **Maintaining assets accounting (FI-AA)** – classification and accounting for the fixed assets items, accounting for fixed assets transactions, calculation of depreciation using various methods and in compliance with different accounting standards.

- **Consolidation** – ensures consolidation of the accounting data from individual companies in order to prepare the summary balance sheet for a certain group of companies (concerns or holdings, agencies).

_Settlements of accounts payable and receivable (FI)_ module is closely integrated with other system modules: when performing transactions on the basis of other modules functionality the system provides for automatic generation of entries in the General Ledger basing on previous settings. In addition, the module _Settlements of accounts payable and receivable (FI)_ comprises the facilities that support closing of the financial period and year.
Funds Management (FM)

*Funds Management* module provides for the registration of the budget structure, input of the initial budget, registration of budget data adjustments, control of budget allocations accessibility and budget execution analysis. *Funds Management* module comprises the tools for blocking and unblocking of budget data. Besides, the module allows rollover of budget data from one financial year to another according to established rules.

Treasury (TR)

*Treasury* module ensures processing of bank statements, formulating of forecast on funds receipts and spending, registration of the cash plan, management of securities, loans, market risks, etc.

Material Management (MM)

*Material Management (MM)* module supports maintenance of different types of contracts with suppliers, registration of purchase orders and requests and management over inventories within an organization. *MM* module is closely integrated with *FM* module and, as a consequence, the system provides control of budget funds availability on registration of purchase documents.

In addition, *SAP R/3* includes modules for other activity areas: *Sales and Distribution (SD)*, *Controlling (CO)*, *Project System (PS)*, *Human Resources (HR)*, *Production Planning and Management (PP)* and others.

Generating Reporting and Output Documents

Every *SAP R/3* module comprises a great number of standard reports. The reports are generated using parameters input forms that allow generating the reports for different periods, with various levels of details, etc.

In order to realize lacking reports the system comprises the report writers (*SAP Query*, *Report Writer*, *Report Painter*) incorporated into the system structure. The usage of report writers is a convenient tool to generate the query reports that do not require programming skills from the user. In the event of impossibility to generate some complicated reporting forms by means of report writers there is an opportunity to use programming language ABAP.

For multidimensional data analysis *SAP BW* data warehouse is employed, which is an independent application. It supports storage and conversion of data coming from *SAP R/3* system or other automated systems, formation of standard reporting forms, comprises means for generating standard reports and query reports.

Industry solution

For general government sector *SAP Company* has designed a special industry solution – *SAP for Public Sector*, which is oriented for the following user groups:

- municipal executive authorities, including budget institutions, financial departments, and Treasury units;
- Non-commercial organizations, e.g., educational institutions, research institutes, associations, funds, etc.

*SAP for Public Sector* industry solution is designed on the basis of standard *SAP R/3* software product modules and is supplemented with special components, which are oriented to meet specific requirements of government authorities.

2.4.3. Experience in Creating Financial Accounting Systems

*SAP R/3* product has been successfully used for creation of distributed financial and accounting systems operating on hundreds of geographically-distributed sites and servicing thousands of users. The product has high scalability characteristics, is capable to support thousands of concurrent users under the installation on one computer complex.

2.4.4. Experience of Application in Public Finance Management Sphere

Currently *SAP for Public Sector* operates in more than 2,800 government institutions in 35 countries around the world. At that *SAP* share on the market of ERP-systems for public sector is amounted to 43 % (Oracle – 17 %, Navision – 1 %) according to AMR (2000).

As examples of applying *SAP R/3* system for realization of public finance management functions the informational systems of State Treasury under MOF of the Republic of Croatia and Federal Ministry of Finance of Austria can be named.
2.4.5. Functional Requirement Compliance Analysis

**Budget Preparation and Approval, Budget Appropriations Management**

*Funds Management* (FM) module provides for the procedures of budget data maintenance, accounting and control. The Budget appropriations can be registered in the system in the form of structured budget plan, presented as listing of budget items by organizational units. The structured budget plan has a hierarchical structure, which provides a basis for budget data input into the system and is formed within the limits of a financial year. Structured budget plan can also be used for cash plans registration.

Changes in planned appropriations are realized using the documents on budget reduction and increase, documents on budget data transfer between line items or organizational units. The application of such mechanism allows tracking of all amendments introduced into the budget data.

The module has control functions for commitments and payments amounts in order not to exceed the planned data. The system also provides various supplementary mechanisms for budget data management, videlicet for blocking and provisioning of budget appropriations.

**Commitments Management, Receipts and Payments Management**

Registration of budget commitments within the system can be realized by using the functionalities of *Material Management* (MM) and *Financials* (FI) modules.

Within the limits of *Material Management* (MM) module the system allows registering procurement documents: contracts with goods and services suppliers, procurement orders. Procurement documents include information on budget classification codes, on source of funds origin, budget institution making a purchase and other attributes.

For registration of Payment Requests in the system, the functionality of *FI-AP* module can be used.

The system provides automated control of budget availability when procurement and financial documents are recorded into the system and allows setting up various control levels:

- **Prohibitive** – means that the procurement or financial document cannot be registered in the system when available budget fund balances are exceeded.
- **Preventive** – means that the procurement or financial document can be registered in the system when available budget fund balances are exceeded. At that the system generates the appropriate notification on the fact that budget fund balances are exceeded.

Within the information system of *Material Management* (MM) and *Financials* (FI) modules the system realizes a set of standard reports that allow analyzing the registered procurement documents and their status.

Functions related to receipts processing and accounting are realized by means of special solution: *PSCD – Collection and Disbursement*.

This solution is designed to perform a broad set of control and accounting procedures related to tax and other receipts collection management. This solution is capable to realize the task on allocation of taxes pursuant to the established rates.

PSCD solution is closely connected with *SAP R/3* components: *Funds Management* (FM), *Financials* (FI), *Sales and Distribution* (SD), and *Controlling* (CO).

Realization of *Payments Management* processes can be fulfilled by means of modules *Financials* (FI) and *Treasury* (TR).

Within the limits of *Banking Accounting* functionality in FI module the system enables the automation of transactions for payments preparation: selection of open payables (creditors) items, definition of payment type and bank details of the spending unit, generating and printing out payment documents. The system organizes matching control for the amounts of generated payment documents and the amount of bank account balance.

The system enables the registration and control of bank statement, including the capability to process electronic statement. For receipts processing the system incorporates the facilities to classify the receipts in accordance with budget classification codes.

The system possesses the tools for organization of electronic workflow with credit organizations. The system supports and identifies the most widespread formats of data exchange with the banking system.

**Cash Management**

*Cash Planning and Management* function can be implemented via SAP system software solution *Strategic Enterprise Management – Business Planning and Simulation (SEM BPS)*, which provides multipurpose tools for realization of the process on long-term and short-term planning of financial and economic activity of an enterprise. This solution is integrated with solutions *SAP for Public Sector* and *SAP BW*.

Solution functionality supports cash planning functions and forecast generation basing on the data for past periods.
Financial Reporting

All required reporting can be generated by Informational systems in *SAP for Public Sector* and *SAP BW* solution – data warehouse.

All *SAP for Public Sector* system modules comprise a great number of standard reports. The Informational system allows generating various types of reporting including the reporting on totals with the capacity to switch over to detailed items, registers, lists, etc., with the application of a wide range of sampling criteria.

In order to generate additional reporting forms the system provides for the following facilities: search and analytical reports subsystem, report writers (*SAP Query, Report Painter, Report Writer*). In the event of necessity to generate complicated reporting forms using a great data volume from different system modules there is an opportunity to use internal programming language ABAP.

Besides, various reporting forms can be generated by *SAP BW* Information warehouse system component. *SAP BW* Information warehouse is an independent application from the solution package offered by SAP for data storage and writing reports. At that a multidimensional analysis, which includes search and analytical reports system capabilities, can be used.

Accounting Functions

Requirements to accounting and accounting reporting generation procedures are fulfilled by functionality of *Financials (FI)* module. *FI* module is the key system element and supports the maintenance of accounting for an enterprise or a group of enterprises. The system enables maintenance of parallel accounting pursuant to different accounting standards, usage of several currencies for accounting, and generating a set of accounting reports. Accounting entries are saved in the system in the form of electronic financial documents, containing the information on economic transaction: transaction title, accounts, transaction amount, entry currency, analytical characteristics such as budget classification and organizational units.

*Financials (FI)* module is integrated with other system modules, and provides automatic generation of accounting entries resulting from transactions registration, performed by other system modules. The system provides the tools for defining rules to be used to select the accounts of automatic accounting entry. The system supports various control types on registration of accounting documents: control of the posting date matching against the period opened for transactions, control of filling in the mandatory fields, e.g., analytical characteristics and field values permissibility control, etc.

In the *Financials (FI) and Funds Management (FM)* modules the transactions on closing of financial years such as automatic closing of General Ledger accounts and rollover of the General ledger accounts balances to the following year are automated.

2.4.6. Technological Requirements Compliance Analysis

*SAP R/3*-based solution can operate on a large range of hard- and software computing platforms. The system is capable to use a large number of server equipment and Linux, Microsoft, Unix, Sun Solaris operating systems. *Oracle DB, SAP DB, DB2, Informix, MS SQL,* and *Oracle DMBS* are supported.

*SAP R/3* has modular expandable structure that can be adapted to the specific requirements. All modules are closely integrated between each other and operate using a unified database. Moreover the system possesses standard development tools in order to realize any lacking functionality.

*SAP R/3* supports users operation with the connection to centralized database regardless of user territorial remoteness. Each user workplace can be configured with the consideration of his authorities and access rights to the system data and functions.

*SAP R/3* has the tools for data export into text files, *MS Excel,* and other formats.