

Auditing of the Software of Computer Accounting System

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Abstract. The article is aimed at determining the order and methodology of auditing the software of the computer accounting system (CAS). It has been found that software auditing should be performed separately for each of its components. The components of the functional part of the CAS software are the database management system (DBMS) and the application software supporting the accountance automation. For auditing of the first component part are used such techniques as general evaluation, subject check of the embedded algorithms of information processing. Auditing the client software algorithms is carried out by means of the control data method, which is reduced to such procedures as creation of another database of test data with imaginary objects and its processing by the client program, as well as introduction in a copy of the real database of imaginary objects (employees, creditors, material values) and the formation of reporting. Not only the current methods of calculation or evaluation of accounting objects, but all of the software, are subject to mandatory verification. This will avoid errors if the enterprise accounting policy changes.

Keywords: computer accountance system, auditing, functional component, DBMS, software algorithms, test data, imaginary data.

1 Introduction

Modern accounting practice is focused on automated data processing. The use in business of information technology and computer networks in the process of collecting and generalizing of information have changed environment for both accounting and auditing. Under these conditions, instructional techniques of audit are changed. Information technology allows processing of large data amounts, making the methodological basis of audit more complete and relevant to modern business requirements.

Many reputable authors such as [9] believe that the basic components of a modern digital computer are: Input Device, Output Device and Central Processor. It is a system in which accountants enter financial data into spreadsheets and other accounting software, and then mathematical algorithms compute the information into the necessary ledgers and financial statements [10].

In our opinion, computer information technologies become the auditor's tool and at the same time the subject of its inspection. It requires the expansion of the methodical tools of the controller. All components of the computer accounting system are subject to the audit, namely:

- information as an object and a product of audit;
- technical support - computing, telecommunication and other technical means;
- software in which accounting methods are implemented;
- a specialist who implements the information process and owns accounting methods but also special knowledge and software skills.

Other authors have the same opinion "Audit function include under the accounting information systems of electronic checking all the components of an electronic information system: Workers, the hardware, software and the database These components are integrated with each other in order to achieve the objectives of review" [1]. Each of these components has the reliability risks of financial reporting and has its own verification methods.

Author [10] determines such main five steps of the audit process for a computerized accounting system:

- 1) conducting the initial review (planning the audit);
- 2) reviewing and assessing internal controls;
- 3) compliance testing (testing the internal controls);
- 4) substantive testing (testing the detailed data);
- 5) and reporting (conclusions and findings).

However, the author [10] does not include to the audit steps the inspection of such component of computer accounting system as application software. This is important part of information process because it is here that the algorithms of data processing are laid out. Therefore, mistake made here is multiplied exponentially. Furthermore, in tests often overlooked such as part of software as databases, namely, it is the basis for controlling access to data, limiting user functions and journaling their actions.

Other authors [1] determine such procedures of Software control as: "1) Verification procedures for the accreditation of programs. 2) Verification tests of aggregates for regulatory programs itself. 3) Sudden review procedure programs during the time of use. Control over the database: it must ensure the protection of databases in the enterprise and for the following reasons: 1) To contain a huge amount of data. 2) To contain basic data and confidentiality of the facility. 3) Databases are one of the assets of the facility."

At the same time, the authors do not provide characteristics for these procedures of Software control. In addition, the authors point to the importance, but do not define the methods of checking the DBMS, which is also part of the application software hidden from the accountant.

The purpose of the article is to determine the procedure and methodology for auditing the software of the computer accounting system (CAS), in particular its supporting and functional components (namely accounting software and DBMS).

Methodology of the Study. It is a theoretical study relies on deductive approach where we use deductive approach in the preparation of the theoretical framework for the study and formulation of the problem and research hypotheses.

2 Theoretical and Methodological Background

It is known, the auditing methodological background is set out in International Standards on Auditing. They are recognized in Ukraine. The International Auditing Standards (ISA) established the provisions and recommendations for implementation of auditing in the computer environment in 2004, namely:

- International Standard on Auditing 401 "Auditing in Computer Information Systems Environment";
- IAPS 1001 "IT Environments – Stand-Alone Personal Computers"
- IAPS 1002 "IT Environments – On-Line Computer Systems"
- IAPS 1003 "IT Environments – Database Systems"
- IAPS 1009 "Computer-Assisted Audit Techniques".

In January 2005, released a new edition of the International Standards on Auditing, which marked a radical restructuring of their ideology on the use of information technology - standards of auditing in IT Environments removed and all audit was considered as a Computer Audit. The same trend has been extended in subsequent editions of ISA.

It should be noted that the technology of accounting, and therefore the audit is conducive to their computerization. In particular, the preconditions for the creation and use of auditing automation systems are:

- the possibility of formalizing accounting transactions (the ability to prescribe accounting transactions in the mathematical formula). For accounting is typical using of a variety of simple arithmetic operations, regulated rules of information processing (mathematical formulas, actions with tables, double entry, list the typical accounting activities, etc.) significant amounts of data. Formula can be prescribed calculation of turnover, balance of synthetic accounts, proper payments to the budget and extrabudgetary funds, indicators of financial and economic activity;
- creating and using of arrays of normative reference information;
- business activity in general and its types are subject of state regulation. In particular, the work of hired workers and their payment, social insurance of employees, the quality of manufactured goods, the amount of taxation, etc. are normalized. All these norms of state regulation, as a rule, are put into directories of the information system;
- standarding of audit. Audit is characterized by clear rules for its implementation and documentation. It is advisable to automate the compilation and editing of audit documents such as a consent letter for audit, agreement for audit, the auditor's report, required set of worksheets, tests, etc.
- high level of development of computer technology, computing power, communication technologies. The current level of development of technical support allows to automate most of the audit procedures, but also provides the possibility of a virtual presence of the auditor in verifying the geographically distant objects. The use of "cloud computing" creates preconditions for remote access to enterprise documents;
- high level of development of mathematical methods of economic analysis, used to assess the financial and economic enterprise activity. The software contains complex methods not only for the current or retrospective analysis, but also forecast. It is a powerful tool for an auditor, an economist and a top manager for the evaluation

of the effectiveness of managerial decisions, probability of bankruptcy, solvency restoring. Most of the analysis tasks have a mathematical basis and therefore they can be automated.

Automation of audit procedures provides a number of advantages. It decreases the volume of work along with an increase in the accuracy of the verification. It is advisable to use entire audit method that reduces audit risk.

The use of global networks, cloud computing tools makes it possible to make audit in geographically distant access to the database. It increases the availability of audit services, decreases its cost, allows clients to engage audit firms with the better reputation (for example, from other regions of the country or from abroad).

This sudden change in the development of various organizations led to the change in the nature of audit evidence generated by each financial transaction [9]. Along with this, the requirements for the qualification of the auditor are increased. Required condition is not only an understanding of data processing algorithms in the client's accounting software, but also understanding of audit automation programs. The auditor should be aware of the novelties of the application software market (accounting and auditing) and general purpose. The auditor is therefore required to possess reasonable knowledge of various hardware and software used in the organization in order to audit a computerized accounting system. The last few years have been an exciting time in the world of IT auditing as a result of the accounting scandals and increased regulations [9].

To solve the managing tasks, the components of the software are divided into: functional and non-functional subsystems (fig. 1).

3 Audit of Non-Functional Software of Enterprise

The non-functional component of the information system completely determines the characteristics of the overall information system because it reflects its system-technical, structural side and it is intended for the implementation of the functional part of information system. It is not related to solving the of the tasks of the subject area, but creates an "environment" for the acting of functional software. Its task is to promote the effective functioning of the overall system and its components particularity. It should be noted that the non-functional component of the information system is not an end in itself, it is intended for the rational organizing and operating of the functional component. However, the successful operation of the latter is impossible without the components of the first one.

The non-functional component of the information system include informational, technical, mathematical, program, linguistic, organizational, technological, legal and methodological support. They perform an supporting function in the computer accounting systems. These include, in particular, operating systems, antivirus software, text editors, spreadsheet editor, font editor, etc.

The coordinated activity of the functional component of the enterprise information system is impossible without proper organization of its Non-Functional subsystem. The discrepancy of the selected functional software to the basic characteristics of the Non-Functional subsystem will not allow successful implementation of the tasks of the application area.

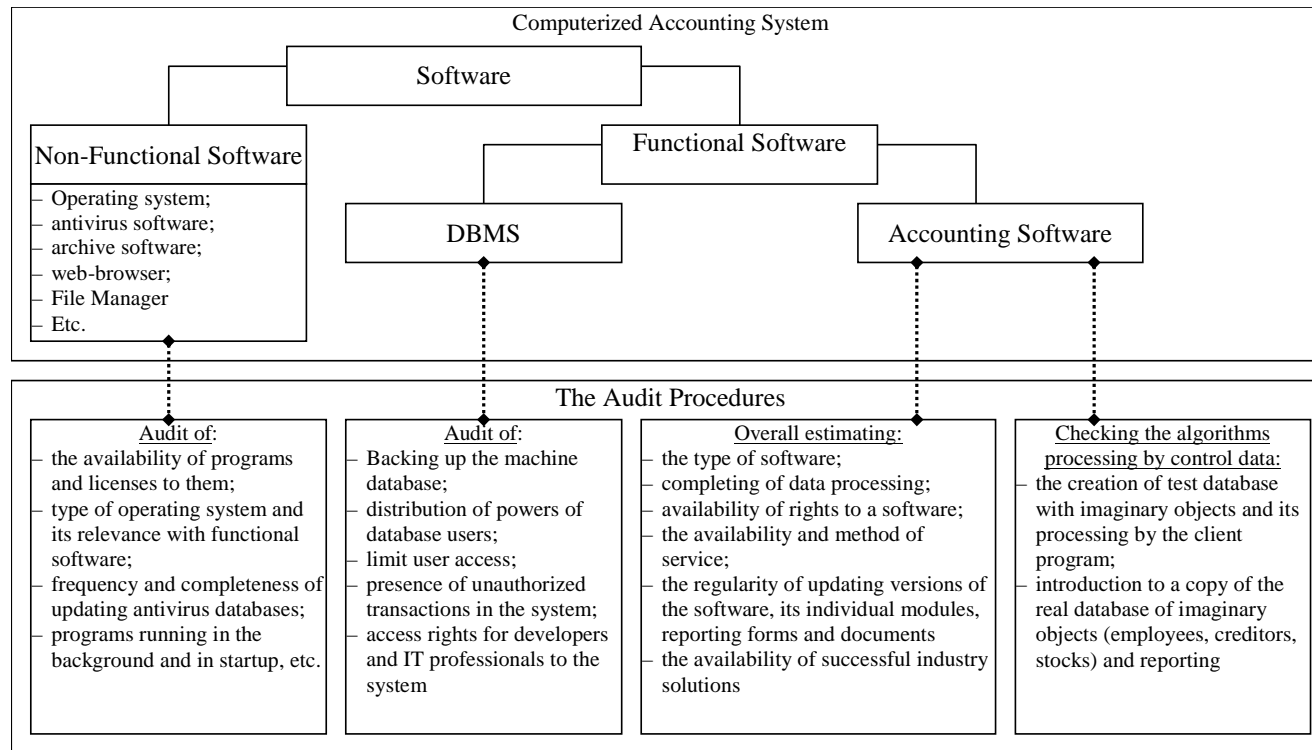


Fig. 1. Computer-Assisted Audit Techniques for Client Accounting Software checking

Application software can be divided into two groups. The first is a necessary component for the operation of functional subsystems, such as operating systems, antivirus programs, etc. Others allow a specialist to perform their functions more effectively (for example, browsers, text editors, spreadsheet editors, graphic image viewer programs, graphic text recognition, etc.). To check the work of general-purpose programs, the auditor performs the following procedures:

- Verification of the availability of general-purpose software (operating systems, antivirus, archivers, browser browsers, mailboxes, etc.) and their licenses, technical documentation;
- checking the availability of software service contracts;
- checking of the type of operating system, chronology of its changes and the possibility of use with selected software applications;
- checking the availability of antivirus programs, their licenses, periodicity of updates and the relevance of databases;
- Investigating programs, which are running in the background and in autorun, and so on.

It is advisable to provide protection against the establishment of unauthorized programs because of the possibility of conflicts with the running enterprise software, the probable presence of viruses and spyware. Effective will be measures not only prohibitions, but also the impossibility of such installation workers in the workplace.

4. The Audit of Company's Software and its Functional Subsystems

The functional part of the information system of the company is designed for solving tasks in special area, namely in accounting. Such part is a model of the company's management system and mirrors an organizational structure of the company and its business. Here, there are hidden algorithms of information processing, therefore, a mistake done in the formalization of business-processes, precisely in software's algorithms that process accounting information, could be multiplied in geometric progression. This can lead to the substantial distortion of financial accounting and reporting within the company. Due to this problem, an auditor pays more attention to functional issue that is designed for solving the applied tasks in special subject area.

The computational tasks are distributed among such key parts of the automatized system of accounting as database management system (DBMS) and applied software in order to automatize managerial and financial accounting. These systems have different functions:

- DBMS performs the function of control to an access to the data from the side of users, the data accumulation, the organization and saving of data, and, finally, the search and providing of data in convenient format to the user;
- applied software and applications perform the function of request by the users along with needed calculations and computations. Here there are algorithms of accounting information processing, as well as computation of accounting registries and reports.

4.1. The Audit of Database Management System

Data base management systems have the main purpose to provide and secure data. The developers of DBMS include various tools in such systems to ensure the consistency and integrity of the data. The classical approach to the software protection of the databases is to use the instruments of DBMS and includes in itself the following procedures:

- the separation of access to the data – each individual user, including also an administrator, have an access to the needed information in accordance with the position within the company;
- the protection of access – a user may get an access to the data only via the procedure of authentication and identification. For this goal, single or various levels of protection can be used. For example, as a rule, for the authentication, the name of the user is being used. But for the identification of this same user an additional information may be needed, e.g. a password. The additional technical gadgets or instruments may be also used. For example, personal cards with microchips or magnetic tapes, encoded locks to the access in various premises or rooms, and others;
- data encryption – data must be encrypted: both those data that are being transmitted (the protection from the interception) and those data that are being recorded from the lost or theft of data storage e.g. hard disk or flashcard along with unauthorized review/changes with a help of non DBMS tools.

All above mentioned organizational limitations and restrictions to ensure the protection of computer system of the company must be clear written out in regulatory documents and procedures in accordance with the official instructions and are also subject of the audit of the company.

An auditor has the following purposes:

- auditing of the availability of separation of authorities and power among the users of DBMS. The auditor analyzes the rights and authorizations of the users, the misuse of these rights along with the availability of the systemic approach towards the separation of power among company's personnel with an access to databases. It is relevant to work out a matrix of the separation of authorizations to support the minimal principles of the access' rights;
- auditing of the access' restriction from the side of all users of the system with a help of the authorized access into the database system. All actions by the users must to be protocolled. The personnel of the company are to be responsible for the quality of the entered / changed data. The registration of changes in ledger allows us to track the chronology of any actions;
- auditing of the availability of unauthorized operations within the system and the determination of possible responsibility for entered changes into the database. The auditor review and check it out the ledgers and protocols on the subject on unauthorized access, hackers' attacks and other hacking;
- auditing of the availability of reserved copies of the information from the system of accounting database. The frequency of such actions has be defined by the duration of the manufacturing processes at the company and should not exceed one reporting period;
- analysis of the access' rights into the system by the software (applications) developers along with personnel of the information technologies department. As a

rule, such personnel (workers) have an unlimited access to the accounting system as well as unlimited rights within the system on the level on various modules applied in automated by these modules processes. This increase a risk of an unauthorized change in the data of an accounting system as a result of deliberate or unintentional actions of such users. The problem is exacerbated by the fact that IT professionals are not directly responsible for the changes and actions within the system. Moreover, IT workers can enter such changers directly omitting a protocol ledger as well as an interface of applied application. It is obvious that the analysis of the protocol ledger is not enough to appropriately evaluate such threats. For these purposes, the audit of changes in data on the level of databases has to be used with the help of IT professionals and special tools.

The audit of the client's DBMS demands special knowledge and skills in the area information technologies; therefore, an expert is needed to perform such auditing.

4.2. Audit of client's application software

Checking the application software intended for automation of financial and economic activity of the client is carried out in two ways:

- 1) overall assessment,
- 2) substantive testing of embedded algorithms for processing information

Checking of application software begins with an assessment of its overall status. The indicators for such an assessment are given in Table 1.

Table 1. Indicators of a general appraisal of application software designed to automate the accounting of financial and economic activities of the client [11]

Indicators of estimating	Characteristic of estimating
type of software product	typical
	specifically ordered
completing of data processing	management information system that automates all areas of business management
	only accounting is automated
	some parts of the accounting are automated
	some accounting areas are not automated
availability of rights to a software	used a licensed product
	counterfeit copy
availability and method of service	used a licensed product
	counterfeit copy
the regularity of updating versions of the software, its individual modules, documents	Updated regularly
	Updated irregularly
	Not updated
the availability of successful industry solutions	The program is designed specifically for the industry in which the client operates
	The program is adapted, customized for the client
	The client uses several software products to automate various processes

The results of the overall evaluation of the software are reflected in the audit documents. They become the basis for the formation of an audit opinion.

The auditor checks the information processing algorithms to verify the correctness of the application software. This test allows to make conclusions about the reliability of the outgoing information in general and the financial statements, in particular.

The auditor never performs the unbundling (disconnection to separate software components) of the client's information system and does not interfere with the algorithms of information processing

The last one is perceived as a "black box" where the data is evaluated at the entrance to and exit from the system. Auditor estimates the correctness of data transformation.

Checking the processing algorithms of client's software is carried out using the method of control data. Its using requires the implementation of such procedures:

- 1) the creation of test database with imaginary objects and its processing by the client program;
- 2) Inputting to a copy of the real database of imaginary objects (employees, creditors and stocks) and reporting.

Comparison of audit techniques of algorithms of client's software using the test data is given in Table 2.

Table 2. Audit Techniques of Algorithms of Client's Software Using the control data methods

Indicator	Test data method	Method of imaginary data
Checked database	Another database with imaginary data	Copy of client's database
Processing data	imaginary data	Real and imaginary data
Auditor's Application software for inspection	Client's Application software	
Place of auditing	automated workplace of an accountant	
Object of inspection	Inspecting mainly of synthetic accounting only The starting point for the inspection is the logbook of business transactions	imaginary data (and inspection too) can start from the moment of inputting of primary document
Labor intensity of inspection	Can be made in the maximum avtomatized regime. The auditor must have a prepared database (the logbook of business transactions) which is subject for inspection	The Labor intensity is higher because of handle inputting the imaginary data, its monitoring in accounting and reports
Result of data processing	Known to the auditor in advance	

We characterize the use of each of these options in detail.

For audit of algorithms of application, software is used test data method. It is implemented in the automated workplace of an accountant under imaginary data. These test data meet the following requirements:

- It is imaginary data;
- Database is previously prepared by auditor;
- The starting point for the inspection is the logbook of business transactions, therefore mainly only synthetic accounting and reporting are subject for inspection
 - figures of financial reporting are previously known to auditor
- The content of the test data should reflect the features of the enterprise's activities, organizational structure, form of the ownership, its sectoral affiliation
 - part of the data auditor is deliberately make incorrect from the legal and accounting point of view
 - Test data can be used repeatedly for other similar entities

Test data inputted to the client's computer accounting system and result figures obtained after processing are compared with forecasted indicators. If control amount is equal to fact figures that correctness of data processing is proved.

The advantages of this method of inspection is its low Labor intensity. However using of test data has some disadvantages. For example, it doesn't process primary and analytical accounting.

Auditing of algorithms of application software they make by the method of imaginary data. As in the previous case, they make this inspection on the automated workplace of an accountant in the environment of his accounting software. Auditor works with copy of real database where he input imaginary data (employers, creditors, assets ect.).

Processing algorithms of synthetic accounting but also primary and analytical accounting too is subject of inspection by method of imaginary data.

This inspection has punctate quality. Auditor inspects algorithms with high risk of errors. As in the previous case, previously auditor know financial reporting figures. For example, it is advisable to check the correctness of the algorithms relative to:

- methods for calculating of amortization of non-current assets;
- salary calculation with all possible allowances and surcharges, as well as deductions from it;
- write-off for expenses of transport and procurement costs of the enterprise
- write-off the expenses of production for total costs of the enterprise
- methods for stocks assessing for outputting, etc.

It is advisable to check algorithms of calculation valid not only at the time of inspection and also all of them which are introduced in the software product. This will avoid mistakes in the case of changing the company's accounting policies.

The labor intensity of the imaginary data method is high because of the input of the imaginary data. Its monitoring in accounting and reporting must be done manually, too.

5 Conclusions

Auditing of software of computer accounting system often is ignored, but it is the important part of its inspection. This is where the programmatic algorithms for information processing are laid down. Errors occurred in the software algorithms for the processing of accounting information multiplied exponentially and can significantly distort the financial statements.

Our research has allowed us to systematize the consistency and the content of audit procedures in carrying out auditing CAS software. Namely:

1. There are so subjects of auditing of components of application software:

- Non-functional software (operating system, antivirus software, archive software, web-browser, File Manager, Etc.);
- Functional software, namely database management system and application software (accounting software).

2. We have discovered that while conducting software auditing, such important component of CAS as DBMS is ignored. Therefore, we proposed audit procedures for inspection of this object:

- auditing of the availability of separation of authorities and power among the users of DBMS;
- auditing of the access' restriction from the side of all users of the system with a help of the authorized access into the database system;
- auditing of the availability of unauthorized operations within the system and the determination of possible responsibility for entered changes into the database;
- auditing of the availability of reserved copies of the information from the system of accounting database;
- analysis of the access' rights into the system by the software (applications) developers along with personnel of the information technologies department.

3. For auditing of application software (accounting software) they use a general assessment of it and checking algorithms for information processing. Checking of application software begins with an assessment of its overall status. The indicators for such an assessment are type of software product, completing of data processing, availability of rights to a software, availability and method of service, the regularity of updating versions of the software, its individual modules, reporting forms and documents, the availability of successful industry solutions. The results of the overall evaluation of the software are reflected in the audit documents. They become the basis for the formation of an audit opinion.

5. A key element of auditing of the software of computer accounting system is the audit of algorithms of information processing. For its implementation is used control data methods which are divided into 1) Test data method and 2) Method of imaginary data. The advantages of first one is low labor intensity of inspection. It can be made in the maximum automatized mode. However, its disadvantages is non-processing primary and analytical accounting.

Inspection by second method – method of imaginary data has punctate quality. Auditor inspects algorithms with high risk of errors. The labor intensity of the imaginary data method is high because of the input of the imaginary data. Its monitoring in accounting and reporting must be done manually, too.

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