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Computer-Based Audits

Carlton D. Stolle

Computer-based audits are a reality today, but they are also a threat to the CPA who watches unconcerned while those more familiar with EDP invade his field. Here are some suggestions as to what he can do —

COMPUTER-BASED AUDITS

by Carlton D. Stolle
Texas A & M University

THERE is a burgeoning volume of writings on the audit of systems with on line-real time capabilities. The myriad of articles and books appearing are only a reflection of the changes taking place in the financial reporting systems of the different reporting entities. For anyone who is close to the profession, the statement that a change is occurring is somewhat analogous to the case of a person who stands in the rain and listens to the weather forecaster predict precipitation–the practitioner is aware of the situation! He knows that the "horse and buggy days" of auditing are fading fast.

The change has caused a great amount of perplexity. What was once the sacred realm of the accountant is now being tampered with by the computer scientist and the operations research analyst. This is mute evidence that no profession is isolated and that we accountants had better regroup and renew our audit objectives and techniques with some vigor. In order to satisfy the client tomorrow, we are going to have to provide services that go beyond the mere area of opinion generation (witness the growth of management advisory services). We must have the capacity to provide the services that the client needs to be able to make informed decisions for the achievement of company goals –services that are now possible through information stored in the financial data base of the client but that have yet to be released because someone has not yet realized the importance of the specific information or does not know how to extract and analyze the data. Here is a vast new resource which

the public accountant can begin to explore with modern technical audit applications.

No group has a greater awareness of the structure of an organization's financial status than the accountant, and most business decisions originate within the financial structure. Whether the financial data base is eventually unlocked by the internal accounting staff, the operations research specialist, or the independent accountant is of little initial concern to the audit client as long as derived benefit can be seen. But if pertinent internal information waiting to be discovered is consistently uncovered by someone other than the public accountant, there will be a time at which the auditor's client will begin to wonder why the public accountant—usually a respected firm of CPAs—seldom brings the pertinent information into focus on a timely basis while the audit is being performed.

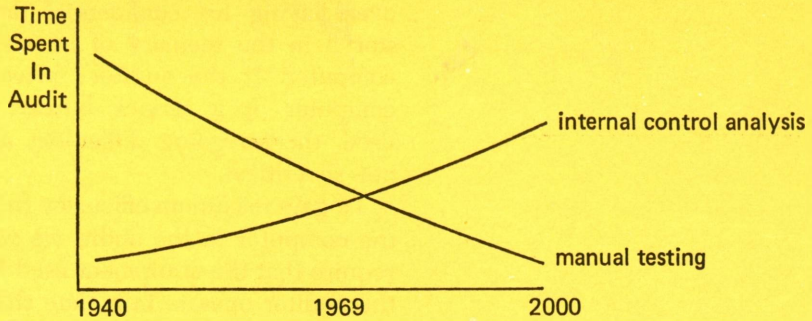
Accountants are vulnerable

We wholeheartedly concur with Richard Mattessich[1] in his belief that the science of the operations analyst is gradually encroaching upon the accountant's function and will continue to do so if the accountant does not himself become more adept at extracting, analyzing, and interpreting financial information. New disciplines are developing which use financial data as the heart of model building, simulation, and design decisions. The accountant may be stepping to the background by default if he does not fully exploit his own potential analytical ability. The question the auditor must ask is how he can upgrade his services when he knows that his prime objective is only to determine whether the financial statements "present fairly the financial position of XYZ Company. . . ."[2]

[1] Mattessich, Richard, *Accounting and Analytical Methods,* Richard D. Irwin, Inc., New York, 1964.

[2] "Auditing Standards and Procedures," *Statements on Auditing Procedure No. 33,* American Institute of Certified Public Accountants, New York, 1963, p. 57.

EXHIBIT 1



The answer seems to be that as long as the auditor uses techniques that were created a score of years ago (on financial data that are much more voluminous and complex today), both the time constraint and the economic constraint will make any meaningful additional services difficult to render.

Looking solely at the audit function, we see that the voluminous data that must be examined are tending to demand that more and more attention be given to analysis of internal control. (See Exhibit 1 above.)

Not only is it desirable to evaluate the company's control procedures as a prelude to the expression of an opinion, but it has become a necessity. The auditor is finding very often that individual account examination is becoming exceedingly difficult because (1) the volume of data makes detailed auditing financially prohibitive, and (2) the accounting techniques used have made transaction tracing extremely strenuous. The use of statistical techniques in testing the accuracy of "judgment" auditing has shown that detailed audit tests often lack a sufficient number of sample elements to make the test results reliable. To offset some of the difficulties, it is rapidly becoming evident that computer technology is going to prove an invaluable audit tool.

In this article we are going to examine the feasibility of and applications for using the computer in the conduct of the audit. The purpose is to give the auditor a broad perspective on the computer's capability to rapidly test, analyze, and make decisions. This does not necessarily imply either auditing "around" or "through" the computer in the context in which those terms are used today. It will be a necessity that the auditor have access to a computer of sufficient sophistication and that the computer be equipped with special programs that will test the output or even the operational characteristics of the client's computer operations.

Prerequisites

Because we are discussing the possibility of making the computer an audit tool, we will require the auditor to have certain facilities available. Generally, two possibilities exist for acquiring these facilities:

a. The auditor may have his own "in-house" computer at the firm's home location.
b. The auditor may lease the computer services from a service bureau in his area.

The latter arrangement appears to be most feasible. Not many public accounting firms have facilities which are sophisticated enough for the applications we will later discuss. With a service bureau leasing arrangement (which is available in most metropolitan areas), the auditor can buy the services he needs without undergoing the cost of extensive hardware and software expenditures.

In some applications the computer of a client may be used, but this arrangement offers some severe disadvantages. First, the auditor needs to maintain control over his own operations and programs. Second, if the auditor serves more than one client with only one computer,

The auditor now has his choice from among several lightweight, portable remote terminal devices. They go where the auditor goes. Whenever access to the service computer is needed, a regular telephone mouthpiece/receiver is placed on a special cradle on the remote terminal, the computer's telephone number is dialed (opening the communication channel), and information is inserted via a special keyboard on the terminal.

the client may show some concern over having his confidential data stored in the memory of an alien computer. If the auditor's private computer or a service bureau is used, the foregoing difficulties are not so critical.

To gain maximum efficiency from the computer in the audit, we will require that the equipment used by the auditor operate in a time sharing mode. Time sharing implies that the central computer (that is, the auditor's computer) be (1) electronically accessible from the client's firm where the audit is taking place, and that it be (2) electronically accessible by more than one auditor at different locations at the same time. Time sharing allows one computer to service many remote inquiry terminals simultaneously. In total, Vern E. Hakola depicts the time sharing configuration as:

"Time sharing is:

"1. *On line,* with remote terminal units connected directly to the computer via a communications system (telephone lines usually). The on line connections can be made and broken much like an ordinary telephone call.

"2. *Real time,* in that it responds to user demands for computing service within time constraints which allow the computer to become an 'in line' part of the operation being performed. To qualify, for example, the computer must supply order status information while a customer is on the telephone, or bank balances while the customer is at the teller station.

"3. *Multiprograming,* where more than one computer program is in operation within a given computer, with the programs automatically switching, based on a designated priority scheme.

"4. *Multi-access, mass storage,* in that it must provide for independent access by many users and, by implication, requires mass storage to retain programs and data for many users.

"5. Interactive in a *conversational mode,* in that it must recognize the need to minimize the training and experience level of many users if it is to be generally acceptable. Thus it must guide users in a conversational mode whereby it asks for information in a user-understood language . . . test the user entry for validity and request reentries when required. . . ."[3]

Technologically, computer-based audits are possible today. As was stated before, there must be a communication link between the firm being audited and the computer which is housed at the service bureau. The geographical distance between the remote terminal and the service bureau may be many miles, and the communication link may be ordinary voice-grade telephone lines.

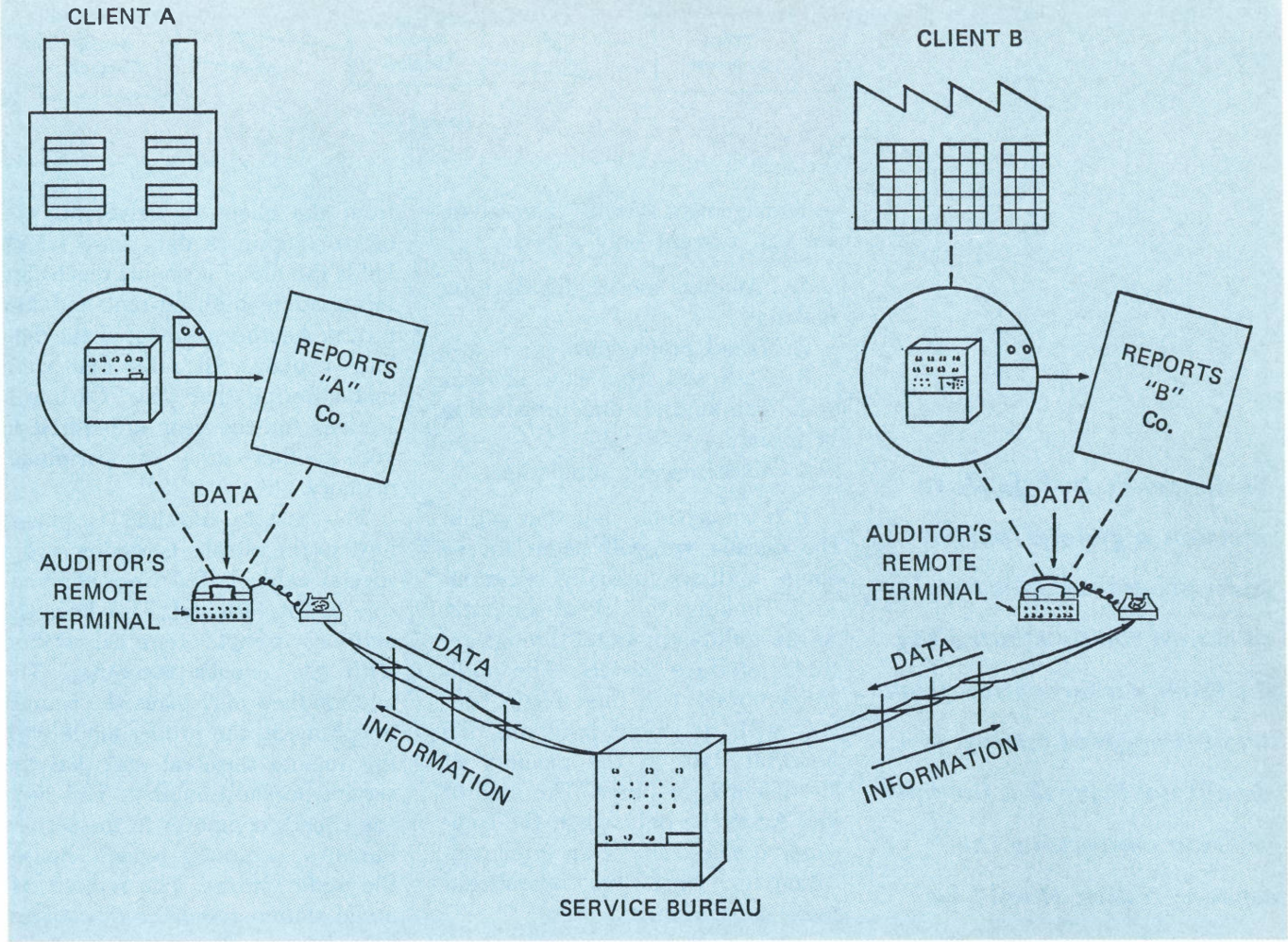
Service only when needed

This configuration should not imply to the reader that the client who is being audited must be permanently connected with the service bureau computer. The auditor now has his choice from among several lightweight, portable remote terminal devices. They go where the auditor goes. Whenever access to the service computer is needed, a regular telephone mouthpiece/receiver is placed in a special cradle on the remote terminal, the computer's telephone number is dialed (opening the communication channel), and information is inserted via a special keyboard on the terminal. Only after this procedure has been accomplished is there any link between the client's organization and the servicing computer.

The previous explanation was oversimplified and superficial, but it does describe the method by which the computer can be used from varying remote access points. Two or more auditors can be "in the field" at one time, and they can make use of the same computer at

[3] Hakola, Vern E., "Computer Time Sharing and the CPA—Opportunity or Problem?" *The Journal of Accountancy,* January, 1969, p. 64.

EXHIBIT 2



the same time from their different locations. (See Exhibit 2 on this page.)

Many audit tests are very routine and redundant. They are performed on virtually all clients or on one client repeatedly each year. It is the redundant application that is most amenable to computer programing. If one computer program is capable of doing in one-half minute with high efficiency the work that may occupy two hours a day manually with relatively low efficiency, we can begin to see the economic costs and intellectual talent that can be saved if the procedure can be applied to many clients. The same computer, housing the same generalized audit programs, can be used repeatedly from any geographical location, thus saving time and money.

Practical applications fall into two major categories: those relating only to audit test and those relating to managerial services. Indeed, in the audit realm, we may place the following applications rather easily:[4]

1. The use of the service computer to select sample elements by statistical methods or to analyze the results of the elements tested
2. The use of the service computer to test the reasonableness of account balances
3. The use of the service computer to test the accuracy of depreciation and amortization provisions
4. The use of the service computer to test accrual adjustments
5. The use of the service computer to prepare confirmations and to analyze the results of the replies.

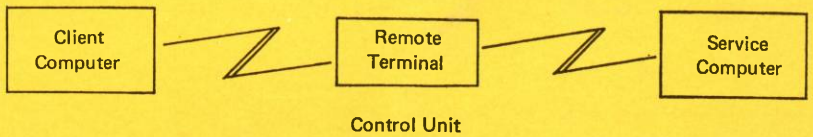
The above list is by no means a complete summary of all of the possible applications, but it should give the reader some idea of the power available through computer usage. Disregarding audit accuracy, the time saving alone will be a tremendous positive factor under such a system.

Since applications involving managerial service aids are as variable

CARLTON D. STOLLE, CPA, is an assistant professor of accounting at the College of Business, Texas A & M University. He is developing a computer audit simulation for the instruction of auditing students. Mr. Stolle received his B.S. from Texas Lutheran College and his M.B.A. from Texas A & M University. He is a member of the Texas Society of CPAs, the AAA, and the Southwestern Social Science Association.

[4] The reader may wish to consult "Generalized Computer-Audit Programs" in the January, 1969, issue of *The Journal of Accountancy*, pages 54 through 62. Dr. W. Thomas Porter discusses in some detail and gives examples of applications involving "generalized" service programs.

EXHIBIT 3



as management systems themselves, we can present only a few:

1. Analysis models for decision making
2. Trend projections
3. Cash and fund flow analysis
4. Tax analysis and preparation of forms
5. Mathematical simulations.

It is conceivable now that within the decade we will begin to see some auditors actually electronically linking the client-computer to the auditor-computer through remote interface devices. The auditor-computer can then begin testing, with its stored programs, the financial data in the memory of the client's computer. The auditor will intervene only when the computer notifies him of an error condition or when the operational mode must change.

No longer is it difficult to envision a general purpose audit program that is capable of almost totally eliminating the human intervention from detailed account testing. We should not infer that the final decision concerning the account testing should be made by the computer. We are implying that the computer should be used as a tool to eliminate the manual efforts now requiring so much of the auditor's time.

Human error minimized

No longer is it difficult to envision a general purpose audit program that is capable of almost totally eliminating the human intervention from detailed account testing. We should not infer that the final decision concerning the audit opinion should be made by the computer. We *are* implying that the computer should be used as a tool to eliminate the manual efforts now requiring so much of the auditor's time.

Picture, if you will, a service bureau computer in which is stored a general purpose audit software routine. The audit program calls for the auditor to perform a detailed test upon the client's accounts receivable. The account balance consists of a large number of subsidiary accounts and comprises a significant balance of total assets. The auditor obtains permission from the client to delve into the client-computer's data base which holds the file of accounts receivable information—both current and historical. Another segment of the data base contains all sales that were made during that year. Cash collections for the year are stored in yet another area of peripheral memory.

The remote terminal is placed next to the client's computer and a special cable is fed from the console to the terminal. This links the auditor's remote terminal station with the client's computer. The auditor then may place the nearest telephone in the proper mode with the remote terminal and dial the service bureau's number. This links the client's computer to the service bureau's computer which houses the audit routine. The remote terminal station serves as the control link between the two computers. (See Exhibit 3 above.)

The service bureau houses the computer which will actually do the auditing with an accounts receivable audit program capable of performing the following functions:

1. Testing the footing of the total of accounts receivable.
2. Testing for any accounts with credit balances and storing them for a later exception printing.
3. Mathematically determining the number of accounts to be sampled at the error range and confidence level the auditor specifies via the remote terminal.
4. Choosing subsidiary accounts to be tested.
5. Writing confirmations to be sent to selected individual customers.
6. Having selected the accounts to be tested, the service computer can scan the data base of the client's computer and locate all sales for

the sales file and cash receipts from the appropriate storage area in the client's computer's memory. The sales and the receipts can then be summed and matched with the ending balances in each account being tested. Any differences found will be flagged for another exception report.

7. Based upon the magnitude of the located errors in (6) above, the computer can mathematically determine whether the account balance is within the parameters established in (3) above.

8. The program can also test the reasonableness of the bad debt allowance, age the accounts, and determine the average collection period.

To initiate processing the auditor will encode special information into his terminal for transmission to the service bureau. The information required before processing can begin will be the following:

1. The service computer must be informed which program it will need to perform its intended function. In essence, the auditor will tell his computer, "I will need the accounts receivable audit routine. Please be ready."

2. Since the accounts receivable audit routine is a general program which can operate on the data of several clients even though the clients' files are in different formats in memory, the auditor must inform his computer where to search for the proper data and what those data will look like in memory.

3. The auditor then will "key in" information that indicates acceptable statistical tolerances. For example, the auditor may be willing to accept a ± 5 per cent error range with the assurance that he can be 90 per cent confident that the sample results will be representative of the entire receivable file.

After this last bit of information is transmitted, the service computer will begin processing—reaching directly into the client-computer's memory to search for data. Minutes later, the computer will print the following information for the auditor to analyze:

1. Which accounts were selected and tested in detail.

2. A confirmation for certain accounts. (The computer could have been programed to heuristically prepare confirmations based upon its experience with account ages, dollar balances, account activity, or any other programable variable.)

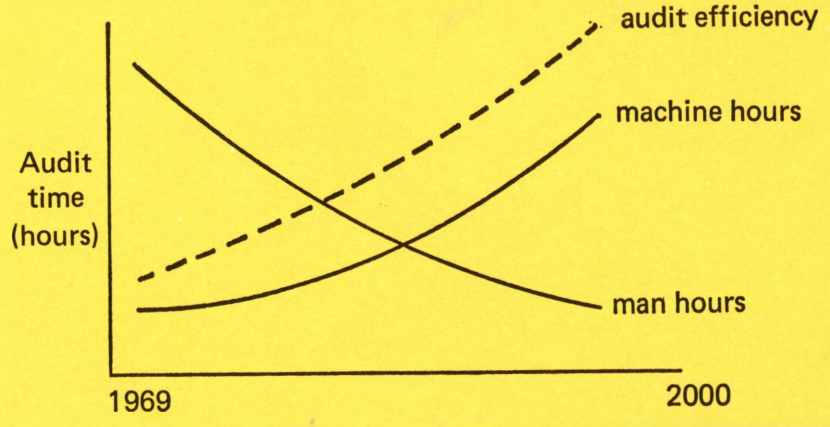
3. A list of accounts in which there was incorrect action and the nature of the discrepancies.

4. An indication whether the results of the detailed tests were within the statistical limits supplied by the auditor.

5. Finally, if requested, the computer could print an analysis of the uncollectible accounts written off, prepare an aged account analysis for management, and determine the average collection period.

Does this all sound too Orwellian? Technically, it is now feasible to do just what was described. However, the software support for such a system requires considerable human preparation time and talent. The point to make, however, is that what may take several man-days using current audit practices will some day be done in very little man-time and the machine-time will be measurable in minutes. The budgeted time for the audit can be reduced while audit-analysis efficiency can correspondingly be increased. (See Exhibit 4 on this page.)

EXHIBIT 4



Time sharing audit systems are only slightly past the point of conception. Most computer-based audit work is still largely theoretical or is done on the computer of the firm being audited, and the audit that is conducted "through" the computer is but a crude approximation of what will come in the years ahead.

Looking into the future, we can visualize the gradual acceptance of the computer-based audit. But widespread acceptance will not occur until the following conditions are met:

1. There is a sizable increase in trained specialists able to implement and utilize advanced audit systems.

2. The client is no longer able or willing to absorb the spiraling costs for the annual manual audit.

3. Manual audits cease to fulfill their designed objectives because of the volume and complexity of data generated by the large business organizations.

4. A genuine need for the use of advanced technology is accepted by the auditing profession.

The substantial reduction of man-hours involving tedious but necessary testing can eventually be realized while audit efficiency is increased at the same time. Once the auditor has been relieved of many of his tedious duties, he can be more cognizant of the client's operational and control problems and can better use his time to provide a better service to the client.