Computer-Assisted Audit Tools and Techniques

NFORMATION TECHNOLOGY (IT) AUDITORS—OFTEN working with their financial and operational internal audit counterparts—gather evidence from an enterprise's books and records to support their conclusions. This audit evidence includes any actual paper-based documents, evidence that these documents or supporting transactions were properly recorded in a timely manner, and appropriate authorizing signatures or notations. Today, most of those documents are IT based and paperless, and IT auditors have a challenge to review and understand those paperless documents and procedures to support their audit conclusions when older traditional paper-based documents have gone away. Although IT auditors test and review the internal controls surrounding those IT systems, they often need tools to better understand and evaluate the completeness and accuracy of the data stored in the files and databases of IT applications. It is almost always more efficient to use IT techniques to examine all recorded items on the supporting computer files. IT auditors can also act with greater independence by developing their own specialized file retrieval methods. There are many approaches to retrieving data through computer-assisted audit tools and techniques (CAATTs), which are independent auditor–controlled software to assist internal audit efforts.

An IT auditor must obtain evidence on the validity of accounting and operational data. However, large volumes of data or the lack of paper documents often makes this review of audit evidential materials difficult or almost impossible. This chapter describes IT audit approaches to testing, analyzing, and gathering detailed evidence from data contained on IT applications through the use of CAATTs controlled by IT auditors. These techniques allow an IT auditor to review the contents of computerized applications data in files, ranging from accounting systems on large database repositories to smaller systems residing on departmental desktop systems. Although some CAATTs

require specialized data processing skills, there are many powerful audit software tools that the typical IT auditor, with no particular programming skills, can use.

There are many tools and techniques available to help make audit reviews of IT-supported systems more efficient and effective. All IT auditors should have a basic understanding of the general use of CAATTs to access and review automated data to support IT audits. If an IT auditor does not have the skills to execute a particular CAATT process, he or she should have a sufficient level of knowledge to describe it and request help from another member of the IT audit team.

UNDERSTANDING COMPUTER-ASSISTED AUDIT TOOLS AND TECHNIQUES

A CAATT is a specialized computer program or process, controlled by IT or other auditors, that is used to test or otherwise analyze data on computer files. Terminologies change over time, and an IT auditor sometimes will see the term *CAAT* or *CAAP* rather than *CAATT*; the first refers to just "techniques" and the second is an abbreviation for "procedure." All of these expressions refer to similar techniques and can be used interchangeably. The American Institute of Certified Public Accountants (AICPA) uses CAATTs, the term preferred for this chapter, although the Information Systems Audit and Control Association (ISACA) and the Institute of Internal Auditors (IIA) still uses the name CAAT.

In the early years of data processing systems, auditors typically relied on printed outputs from IT systems and used conventional audit procedures to read, test, and analyze these computer-generated reports. As IT systems became more pervasive with ever larger data files, auditors needed better approaches to evaluate the documentation and records stored in large IT systems and files. In the early days, a few pioneer IT auditors developed CAATTs to read and analyze financial data. However, many auditors continued to use conventional manual techniques, relying primarily on the printed report results of IT systems.

The necessity for CAATT procedures first became evident with the Equity Funding fraud in the early 1970s. Equity Funding Corporation, a U.S. insurance company, was reporting very significant growth and earnings from the late 1960s up through the early 1970s. It was later determined, however, that Equity Funding's growth and earnings were based on a massive management fraud in which fictitious insurance policies were entered on the company's computerized records. At that time, the external auditors relied on the printed report outputs generated by the Equity Funding computer systems rather than on the data recorded on their computer files. Had the external auditors looked at the contents of those computer files, they might have detected the fraud. Equity Funding did not have a significant internal audit function, and an Equity Funding employee and then their external auditors eventually revealed the fraud. Equity Funding's external auditors then independently reviewed computer procedures to analyze the contents of computerized records. The Equity Funding fraud launched what was then called computer auditing—now IT auditing—and the use of CAATTs.

A CAATT is an auditor-controlled computer program or process that can be used to read production IT files to analyze, summarize that data, and perform other audit tests. In the days of legacy mainframe computer systems and before today's powerful desktop software tools, a CAATT often was considered to be an advanced audit technique. End users typically relied on their data processing departments to write special retrieval programs to give them various requested output reports. Later both internal and external auditors began to use what was called generalized audit software to develop their own programs independently for testing and analyzing data. This generalized software became the basis for CAATTs, a term used to define specialized IT audit systems and procedures. An example might better clarify the concept of a typical CAATT. Assume that IT audit is interested in testing the accuracy of account agings from an automated accounts receivable system; however, most calculated data for that system is stored only on computer files, with no significant paper reports describing these calculations. Financial and IT auditors are concerned that the receivables, as reported on the aged trial balance report, may not be properly aged as to the number of days due. Thus, the receivables account balances may be over- or understated. IT audit can test these agings using any of three approaches.

First, IT audit could use traditional, manual approaches where items are selected from an IT output report and then are traced back to any original source documents that may exist. IT audit can then determine if the items selected are entered properly on IT system records and if the aging calculations are correct. This method will work if paper records are available. However, because of the volume of receivable records in typical IT systems, IT audit can trace and test these items only selectively. Some exception conditions may be missed with such a manual test. In addition, IT audit might not be able to determine easily if the dates of transaction-based agings are functioning correctly.

A second approach is to perform an internal controls review over the automated accounts receivable system. The idea is that if internal controls over the application are found to be good, IT audit can rely on system output reports. IT application internal controls reviews are discussed in Chapter 10. A review of systems documentation will determine whether the system is properly aging receivables. IT audit would then test those controls by, for example, running some test transaction into the system, either through manual transactions or another CAATT. Properly performed, this review can detect significant internal control problems as well as determine whether the system is generally working in a correct, well-controlled manner. However, IT audit would be able only to estimate the total extent of the financial statement adjustments necessary due to any account aging errors. Thus, in conjunction with this test, IT audit must determine that controls over data entry and error correction are adequate.

A third and perhaps better approach is to use a CAATT application to recalculate independently all of the agings in the accounts receivable system, develop totals for the accounts receivable balance, and produce a listing of any unusual exception items. IT audit might perform this CAATT-oriented approach in five steps:

1. **Determine CAATT objectives.** IT audit should never just "use the computer" to test a system without a clear set of starting audit objectives for any CAATT. In the

previous examples, IT audit would have an objective of determining if accounts receivable agings are correctly stated.

2. **Understand the supporting IT systems.** IT audit should review IT systems documentation to determine how accounts receivable agings are calculated, where this data is stored in the system, and how items are described in system files.

3. **Develop CAATT programs.** Using generalized audit software, other retrieval packages, or a computer language processor, IT audit would write its own programs to recalculate accounts receivable agings and to generate totals from accounts receivable files.

4. **Test and process the CAATT.** After testing the programs, the IT auditor would arrange to have the CAATTs processed against production accounts receivable files.

5. **Develop audit conclusions from CAATT results.** Similar to any audit test, audit conclusions would be drawn from the results of the CAATT processing, documented in the workpapers and discussed in the audit report, as appropriate.

This is the general approach to developing and processing CAATTs. It follows the same steps IT audit would use for establishing audit objectives and performing appropriate tests on any system or process. As discussed, a CAATT is a specialized set of computer programs or procedures that are under the control of IT audit. The CAATT can be developed through generalized audit software programs run on the production computer system, specialized software run on the auditor's own laptop computer, or specialized auditor-use-only program code embedded in an otherwise normal production application. With our major reliance on IT processes in all areas of an enterprise today, CAATTs can enhance IT audit processes in some of these areas:

- **Increase audit coverage.** CAATTs can allow an IT auditor to review and analyze such components as massive financial databases where IT auditors do not have easy access to online screen reports and certainly not paper reports.

- **Focus on risk areas.** Similar to the last point and our example of testing accounts receivable agings, CAATTs often allow an IT auditor to review and investigate areas that have not received a high level of IT audit scrutiny.

- **Increase cost effectiveness.** Although CAATTs may require some incremental time and cost to develop, they can be very effective for analyzing large volumes of IT-resident data over multiple periods.

- **Improve audit credibility.** CAATTs provide IT auditors with the ability to independently look at complex databases and provide detailed analyses and recommendations; that type of analysis can very much improve IT auditor credibility.

- **Improve coordination of both IT and financial and operational auditors.** CAATTs often are used to analyze financial and operational processes using IT processes. They will cause both IT and other internal auditors to better talk and coordinate their audit objectives and needs.

- **Encourage auditor independence from IT operations.** IT auditors do not have to be heavily dependent on the IT systems and infrastructure to operate their CAATTs. Although strong coordination is essential, IT auditors can operate in a fairly independent manner.

IT auditors should have a good understanding of when CAATTs should be used to enhance the audit process, the types of software tools available to an IT auditor, and how to use a CAATT in an audit. Although some CAATTs require an IT auditor to have specialized programming knowledge, most can be implemented by any internal auditor with only a general understanding of information systems.

DETERMINING THE NEED FOR CAATTS

CAATTs are powerful tools that can enhance both the audit process and auditor independence. However, these procedures sometimes can be time consuming to develop and will not always be cost effective unless properly planned and designed. IT audit needs to understand when a CAATT might increase overall audit efficiencies and when it will not. This section discusses areas where CAATTs will enhance an audit and areas to consider when developing and implementing a CAATT. Other sections discuss alternative CAATT approaches and procedures for implementing them as well as some problems with this approach.

Before developing a specific CAATT, an IT auditor should first determine if the planned approach is appropriate. All too often, a member of management or even the chief audit officer may have attended a seminar about audit efficiencies and then asks the IT audit team to "do something" to improve audit efficiency by using IT resources as part of IT audits. This was particularly true several years ago, when management expressed strong concerns about all levels of audit costs associated with Sarbanes-Oxley Act (SOx) Section 404 reviews, as discussed in Chapter 1. This type of improved audit efficiency directive often results in disappointments for all parties. Similarly, a highly technical IT auditor sometimes develops a "technically interesting" CAATT as part of an audit even though it really does not support the overall objectives of that review. The result may be interesting but will not contribute to the overall effectiveness of the IT audit's objectives. The decision to develop and implement a CAATT in support of an IT audit will depend on the nature of the data and production programs being reviewed in the audit, the CAATT tools available to IT audit, and the objectives of the audit. IT audit needs an overall understanding of CAATT procedures in order to make this decision, and should consider:

- **Audit nature or objectives.** IT audit initially should evaluate the materials to be reviewed in a planned audit and consider the size and format of any IT-based data. Audits based on values or attributes of computerized data are typically good candidates for CAATTs. For example, the above-mentioned accounts receivable audit is a good CAATT candidate because there is generally a large volume of transactions but few paper records. Many of the operational and financial audit areas discussed throughout this book are also good candidates for CAATTs.
- **Nature of the data to be reviewed.** CAATTs are most effective when both data and decision-dependent information about that data are based on automated systems. For example, a manufacturing inventory system will have most of the descriptive information about its inventory on IT system databases or files. Inventory-related data is input directly, and inventory status information is based on system

reports on output screens. Often only limited paper-based original records exist. IT audit procedures for inventory here might include an analysis of manufacturing costs, and inventory system attributes can be summarized and analyzed through a CAATT. Other computer systems are comprised of little more than log files that organize otherwise manual records. An engineering project authorization system might have summary data stored in a systems file, but most of the information about the projects may be in manual, paper-based files. CAATTs might not be very effective in these areas because IT audit also would need to review the manual data. Only audits over areas where there is heavy dependence on IT data are good potential candidates for a CAATT.

- **Available CAATT tools and audit skills.** IT audit must develop its CAATTs using the automation tools available within the audit department or IT function. If IT audit does not have or has not budgeted for specialized CAATT software, an IT auditor cannot develop CAATTs that require such software. IT audit needs to consider the types of audit software available before embarking on any CAATT projects. That availability may be based on both audit budget constraints and product limitations.

Auditor skills also must be considered. Although training materials are available, the in-charge auditor must assess whether technical audit specialists are needed and are available for the CAATT development project. The last three points are stated in very general terms, but they are areas to be considered when planning the overall strategy for using CAATTs.

These comments point to many areas where a CAATT will be difficult or not particularly cost effective. However, IT audit should keep an open mind and always consider using CAATTs to enhance IT audit effectiveness. Given the lack of paper-based audit trails in many IT systems, an IT auditor has little choice but to use computer-assisted audit procedures. The challenge to IT audit is to identify appropriate areas for CAATTs.

Computer technology has changed extensively over the years. The batch-oriented systems of the past have been replaced by online, database-oriented systems. Large centralized computer hardware has been replaced, in many respects, by networked client-server workstations. Despite these changes, however, the auditor's basic approach for defining CAATTs has not really changed. For example, in 1979, the AICPA published an audit guide, *Computer-Assisted Audit Techniques* that provided some basic direction on the use of CAATTs. Although now long out of date and out of print, that guide contained a list of the types of audit procedures that can be performed through the use of CAATTs. Adapted for IT auditors, this set of procedures includes:

- **Examining records based on criteria specified by IT audit.** Because the records in a manual system are visible, IT audit can scan for inconsistencies or inaccuracies without difficulty. For records in systems files, IT audit can specify audit software instructions to scan and print records that are exceptions to the criteria, so that follow-up actions can be taken. Examples of specified areas are:
  - Accounts receivable balances for amounts over the credit limit
  - Inventory quantities for negative and unreasonably large balances

- Payroll files for terminated employees
- Bank demand deposit files for unusually large deposits or withdrawals
- **Testing calculations and making computations.** IT audit can use software to perform quantitative analyses to evaluate the reasonableness of auditee representations. Such analyses might be for:
  - Extensions of inventory items
  - Depreciation amounts
  - Accuracy of sales discounts
  - Interest calculations
  - Employees' net pay computations
- **Comparing data on separate files.** When records on separate files should contain compatible information, software can determine if the information agrees. Comparisons could be:
  - Changes in accounts receivable balances between two dates, comparing the details of sales and cash receipts on transaction files
  - Payroll details with personnel files
  - Current and prior period inventory files to assist in reviewing for obsolete or slow-moving items
- **Selecting and printing audit samples.** Multiple criteria may be used for selection, such as a judgmental sample of high-dollar and old items and a random sample of all other items, which can be printed in the auditor's workpaper format or on special confirmation forms. Examples are:
  - Accounts receivables balances for confirmations
  - Inventory items for observations
  - Fixed-asset additions for vouching
  - Paid voucher records for review of expenses
  - Vendor records for accounts payable confirmations
- **Summarizing and resequencing data and performing analyses.** Audit software can reformat and aggregate data in a variety of ways to simulate processing or to determine the reasonableness of output results. Examples are:
  - Totaling transactions on an account file
  - Testing accounts receivables aging
  - Preparing general ledger trial balances
  - Summarizing inventory turnover statistics for obsolescence analysis
  - Resequencing inventory items by location to facilitate physical observations
- **Comparing data obtained through other audit procedures with IT system data files.** Audit evidence gathered manually can be converted to a machine-readable form and compared to other data files. Examples are:
  - Inventory test counts with perpetual records
  - Creditor statements with accounts payable files

Although many of these procedures originally were developed by external auditors before integrated database files existed, these techniques are generally applicable for today's IT auditors. The number and sophistication of CAATTs will increase as the individual IT auditor becomes more experienced in their use.