Computer Printouts as Evidence: Stricter Foundation or Presumption of Reliability?

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COMMENTS

COMPUTER PRINTOUTS AS EVIDENCE: STRICter FOUNDATION OR PRESUMPTION OF RELIABILITY?

I. Introduction

Computer-generated evidence is an increasingly important resource in today’s courtroom. Much evidence that was once created manually is now created by computer. Given this fact, the issue facing courts is whether the legal system is in need of new rules of evidence or stricter foundation requirements to deal adequately with computer-generated evidence. Some courts and commentators maintain that although computer-generated records have an aura of reliability, they are actually more unreliable and inaccurate than traditional forms of evidence. Therefore, the argument goes, the legal system needs new rules of evidence or stricter foundation requirements to deal with computer printouts. Others contend, however,


that because computer technology has advanced so substantially, computer-generated records should enjoy a presumption of reliability.  

This Comment begins by analyzing the relationship between computer-generated evidence and the trustworthiness and accuracy of that evidence. Next, arguments for and against stricter foundation requirements for computer printouts are summarized. The application of the Federal Rules of Evidence to computer printouts is then explored. Although computer-generated evidence raises issues under many of the Federal Rules, this Comment focuses on the rules regarding authentication, the hearsay exceptions for records of regularly conducted activities and their absence, the hearsay exceptions for public records and their absence, and the rule regarding

4. See generally Comment, Presumption of Reliability, supra note 2.
5. See Fed. R. Evid. 102.
6. For a discussion of the admission of computer-generated evidence through an expert, see United States v. Robinson, 783 F.2d 64, 69 (7th Cir. 1986); United States v. Bastani, 697 F.2d 170, 176-77 (7th Cir. 1982); cert. denied, 460 U.S. 1091 (1983); Perma Research & Dev. v. Singer Co., 542 F.2d 111, 115 (2d Cir. 1976); cert. denied, 429 U.S. 987 (1976); In Re Paternity of T.L.S., 125 Wis. 2d 399, 403-04, 373 N.W.2d 55 (Ct. App. 1985); Robert R. Henak & Ellen Henak, Using Computer Printouts in the Courtroom, Wis. L.W., Mar. 1989, at 10. For a discussion of the best evidence rule and computer-generated evidence, see King v. State ex rel Murdock Acceptance Corp., 222 So. 2d 393 (Miss. 1969) (printouts are best evidence because records stored on tape would be "unavailable and useless"); Transport Indem. Co. v. Seib, 132 N.W.2d 871 (Neb. 1965) (computer printouts are originals); MANUAL, SECOND, supra note 2, § 21.446, at 61 n.80 (a printout made especially for trial is an original under Rule 1001(3)); WEINSTEIN, supra note 2 ¶ 1001(3)[04], at 1001-60; Comment, Presumption of Reliability, supra, note 2, at 125-29. For a discussion suggesting treating printouts under a new best evidence rule, see Singer, supra note 2, at 184-92 (arguing for modifying Rules 1001(3) and 1001(4)). For a discussion of the use of private computerized records, see Sabatino v. Curtiss Nat'l Bank, 415 F.2d 632 (5th Cir. 1969), cert. denied, 396 U.S. 1059 (1970); Comment, Presumption of Reliability, supra note 2, at 140-43; Note, Competency, supra note 2, at 113-14. For a discussion of the admission of printouts through the use of a photocopy statute, e.g. 28 U.S.C. § 1732, in connection with the records of regularly conducted activity exception to the hearsay rule, see BENDER, COMPUTER LAW, SOFTWARE PROTECTION § 6.04, at 6-19 (1990). For a discussion of the use of computer-generated simulations, models, and projections, see Note, Competency, supra note 2, at 114-20. For a discussion of printouts as admissions of a party opponent, see BENDER, supra § 6.08, at 6-201. For a discussion of whether the use of a computer program to calculate maintenance and support in a divorce action constitutes the use of evidence not before the court, see Bisone v. Bisone, 165 Wis. 2d 114, 477 N.W.2d 59 (Ct. App. 1991).

8. Fed. R. Evid. 803(6). This hearsay exception is sometimes called the "business records exception."
summaries. Decisions made under the common law, state statutes, or pre-Federal Rules statutes are discussed when appropriate.

II. COMPUTER SYSTEMS' RELATIONSHIP TO EVIDENTIARY ISSUES

A. Overview of Computer Systems

Computer systems used by different business and government entities differ enormously in their makeup. The component parts of a computer system influence the reliability of that system and the accuracy and trustworthiness of the system's output. Although a detailed description of computers and data processing is beyond the scope of this Comment, an understanding of basic information systems principles assists in analyzing the evidentiary issues presented by computer-generated evidence.

While some aspects of computer processing have changed over the years and the speed at which computers perform instructions and access data has increased, the basic principles of computing have remained the same. A computer system consists of hardware and software. The hardware is the physical components of the computer system.

Computer software can be divided into two categories: systems software and applications software. The former, sometimes referred to as the operating system, consists of the programs that direct the computer's

12. FED. R. EVID. 1006.
13. Many states have evidence codes based wholly or substantially on the Federal Rules. GRAHAM C. LILY, AN INTRODUCTION TO THE LAW OF EVIDENCE xxv (2d ed. 1987).
14. For a discussion of the basic concepts, and examples of basic data processing systems, see BENDER, supra note 6, § 6.02(2), at 226-27 (example of update of customer master account); Singer, supra note 2, at 159-62 (example of calculation of salesmen's commission); Note, Appropri- ate Foundation, supra note 2, at 73-78.
15. Computers can be categorized according to size as mainframe, mini, and personal. A large manufacturing corporation may own or lease one or more large mainframe computers manufactured by companies such as IBM or Amdahl for corporate wide database and file processing such as payroll, benefits, and order entry. The same corporation may own or lease several mini computers manufactured by companies like IBM or Digital Equipment Corporation to process inventory transactions at each of its manufacturing plants. The corporation may own or lease hundreds of personal computers made by different manufacturers to perform word processing and other functions. The corporation may upload information from the minis and personal computers to the mainframe on a regular schedule, via a telecommunications network, and may similarly download information from the mainframe to the minis and personal computers. See generally Connery & Levy, supra note 2, at 266.
16. Id.
17. A typical system's hardware consists of the central processing unit, terminals, disk drives, printers, tape readers, and other peripheral units. Singer, supra note 2, at 159.
Applications software consists of programs that perform a business function or solve problems. Applications programs are sets of instructions that are written in a programming language. A programmer may write applications software to be sold prepackaged by a software vendor or a programmer may write an applications program for a specific customer or employer.

Evidence generated by a computer can include computer programs, the operations log, disk or tape files in machine-readable form, and computer printouts. This Comment focuses on printouts. The applications of computers are endless, and thus, so too are the types of printouts that may be offered as evidence. Printouts of hospital records, bank records, telephone records, inventory records, Internal Revenue Service records, and Drug Enforcement Agency records are only a few examples of the types of computer-generated documents that may be offered as evidence.

B. Factors Which Influence the Trustworthiness and Accuracy of Computer Printouts

Computers generate records using processes that introduce factors different from those that have traditionally influenced the trustworthiness and accuracy of evidence.

Computer data acquires reliability as evidence from the system under which it is produced. If the original data fed in is not accurate or if the machine and its program are not well designed and operated or if the data produced is not properly evaluated, it has no probative force.

19. For example, the operating system may direct the computer to read a disk file and to load an applications software program into memory for execution. See Connelly & Levy, supra note 2, at 266.
20. In a business setting, applications software might perform payroll, order entry, financial, and other functions. Id.
21. Once written, an applications programmer must transform the applications program into machine language before executing the program. Id. at 267.
22. Peritz, supra note 2, at 992.
23. See United States v. Bonallo, 858 F.2d 1427 (9th Cir. 1988) (admission of a program that allowed one person to withdraw cash from a bank but withdrew the sum from another person’s account); Bender, supra note 6, § 6.02(4), at 6-13.
24. Bender, supra note 6, § 6.02(3), at 6-12 (e.g., to prove that a program was run at a certain time on a certain day).
25. Bender, supra note 6, § 6.02(1), at 6-8.
26. Id. For the purposes of this Comment, the term computer printout denotes a system’s report or output, usually produced on a printer attached to the system.
27. Note, Competency, supra note 2, at 105.
28. Weinstein, supra note 2, ¶ 901(b)(9)(02), at 901-1113.
The trustworthiness of computer printouts and the accuracy of the output of computer systems is often questioned when parties attempt to authenticate or lay the foundation for computer-generated records of regular conducted activity, computer-generated public records, and computer-generated summaries. Both the trustworthiness and accuracy of computer printouts depend upon the trustworthiness and accuracy of a computer system's hardware, software, data entry procedures, applications controls, and system security.

Computer hardware has a reputation for reliability; it is rarely a contributing factor to errors in computer-generated evidence. In King v. State ex rel. Murdoch Acceptance Corp., the court stated: "[T]he scientific reliability of such machines, electronic computing equipment, in the light of their general use and the general reliance of the business world on them can scarcely be questioned."

Software, however, does not enjoy the same reputation for reliability. Some commentators contend that computer software does not deserve a reputation for reliability. Computer programmers modify and test the programs they write with varying degrees of thoroughness and expertise. Also, users or auditors may not discover errors until after months of processing. Conversely, others argue that the software in use today is presumptively reliable. They contend that sophisticated testing techniques developed over the years and the use of packaged software have contributed to the reliability of software.

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29. Note, Competency, supra note 2, at 105.
30. Singer, supra note 2, at 165-66.
31. Peritz, supra note 2, at 990 (also noting user expertise, industry marketing practices, and the conversion process as factors influencing a computer system's reliability and the accuracy of its output); Singer, supra note 2, at 163.
32. See United States v. Russo, 480 F.2d 1228 (6th Cir. 1973), cert. denied, 414 U.S. 1157 (1974); Singer, supra note 2, at 163; Comment, Presumption of Reliability, supra note 2, at 123.
33. Singer, supra note 2, at 163.
34. King v. State ex rel Murdoch Acceptance Corp., 222 So. 2d 393 (Miss. 1969).
35. Id. at 398 (alterations in original).
36. See Singer, supra note 2, at 164.
37. Id.
38. See Comment, Presumption of Reliability, supra note 2, at 123-24.
39. Id. at 120 n.4 (packaged software is a pre-programmed set of programs for use in specific applications areas such as accounts receivable or payroll and usually comes with user manuals, error message glossary, and a hot-line number to call for help with problems); see also Note, Competency, supra note 2, at 109 (programs with errors will not last long in marketplace). But see Peritz, supra note 2, at 992-93 (users of packaged software not likely to recognize errors).
Errors can occur when humans enter data into a computer file or database.\textsuperscript{41} Therefore, computer programs edit input for errors which, depending on the quality of the editing routine, may make data created by a computer more or less reliable than data created by traditional methods of record-keeping. Optical character readers read input without a chance for human error\textsuperscript{42} and increase the reliability of computer-generated evidence.

Applications controls include input controls, processing controls, and output controls. Properly implemented applications controls can contribute to the trustworthiness and accuracy of a computer system printout.\textsuperscript{43} Input controls include input editing routines and reporting of input errors.\textsuperscript{44} Processing controls and output controls assure that the system executes in the intended manner and that the system creates accurate output.\textsuperscript{45}

A computer’s security system also contributes to the trustworthiness and accuracy of computer-generated evidence.\textsuperscript{46} A security system denies unauthorized access to a computer system’s programs, reports, hardware, or on-line environment.\textsuperscript{47} Although most computer systems have some type of security system, the publicized success of “hackers” and the potential for fraud and criminal acts connected with computer systems indicates that not all security systems work as intended.\textsuperscript{48}

III. THE ARGUMENTS FOR AND AGAINST REQUIRING STRICTER FOUNDATIONS FOR COMPUTER PRINTOUTS

A. The Argument for Requiring a Stricter Foundation for Computer Printouts

What type of foundation should courts require as a condition of admissibility for computer printouts?\textsuperscript{49} The few reported decisions on computer printouts as evidence contain superficial and inconsistent analyses of this issue—providing little guidance for attorneys and judges.\textsuperscript{50}

\begin{enumerate}
\item See Johnston, \textit{supra} note 2, at 673; Comment, \textit{Presumption of Reliability}, \textit{supra} note 2, at 124.
\item Singer, \textit{supra} note 2, at 164.
\item \textit{Id.} at 165.
\item \textit{Id.} at 165-66.
\item \textit{Id.} at 166.
\item See Peritz, \textit{supra} note 2, at 990-91; Singer, \textit{supra} note 2, at 167.
\item Singer, \textit{supra} note 2, at 167.
\item See \textit{McCormick}, \textit{supra} note 2, § 314, at 885.
\item See, e.g., United States v. Edick, 432 F.2d 350, 354 (4th Cir. 1970) (admission without analysis); Johnston, \textit{supra} note 2, at 673, 676.
\end{enumerate}
The argument for requiring a stricter foundation than is currently required rests on two related premises. First, the legal community does not adequately appreciate the limits of computer technology and therefore does not apply the existing rules in a manner that assures fairness and justice. Second, a computer printout carries with it false indicia of trustworthiness, accuracy, and reliability.

Judicial policies and the misunderstandings of the limits of computer reliability promote the admissibility of unsubstantiated evidence. At the trial level, counsel must raise evidentiary issues and courts have liberal policies of admissibility and discretion in admitting evidence. However, counsel often does not appreciate the limits of computer reliability and accuracy, and fact-finders are prejudicially swayed by computer output. Accordingly, trial courts cannot make fair rulings about printouts. At the appellate level, courts reluctantly reverse lower courts’ questionable decisions on other grounds. Appellate courts cannot easily reverse for abuse of discretion without clear standards for deciding computer evidence issues.

This combination of judicial policy together with the prejudicial nature of computer printouts results in the admission of inaccurate and untrustworthy evidence. Stronger foundation requirements would remedy this problem by increasing the probability that a printout is accurate and trustworthy. Furthermore, current practices do not treat the parties fairly because, even if discovery related to computerized evidence takes place, analyzing an opponent’s system may entail excessive time and expense, effectively precluding an argument based on evidentiary issues.

51. See Peritz, supra note 2, at 960; Singer, supra note 2, at 158.
52. See MARK A. DOMBROFF, DOMBROFF ON UNFAIR TACTICS § 14.37, at 510 (2d ed. 1984) ("The very fact of a computer does seem to add weight and credibility to the evidence with which it is connected."); Peritz, supra note 2, at 960; Sprowl, supra note 2, at 547; Note, Appropriate Foundation, supra note 2, at 79; Note, Competency, supra note 2, at 108.
53. See United States v. Vela, 673 F.2d 86 (5th Cir. 1982); Fed. R. Evid. 103.
54. Peritz, supra note 2, at 958.
55. Id.
56. Id. (citing United States v. Fendley, 522 F.2d 181, 191 (5th Cir. 1975) (Godbold, J., dissenting)).
57. Singer, supra note 2, at 171 n.35.
59. Peritz, supra note 2, at 960-61.
B. The Argument Against New Rules of Evidence and Stricter Foundation Requirements for Computer Printouts

The argument against new rules of evidence and stricter foundation requirements for computer printouts is based on the premise that technological advances and experience have improved the trustworthiness and accuracy of computer printouts. Supporters of this argument conclude that computer-generated evidence should enjoy a presumption of reliability. Judge Weinstein notes: "Despite reports of errors made by computers, well operated computer systems achieve high levels of accuracy, substantially greater than is possible for people making hand calculations. Machine and human mistakes can be minimized by new techniques of prevention, detection and correction." Others argue that computers do not introduce any new evidentiary issues. The possibility of errors did not begin with the arrival of computers, rather, it has always existed. In addition, the reliance of the business world on computers provides a circumstantial guarantee of trustworthiness.

Moreover, the legal community and jurors have an increased awareness of the limits of computer reliability. This increased awareness removes any false indicia of trustworthiness and accuracy that computer-generated evidence might have once carried. Finally, requiring proponents of computer printouts to supply extensive foundation testimony unfairly burdens the proponent of such evidence, and increases the complexity and decreases the efficiency of trials. Any doubts regarding the accuracy of the evidence should affect the weight, not the admissibility, of the evidence.

60. Comment, Presumption of Reliability, supra note 2, at 153-54.
61. WEINSTEIN, supra note 2, ¶ 1001(4)[07], at 1001-94.
62. See, e.g., DOMBROFF, supra note 52, ¶ 14.37, at 510 (a computer is just a "high speed calculator").
64. See, e.g., MCCORMICK, supra note 2, ¶ 306, at 872, ¶ 314, at 885 ("The usual conditions for the [business records exception] are applicable.").
65. "As one of the many who have received computerized bills and dunning letters for accounts long since paid, I am not prepared to accept the product of a computer as the equivalent of Holy Writ." Perma Research & Dev. v. Singer Co., 542 F.2d 111, 121 (2d Cir. 1976) (Van Graafeiland, J., dissenting), cert. denied, 429 U.S. 987 (1976).
66. "In this wondrous age of computerization, just about every adult has at least one horror story to tell—checks bounced by mistake, an erroneous rejection of a credit card purchase, bills rendered for merchandise never ordered, or insurance policies threatened with cancellation for some unexplained delinquency." BENDER, supra note 6, at § 6.02[2] n.3.
67. Peritz, supra note 2, at 961 n.21; see also Comment, Presumption of Reliability, supra note 2, at 153.
68. Comment, Presumption of Reliability, supra note 2, at 134-35. This argument also notes the negative reaction to British statutes that were created to deal specifically with computer-gener-
IV. APPLICATION OF THE FEDERAL RULES OF EVIDENCE TO COMPUTER PRINTOUTS

Courts, lawyers, and the drafters of the rules of evidence have addressed many technological changes over the years. In discussing the law's treatment of computer-generated business records, Judge Brown, the former Chief Judge of the United States Court of Appeals for the Fifth Circuit, wrote:

For a machine now capable of making 240,000 additions per second, reading magnetic tape containing 4 1/2 million digits of information on a single reel at a breath-taking speed, to speak of the shop book rule is, indeed, an anachronism. But we operate more comfortably with familiar concepts. Just as that rule dispensed with the necessity of producing the person who made the entry, the law must find a means of giving judicial currency to that which is reliable and acceptable in the market place.

The Federal Rules of Evidence are to "be construed to secure fairness in administration, elimination of unjustifiable expense and delay, and promotion of growth and development of the law of evidence to the end that the truth may be ascertained and proceedings justly determined." This Section of the Comment focuses on the question of whether the current application of the Federal Rules of Evidence governing authentication, the

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business exceptions to the hearsay rules, and summaries to computer printouts effectuate the policies underlying the Rules: fairness between the parties, efficiency, justice, and the ascertainment of truth.

A. Authentication

1. Authentication Under Rule 901(b)(9)

"The requirement of authentication or identification as a condition precedent to admissibility is satisfied by evidence sufficient to support a finding that the matter in question is what its proponent claims." When the "accuracy of a result is dependent upon a process or system which produces it," "[e]vidence describing a process or system used to produce a result and showing that the process or system produces an accurate result" conforms to the requirements of authentication under Rule 901(b)(9). Rule 901(b)(9) does not preclude a judge from taking judicial notice of the accuracy of a process or system. Rule 902(4) treats certified copies of public records as self-authenticating.

Most of the early cases that set standards for authenticating computer printouts imposed a substantial burden on the proponent of such evidence. Some of these cases also discussed factors required for the admissibility of computer printouts that today have relevance to Rule 901(b)(9)'s inquiry into the reliability of a computer system and the accuracy of its result.

73. Fed. R. Evid. 901, 902.
74. Fed. R. Evid. 803(6), 803(7).
75. Fed. R. Evid. 803(8), 803(10).
76. Fed. R. Evid. 1006.
77. See Fed. R. Evid. 102.
78. Fed. R. Evid. 901(a).
79. Fed. R. Evid. 901 advisory committee's note (expressly including computers under 901(b)(9)).
80. Fed. R. Evid. 901(b)(9).
82. Fed. R. Evid. 901(b)(9) advisory committee's note.
In the seminal case of *Transport Indemnity Co. v. Seib*, the Nebraska Supreme Court discussed the authentication of a computer printout. The court considered 141 pages of trial testimony in deciding whether the foundation for the evidence was properly laid. The court admitted the evidence.

Two years later, in *King v. ex rel Murdock Acceptance Corp.*, the Mississippi Supreme Court set down the following guidelines for the admissibility of computer-generated business records:

1. the electronic computing equipment is recognized as standard equipment;
2. the entries are made in the regular course of business at or reasonably near the time of the happening of the event recorded; and
3. the foundation testimony satisfies the court that the source of information, method and time of preparation were such as to indicate its trustworthiness and justify its admission.

Some time later, the Chancery Division of the Supreme Court of New Jersey set down more detailed guidelines which, in addition to laying the business records foundation, the proponent of computer-generated business records had to meet:

1. the competency of the computer operators . . .
2. the type of computer used and its acceptance in the field as standard and efficient equipment . . .
3. the procedure for the input and output of information, including controls, tests, and checks for accuracy and reliability . . .
4. the mechanical operations of the machine . . . and
5. the meaning and identity of the records themselves.

In *United States v. Scholle*, the court stated:

Even where the procedure and motive for keeping business records provide a check on their trustworthiness . . ., the complex nature of computer storage calls for a more comprehensive foundation. Assuming properly functioning equipment is used, there must be not only a showing that the requirements of the Business Records Act have been satisfied, but also the original source of the computer program must be delineated, and the procedures for input control including tests used to assure accuracy and reliability must be presented.

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85. *Id.* at 874.
86. *King v. ex rel Murdock Acceptance Corp.*, 222 So. 2d 393 (Miss. 1969).
87. *Id.* at 398.
90. *Id.* at 1125 (citations omitted).
In *People v. Bovio*, the court reversed a conviction because the foundation lacked testimony regarding whether standard hardware created the evidence and whether the program that created the report was standard, unmodified, and run according to instructions.

Modern courts generally employ liberal standards when assessing the admissibility of computer-generated evidence. Many courts completely bypass authentication for business records, requiring only the foundation for the business records exception to the hearsay rule. One commentator has observed that "[c]ourts seem to treat computerized records as if they were self-authenticating." Commentators have criticized this relaxed standard because it allows untrustworthy evidence into the record and unfairly burdens the opponent of such evidence.

Although courts may have relaxed authentication standards, some courts today require advance notice of the intent to use computer-generated evidence and require that the proponent give the opponent an opportunity to examine the program used to produce the output. Other courts have discussed requiring discovery related to the computerized evidence.

As the cases and comments discussed herein indicate, the question now is whether the relaxation of authentication standards treats the parties fairly, results in justice, and increases the probability of finding the truth. The Advisory Committee's notes to Rule 901(b)(9) fail to resolve this dilemma. The committee cites *Seib*, which contained 141 pages of trial authenticated testimony on system reliability, and two other cases that

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92. *Id.* at 833.
93. *See*, e.g., *United States v. Vela*, 673 F.2d 86 (5th Cir. 1982); *Weinstein*, *supra* note 2, ¶ 901(b)(9)(02), at 901-111.
95. *Peritz*, *supra* note 2, at 981-82.
96. *See id.* at 978-84; *Singer*, *supra* note 2, at 168-76.
relied on the circumstantial guarantee of trustworthiness inherent in business records.102

Commenting on the extensive authentication testimony required in Seib,103 Judge Weinstein indicated that "[s]uch an extensive demonstration is no longer necessary in view of the widespread acceptance of [computer-generated evidence]."104 Judge Weinstein contends:

A computer system with a print-out is no more obscure than a manual computation . . . . The data is simply stored electronically rather than manually. If the computer has been properly programmed and operated there is less likelihood of error by machine computations than there is by human figuring. . . . Since there is a chance that the computer output is inaccurate, the person offering the computer print-outs in evidence should, in addition to explaining the programming methods used, give a description of the controls used to detect both human and machine errors. This precaution is not required as a foundation for admissibility but as a tactical precaution to forestall any doubt in the trier's mind.105

In addition, Judge Weinstein adopts the Manual for Complex Litigation's (Manual) approach to pre-trial notice, suggesting proponents should give advance notice of their intent to use computer-generated evidence, thereby enabling the opponent to, by expert testimony if necessary, verify the accuracy of the system.106

Dean McCormick takes the position that an authenticating witness need only show that a printout is a "correct reflection of what is in the machine, rather than . . . what is in the machine is correct."107

The Manual places the burden of authenticating computerized evidence on the proponent of the evidence.108 Although intended for use in complex litigation, "the [Manual for Complex Litigation, Second's] principles of management, and many of the techniques it describes may be useful in criminal cases, in state courts, and in routine federal civil litigation."109

102. FED. R. EVID. 901 advisory committee's note.
103. See Seib, 132 N.W.2d at 871.
104. WEINSTEIN, supra note 2, ¶ 901(b)(9)[02], at 901-134.
105. Id. at 901-134-35 (citation omitted).
106. Id. ¶ 901(b)(9)[01], at 901-109.
107. MCCORMICK, supra note 2, § 314 n.6. For a criticism of this approach, see Peritz, supra note 2, at 980 ("[H]ow can we presume that 'what is in the computer' is itself reliable?").
108. MANUAL, SECOND, supra note 2, § 21.446, at 61.
109. Id., § 10, at 1; see also Peritz, supra note 2 (arguing that the recommendations of the prior edition of the Manual for Complex Litigation be adopted for all cases involving computer-generated business records).
The Manual assumes authentication of computerized evidence will take place under Rule 901(b)(9).\footnote{110} The recommendations in the Manual shift the emphasis that prior editions of The Manual for Complex Litigation placed on admissibility to that of weight.\footnote{111}

The Manual recommends that discovery\footnote{112} take place regarding the reliability of computerized evidence.\footnote{113} Such discovery includes inquiry into "the underlying source materials, the procedures for storage and processing, and some testing of the reliability of the results obtained."\footnote{114} A party can request discovery in machine readable form so that the requesting party can analyze the evidence on its own computer.\footnote{115}

However, the Manual takes the position that the proponent need not prove the evidence is "free from all error or possible error."\footnote{116} The trier of

\begin{itemize}
\item \footnote{110} See \textit{Manual, Second, supra} note 2, § 21.446, at 61 n.81.
%\item \footnote{111} For example, the prior edition of the \textit{Manual for Complex Litigation}, the \textit{Manual for Complex Litigation} (5th ed. 1982), contained six recommendations designed to close the "gap between the competence of the juror, the bench, and the bar on one hand, and the competence of the persons and machines employed by business and science to ascertain facts and draw conclusions, on the other." \textit{Id.} § 2.71, at 110. The recommendations included:
%\item \footnote{112} Discovery can be obtained of "data compilations" under \textit{Fed. R. Civ. P. 34}. Such discovery is, of course, subject to the work product doctrine and protective orders for trade secrets and privileged information. \textit{Manual, Second, supra} note 2, § 21.446 n.79.
%\item \footnote{113} \textit{Id.} § 21.446, at 59.
%\item \footnote{114} \textit{Id.}
%\item \footnote{116} See \textit{Manual, Second, supra} note 2, § 21.446, at 61 n.81.
fact should decide the ultimate issue of accuracy, with the possibility of errors affecting only the weight of the evidence, not admissibility.\textsuperscript{117}

The current procedure for authenticating computer printouts has been criticized. One commentator suggests applying the more stringent recommendations of the fifth edition of the \textit{Manual for Complex Litigation} to all cases, and argues for requiring a party to authenticate computer printouts under 901(b)(9) in addition to laying the foundation required by the Rule 803(6) hearsay exception.\textsuperscript{118} Other commentators have proposed new rules of evidence to deal with computer printouts.\textsuperscript{119}

\begin{enumerate}
\item Id.; see also \textit{WEINSTEIN, supra} note 2, ¶ 901(b)(9)[02].
\item Peritz, \textit{supra} note 2, at 978-84.
\item Singer advocates changing Rule 901 to exclude computer systems and proposes the following Rule 901(c):

\begin{enumerate}
\item \textbf{(c) COMPUTER SYSTEM OR PROGRAM.} Evidence describing a computer program or system of computer programs used to produce a result and showing, by description of the computer hardware, programming method, stored database, operation of the system, system security, and specific application controls, that the program or system produces an accurate result, satisfies the authentication requirement for a computer programmer [sic] or system. Voluminous testimony should not be required to lay a foundation for the computer system or process. For instance, the explanation of the computer hardware need not be more than an overview by the manufacturer of the central processing unit and of the types of input/output devices used by the system.

Singer, \textit{supra} note 2, at 174. Singer also proposes modifying Rule 803(6) by adding:

The evidence described in this paragraph does not include evidence which has been created by a program or programs if it was not the regular practice of the business to translate computer-stored information into the form in which it is introduced with that program or programs. A computer printout or summary of otherwise admissible computer stored evidence is admissible through Rule 1006.

\textit{Id.} at 180, adding a Rule 803(25):

Public records or the record of a public official as referred to in the exception categories for the hearsay rule are not to be interpreted to apply to records which have as their source a computer system. These records are not excluded by the hearsay rule so long as they meet the requirements of Rule 803(6) or Rule 803(7).

\textit{Id.} at 183, modifying Rule 1003 by adding:

provided that, in the case of a duplicate of data stored in a computer or similar device, the proponent of the evidence satisfies the requirement of Rule 1006(b).

\textit{Id.} at 188, and adding Rule 1006(b):

\begin{enumerate}
\item \textbf{(B) COMPUTER STORED DATA.} If admissible data are stored in a computer similar device, and a printout of that data, or other output which is readable by sight, is presented, both the process which created the computer stored data and the process which translated the data must satisfy the requirements of Rule 901(c). The following shall be made available for examination or copying, or both, by other parties at a reasonable time and place: 1. The original computer stored data being translated. 2. The program or programs used to translate the data. 3. Documentation for the computer stored data and programs. The court may order that they be produced in court. The process used to translate the data shall be shown by the testimony by a qualified witness.

\textit{Id.} at 188-89; see also Note, \textit{Appropriate Foundation, supra} note 2, at 91 for the following suggested statute:
\end{enumerate}
\end{enumerate}
The argument for requiring authentication under 901(b)(9) contends that the current practice of bypassing authentication and requiring only the business records foundation\textsuperscript{120} treats the parties unfairly because computer printouts are not as reliable as other types of business records. In addition, requiring only the business records foundation unfairly places the burden on the opponent of the evidence to establish that the computer does not produce an accurate result.\textsuperscript{121} Computer-generated evidence should thus be authenticated under Rule 901, in addition to meeting the foundation requirements of Rule 803(6), because the current practice allows parties to introduce untrustworthy evidence.\textsuperscript{122}

Furthermore, the argument continues, Rule 902(4), which treats public records as self-authenticating, should not apply to certified computer-generated public records because the accuracy of public records, like that of business records, depends on the system that produces them.\textsuperscript{123}

This argument distinguishes between taking judicial notice of the accuracy of a system or process and taking judicial notice of the result of a system or process.\textsuperscript{124} The use of radar provides an example:\textsuperscript{125} If a court can take judicial notice of the reliability of radar, yet require proof of the accuracy of a given reading, a court can also take judicial notice of the reliability of computer systems but still require proof of the accuracy of a given printout.\textsuperscript{126}

Other commentators contend that, rather than requiring strict foundation requirements, printouts should enjoy a presumption of reliability.\textsuperscript{127}

\textbf{SECTION 1.} A computer printout recording a business act, event, or transaction shall be admissible into evidence to prove the truth of the matters asserted therein provided the offering party shows:

1) that the input procedures conform to standard practices in the industry; and, the entries are made in the regular course of business, and

2) that he relied on the data in the database in making a business decision(s), within a reasonably short period of time before or after producing the printout sought to be introduced at trial, and

3) by expert testimony that the program reliably and accurately processes the data in the database.

\textsuperscript{120} See, e.g., MCCORMICK, supra note 2, § 314, at 885-86 n.6.

\textsuperscript{121} E.g., United States v. De Georgia, 470 F.2d 889 (9th Cir. 1969); see also Singer, supra note 2, at 168-69.

\textsuperscript{122} Peritz, supra note 2, at 976-78. Peritz also argues that current practice contradicts the meaning of 803(6). \textit{Id.} at 985.

\textsuperscript{123} Singer, supra note 2, at 170.

\textsuperscript{124} Peritz, supra note 2, at 983.

\textsuperscript{125} \textit{Id.}

\textsuperscript{126} \textit{Id.}

\textsuperscript{127} E.g., Comment, \textit{Presumption of Reliability}, supra note 2.
Courts should take judicial notice of the reliability of a computer-generated business record upon a showing that the record satisfies the business records foundation. Requiring extensive authentication confuses the relevancy concerns of authentication with the assurances of trustworthiness required under the exceptions to the hearsay rule. This argument appears to accord with current judicial treatment.

One commentator strikes a half-way position by distinguishing between types of programs that courts can judicially notice as reliable. Courts should take judicial notice of the reliability of programs used with accurate results over a long period of time, as well as packaged programs in use by many customers, but not customized programs or packaged programs that allow the user to customize the environment for particular purposes as reliable.

2. The Authenticating Witness

Courts have generally held that the proponent of a printout need not supply a computer programmer or operator as an authenticating witness. For example, in United States v. Linn, the court characterized a defense objection that the authenticating witness lacked "personal knowledge" because she could not distinguish between "menus," "databases," and computer "code" as "frivolous." However, some courts have suggested that the authenticating witness should have some familiarity with the records and the testing of the program.

The fifth edition of the Manual for Complex Litigation recommended that the proponent provide "expert testimony that the processing program reliably and accurately process the data in the database." The Manual

128. See Fed. R. Evid. 201.
129. Comment, Presumption of Reliability, supra note 2, at 149-50.
130. Id. at 148-49.
131. See supra notes 109-10 and accompanying text.
132. Note, Competency, supra note 2, at 109.
133. Id.
135. United States v. Linn, 880 F.2d 209 (9th Cir. 1989).
136. Id. at 216.
138. MANUAL FOR COMPLEX LITIGATION (5th ed. 1982).
139. Id. § 2.716(c).
for Complex Litigation, Second, published three years later, has deleted this recommendation.140

Some commentators argue that if a proponent prepares a computer-generated record for trial that party should also provide an authenticating witness familiar with the language of the program that produced the record.141 Others maintain that requiring expert authenticating witnesses places too great a burden on the proponent of computer printouts.142 Because of the volatility of the software and hardware markets, and because one company can use hardware and software from a myriad of vendors to produce one record, it may be impracticable financially and otherwise to produce extensive expert authenticating evidence.143 Therefore, any witness that can show that the evidence is what its proponent purports should suffice.144

B. Records of Regularly Conducted Activity

1. Records of Regularly Conducted Activity Foundational Requirements

Under Rules 803(6) and 803(7), computer printouts present the issue of what type of foundation sufficiently indicates trustworthiness.145 The previous section of this Comment discussed the related issue of whether courts should require authentication of printouts under Rule 901(b)(9). The two issues are closely related because if a party authenticates a printout under Rule 901(b)(9), the perception of a business record’s trustworthiness will probably increase, while if a court does not require a party to authenticate under Rule 901(b)(9), the opponent of such evidence may more readily raise objections to its trustworthiness. These objections will most likely note the lack of the same type of facts that authentication under Rule 901(b)(9) would establish.

The Federal Rules allow exceptions to the hearsay rule because “under appropriate circumstances a hearsay statement may contain circumstantial guarantees of trustworthiness to justify non-production of the declarant in person at the trial even though he may be available.”146 Federal Rule of

140. MANUAL, SECOND, supra note 2, § 21.446, at 61.
141. Singer, supra note 2, at 172.
142. Comment, Presumption of Reliability, supra note 2, at 151.
143. Id. at 151-52.
144. See, e.g., United States v. Vela, 673 F.2d 86 (5th Cir. 1982) (telephone company employee); Rosenberg v. Collins, 624 F.2d 659 (5th Cir. 1980) (company comptroller).
145. Singer, supra note 2, at 177.
146. FED. R. EVID. 803 advisory committee’s note.
Evidence 803 provides that "the following is not excluded by the hearsay rule, even though the declarant is available as a witness":147

(6) Records of regularly conducted activity. A memorandum, report, record, or data compilation, in any form, of acts, event, conditions, opinions, or diagnoses, made at or near the time by, or from information transmitted by, a person with knowledge, if kept in the course of a regularly conducted business activity, and if it was the regular practice of that business activity to make the memorandum, report, record, or data compilation, all as shown by the testimony of the custodian, or other qualified witness, unless the source of information or the method or circumstances of preparation indicate lack of trustworthiness.148

(7) Absence of entry in records kept in accordance with the provisions of paragraph (6). Evidence that a matter is not included in the memoranda, reports, records, or data compilations, in any form, kept in accordance with the provisions of paragraph (6), to prove the nonoccurrence or nonexistence of the matter, if the matter was of a kind of which a memorandum, report, record, or data compilation was regularly made and preserved, unless the sources of information or other circumstances indicate lack of trustworthiness.149

Courts consider records of regularly conducted activity unusually reliable for four different reasons: "systematic checking, . . . regularity and continuity which produce habits of precision, . . . [the] actual experience of business in relying upon them, . . . [and the] duty to make an accurate record as part of a continuing job or occupation."150 Even though courts consider these records reliable, opponents can attack the foundation as lacking trustworthiness.151

On its face, Rule 803(6) includes "data compilations." The Advisory Committee's notes state that the term "data compilation," as used in Rule 803(6), includes "electronic computer storage."152 Additionally, courts have interpreted data compilation to include computer printouts.153

147. FED. R. EVID. 803.
148. FED. R. EVID. 803(6).
149. FED. R. EVID. 803(7).
150. FED. R. EVID. 803(6) advisory committee's note.
152. FED. R. EVID. 803(6) advisory committee's note.
Despite the plain language of Rule 803(6), some argue for stricter foundational requirements or new rules for computer-generated business records so that the trier of fact may better assess the record’s trustworthiness. In particular, the trier of fact is unlikely to appreciate the various electronic, mechanical and human errors that can cause inaccuracies in output, without the benefit of substantial, foundational testimony. Others claim courts should treat computerized business records like any other business record. Still others contend that a court should presume that computer-generated business records are reliable.

Courts appear to treat computer printouts like other business records, if not more favorably. In United States v. Fendley, the court required, under the old Federal Business Records Act, that a printout: (1) be made and kept in the regular course of business, (2) for ordinary business purposes and relied on by the business, and (3) not a mere accumulation of hearsay or uninformed opinion. The dissent noted that the proponent laid an inadequate foundation because “the only entrant or recorder revealed by the foregoing testimony is the computer” and also noted that the proponent may have created the printout specifically for use in the litigation.

United States v. Scholle dealt with the issue of the foundation required under Rule 803(6) for Drug Enforcement Agency records in a criminal conviction. The court noted that data compilations were included within the rule and that printouts were not inherently unreliable, but stated that the complex nature of computer evidence required a greater foundation that would include the source of the program, the procedures for input, and

154. Johnston, supra note 2, at 673.
156. See, e.g., United States v. Vela, 673 F.2d 86, 89-90 (5th Cir. 1982) (“computer evidence is not intrinsically unreliable. . . . Vela’s arguments for a level of authentication greater than that regularly practiced by the company in its own business practices go beyond the rule and its reasonable purpose to admit truthful evidence”). The district judge determined computer generated records were “even more reliable than . . . average business record[s] because they are not even touched by the hands of man.” Id. at 90.
157. Comment, Presumption of Reliability, supra note 2, at 132.
158. See, e.g., Vela, 673 F.2d at 86.
161. Fendley, 522 F.2d at 185.
162. Id. at 191-94 (Godbold, J., dissenting).
tests for accuracy and reliability.\textsuperscript{164} The court did not discuss why it analyzed the records under the business records exception rather than the public records exception.

The court in \textit{United States v. De Georgia}\textsuperscript{165} discussed the draft of Rule 803(7) and admitted testimony of a car rental security manager regarding the absence of a rental record in a prosecution for interstate transportation of a stolen rental car.\textsuperscript{166}

Rule 803(6) requires a printout be made "at or near the time" of the events recorded.\textsuperscript{167} This requirement tends to increase the probability of accuracy of the records.\textsuperscript{168} Some argue that computer printouts are not made at or near the time of the events recorded.\textsuperscript{169} However, in \textit{Transport Indemnity Co. v. Seib},\textsuperscript{170} the Nebraska Supreme Court rejected that argument as exalting "form over substance" because, although the proponent might have printed the report for use at trial, the record was created in the usual course of business.\textsuperscript{171}

In general, courts have adopted the \textit{Seib} view on contemporaneity of recording. In \textit{United States v. Russo},\textsuperscript{172} the court stated:

It would restrict the admissibility of computerized records too severely to hold that the computer product, as well as the input upon which it is based, must be produced at or within a reasonable time after each act or transaction to which it relates.\textsuperscript{173}

The \textit{Russo} court found such records trustworthy, noting the Federal Business Records Act should be "liberally construed" to bring the "realities of business and professional practices" into the courtroom.\textsuperscript{174}

\begin{itemize}
  \item \textsuperscript{164} \textit{Id.} at 1109.
  \item \textsuperscript{165} \textit{United States v. De Georgia}, 420 F.2d 889 (9th Cir. 1969).
  \item \textsuperscript{166} \textit{Id.} at 891.
  \item \textsuperscript{167} \textit{FED. R. EVID.} 803(6).
  \item \textsuperscript{168} \textit{WEINSTEIN, supra} note 2, \textsuperscript{\textsection}803(6)[05], at 803-193. Computer systems arguably make many different records "at or near the time" of the event recorded: the document that was the source of the input, the semiconductor storage, the record on disk or tape, and the printout. \textit{See, e.g.}, \textit{United States v. Russo}, 480 F.2d 1228, 1237 (6th Cir. 1973), \textit{cert. denied}, 414 U.S. 1157 (1974); \textit{BENDER, supra} note 6, \textsuperscript{\textsection}6.03[2] at 6-17.
  \item \textsuperscript{170} \textit{Transport Indemnity Co. v. Seib}, 132 N.W.2d 871 (Neb. 1965).
  \item \textsuperscript{171} \textit{Id.} at 875.
  \item \textsuperscript{172} \textit{United States v. Russo}, 480 F.2d 1228 (6th Cir. 1973), \textit{cert. denied}, 414 U.S. 1157 (1974).
  \item \textsuperscript{173} \textit{Id. at} 1240.
  \item \textsuperscript{174} \textit{Id.; see also} \textit{United States v. Hutson}, 821 F.2d 1015 (5th Cir. 1987) (admitted over objection that printouts were created eight months after transaction, printout showed date of original transaction); \textit{United States v. Sanders}, 749 F.2d 195 (5th Cir. 1984).
\end{itemize}
Rule 803(6) also requires that a party keep a record "in the course of a regularly conducted business activity."\textsuperscript{175} This element can become an issue when a program written specifically for creating the evidence for trial produces the printout.\textsuperscript{176} One commentator proposes modifying Rule 803(6) to address this issue and recommends as an alternative that proponents print records using utility programs\textsuperscript{177} that most computer systems use.\textsuperscript{178} Opponents can object to reports produced for trial as untrustworthy.\textsuperscript{179}

2. Summaries

If the underlying records are prepared in the usual course of business, a court can admit summaries prepared for trial under Rule 1006.\textsuperscript{180} In addition, Rule 803(6) allows admission of a summary made in the regular course of business. In United States v. Russo,\textsuperscript{181} the court admitted a summary of records that were made in the usual course of business.\textsuperscript{182} However, commentators have noted that even accurate summaries can mislead through data selection.\textsuperscript{183}

3. The Qualifying Witness

The knowledge of the qualifying witness may influence a court's determination of trustworthiness.\textsuperscript{184} However, courts generally do not require the qualifying witness to have knowledge of the specific transaction that created the record.\textsuperscript{185}

\textsuperscript{175} FED. R. EVID. 803(6).
\textsuperscript{176} See, e.g., United States v. Fendley, 522 F.2d 181, 184 (5th Cir. 1975); Singer, supra note 2, at 179.
\textsuperscript{177} Singer, supra note 2, at 181 (such a program will often be part of the many programs written for a system and vendors will often supply utility programs).
\textsuperscript{178} Id. at 181 n.56 (citing City of Seattle v. Heath, 520 P.2d 1392 (Wash. Ct. App. 1974)); see also Bender, supra note 6, § 5.03[2], at 5-101 n.5 (suggesting the possibility of reading records directly off tape in polarized light).
\textsuperscript{179} FED. R. EVID. 803(6); see generally Palmer v. Hoffman, 318 U.S. 109, 113-14 (1943) (motive for creating report influences trustworthiness of record).
\textsuperscript{180} MANUAL, SECOND, supra note 2, § 21.446, at 61 nn.80, 81; Note, Competency, supra note 2, at 111.
\textsuperscript{182} Id. at 1240. But see Sprowl, supra note 2, at 565 (calling Russo's holding that a summary was an original business record "absurd").
\textsuperscript{183} Henak & Henak, supra note 6, at 58; Sprowl, supra note 2, at 563-65; Comment, Guidelines for Admissibility, supra note 2, at 961.
\textsuperscript{184} E.g., Railroad Comm'n v. Southern Pac. Co., 468 S.W.2d 125, 125 (Tex. Ct. App. 1971).
\textsuperscript{185} E.g., United States v. Fendley, 522 F.2d 181, 187 (5th Cir. 1975).
In *United States v. Jones*¹⁸⁶ the court held:

It is not essential that the offering witness be the recorder or even be certain who recorded the item. It is sufficient that the witness be able to identify the record as authentic and specify that it was made and preserved in the regular course of business.¹⁸⁷

The fifth edition of the *Manual for Complex Litigation* set out detailed additional requirements for the foundation of computer-generated records that were kept in the regular course of business and that were prepared for trial.¹⁸⁸ Those requirements included evidence of the input procedures and expert testimony on the program.¹⁸⁹ The *Manual for Complex Litigation, Second*, however, does not contain those two recommendations.¹⁹⁰

**C. Public Records and Reports**

Federal Rule 902(4) provides that certified copies of public records, "including data compilations in any form," do not require extrinsic evidence of authenticity as a condition precedent of admissibility because "practical considerations reduce the possibility of unauthenticity to a very small dimension."¹⁹² Rule 902(4) does not, however, preclude objections to authenticity.¹⁹³

The Federal Rules allow public records as an exception to the hearsay rule because of "the assumption [that] a public official will perform his duty properly and the unlikelihood he will remember details independently of the record."¹⁹⁴ Federal Rule of Evidence 803 provides that "the following are not excluded by the hearsay rule, even though the declarant is available as a witness":¹⁹⁵

(8) PUBLIC RECORDS AND REPORTS. Records, reports, statements, or data compilations, in any form or public offices or agencies, setting forth (A) the activities of the office or agency, or (B) matters observed pursuant to duty imposed by law as to which matters there

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¹⁸⁷. Id. at 252; see also *United States v. Miller*, 771 F.2d 1219, 1237 (9th Cir. 1985); *United States v. Young Brothers*, 728 F.2d 682, 693 (5th Cir. 1984), *cert. denied*, 469 U.S. 881 (1984) (qualifying witness does not need to be preparer or attest to the accuracy of records); *Rosenberg v. Collins*, 624 F.2d 659 (5th Cir. 1980); *United States v. Verlin*, 466 F. Supp. 155 (N.D. Tex. 1979).

¹⁸⁸. *MANUAL FOR COMPLEX LITIGATION* § 2.71, at 110 (5th ed. 1982); see supra note 117 for text of recommendations.

¹⁸⁹. Id.


¹⁹¹. FED. R. EVID. 902(4).

¹⁹². FED. R. EVID. 902 advisory committee's note.

¹⁹³. Id.

¹⁹⁴. FED. R. EVID. 803(8) advisory committee's note.

¹⁹⁵. FED. R. EVID. 803.
was a duty to report, excluding, however, in criminal cases matters observed by police officers and other law enforcement personnel, or (C) in civil actions and proceeding against the Government in criminal cases, factual findings resulting from an investigation made pursuant to authority granted by law, unless the sources or other circumstances indicate lack of trustworthiness.  

(10) ABSENCE OF PUBLIC RECORD OR ENTRY. To prove the absence of a record, report, statement, or data compilation, in any form, or the nonoccurrence or nonexistence of a matter of which a record, report, statement, or data compilation, in any form, was regularly made and preserved by a public office or agency, evidence in the form of a certification in accordance with Rule 902, or testimony, that diligent search failed to disclose the record, report, statement, or data compilation, or entry.

Far fewer published cases discuss computer-generated public records than discuss computer-generated business records. The scarcity of published decisions on the issue suggests in itself that such public records are treated as self-authenticating under 902(4). In United States v. Farris, the court discussed the draft of Rule 902(4) and held, under a predecessor of Rule 803(8), that public records certified by the Secretary of the Treasury were sufficient to prove the failure to file tax returns, without further authentication.

The court in United States v. Orozco allowed into evidence customs records of car license numbers that had crossed the Mexican-American border, noting that the agents who entered the license numbers had no reason to fabricate and "the possibility of an inaccurate entry is no greater here than it would be in any other recording system. ... [N]othing about this recording procedure indicates a 'lack of trustworthiness.'"

In United States v. Cepeda Penes, the absence of computerized tax records was used against a criminal defendant. The court recognized the difficulty in assessing the reliability of the programming and accuracy of

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197. FED. R. EVID. 803(10).
198. United States v. Farris, 517 F.2d 226 (7th Cir. 1975).
199. Id. at 228; see also United States v. Neff, 615 F.2d 1235, 1241-42 (9th Cir. 1980), cert. denied, 447 U.S. 925 (1980) (search of IRS computer records showed failure to file tax return); United States v. Orozco, 590 F.2d 789 (9th Cir.), cert. denied, 442 U.S. 920 (1979); United States v. Lanier, 578 F.2d 1246, 1254-55 (8th Cir.), cert. denied, 439 U.S. 856 (1978) (Federal Reserve Bank computer records used against vendor of food stamps).
200. United States v. Orozco, 590 F.2d 789 (9th Cir. 1979).
201. Id. at 794.
input procedures and recommended that proponents give advance notice of their intent to use computer-generated evidence. \(^{203}\)

Those who argue for stricter foundational requirements for computer printouts argue against self-authentication of certified computer-generated public records because their accuracy and reliability depend on the accuracy and reliability of the system that created them. \(^{204}\) One commentator takes the position that computer-generated public records should meet the foundation requirements for business records as well as the authentication requirements of a modified Rule 901. \(^{205}\)

Those who argue for self-authentication under Rule 902(4) point out that this rule explicitly includes "data compilations" and that there is no basis for assuming computers increase errors or make errors harder to detect in public records. \(^{206}\)

V. ANALYSIS

As noted by commentators and courts, a computer printout may contain false information. Yet, so may a record created with a pencil and paper. Creating a record with a computer simply adds factors that may contribute to errors. Today, attorneys, judges, and juries have adequate experience with computers and their output to be aware of the limits of computer reliability and accuracy. \(^{207}\) This experience eliminates not only the false indicia of infallibility computer printouts might once have carried, but also the need for all participants in a trial to become computer experts. \(^{208}\)

Although the legal system does not need new rules of evidence to deal with printouts, blessing printouts with a presumption of reliability is not justified. The information systems that business and government depend on are sufficiently diverse that the factors which influence the accuracy, reliability, and trustworthiness of a printout should be placed before the jury. To help attain that objective, standards should be developed to deal with printouts. These standards should require: (1) pre-trial notice of the intent to use computer printouts, \(^{209}\) (2) discovery concerning the reliability and accuracy of computer printouts and the system that produced them, \(^{210}\)

\(^{203}\) Id. at 760-61.
\(^{204}\) See Singer, supra note 2, at 170.
\(^{205}\) Id. at 170-74.
\(^{206}\) E.g., Comment, Presumption of Reliability, supra note 2, at 138-39.
\(^{207}\) See supra notes 60-61, 104 and accompanying text.
\(^{208}\) Id.
\(^{209}\) See supra note 106.
\(^{210}\) See supra notes 112-14.
authentication under Rule 901(b)(9) for all types of printouts, except certified public records,\(^{211}\) and (4) the additional Rule 803(6) and 803(8) foundations for printouts of business and public records.\(^ {212}\)

Adequate pre-trial notice and discovery will decrease the admission of false or misleading evidence, increase the efficiency of trials, provide a fairer means to deal with evidentiary burdens, and assist the trier of fact in assessing whether the printout contains what its proponent asserts. Furthermore, notice and discovery will create more efficient trials because the opponent can explore, by expert if necessary, the details and nuances of such proof before, rather than at trial. Discovery will also provide opposing counsel with more evidence to put before the fact-finder to use in assessing the printout.\(^ {213}\)

Proponents should authenticate printouts, except those of certified public records, under Rule 901(b)(9). Authentication under Rule 901(b)(9) is needed because the reliability and accuracy of computer-generated evidence depend upon the system which produces it.\(^ {214}\) Such authentication need not be extensive, however. The information provided by the suggested pre-trial notice and discovery should meet Rule 901(b)(9)'s requirements in most cases. As long as the court finds that a reasonable jury could find, by a preponderance of the evidence, that the printout is what its proponent claims, any lack of proof should affect the weight given the evidence, not its admissibility.\(^ {215}\)

Authentication under Rule 901(b)(9) will produce fair and just results. Requiring the proponent to authenticate printouts treats the parties fairly because the proponent has access to information about the system and its programs. This requirement of authentication also comports with the treatment of other types of evidence.

It is not necessary, or pragmatic, however, to require expert proof of reliability and accuracy.\(^ {216}\) Lay awareness of the limits of computer reliability eliminates the necessity of expert authentication.\(^ {217}\) In addition, finding experts for multiple vendors' software and hardware may be prohibitively expensive, or impossible. Even so, expert authentication testimony may benefit a proponent. If a party produces strong testimony relating to the reliability of a system and the accuracy of its result, the printout

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\(^{211}\) See supra notes 118-122.

\(^{212}\) Id.

\(^{213}\) See generally supra notes 104-06, 110-17 and accompanying text.

\(^{214}\) See supra notes 118-22.

\(^{215}\) See supra notes 104-06, 110-17 and accompanying text.

\(^{216}\) See supra notes 116-17, 142-44 and accompanying text.

\(^{217}\) See supra notes 104-05 and accompanying text.
will have more probative force. If the proponent fails to lay a strong authenticating foundation, the opponent will have information, as the result of discovery, to put before the jury that will decrease the probative force of the printout.

In addition to authenticating the printout under Rule 901(b)(9), proponents of records of regularly conducted activity should be required to lay the separate Rule 803(6) foundation.\textsuperscript{218} The traditional foundation required for business records should suffice.\textsuperscript{219} The policies behind Rule 803(6) apply equally to computer-generated business records and manually-documented records. Extensive business and governmental reliance on computer systems provides circumstantial guarantees of trustworthiness. Pre-trial notice and discovery will give the opponent of such evidence a fair chance to discover if the computer-generated evidence is indeed trustworthy.

The policy justifying self-authentication of traditional certified public records applies equally to computer-generated certified public records.\textsuperscript{220} Therefore, proponents can authenticate computer-generated certified public records under Rule 902(4). Because the reliability and accuracy of a computer-generated certified public record depend, in part, on the reliability and accuracy of the system that produced it, doubt may be cast on a computer-generated certified public record's trustworthiness.\textsuperscript{221} Pre-trial discovery will provide the opponent of such evidence with information regarding the system's reliability and accuracy of result that the opponent can use to object to a computer-generated certified public record's authenticity under Rule 902(4), or trustworthiness under Rule 803(8).

\textbf{VI. CONCLUSION}

Courts do not need new rules of evidence, stricter foundations, or presumptions of reliability to deal adequately with computer printouts. The Federal Rules of Evidence are sufficient safeguards of the reliability of computer-generated evidence. Authenticating printouts under Rule 901(b)(9) and requiring the additional Rule 803(6) and Rule 803(8) foundations will give the trier of fact adequate evidence to judge a printout's reliability, accu-

\textsuperscript{218} \textit{See generally supra} notes 118-22 and accompanying text.
\textsuperscript{219} \textit{See generally supra} notes 150-57 and accompanying text.
\textsuperscript{220} \textit{See generally supra} notes 194-205 and accompanying text.
\textsuperscript{221} \textit{See supra} note 203 and accompanying text.
racy, and trustworthiness. Any doubts the trier of fact has should affect the weight given the evidence, not its admissibility.\textsuperscript{222}

\textbf{Mark A. Johnson}

\textsuperscript{222} See \textit{supra} notes 103-06, 111-17 and accompanying text.