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LEGAL VALUE OF COMPUTER RECORDS

Report of the Secretary-General

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INTRODUCTION

1. The Commission at its fifteenth session in 1982 considered a report of the Secretary-General containing a discussion of certain legal problems arising in electronic funds transfers. 1/ In respect of the question of the legal value of computer records the report concluded: "The problem, while of particular importance to international electronic funds transfers, is one of general concern for all aspects of international trade. Generalized solutions would, therefore, be desirable." 2/ On the basis of this report the Commission requested the Secretariat to submit to some future session a report on the legal value of computer records in general. 3/

2. Subsequent to the fifteenth session of the Commission, the Working Party on the Facilitation of International Trade Procedures, a body jointly sponsored by the Economic Commission for Europe and the United Nations Conference on Trade and Development, considered a report on the legal aspects of automatic trade data interchange which concluded, *inter alia*, "that there is an urgent need for international action to establish rules regarding legal acceptance of trade data transmitted by telecommunications. Since this is essentially a problem of international trade law, the United Nations Commission on International Trade Law (UNCITRAL) would appear to be the central forum." 4/ At the request of the Working Party the report was forwarded by the Executive Secretary of the Economic Commission for Europe to several international organizations for their consideration and was submitted to the Commission at its sixteenth session as an annex to document A/CN.9/238.

3. As part of the preparation for the current report, the Secretariat prepared a questionnaire on the use of computer-readable data as evidence in court proceedings. The purpose of the questionnaire was to collect information on the evidential value of records stored or transmitted in computer-readable form. At the same time and in co-operation with the Secretariat of the Commission the Customs Co-operation Council (CCC) prepared a questionnaire on the acceptability to customs authorities of a goods declaration in computer-readable form and subsequent use of such a declaration in court proceedings. The questionnaire prepared by the Secretariat of the Commission was sent to Governments and was included for information with the questionnaire sent by the Customs Co-operation Council. The questionnaire prepared by the Customs Co-operation Council was sent to its member States and was included for information with the questionnaire sent by the Secretariat

1/ Document A/CN.9/221 (and Corr. 1, French only).

2/ Ibid., para. 81.

3/ Report of the United Nations Commission on International Trade Law on the work of its fifteenth session, Official Records of the General Assembly, Thirty-seventh Session, Supplement No. 17 (A/37/17), para. 73.

4/ Document TRADE/WP.4/R.185/Rev.1, para. 4 of the foreword.

of the Commission. The two questionnaires were sent concurrently to ensure co-ordination between ministries in preparation of the replies. The information contained in the replies has been used in the preparation of this report. 5/

I. BUSINESS RECORDS

A. Types of business records

4. Transaction oriented business records, which are the subject-matter of this report, are those which record the activities of an enterprise. Whether created or stored on paper or in a computer, they can be classified as either (1) originals or copies of transaction documents, (2) chronological records of transactions or (3) summary records of those transactions. Although the different characteristics of these types of records pose somewhat different problems in regard to their legal value when they are maintained in computer-readable form rather than in paper-based form, they share the characteristic of recording actual events.

5. The legal value of business records of an enterprise which do not reflect transactions, such as an analysis of its activities and its planning operations for the future, is determined by different criteria from transaction oriented records and is not considered in this report.

6. Transaction documents include such inter-enterprise documents as contracts, purchase orders, confirmations, shipping documents and payment instructions. They include such intra-enterprise documents as memoranda, time records, leave slips and inventory requisitions. They also include documents submitted to the State for such purposes as customs clearance or exchange control.

7. The records of an enterprise can be expected to contain the originals of the transaction documents which have been received from outside the enterprise and copies of the transaction documents which have been sent outside the enterprise. The original is often authenticated by signature or its equivalent, but copies retained by the sender usually do not show the authentication. Both the originals and copies can be expected to show one or more dates, which may be significant depending on the manner shown. The documents may show a sequence number indicating the order in which they were used, sent or received by the enterprise. Transaction documents are the basic documents on which all other records of an enterprise are based and their authenticity as to source, date and content is fundamental in case of later inquiry or dispute. Since the long-term storage of paper-based transaction

5/ An analytical summary of the replies received by the Secretariat is contained in the annex to this document. It may be useful to many to read the annex before reading the text of the main report. A summary of the replies received by the Customs Co-operation Council is contained in its document no. 31.678 and those replies are reflected in this report to the extent relevant.

documents is expensive, many documents are reproduced or recorded by microfilming or on computer and the originals are destroyed either immediately or after a restricted period of time.

8. Administrative documents prepared by enterprises must conform to the requirements specified by the administration for the documents in question. In many cases the document is in the nature of a printed form to be filled out by the enterprise. Some documents required in international trade must conform to a format prescribed in an international convention. The records of the enterprise would contain only a copy of the document as it was submitted to the administration.

9. Chronological records, such as the accounting journal of an enterprise or a log of incoming or outgoing communications, set forth in chronological order the sending or receipt of transaction documents. Some chronological records contain the content of the events represented by the transaction documents. A chronological record may also consist of a file of transaction documents kept in chronological order.

10. A chronological record may be authenticated, but often is not. A chronological record which is dated and sequential establishes a strong presumption that it reflects the activities of the type in question for that period of time. The strength of the presumption depends on such factors as the extent to which transaction documents are required for all relevant transactions, the extent to which they are required to carry sequence numbers and the rigour with which they are entered into the chronological record.

11. Summary records, such as an accounting ledger, record transactions relevant to a particular account or activity. They allow for the current status of that account or activity to be easily assessed. Although entries to summary records may be authenticated, they often are not.

12. In most cases the records of an enterprise which are of ultimate legal significance are the transaction documents. Chronological and summary records are often of legal significance only as a means of easily determining what events have occurred and as an index to the transaction documents which serve as the evidence of those events. However, in some cases the chronological or summary documents are of legal significance in their own right. Dividends may be payable only to those persons shown to be stockholders on the stockholder ledger of the enterprise. Posting of the debits and credits to the customer account in a bank may constitute honour of a cheque or payment order.

B. Physical nature of business records

1. Paper-based documents and records

13. Paper can be used for any type of transaction document or for any type of business record. Since paper is durable, paper-based documents and records can be expected to remain in existence for a longer period of time than is usually economically or legally necessary. Alteration of the document or other record can normally be detected. As methods of altering paper-based documents and records have improved, the techniques for making paper which readily shows alterations have also improved. The document or record can be authenticated by signature or other means. Paper-based documents are portable. They can be sent by messenger or mailed to distant places, thereby

permitting the transmission of the data, the instructions or the legal rights symbolized by the document. These are the characteristics of paper which have made it desirable as a medium on which documents or records are kept.

2. Electronic documents and records

(a) Telegraph and telex

14. Intra- and inter-enterprise transaction documents have been sent by telecommunications in the form of telegraph and telex for over a century. From the viewpoint both of business use and of legal consideration, telegraph, telex and allied technologies have generally been considered to have many of the characteristics of paper-based documents. Since both the sender and the receiver of the message retain a paper copy, legal requirements that a contract or other document must be in writing have been generally considered to be fulfilled by the exchange of telegrams and telex. ^{6/}

15. Telegraph, telex and allied technologies have, however, had several technical limitations which have affected their usefulness and have created certain legal difficulties. Since the technology has been limited to the sending of messages in linear form, the use of telegraph and telex has been limited to those messages which could by their nature be transmitted in that form. Therefore, although they have been widely used to transmit such transaction documents as purchase orders, acknowledgments, confirmations, and payment instructions, they could not be used to send messages which had to be received in a particular format, such as chronological or summary records or transaction documents of the nature of bills of lading or most administrative documents. However, if the enterprise had personnel or agents at the place a transaction document was needed, its data content could often be transmitted to that place for entry on the appropriate forms.

16. Telegraph and telex permit limited possibilities for authentication. By their very nature they cannot be signed. This normally does not interfere with their use in business or with their use as evidence in case of later dispute, since the context of the message and standard call back procedures give adequate assurance of their source. Where assurance of the source is particularly important to the parties and may be of later importance in case of dispute, test keys and related procedures can be used. Nevertheless, and in spite of the wide-spread use of telex for commercial purposes, adequate authentication of telex messages remains a serious problem where possibilities of fraud are significant.

17. Because the transmission charges for telegraph and telex have been relatively expensive, contract offers, acceptances and other documents have often been sent in summary form and the full text sent in a later mailed confirmation. This has raised problems where the confirmation differed in some material respect from the telecommunicated message. A similar problem is

^{6/} See, for example, United Nations Convention on Contracts for the International Sale of Goods (Vienna, 1980), art. 13, A/CONF.97/18, Annex I; Official Records of the United Nations Conference on Contracts for the International Sale of Goods, United Nations publication, Sales No. E.81.IV.3: "For the purposes of this Convention 'writing' includes telegram and telex".

raised when the text of a telegramme or telex is altered in a material respect during transmission. However, legal rules have been developed to resolve these conflicts without casting doubt on the legal value of the telecommunication itself. ^{7/}

(b) Paper-based documents prepared on computer

18. Paper-based documents are often prepared on computers, including word-processors. In its reply to the Customs Co-operation Council, the United States reported that a 1982 survey showed that 60 per cent of the goods declarations submitted to the customs authorities in that country were prepared on computers. ^{8/} These documents would seem to have the same physical and legal characteristics as similar documents prepared on a typewriter. ^{9/} In any case, it may currently be impossible to tell whether a particular paper-based document was prepared on a typewriter or on a computer.

(c) Documents transmitted computer-to-computer

19. Computer-to-computer telecommunications can be used to create paper-based documents at a distant location. One advantage of this technology over earlier telecommunications technology is that the document can be transmitted in the format required for paper-based documents of the type in question. This has been discussed as one means to ensure that bills of lading are available at the port of destination before the goods arrive. However, if the paper-based document must be authenticated by signature or other means which requires action on the document, the sender of the document would continue to need an authorized representative at the destination.

20. It has often been noted that one party may prepare transaction documents on a computer, print out the documents in an acceptable format and transmit them to the recipient, who may promptly re-enter the data into his own computer. The re-entry of the data is done at considerable expense and at the risk of error. Both the expense and the error-rate are reduced if the re-entry of the data from the paper-based document can be accomplished automatically by machine reading. It can be reduced even more if the document can be transmitted directly between the two computers without the necessity of transmitting paper-based documents.

^{7/} Ibid., art. 27, which provides that "... if any ... communication is given ... by means appropriate in the circumstances, a delay or error in the transmission of the communication or its failure to arrive does not deprive that party of the right to rely on the communication".

^{8/} CCC document no. 31.678, cited in footnote 5, above.

^{9/} The reply given by several States to question 8 of the UNCITRAL questionnaire that a print-out would not satisfy the requirement of written form seems in large measure to be directed at specific types of records and would not preclude every form of record from being prepared on a computer.

21. Computer-to-computer transmission of transaction documents is usually done in a format suitable for further computer processing. The transaction between the parties may call for a print-out at either end, but the technology does not require one since the transaction document can be read, stored and processed in computer-readable form. Transaction documents can be transmitted individually by telecommunications or in batch-mode by exchange of computer memory devices or by telecommunications.

22. Authentication of documents transmitted in batch-mode by exchange of computer memory devices is often done by signature on an accompanying paper which identifies the batch. Authentication can also be accomplished by electronic techniques as it can for documents sent by telecommunications.

(d) Storage of data in computer-readable form

23. One of the primary characteristics of computers has been the ease with which records could be corrected and brought up to date. This is a great advantage for the preparation of all documents and records and for maintenance of current summary records, such as a ledger account for accounts receivable. It is a serious disadvantage for the permanent storage of all types of business records considered in this report. Transaction documents sent or received should be stored in an unalterable form. It should be possible to add new items to the end of a chronological record, but not to alter an item once it is recorded. Summary records showing the status of an account or of an activity as of fixed dates, e.g. status at the end of the year, should be stored in an unalterable form.

24. Alterations to data could occur either inadvertently as a result of technical factors or human errors or deliberately. Particular concern has been expressed over the possibility that records may be deliberately altered. Unauthorized alterations of records, which are facilitated by remote access to the computers storing the records, are of serious concern to the enterprises whose records have been altered, and raise many legal questions in regard to civil and criminal liability for those acts and for their consequences. More serious problems for the legal acceptability of computer records are raised by the possibility that the enterprise itself might deliberately alter its records, since this possibility casts doubt on the credibility as evidence of all computer stored records.

25. The protection of the records of an enterprise from unauthorized alteration has been raised to a high art, and the procedures and technology available continue to improve. If the recommended procedures are rigorously followed, unauthorized penetration of the computer system is unlikely. Many of these same procedures are also useful against deliberate alteration by the enterprise itself. However, relevant legal rules must take into consideration the possibility that the technical means of protecting the data from alteration may not have been used or may have failed.

26. In order to store computer records in a form which could not be altered, some enterprises have stored authenticated and dated hard copies of all significant records. Recent technological developments using optical disks seem to permit the storage of data in an unalterable form. The generalized use of such storage media for transaction documents and for the permanent storage of chronological and summary records as of fixed dates would reduce the concerns as to whether the record may have been altered. However, further technological developments may discover means to alter the content of optical disks as well.

II. EVIDENTIAL VALUE OF COMPUTER RECORDS

A. Legal rules on reception of evidence

27. There are three major variations on the general law of evidence which affect the evidential value of computer records. ^{10/} The variations are based on different legal traditions and practices in the fact-finding process in civil and commercial disputes.

1. Free introduction of all relevant evidence

28. In many legal systems the litigants are in principle allowed to submit to the tribunal all information which is relevant to the dispute. If there is a question as to the accuracy of the information, the tribunal must weigh the extent to which it can be relied upon. In these legal systems there is in principle no obstacle to the introduction of computer records as evidence in judicial or arbitral proceedings.

2. Exhaustive list of admissible evidence

29. Some States establish an exhaustive list of acceptable evidence, which always includes written documents as one of the acceptable forms of evidence. The States falling into this group which replied to the questionnaire had not amended the list to include computer records, although several indicated that a reform of the law was contemplated or in various stages of implementation. As a result, in a few of those States computer records were not admissible as evidence in any court. In other States replying to the questionnaire a computer record might be relied upon to furnish to the court a presumption as to the facts in the case.

30. Moreover, in some of these States the restriction on the use of non-written evidence is found in the civil law governing non-commercial matters. In commercial matters, as well as in criminal trials, non-written evidence may be freely accepted. In those States a computer record may, therefore, be generally acceptable as evidence in all matters of commercial dispute.

3. Common law hearsay evidence limitation

31. In principle, common law countries employ an oral and adversarial procedure in litigation. As part of that dual tradition, a witness can testify only to what he knows personally so as to allow the opponent an opportunity to verify the statements by cross-examination. What he knows through a secondary source, e.g. another person, a book or a record of an event, is denominated "hearsay evidence", and, in principle, the tribunal cannot receive it as evidence.

32. Because of the difficulties which the hearsay evidence rule has caused, there are many exceptions to it. One of those exceptions is that a business record created in the ordinary course of commercial activity may be received as evidence even though there may be no individual who can testify from

^{10/} Annex, question 1.

personal knowledge and memory as to the particular record in question. In some common law countries a proper foundation must be laid for the introduction of the record by oral testimony that the record is of a normal nature. In others, the record is automatically accepted subject to challenge, in which case the party relying upon the record must show that it is of the proper kind.

33. Some common law countries have accepted computer print-outs as falling within the business records exception to the hearsay-evidence rule. Many common law countries have adopted special laws providing that computer records may be admitted as evidence if certain conditions are fulfilled. ^{11/} The conditions for admission of computer records may be different in criminal trials from the conditions for admission in civil cases, ^{12/} but there would normally be no distinction regarding the admission of the computer records of an enterprise between litigation against another commercial enterprise and litigation against a consumer.

34. As a result of these developments, there are no remaining theoretical or philosophical objections to the use of computer records as evidence in common law jurisdictions. Objections to the admission of particular computer records, however, are based on a claim that the record in question had not been shown to meet the statutory or court-enunciated criteria for admission.

B. Trustworthiness of computer records in individual cases

35. The trustworthiness of computer records has been evaluated at three levels. At the most general level, those legal systems which do not allow the free introduction of all relevant evidence have had to decide whether computer records in general were sufficiently trustworthy to be admissible as evidence before a court. As noted above, with some exceptions among countries with an exhaustive list of admissible evidence, a decision in favour of admissibility has generally been made. At a second level the common law legal systems have had to provide criteria for the courts to determine in individual cases whether the data stored in a particular computer or computer system is sufficiently trustworthy to be admitted as evidence in regard to specific matters in a particular litigation. The other legal systems do not face this problem. At a third level courts in all legal systems must evaluate in individual cases the credibility of the computer record before them.

1. Criteria for admissibility in common law courts

36. Although the specific criteria for the admissibility of computer records differ in the various common law countries, they fall into three categories. Firstly, the proponent of the record is required to show that the computing equipment used was such that it may be expected to have functioned properly.

^{11/} Several of the common law respondents included copies of the relevant legislation.

^{12/} The differences between the rules for admission in civil cases and in criminal proceedings were pointed out in the reply of the United Kingdom. The law in respect of computer-readable output as evidence was the subject of legislation before Parliament at the time of the reply in the summer 1984.

It may be necessary to show that the equipment was designed to perform the tasks it was asked to undertake, that the various elements of hardware were compatible and that the software was appropriate. Secondly, it must be shown that in entering information into the computer appropriate procedures were followed to ensure the accuracy of the record, e.g. that the entries were made in the regular course of business at or reasonably near the time of occurrence of the event recorded. Thirdly, it must be shown that the method of storing and processing information and preparing the print-out, i.e. the programming, operation and control of the computer, was such as to assure the trustworthiness of the record. 13/

37. Some common law statutes have been drafted in the context of off-line batch-processing, where the closed nature of the system has permitted the party relying on the evidence to describe the system to the tribunal in relative detail. In newer systems, however, the computer itself may make decisions as to how the data will be processed depending upon intermediate results. It may not be possible to describe the process followed in regard to a particular record in these systems. Similar difficulties are faced in describing to a tribunal for its evaluation a distributed processing system, especially if any portion of the processing is done by outside value-added facilities, or in describing the relationship between the system at one enterprise at which a computer record was created and the system at a second enterprise to which the record was transmitted by physical exchange of computer memory device or by telecommunications. As a result of these technological developments, some common law statutes may not provide an adequate legal basis for the courts to admit computer records from the more complex systems. 14/ However, these same developments have led the courts to accept more general statements from the proponent of the computer record tending to establish that the computer system has been working properly.

38. Although the normal rules governing the use of hearsay evidence would require a person who is familiar with the computer system to present in oral testimony before the court the information necessary for admitting the computer stored data as evidence, most of the laws specifying the procedure to be used for the admission of computer records permit the submission of an affidavit by that person, eliminating the need for oral testimony unless there is a dispute as to the accuracy of the data. In the case of enterprises which

13/ The "seven statements" to be made to a common law court to support the admissibility of computer stored data as suggested in A. Kelman and R. Sizer, *The Computer in Court* (Gower, 1982), p. 71, may be compared with the requirements for computer stored data which is to be used as evidence in the largely civil law courts of the member States of the Council of Europe as those requirements are reflected in Council of Europe Recommendation No. R (81) 20, Appendix, arts. 3 and 5, 11 December 1981, reproduced in the Report of the Secretary-General, *Electronic Funds Transfer*, A/CN.9/221.

14/ According to the reply from one common law country, a computer record received from a computer of another firm would probably not be admissible. Annex, question 6. This would seem to raise doubts as to the legal security of all inter-bank electronic funds transfers in that country.

maintain computer systems with a high degree of professional care and which keep detailed records of every aspect of the system and its operations, it may be sufficient for the affidavit to be quite simple. 15/

39. At the present time, even if there is a challenge to the accuracy of the data, it would be rare for a court in most common law countries to refuse to admit computer stored data into evidence for evaluation as to its credibility by the jury or by the court in its role as the finder of fact unless the terms of the statute had not been drafted in the light of current technology, 16/ the computer system was managed in an unprofessional manner, or the data to be presented was the result of sophisticated analysis by the computer and the assumptions underlying the analysis and the procedures by which the analysis had been made were not clearly documented and acceptable. This latter problem, however, is seldom posed in respect of the recording and data processing of documents and other records of an enterprise.

2. Evaluation by court of credibility of computer stored data

40. Computer stored data may be inaccurate even if the proponent has shown the system to be sufficiently well managed for the data to be admitted as evidence in a common law court. There is an even greater possibility that inaccurate data will be placed before the court in other legal systems which have no procedure for refusing admittance of untrustworthy data from an individual computer system. In either case when the accuracy of the data is challenged, the court must evaluate it for its credibility.

41. The weight to be given to computer stored data may be established by legal rule. Council of Europe Recommendation No. R (81) 20 provides that a computer recording of the books, documents and data designated by law as being among those which can be kept on computer and made in conformity with the procedures set out in articles 3 and 5 of the Appendix "shall be presumed to be a correct and accurate reproduction of the original document or recording of the information it relates to, unless the contrary is proven". 17/ This presumption of accuracy would be in conformity with the presumption of accuracy given to written documents and records of an enterprise in some countries. However, it appears that in most countries the court would be free to evaluate the credibility of computer stored data on the basis of the evidence before it. 18/

15/ See the pro-forma certificate drafted in the United Kingdom for use under the Civil Evidence Act 1968, in Computer Generated Output as Admissible Evidence in Civil and Criminal Cases, The British Computer Society, ed. T.R.H. Sizer and A. Kelman (Heyden & Son Ltd., 1982), Figure 2.

16/ The reply from the United Kingdom noted that "the Acts in question were passed in 1968 and 1972 and the definition of computer is 'any device for storing and processing information', which appears to mean hardware but not software".

17/ Appendix, art. 2, 11 December 1981.

18/ Annex, question 4.

42. It is not known whether any legal system has given the courts guidance as to the factors which they should take into consideration in evaluating the credibility of the computer record. However, it would seem that the factors to be considered by a common law court in deciding whether to admit computer stored data in evidence, which are similar to the factors set forth by the Council of Europe in the Appendix to its Recommendation, would be the primary factors to be considered in favour of the accuracy of the data. In addition, a number of replies to the questionnaire indicated that where data has been transmitted from one computer system to another, the evidential weight of the data stored in the computer of the second firm would also depend on the measures taken to prevent risk of alteration of data during transmission. 19/ Since a common law court would already have considered the same factors and found the computer system sufficiently trustworthy to admit the data as evidence, a strong presumption that the data is accurate may in fact be established in the mind of the court with the result that the party contesting the accuracy of the data may carry a burden of proof not established by legal rule. While the technical problem is somewhat different, the party contesting the accuracy of a computer record in other legal systems may face the same difficulty once the proponent of the record has established that the computer system was well managed. The party attacking the accuracy of a computer record must have means of determining whether the computer system may have defects in design or maintenance which could lead to inaccuracies in result. In the common law countries this would normally occur by means of "discovery". 20/ In the civil law countries the evaluation may often be carried out by an expert appointed by the court.

C. Best evidence - original or copy

1. Recording in computer from original paper document

43. It has been a general rule of evidence that documents and other records had to be presented to a court in their original form so as to assure that the data presented to the court was the same as the original data. However, in recent years the large savings which can be realized by storing microfilms or computer recordings of original paper documents and destroying the originals has led many States to permit their use as evidence in place of the original. 21/

19/ Annex, question 6.

20/ The rules of discovery are themselves complex and may not be sufficient to allow for adequate testing of a computer system. For a brief description of the law in Australia and proposal for reform, T.H. Smith, "Computers and the Law of Evidence", Transnational Data Report, Vol. VI, No. 8 (December 1983), p. 451.

21/ One of the main purposes of Council of Europe Recommendation No. R (81) 20, 11 December 1981, was to establish uniform conditions under which original paper-based documents might be microfilmed or copied on computer and subsequently destroyed.

44. The data from an original paper document may be transferred to a computer in several ways. An image of the document can be stored in digital form and later reproduced in visual form when needed. It is, however, less expensive to record only the essential data on the document. In this latter case the visual form of the document when reproduced would not be the same as the original. Therefore, in some cases an image of particularly important segments of the document, such as the signature, may also be recorded. At present data capture by automatic means from a paper document is largely limited to data printed in type faces designed for automatic reading. Other data which is handwritten or which is printed or typed in other type faces may need to be entered into the computer by re-keying. New equipment is in development which promises to increase substantially the amount of data on paper documents which could be captured automatically and accurately.

45. Although the technology of transforming a paper document to a computer record is different from that used in microfilming the records for storage, the legal problems are similar. Firstly, data capture does not allow for testing whether the paper document had been altered as to content or authentication prior to its transformation into the new form for storage. Secondly, the content of the original paper record may not have been accurately captured and transformed into a computer record. This is a rare problem where the data was captured automatically from a paper record which was printed or typed in a type face designed for automatic capture. It is a more likely event if the data was entered into the computer by re-keying. Thirdly, the computer record is subject to subsequent deliberate or inadvertent alteration. This, however, is a problem common to all computer records.

46. As a result of these concerns, some States require enterprises which have reproduced paper-based documents on microfilm or recorded them on computer to keep the original documents for varying periods of time which are long enough for most problems to surface. The period of time recommended by the Council of Europe in Recommendation No. R (81) 20 was up to two years. 22/

2. Print-out as original or copy of computer record

47. The record as stored in a computer in electronic form cannot be read or interpreted by a human being. Therefore, it cannot be presented to a tribunal unless it takes on a visual form, either on a visual display unit which the tribunal can see or on a print-out. According to the replies to the questionnaire, both means of presenting the data to the court are in use. 23/

48. In a few States the question has arisen whether the print-out or the image on the visual display unit is the original computer record or is a copy of the record stored in computer-readable form. In most States this question seems either not to have arisen or the copy in human-readable form has been accepted on the grounds that the original record was not available to the court. Where this question has threatened to preclude the presentation of

22/ Appendix, art. 1, para. 2, 11 December 1981.

23/ Annex, questions 2 and 3.

computer records as evidence, the rules of evidence have been amended to provide that a print-out could be considered to be an original record. 24/

III. AUTHENTICATION

49. Authentication of a transaction document serves to indicate to the recipient and to third parties the source of the document and the intention of the authenticating party to issue it in its current form. In case of dispute, authentication provides evidence of those matters. Although an authentication required by law must be in the form prescribed, an authentication required by the parties can consist of any mark or procedure they agree upon as sufficient to identify themselves to one another.

50. The most common form of authentication required by law is a signature. Signature is usually understood to mean the manual writing by a specific individual of his name or initials. A manual signature is personal to the individual signing and it cannot properly be made by any other person.

51. The demands of modern commerce have led many legal systems to permit required signatures to be made by stamp, symbol, facsimile, perforation or by other mechanical or electronic means. This trend is most evident in the law governing transport of goods where all the principal multilateral conventions which require a signature on the transport document permit that signature to be made in some way other than by manual signature. 25/ One reply to the questionnaire indicated that there was a general rule in the commercial law of that State that a document may be "signed" by the use of any symbol executed or adopted by a party with the present intention of authenticating a writing. However, the reply also indicated that there were numerous exceptions to this general rule. 26/

52. Various techniques have been developed to authenticate documents which have been transmitted electronically. Telex and computer-to-computer telecommunications often employ call back procedures and test keys to verify the source of the message. Certain encryption techniques authenticate the source of a message, and usually verify the content of the message as well. Remote access to a computer may require use of a password, or the use of a magnetic stripe or microcircuit plastic card and a personal identification number (PIN) or password. Other techniques for authentication of electronic documents, such as electronic analysis of signatures, fingerprints, voice patterns and eye patterns are in various stages of development.

24/ Reply of the United States. (Also see the report of the United States submitted to ECE/UNCTAD Working Party on Facilitation of International Trade Procedures, ECE document TRADE/WP.4/R.298/Rev.1, in particular para. 28).

25/ Report of the Secretary-General, International Transport Documents, A/CN.9/225, para. 47.

26/ Reply of the United States. Also see para. 32 of the ECE document cited in footnote 24, above.

53. One technique which is often used when electronic documents are transmitted by the physical delivery of magnetic tapes or other computer memory devices is for the sending party to supplement any electronic authentication which may be on the memory device with a signed writing. Where the memory devices are physically delivered to the recipient of the documents, the addition of a signed writing adds little inconvenience or cost.

54. Although an individual document sent by telecommunications can be confirmed by a subsequent signed writing, as has been a customary practice in regard to telegrams and telex, in many cases that would defeat the purpose of computer-to-computer telecommunications. However, two parties who anticipate communicating frequently by computer-to-computer telecommunications may agree in writing beforehand on the form of the communications and the means to be used to authenticate the documents. Such an agreement may also be required by an administrative organ of the State before it will accept documents in electronic form, whether by telecommunications or computer memory device. ^{27/} This signed agreement may be considered to supply any signature which is required by law. Nevertheless, any authentication of the computer-readable document itself would be in electronic form.

55. Although a manual signature is a familiar form of authentication and serves well for transaction documents passing between known parties, in many commercial and administrative situations it is relatively insecure. The person relying on the document often has neither the names of persons authorized to sign nor specimen signatures available for comparison. This is particularly true of many documents relied upon in foreign countries in international trade transactions. Even where a specimen of the authorized signature is available for comparison, only an expert may be able to detect a careful forgery. Where large numbers of documents are processed, signatures are sometimes not even compared except for the most important transactions.

56. Electronic forms of authentication using computers offer one major advantage over visual comparison of manual signatures. The procedure is so relatively inexpensive that every authentication can be verified as a routine matter. There is no need to restrict verification to the most important transactions.

^{27/} In its reply to the Customs Co-operation Council (CCC), Denmark stated that before being permitted to submit information to the customs authorities by means of magnetic tapes or diskettes, the consignee must obtain an authorization from the authorities.

"34. Such authorization states exactly that the permission to submit clearance information by means of magnetic tapes or diskettes is subject to the condition that in all respects the same validity in law is attributed to the information as if the information were submitted by means of a signed Customs declaration.

"35. This implies that by accepting an authorization a consignee has "signed" all the clearance information which he submits by means of magnetic tape or diskettes, and the arrangement is thus within the framework of the legislation in force." (CCC document no. 31.678, cited in footnote 5, above)

57. If the proper procedures are followed, some authentication techniques in current use for computer-to-computer messages are unlikely to be used successfully by unauthorized persons. There are encryption techniques available which also serve to authenticate a message and which cannot be deciphered in a commercially significant period of time. Microcircuit cards perform the authentication procedure within an area of the microcircuit chip which cannot be reached from the outside. Therefore, it is expected that once these cards are in widespread use, they will offer a highly secure form of authentication of the person who used the card.

58. The legal problem, therefore, rests primarily with those laws which state that a document must be "signed". Where it is not possible to interpret the law so as to consider an electronic form of authentication as a "signature", it may be desirable either to indicate in the law that an electronic form of authentication is a "signature" or to permit documents to be "authenticated" by electronic means. 28/

IV. REQUIREMENT OF A WRITING

59. Legal rules which require the existence of a document for the validity of a transaction or to evidence that transaction or which require the maintenance of certain chronological or summary records of the enterprise often state that those documents or other records must be in writing. Since until recently the records of an enterprise were of necessity kept in paper-based form, the requirement of a writing was considered to be synonymous with the requirement of a paper-based document or other record. However, with the development of computers and computer-to-computer teletransmission of documents, the purpose lying behind a legal requirement that there be a document or other record may as well be satisfied by the existence of a computer record.

28/ The ECE/UNCTAD Working Party on Facilitation of International Trade Procedures, in its Recommendation No. 14, adopted at its ninth session in March 1979,

"Recommends to Governments and international organizations responsible for relevant intergovernmental agreements to study national and international texts which embody requirements for signature on documents needed in international trade and to give consideration to amending such provisions, where necessary, so that the information which the documents contain may be prepared and transmitted by electronic or other automatic means of data transfer, and the requirement of a signature may be met by authentication guaranteed by the means used in the transmission; and

Recommends to all organizations concerned with the facilitation of international trade procedures to examine current commercial documents, to identify those where signature could safely be eliminated and to mount an extensive programme of education and training in order to introduce the necessary changes in commercial practices." (ECE Document TRADE/WP.4/INF.63; UNCTAD document TD/B/FAL/INF.63)

A. Evidence

60. As noted in Part II of this report, in most legal systems there are no major obstacles to the use of computer records as evidence. Therefore, where a document is required primarily to facilitate subsequent proof of the existence of the transaction and its terms, a document in computer-readable form would often be sufficient.

61. Where the document is of a nature that it can be stored only in the computer of one of the parties, a paper-based copy or receipt may be desirable. Such a receipt is required, for example, by Montreal Protocol No. 4 (1975) to amend the Convention for the Unification of Certain Rules relating to International Carriage by Air (Warsaw 1929), article 5(2), which provides that if, in place of issuing an air waybill, the carrier has used another means which would preserve a record of the carriage to be performed, "the carrier shall, if so requested by the consignor, deliver to the consignor a receipt for the cargo permitting identification of the consignment and access to the information contained in the record preserved by such other means." However, a receipt may not always be necessary. Many States do not require a bank to issue a receipt to a customer using an automatic cash dispenser or automatic teller machine on the grounds that the records of a bank can be expected to be accurate in this regard and the cost of furnishing a paper receipt would be excessive.

B. Awareness of consequences

62. Creation of a document to consummate a transaction may make the parties more aware of the legal and economic consequences of their act by causing them to be more specific about the transaction than they otherwise would be. Oral agreements or agreements arising out of conduct of the parties may be ambiguous as to whether one or both parties intended to enter into an agreement and whether they understood the terms of that agreement. Nevertheless, many agreements of this type are enforced, although other agreements require the creation of a document or a contemporaneous confirmation of the transaction in documentary form.

63. The form which a document should take to fulfill this function would seem to be of little importance as long as the actions required of the parties create an awareness that legal consequences will arise out of those actions. The sending of a computer-to-computer message is as likely to bring about such awareness as is the sending of a letter or a telex, even though the computer-to-computer message does not necessarily result in a paper print-out at either the point of sending or the destination. Similarly, the authorization of a funds transfer by inserting a magnetic stripe or microprocessor card into a bank terminal and entering a personal identification number (PIN) or a password would necessarily make the transferor aware that legal consequences will follow from those acts.

C. Third party reliance

64. Some of the most important commercial documents are specifically designed for the reliance of third parties on them. Such documents include negotiable instruments and documents of title, inspection and weight certificates and airline passenger tickets authorizing passage on more than one carrier.

Because of the wide variety of such documents in existence, it is difficult to generalize as to the extent to which they are required by law. It may be the case that they are largely required by commercial parties for commercial reasons or, if required by law, they are required in order to permit the State to verify the details of the transaction for purposes of taxation, import controls, exchange control or for other regulatory reasons. Undoubtedly, however, the use of some documents of this type is required by law for the protection of third parties.

65. In regard to a number of transactions which traditionally called for the use of documents on which third parties could rely, satisfactory electronic substitutes have been devised. Where the use of such documents had not been required, the new procedures could be instituted without changes in the law. Therefore, cheques and paper-based payment orders have been replaced by electronic funds transfers and in some trades bills of lading have been replaced by sea waybills or electronically transmitted shipping documents, all without legislative activity. However, in some States where the law required the issuance of paper-based share certificates, bonds and other investment securities, their replacement by electronic registers required authorizing legislation. 29/

66. In regard to a number of other transactions, satisfactory electronic procedures have not as yet been devised. The most frequently mentioned example is that, to date, it is not possible to effect a letter of credit transaction without accompanying paper documentation. However, as solutions are found to the existing technical and commercial problems in respect of these transactions, legal provisions requiring the use of documents in paper-based form on which third parties can rely may become unnecessary.

D. Subsequent audit

67. All countries require enterprises to maintain certain records and the supporting documentation for the purpose of permitting a subsequent audit of the activities of the enterprise. In a few cases the subsequent audit may be performed by private parties with an interest in the matter, such as shareholders of an enterprise who may have a right to have the conduct of the management audited. In most cases the subsequent audit is undertaken by the State for purposes of taxation or to verify conformity with various regulatory controls.

68. It appears from the replies to the questionnaire that most rules on the form in which records must be maintained by enterprises concern chronological and summary records. 30/ The traditional legal rules as to required accounting practices may include such matters as that the pages must be bound

29/ In reply to question 8, Finland indicated that according to a provision in the Limited Companies Act, the stock register as well as the shareholders' register may be compiled through automatic data processing or other means.

30/ Annex, question 8.

together and numbered. 31/ States with rules such as these which clearly required a paper-based form have had to change those rules by legislative or administrative action in order for enterprises to maintain their records on computers. 32/ Where such action has not been taken, the specified records of an enterprise must continue to be maintained on paper. It was not clear from the replies to the questionnaire to what extent transaction documents are required to be in paper-based form in order to facilitate later audit. To the extent they are, the same conclusion would seem to apply.

69. Requirements that original paper-based documents must be retained for a certain period of time even though they have been microfilmed or recorded on computer also have as one purpose the possibility of subsequent audit. In Sweden, the Accountancy Act permits the use of punched cards, punched tape, magnetic tape or other material from which a print-out or microfilm can be produced, but these means may not be used for general ledger summaries or simultaneously for both vouchers and books of original entry. 33/

E. Documents submitted to governments

70. Although most replies to the questionnaire indicated that there were no general legal rules prohibiting the administration from accepting data or documents in computer-readable form, it appears that at present in no State are a wide range of computer-readable documents submitted to the governments. 34/ The most commonly reported were tax declarations of various types, including goods declarations to the customs authorities.

71. It is likely that so few computer-readable documents are accepted by governments for a combination of an administrative and legal reasons. In order to transmit any document in computer-readable form from one entity to another either by physical exchange of computer memory devices or by

31/ "The records [cash book, daily ledger, account ledger, general ledger, financial statement ledger] are to be maintained in a proper and clear manner. The records are to be bound or stitched and the pages or the leaves must be accurately numbered before the records are taken into use. Leaves must not be removed from bound or stitched books. The recording of the records must take place in a lasting manner. What has been recorded must not be crossed out or in any other way made unreadable." (Extract from Norway, "The Accounting Act", Act. No. 35, 13 May 1977, art. 6, English translation included in Norwegian reply to questionnaire.)

32/ Pursuant to the Accounting Act, regulations have been issued in Norway regarding the replacement of traditional records and vouchers by computer-readable ones. Several other replies also indicated that relevant legislation had been amended to provide specifically for keeping business records in computer-readable form.

33/ Reply of Sweden to question 8.

34/ Annex, questions 10 and 11; also see CCC document no. 31.678, cited in footnote 5, above.

telecommunications, both parties must have compatible equipment capable of sending and receiving data in that form. Therefore, until the ministry concerned has acquired the necessary equipment and established the necessary procedures, it will continue to require that documents are submitted to it in paper-based form. This problem is particularly significant where the document must be received and acted upon in decentralized locations, such as customs entry points.

72. There appear to be a number of laws or regulations requiring specific documents to be in paper-based form. ^{35/} Although these laws and regulations could presumably be easily amended, any ministry contemplating the acceptance of documents in computer-readable form from enterprises will wish to be assured that the change in procedures will create no new legal problems. The potential legal problems are essentially the same as those faced by enterprises in their dealings with one another, i.e. that the record as received by the administration and stored in its computer will be accepted in case of dispute as a faithful record of the documents transmitted to it by the enterprise and that, in case of difficulties, the authentication of the electronic message to it from the enterprise will be legally sufficient to establish responsibility.

V. LEGAL VALUE OF COMPUTER RECORDS IN INTERNATIONAL TRADE

73. The replies to the questionnaire show that countries on all continents and at every level of economic development have made changes in their law to give increased legal security to computer records. Although these changes in the law concern primarily domestic transactions, the problem of legal security of computer records is of special importance in international trade.

74. The export and import of goods require a large number of documents. While the figures vary from one State to another, and to some extent on the type of goods and financing of the transaction, it is not unusual for an exporter to prepare over 100 different documents for each shipment. These documents must be prepared accurately and promptly so that neither the shipment nor payment is delayed. Furthermore, since some of the documents required for the import of the goods must be prepared in the country of export, there is a great interest in being able to use modern means of telecommunication to eliminate the delays inherent in the sending of paper-based documents through the mails.

A. Computer records as evidence

75. It appears from the replies to the questionnaire that the rules of evidence regarding computer records should not be a major obstacle to the use of computers or to the development of domestic or international computer-to-computer transmission of data or documents. Almost all of the countries that replied to the questionnaire appeared to have legal rules which were at least adequate to permit the use of computer records as evidence and to permit the court to make the evaluation necessary to determine the proper

^{35/} Several of the replies to the questionnaire indicated the existence of such rules. Annex, question 11.

weight to be given to the data or document. The most important differences in the rules reflect differences in the law of evidence which are also applicable to paper-based documents but which have caused no noticeable harm to the development of international trade.

76. Nevertheless, evidentiary questions are of legitimate concern. In a very few States computer records cannot be used as evidence. In at least one State there is doubt whether a message stored in one computer which has been received from another computer in computer-readable form can be used as evidence. Other obstacles to the use of computer records as evidence exist as a result of the particular words of the relevant legislation or because of technological developments.

77. Furthermore, and perhaps of greater importance, there is a widely felt sense of insecurity over the perceived inadequacies in the law governing the use of computer records as evidence. This sense of insecurity may be in its own right an inhibition to the development of new patterns of trade documentation based on computers.

78. Therefore, it appears of greatest importance that there be an assurance that records from well-managed systems, including those using the most advanced technology, will be acceptable as evidence in courts. However, to obtain such assurance it seems neither advisable nor necessary to attempt to unify the rules of evidence regarding the use of computer records in international trade. The principal reasons are that the existence of traditional differences among systems of adjudication, to which the rules of evidence are closely tied, do not allow for a single approach and that the experience in regard to the rules of evidence as they apply to the paper-based system of documentation has shown that substantial differences in the rules themselves have caused no noticeable harm to the development of international trade.

B. Authentication and requirement of a writing

79. A more serious legal obstacle to the use of computers and computer-to-computer telecommunications in international trade arises out of requirements that documents be signed or that documents be in paper-based form.

80. Because of the central role of the customs services in the import and export of goods, it is particularly significant that several of them are currently prepared to accept goods declarations in computer-readable form and that several others have plans to begin accepting declarations in that form in the near future. This development may encourage other administrative services to do likewise, leading to a general relaxation of legal requirements that documents must be in writing or manually signed.

CONCLUSION

81. On the basis of the foregoing, the Commission may wish to conclude that the developments in the use of automatic data processing in international trade have reached such a stage as to justify a concerted international call to Governments to adapt their legal systems in the light of these new developments.

82. Should the Commission so agree, it may wish to consider adopting a recommendation on the basis of the following draft text:

"The United Nations Commission on International Trade Law,

Noting that the use of automatic data processing (ADP) is already firmly established throughout the world in many phases of domestic and international trade as well as in administrative services,

Noting also that legal rules based upon pre-ADP paper-based means of documenting international trade may create an obstacle to such use of ADP in that they lead to legal insecurity or impede the efficient use of ADP where its use is otherwise justified,

Noting further with appreciation the efforts of the Council of Europe, the Customs Co-operation Council and the United Nations Economic Commission for Europe to overcome obstacles to the use of ADP in international trade arising out of these legal rules,

Considering at the same time that there is no need for a unification of the rules of evidence regarding the use of computer records in international trade, in view of the experience showing that substantial differences in the rules of evidence as they apply to the paper-based system of documentation have caused so far no noticeable harm to the development of international trade,

Considering also that the developments in the use of ADP are creating a need in many legal systems for an adaptation of existing legal rules to these developments, having due regard, however, to the need to encourage the employment of such ADP means that would provide the same or greater reliability as paper-based documentation,

1. Recommends to Governments:

(a) to review the legal rules affecting the use of computer records as evidence in litigation in order to eliminate unnecessary obstacles to their admission, to be assured that the rules are consistent with developments in technology, and to provide appropriate means for a court to evaluate the credibility of the data contained in those records;

(b) to review legal requirements that certain trade transactions or trade related documents be in writing, whether the written form is a condition to the enforceability or to the validity of the transaction or document, with a view to permitting, where appropriate, the transaction or document to be recorded and transmitted in computer-readable form;

(c) to review legal requirements of a handwritten signature or other paper-based method of authentication on trade related documents with a view to permitting, where appropriate, the use of electronic means of authentication;

(d) to review legal requirements that documents for submission to governments be in writing and manually signed with a view to permitting such documents to be submitted in computer-readable form to those administrative services which have acquired the necessary equipment and established the necessary procedures;

2. Recommends to international organizations elaborating legal texts related to trade to take account of the present Recommendation in adopting such texts and, where appropriate, to consider modifying existing legal texts in line with the present Recommendation."

Annex

ANALYTICAL SUMMARY OF REPLIES TO UNCITRAL QUESTIONNAIRE
ON USE OF COMPUTER-READABLE DATA AS EVIDENCE
IN COURT PROCEEDINGS

Replies to the questionnaire were received from the following States: Australia, Austria, Burma, Canada, Chile, Colombia, Czechoslovakia, Denmark, Dominican Republic, Finland, Germany, Federal Republic of, Honduras, Hungary, Iraq, Japan, Luxembourg, Mexico, Nigeria, Norway, Philippines, Portugal, Senegal, Sweden, Tonga, United Kingdom of Great Britain and Northern Ireland, United States of America, Venezuela, Yugoslavia, Zambia (29 replies).

Use of computer-readable data in court proceedings

A. Records stored in computer-readable form

Question 1

Can a record of a transaction which is or has been stored in a computer or in a computer-readable form (e.g. magnetic tape, disk or the like) be admitted in evidence in civil, criminal and administrative court proceedings? If the courts in your country generally admit in evidence all data deemed to be relevant to the dispute, leaving it to the finder of fact (judges or jury) to weigh its significance, please answer this question by so stating.

Summary of replies

The replies of many States show that their law of evidence is based on a general principle according to which all relevant data, regardless of its form, is admissible in evidence and, therefore, there is no obstacle to the introduction in evidence of a record which is or has been stored in a computer or in a computer-readable form. In these legal systems it is left to the court to freely weigh the credibility of computer records in the light of all circumstances (Austria, Colombia, Czechoslovakia, Denmark, Finland, Germany, Federal Republic of, Honduras, Japan, Mexico, Norway, Portugal, Sweden, Yugoslavia, Zambia). However, some of these replies note that a computer record, where it reproduces the content of a document, may be regarded as a copy with the consequence that the court may require the production of the document on the ground that it is more reliable evidence (Austria, Finland, Sweden).

According to other replies, characteristic for legal systems of the common law tradition, computer records are admissible under the condition that certain foundation facts are established. These foundation facts are generally related to the method and equipment used in the preparation of the computer record and should show preliminarily that the record may be credible (Australia (some jurisdictions), Philippines, United Kingdom, United States),

although in some legal systems it may be sufficient to show that the computer records were maintained in the usual or ordinary course of business (Australia (some jurisdictions), Canada). (Conditions for the admissibility of computer records are dealt with under question 4, below). The provisions on weight of computer records as contained in some of the common law rules of evidence (Australia, United Kingdom) indicate that a computer record admitted in evidence is weighed by the common law court or jury basically in the same way as in the legal systems where in principle all evidence is admitted.

The third group of replies is from the States where the evidentiary rules contain an exhaustive list of acceptable evidence and, since computer records are not dealt with in these rules, a computer record is considered either as not admissible (Burma, Chile, Dominican Republic) or not acceptable as an independent evidence, i.e. a computer record can only be relied upon in connection with other admissible evidence (Luxembourg, Senegal, Venezuela). However, in some of these States there are no restrictions as to the admissibility of evidence, including computer stored evidence, in commercial cases (Luxembourg, Senegal), in civil cases in which the value of the disputed subject-matter does not exceed the amount fixed by statute (Luxembourg, Senegal, Venezuela), or in criminal cases (Luxembourg, Senegal, Venezuela).

Several replies indicated that reforms in the law relative to the use of computer records as evidence were under active consideration (Chile, Germany, Federal Republic of, Hungary, Luxembourg, United Kingdom).

Question 2

If the court would accept as evidence a record of a transaction which is or has been stored in computer-readable form, would the court accept the record in computer-readable form or would it require a print-out or other human-readable output medium?

Summary of replies

According to some replies, for a computer record to be acceptable in evidence it is required that it be presented to the court in a print-out or other human-readable output medium (Denmark, Philippines, Senegal, Sweden, United Kingdom, Zambia). According to other replies, the way of presenting a computer record to the court may be more flexible. While in some legal systems the interpretation is that the court might be willing to accept a record in computer-readable form provided that it can be made understandable to the court (Austria, Canada, Colombia, Czechoslovakia, Honduras, Mexico, Norway, Portugal, Tonga, United States), there are legal systems which expressly permit a record to be presented to the court by a video display unit or in other form that can be understood by sight (Australia (some jurisdictions), Finland, Germany, Federal Republic of).

Question 3

If the court required a print-out or other human-readable output medium, would it accept a print-out produced for the purposes of the court proceedings or would it require a print-out produced at the time the computer record of the transaction was created?

Summary of replies

It appears that in the States which replied to the question there are no explicit provisions on the time at which a print-out must have been made and that the replies are based on an interpretation of rules of evidence. Under two replies the print-out should have been made at the time the record was created (Philippines (for import goods declarations), Zambia). Under other replies the court will not necessarily refuse to accept a computer print-out only because it has been produced some time after the record has been created or because it has been produced for the purposes of the court proceedings (Australia, Canada, Colombia, Czechoslovakia, Denmark, Finland, Germany, Federal Republic of, Honduras, Japan, Mexico, Norway, Sweden, Tonga, United Kingdom, United States). Some of these latter replies point out that the time of the making of a computer print-out influences the evidential weight to be given to it and that the court may require the submission of an earlier print-out if it exists or it may require the party to establish that the presented print-out corresponds to the original computer record, i.e. that the computer-readable record has not been altered after it was created (Canada, Finland, Germany, Federal Republic of, Senegal, Sweden).

Question 4

What conditions would have to be satisfied prior to the admissibility in evidence of a record stored in computer-readable form or, if all relevant data is admissible in your country, to assure that it was treated by the court as having equivalent weight to similar data submitted in written form?

Summary of replies

Legal systems which indicate in their replies that all relevant data is admissible in evidence do not provide conditions for a computer record to have equivalent weight to similar data submitted in documentary form. It is left to the court to evaluate the weight of the computer record depending upon all circumstances of the case (Austria, Colombia, Czechoslovakia, Denmark, Finland, Germany, Federal Republic of, Honduras, Japan, Mexico, Norway, Sweden, Yugoslavia). The same appears to apply for the cases where computer records are admissible by way of exception (Luxembourg, Senegal, Venezuela).

In legal systems where rules like the "hearsay evidence" rule limit the admissibility in evidence of a computer record, conditions were laid down under which the record would be admissible. These legal conditions could be summarized as dealing with the following issues: (a) the expectation that the computing equipment was functioning properly, (b) the time and the reliability of the method of making computer entries and (c) the sources of information on the basis of which the computer record was made (Australia (some jurisdictions), Philippines, United Kingdom, United States). In a few common law legal systems business records kept on computers are normally admitted in evidence and the above mentioned conditions are used to determine the weight of the evidence (Australia (some jurisdictions), Canada (unsettled as to conditions for admission)).

Question 5(a)

Do the courts in any circumstances accept an authentication of a computer-readable record where the authentication is in electronic form?

Summary of replies

In many legal systems authentication in electronic form would be acceptable (Austria, Czechoslovakia, Denmark, Finland, Honduras, Mexico, Norway, Sweden, United States, Zambia). This position is based either on legal rules dealing with authentication by means other than a handwritten signature or, more frequently, on an interpretation of the rules giving discretion to the court in admitting and assessing evidence. However, in some of these legal systems the electronic authentication would be acceptable only if legal rules do not require a written document for the transaction (Austria, Denmark, Finland, Norway). For other legal systems it appears that the courts would not accept an electronic authentication in any circumstances (Colombia, Germany, Federal Republic of, United Kingdom). There is also a flexible approach according to which an authentication is accepted in such form as the court may approve and this may also include the authentication in electronic form (Australia).

Question 5(b)

If a "signature" is required by statute or other legal rule, would the courts accept a "signature" made in electronic form or would they require the signature to be on paper?

Summary of replies

If a signature is required by statute or other legal rule, many replies indicate that only a paper-based authentication meets the requirement (Austria, Chile, Colombia, Czechoslovakia, Denmark, Germany, Federal Republic of, Finland, Japan, Luxembourg, Norway, Tonga, United Kingdom) and, as stressed by some of these replies, the only acceptable authentication is a handwritten signature (Austria, Finland, Honduras, Senegal). Under other replies a "signature" in electronic form may be accepted as a substitute for a paper-based authentication (Mexico, Sweden, United States, Zambia).

B. Records transmitted in computer-readable form

Question 6

If the data was entered and originally processed on the computer of one firm and subsequently transmitted to the computer of a second firm in computer-readable form (i.e. by teletransmission of the data or by manual transfer of a magnetic tape or other similar data carrier), would the data as stored in the computer of the second firm be less acceptable as evidence than the data as stored in the computer of the first firm?

Summary of replies

According to most replies, the sole fact that data has been transmitted, either by teletransmission or by manual transfer of a data carrier, does not make the data as stored in the computer of the second firm less acceptable than the data as stored in the computer of the first firm (Austria, Colombia, Czechoslovakia, Denmark, Finland, Germany, Federal Republic of, Honduras, Japan, Mexico, Norway, Philippines, Senegal, Sweden). However, some of these replies point out that the evidential weight of the data stored in the computer of the second firm would depend on the circumstances of the case such as the extent of precautionary measures taken against the risk of alteration of data during transmission.

With regard to the common law legal systems where computer records are made admissible by specific rules, according to one reply a computer record received from a computer of another firm would probably not be admissible (United Kingdom). Other replies show that a transmission of data does not necessarily affect the admissibility of the record received in such a way (Australia, Canada, Zambia). According to these latter replies, a computer record received from a computer of another firm can be made admissible in different ways. For example, the record may be admissible if it is treated as a copy and meets the conditions for the admissibility of copies (e.g. that it is not possible or reasonably practicable to produce the original record or by leave of court) or if it is shown that the data was transmitted in the ordinary course of business or if the computers between which the transmission was effected are treated as one computing system.

Question 7

Would any conditions additional to those called for in question 4 be required to be met?

Summary of replies

Provided that the proponent establishes the integrity of the process of transmission, legal systems do not require any additional conditions to be met (Australia, Austria, Canada, Czechoslovakia, Denmark, Finland, Germany, Federal Republic of, Honduras, Japan, Mexico, Norway, Philippines, Senegal, Sweden, Zambia).

C. Business records and submission of required documents

Question 8

Are there any legal rules relevant to commercial activity in general which would prohibit a commercial firm from keeping all of its records in computer-readable form? (Such legal rules might include corporation laws prescribing the nature and form of corporate records or taxation statutes prescribing the type of records which must be available for audit.)

Summary of replies

According to some replies there are no rules relevant to commercial activity in general which would prohibit a commercial firm from keeping all of its records in computer-readable form (Australia, Austria, Colombia, Honduras, Japan, Mexico, Tonga, United Kingdom, United States, Zambia). According to other replies a company has a right to choose the form of its books with the exception of certain enumerated books or parts of books that are to be kept in writing (Canada, Denmark, Czechoslovakia, Finland, Germany, Federal Republic of, Portugal, Senegal, Sweden). The exceptions concern, for example, the annual financial statement (Denmark, Finland, Germany, Federal Republic of, Sweden), minutes of the shareholder's meeting (Finland), records of the company's stock (Finland, Germany, Federal Republic of) or simultaneous keeping of books of original entry and the documentation supporting the entries (Sweden). According to two replies, the competent administration may give permission for parts of the business records to be kept in computer-readable form after being assured of the reliability of the computing system and of the necessary references between entries and the supporting documentation (Finland, Norway).

Question 9

If a commercial firm is required to keep certain records in written form, is the requirement satisfied by a print-out from a record originally stored in a computer? If so, are there any rules as to the period of time after the entry of the data into the computer within which the print-out must be made (i.e. must the print-out be made within the same day, week, month or year)?

Summary of replies

According to some replies the requirement to keep certain records in written form is not satisfied by a print-out from a record originally stored in a computer (Czechoslovakia, Germany, Federal Republic of, Portugal, Senegal). The ground given in one reply is that data could have been manipulated before the making of the print-out (Senegal). According to other replies a computer print-out will generally satisfy the requirement, either as such (Norway, Honduras) or provided that it is signed (Finland).

As to the second part of the question relating to the period of time between the entry of the data into the computer and the making of the print-out, the replies indicate either that there are no rules on the point (Finland, Honduras, Zambia) or that the print-out must be made within the period of time considered to be in conformity with the principles of good accountancy (Norway).

Question 10

Does the administration accept any data or documents from commercial parties in computer-readable form? If so, please indicate some of the more important categories of data or documents which are so accepted.

Summary of replies

Besides the customs administrations (as reported in document 31.678 of the Customs Co-operation Council of 10 August 1984), tax and social security administrations appear to be the most willing to accept certain types of data in computer-readable form (Canada, Finland, Honduras, Norway, Senegal, United Kingdom, United States). Such data are related, for example, to declarations of taxable goods or transactions (Canada, Senegal, Norway) or to social security contributions (Senegal, United Kingdom). In addition, statistical data (Canada, Czechoslovakia, Finland) and data relating to certain transactions, including exports and imports, for the purposes of planning or pursuing the fulfillment of a plan were mentioned (Czechoslovakia).

Question 11

Is the administration prohibited by law from accepting from commercial parties some or all data or documents in computer-readable form? If so, please indicate some of the more important categories, especially among those relevant to international trade.

Summary of replies

According to most replies there are no rules prohibiting the administration from accepting data or documents from commercial parties in computer-readable form (Australia, Austria, Canada, Czechoslovakia, Germany, Federal Republic of, Honduras, Mexico, Senegal, Tonga, United Kingdom, Zambia). Other replies, while indicating that there is no general prohibition for the administration to accept data in computer-readable form, state that there are cases where the administration may be prohibited from accepting data in such form (Finland, Norway, Portugal, United States). The prohibition may be the result of a rule requiring the commercial party to present a written and signed document (Finland, Norway, Portugal) or a rule on the protection of privacy of individuals restricting a commercial party to transfer computer stored data to third parties including the administration (Norway).