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Establishing a Legal Framework for Electronic Commerce: The Work of the United Nations Commission on International Trade Law (UNCITRAL)

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I. Introduction

Technological innovation has always challenged the traditional means of conducting trade and commerce, while at the same time facilitating trade and commerce by providing faster and easier means of communication and access to a wider range of business opportunities, as well as goods and services. Technological change has always presented a significant challenge to existing regulatory structures, and, although sometimes it has been regarded as initially having a negative effect upon accepted rules and practices, business, parliaments, and courts have gradually developed rules and practices that take account of technological

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change. This development necessarily requires re-evaluation of existing rules and regulations and their interrelationship within national legal systems, as well as their relationship to international law and practice. This is particularly so where technological change facilitates increased interaction between parties in the international commercial sphere and activities that were once largely local in effect now have a global effect; one of the characteristics of the Internet is that it supports greater participation by consumers in what are, essentially, international transactions.

In 1996, the United Nations Commission on International Trade Law (UNCITRAL)¹ adopted the Model Law² on Electronic Commerce, the culmination of work in the field of electronic commerce that dates back to the mid-1980s. Exploratory work on electronic commerce at the beginning of that period resulted in recognition of the need for a set of principles that would provide a basic legal framework for electronic commerce, but one that would facilitate, rather than regulate, electronic commerce. It was clear that electronic commerce raised issues central to the regulation of traditional practices and procedures, particularly where there were legal requirements applicable to the form and evidence of legal acts in the context of domestic and international commercial transactions. Moreover, electronic commerce would increasingly involve instances where information that was intended to carry legal significance would be communicated or stored in a paper-less form, instead of being affixed to a paper support traditionally inseparable from that information. While it is often suggested that totally new laws are needed to address some of these issues, a distinction can be drawn between those issues that might require new approaches and significant change and those issues where electronic commerce would not fundamentally affect the application of traditional legal reasoning.

UNCITRAL's early work resulted in recognition of the need for a set of principles that would provide a basic legal framework for electronic commerce, with a focus upon

1. UNCITRAL was established by the General Assembly of the United Nations in 1966, with the general mandate to promote harmonization and unification of international trade law. UNCITRAL has thirty-six member states elected by the General Assembly. Membership is structured so as to be representative of the world's various geographic regions and its principal economic and legal systems. Members of the Commission are elected for terms of six years with the terms of half the members expiring every three years. In addition to member states, all other states may participate as observers in the work of the Commission. States are responsible for designating their representatives who might be government officials, academics, practicing lawyers, or other experts, depending upon the subject matter. Furthermore, UNCITRAL traditionally invites international, governmental, and non-governmental organizations to participate in its meetings as observers. In electronic commerce, this included organizations such as the United Nations Conference on Trade and Development, the World Intellectual Property Organization, the Organization for Economic Cooperation and Development, the European Union, the Commonwealth Secretariat, the African Development Bank, the International Chamber of Commerce, the International Bar Association, and the Internet Law and Policy Forum. Observer states and organizations traditionally take an active role in the preparation of UNCITRAL instruments. UNCITRAL has implemented its mandate by developing texts on a number of topics including sale of goods, arbitration and conciliation, carriage of goods by sea, banking and finance law, procurement, cross-border insolvency, and electronic commerce.

2. A Model Law is a legislative text recommended to states for adoption as part of their national law. In adopting the text of a model law, a state may tailor the text of the law to its needs and, if appropriate, modify or leave out some of its provisions. It is precisely this flexibility that might ensure greater acceptance of a model law than a convention dealing with the same subject matter. However, states would generally be invited to make as few changes as possible in adopting the model text into their legal systems, in order to achieve a satisfactory degree of unification and to provide certainty about the extent of unification—clearly, the more you change the basic terms of the model, the less the harmonizing effect achieved.

what was needed to facilitate rather than regulate electronic commerce, and based upon the adaptation, as a first step, of existing legal principles to the electronic commerce environment.

While it was clear that, to some extent, the legal issues associated with electronic communications could be addressed by contractual arrangements between the parties to the electronic commerce relationship, UNCITRAL concluded that existing contractual frameworks being proposed to users of electronic commerce were often incomplete and incompatible, and therefore inappropriate for international use since they relied to a large extent upon the structures of local law. In addition, often it was not possible, within a contractual framework, to address the mandatory requirements in national legislation relating to handwritten signatures, written records, and other requirements concerning the form of legal acts, or to effectively regulate the rights and obligations of third parties. Several factors suggested that what was required were international solutions, not a solution based upon state-based rule-making regimes. These factors included the transnational nature of electronic commerce, and its disregard for traditional jurisdictional borders, together with the lack of domestic laws dealing with electronic commerce. The time needed for the evolution of commercial practices that could be considered truly international also pointed to the need for some form of solution that could be concluded in a relatively short period of time and be applied uniformly.

At the time it was completed, the Model Law was a unique instrument in a legal landscape where there was no existing body of law, whether uniform international law or national law, that addressed the issues raised by electronic commerce. As such, the Model Law could be described as an instrument of preventive or pre-emptive harmonization, one which led the process of development of law by providing a universally acceptable solution to the issues likely to arise, rather than one that was negotiated after practices and usage had already developed and was thus principally directed at achieving harmonization of those disparate laws and practices. The challenge was to take countries of divergent economic capabilities, legal heritage, telecommunications infrastructures, and needs and to bring them together to develop common analyses of, and approaches to, problems never encountered before. That the challenge was successfully met can be gauged from the influence of the Model Law on electronic commerce laws already adopted, or being developed, around the world.

This paper provides an introduction to the Model Law on Electronic Commerce, including information on its adoption, and the current work being undertaken by UNCITRAL on uniform rules for electronic signatures.

II. UNCITRAL Model Law on Electronic Commerce

It was within the context described above that the UNCITRAL Working Group on Electronic Commerce undertook the preparation of the UNCITRAL Model Law on Electronic Commerce. The purpose of the Model Law is to offer national legislators a set of internationally acceptable rules that detail how a number of legal obstacles to the development of electronic commerce may be removed, and how a more secure legal environment may be created for electronic commerce. As a Model Law, the text may be tailored to meet the needs of an adopting state, which may, where appropriate, modify or leave out some of its provisions.³

3. Within the category of model laws prepared by UNCITRAL, the Model Law on International Commercial Arbitration and the Model Law on Electronic Commerce illustrate the flexibility of the form. The

The Model Law is concerned with what is common to all of the techniques of electronic commerce, that is, the disappearance (albeit limited and progressive) of what has been the norm in commerce between parties for several centuries: the exchange of paper documents. It is not concerned with the techniques of electronic commerce themselves.

The Model Law provides uniform solutions of international application not only to issues of form and evidence of legal acts in the context of domestic and international commercial transactions, but also to other matters currently dealt with by contract, such as rules on time and place of dispatch and receipt of electronic communications and the use of electronic acknowledgements. In addition, it may provide a solution to an issue when it proves impossible to establish the relevant rule of the applicable law and it may be used to interpret or supplement international uniform law instruments.⁴

There are two limitations to the application of the Model Law. The first concerns consumer law. Although the Model Law was drafted without special attention to issues that might arise in the context of consumer protection (given the difficulty of achieving a universally accepted definition of consumer and the existence in some countries of special consumer protection laws governing certain aspects of the use of information systems), situations involving consumers are not specifically excluded from the scope of the Model Law by way of a general provision. Rather, article 1 includes a footnote that provides that the Model Law does not override any rule of law intended for the protection of consumers.

The second limitation concerns the commercial nature of transactions covered. Given the attendant difficulties of drafting a text specifically applicable to transactions of an administrative or civil nature, the Model Law confines itself to electronic messages "used in the context of commercial activities." Since the notion of commercial activities is given a broad definition, in line with the definition of this term in other UNCITRAL texts, the Model Law may be applied to a number of transactions not directly related to international commerce. Increasingly, in fact, the Model Law is being considered for use in areas beyond commercial activities, such as in the public administrative sphere, as governments move to adopt electronic commerce for the delivery of government services and programs.

Model Law on International Commercial Arbitration, which could be described as a procedural instrument, provides a discrete set of inter-dependent articles. It is recommended that, in adopting the Model Law, very few amendments or changes are required. Deviations from the Model Law text have, as a rule, very rarely been made by countries adopting enacting legislation, suggesting that it has been widely accepted as a coherent model text. The Model Law on Electronic Commerce, on the other hand, is a more conceptual text. Legislation adopting or proposing to enact the Model Law largely reflects the principles of the text, but may depart from it in terms not only of drafting, but also in the combination of provisions adopted or proposed for adoption.

4. One proposal in this regard relates to the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York Convention) and possible use of article 7 of the Model Law to liberalize the interpretation of the writing requirement in the Convention. Paragraph 6 of the guide to Enactment of the UNCITRAL Model Law suggests: "the Model Law may be useful in certain cases as a tool for interpreting existing international conventions and other international instruments that create certain legal obstacles to the use of electronic commerce by prescribing, for example, that certain documents or contractual clauses be made in written form. As between those states parties to such international instruments, the adoption of the Model Law as a rule of interpretation might provide the means to recognize the use of electronic commerce and obviate the need to negotiate a protocol to the international instrument involved."

A. BASIC PRINCIPLES OF THE MODEL LAW

1. *Functional Equivalence*

One of the most difficult questions posed by the advent of electronic commerce is whether the legal consequences customarily attached to familiar concepts, such as communications in writing, the expression of intention by means of signed documents, and the distinction between original and copy, continue to have application where information circulates in a form that lacks any intrinsic link with a stable support such as paper.

The Model Law adopts a functional equivalence approach to this question. Functional equivalence involves reference to legal situations known in the world of paper documents in order to determine how those situations could be transposed, reproduced, or imitated in a de-materialized environment. The provisions of the Model Law were thus formed on the basis of a list of functions fulfilled by, for example, writing, signatures, or originals in traditional commercial relations. For instance, article 7 focuses upon the two most basic functions of a signature—to identify the signer and to indicate the signer's approval of the information being signed—and establishes the requirements that would have to be met by any electronic signature technique in order to satisfy a legal requirement for a signature.

2. *Media/Technology Neutrality*

The rules of the Model Law are neutral rules; that is, they do not distinguish between types of technology and could be applied to the communication and storage of all types of information. One of the consequences of the pursuit of media neutrality was the adoption of new terminology, which endeavors to avoid any reference to particular technical means of transmission or storage of information. The result aims to make it easier to conceptualize the form of legal acts separately from the paper support, which is often associated with them.

The concern to promote media neutrality raises other important issues. The impossibility of guaranteeing absolute security against fraud and transmission error is not confined to the world of electronic commerce, but is also found in the world of paper documents. When legal rules for electronic commerce are prepared, the often stringent security measures, which are possible and necessary in communication between computers, certainly can be applied. It may be more appropriate, however, to graduate security requirements in steps similar to the degrees of legal security encountered in the paper world. For example, there is a gradation in security in the different levels of hand-written signature seen in documents of simple contracts and notarized acts. Hence the flexible notion of reliability "appropriate for the purpose for which the data message was generated" as set out in article 7.

In addition, the Model Law, with its focus upon the notion of establishing functional equivalence between paper-based and de-materialized means of communication, does not seek to link any specific legal consequence with the use of particular techniques of communication, but leaves this up to national law.

3. *Party Autonomy*

The Model Law recognizes the importance of contract and party autonomy. On the one hand, its non-mandatory provisions leave the parties free to organize the use of electronic commerce among themselves. On the other hand, some of the Model Law's mandatory provisions allow agreements concluded between the parties to be taken into consideration in assessing whether the nature of the methods used to ensure, for example, the security of messages, is reasonable or appropriate for the purpose.

B. CORE PROVISIONS OF THE MODEL LAW

The provisions contained in Chapter II (articles 5–10) of the Model Law are based upon what could be regarded as well-established rules regarding the form of legal transactions. For that reason, these provisions should be regarded as mandatory and, unless expressly stated otherwise in the individual provisions, not subject to variation by parties to a contract.

Article 5 establishes the basic notion of the text, that is, the principle of non-discrimination or media neutrality. Articles 6 to 8 build upon this, dealing respectively with writing, signatures, and originals. Although these overlap, they are treated in the text as separate and distinct concepts. The three articles are drafted to make the equivalence between paper documents and electronic messages the rule, rather than the exception. Thus, for example, where the law requires a signature, that requirement can be satisfied by an electronic signature. A provision for exceptions is made, so that formal requirements for paper can be maintained in certain circumstances, but they should be described by specific reference to a particular type of transaction. A number of national laws or draft laws that propose adoption of the Model Law set out transactions where paper is to be maintained. Some examples include wills or other testamentary dispositions, negotiable instruments, trusts and powers of attorney, contracts for disposition or acquisition of real or immovable property, documents of title, affidavits, and court process.

1. *Writing*

Article 6 defines the basic standard to be met by a data message in order to satisfy a requirement that information be retained in writing, or that it be contained in a document or other paper-based instrument. While a number of functions are traditionally performed by writings, the Model Law focuses upon the notion of information being stored in a stable and readable format. These two notions are expressed in article 6 as an objective test that information be “accessible so as to be usable for subsequent reference.”

2. *Signature*

The signature issue gave rise to lengthy discussions in the Working Group during the preparation of the Model Law and is the focus of UNCITRAL’s continuing work on rules on electronic and digital signatures.

While signatures perform many functions, all legal systems recognize that a signature serves, at the very least, to (a) identify a person and provide certainty as to the personal involvement of that person in the act of signing; and (b) associate that person with the content of a document. The Model Law concentrates upon these two basic functions.

In order to satisfy a legal requirement for a signature, article 7 requires not only that a method be used that both identifies the originator and confirms the originator’s approval of the content of the message, but also that the method of identification be “as reliable as was appropriate” for the purpose for which it was used. Paragraph 58 of the Guide to Enactment of the Model Law cites a number of legal, technical, and commercial factors that might be relevant to determining appropriateness, such as the nature of the trade activity being undertaken; the course of trading between the parties; relevant trade customs and practice; and the importance and value of the information contained in the message. The article relies on the reasonableness of the parties and the need to strike a balance between the chosen method of identification and the purpose of the message, leaving it to national judges to apply a precise definition.

In adopting a flexible test for the way in which these functions should be fulfilled, the Model Law leaves open the question of which particular technologies can be used to achieve functional equivalence.

3. *Original*

Article 8 focuses upon the integrity of information and the ability to present it, when this is a requirement, as forming the essence of the concept of originality. As with article 7, the Model Law adopts a flexible test of requiring that the method of assurance as to integrity must be reliable. Reliability is assessed by reference to both the purposes for which the information was generated and the relevant circumstances. Factors to be considered in determining reliability would include whether the recording of information was systematic, whether it was recorded without gaps or errors, and how the information was protected against alteration.

4. *Record Retention*

Article 10 lays down rules that allow current requirements relating to storage of information (such as accounting or tax records) to be adapted to the needs of electronic commerce. The Guide to Enactment of the Model Law emphasizes that the message does not need to be retained unaltered as long as the information stored accurately reflects the data message as it was sent.

It should be noted also that article 10, like article 8, recognizes that information initially set out on paper subsequently can be transferred to an electronic medium, and still satisfy record retention requirements and requirements for an original, provided it can be demonstrated to represent accurately the initial information. In so doing, these articles support not only fully electronic transactions, but also the transition to electronically storing records. Care may need to be exercised when transferring paper records to electronic form if any physical attribute of the paper document is integral to the information being retained.

A number of law reform proposals, which include a provision based upon article 10, deal specifically with government acceptance and retention of electronic information. While indicating that use of electronic records is not mandatory, these texts provide for governments and government agencies to specify appropriate standards associated with the creation, retention, filing, and issuing of electronic records; types of authentication required; and procedures for adequate integrity, security, confidentiality, and audit.⁵

C. OTHER PROVISIONS

The non-mandatory provisions of chapter III of part one of the Model Law are to some extent drawn from, or inspired by, certain rules contained in model contracts and interchange agreements. The Model Law seeks to reinforce these rules by according them legislative recognition.

These provisions help to define concepts not usually encountered in the context of paper-based transactions. In so doing, they may go slightly beyond the stated goal of the mandatory provisions of facilitating electronic commerce by way of functional equivalence. In some jurisdictions, these articles may have the effect of placing those using electronic com-

5. See, e.g., Electronic Transactions Act 1998 (Sing.); *Electronic Commerce Security Act 1998*, 5 ILL. COMP. STAT. 175/1.101 *et seq.* (West 2000).

merce in a different, or more defined, position than those conducting their business in more traditional ways, particularly those articles dealing with attribution and acknowledgement.

1. *Acknowledgement of Receipt*

Article 14 establishes a system of acknowledgement of receipt. It focuses upon whether or not a data message was received, but not on whether it has been read. While not imposing the use of any particular procedure of acknowledgement, the article nevertheless addresses a number of the legal issues likely to arise from the use of acknowledgements.

2. *Time and Place of Dispatch and Receipt of Information*

Recognizing that, for the operation of many existing rules of law, it is important to ascertain when and where information was received, article 15 establishes a rule to determine the time and place of dispatch and receipt of messages. While the rule hinges on the place of business of the parties, it is not intended to establish a conflict of laws rule.

3. *Attribution*

Article 13 is the closest the Model Law comes to establishing a rule of liability. The intention is to give maximum legal weight to the authentication procedures established by the parties. Thus, under article 13(3), if the addressee applies a procedure previously accepted by the originator and thereby obtains confirmation that the message originates from the latter, the originator is presumed to be the author of the message. This provision addresses not only the case where an authentication procedure has been agreed upon between the originator and the addressee, but also the case where the originator unilaterally, or by agreement with the intermediary, has accepted a procedure and has consented to be bound by a message that meets the conditions laid down in that procedure.

While it may be appropriate to place emphasis upon agreement between the parties, and this is clearly consistent with other provisions of the Model Law, article 13 nevertheless does not discriminate between security procedures, establishing a presumption of attribution for any and all authentication procedures, without reference to standards of security and reliability. In reality, the security and reliability of such procedures may vary so markedly that there is no factual basis for establishing such a presumption.

4. *Transport Documents*

In preparing the Model Law, UNCITRAL noted that the carriage of goods was the context in which electronic communications were most likely to be used and in which a legal framework facilitating the use of such communications was most urgently needed. Articles 16 and 17 contain provisions that apply equally to non-negotiable transport documents and to transfer of rights in goods by way of transferable bills of lading. The principles embodied in those articles are applicable not only to maritime transport, but also to transport of goods by other means, such as rail, road, and air transport.

D. ADOPTION OF THE MODEL LAW

The UNCITRAL Model Law has had a significant influence on the development of laws aimed at ensuring a framework that removes legal obstacles and establishes a more secure legal environment for the development of electronic commerce.

At the end of 2000, legislation implementing provisions of the Model Law has been adopted in many countries and regions, including: Australia (Electronic Transactions Act

1999); Bermuda (Electronic Transactions Act 1999); Colombia (Electronic Commerce Law 1999); France (Loi n° 2000-230 du 13 mars 2000 portant adaptation du droit de la preuve aux technologies de l'information et relative à la signature électronique); Hong Kong SAR (Electronic Transactions Ordinance 2000); Ireland (Electronic Commerce Act 2000); the States of Jersey (Crown Dependency of the United Kingdom); Philippines (Electronic Commerce Act 2000); Republic of Korea (Basic Law on Electronic Commerce 1999); Singapore (Electronic Transactions Act 1998); Slovenia (Electronic Commerce and Electronic Signature Act 2000); and Illinois, United States (Electronic Commerce Security Act 1998).

In addition, uniform legislation influenced by the Model Law and the principles on which it is based has been prepared in the United States as the Uniform Electronic Transactions Act adopted in 1999 by the National Conference of Commissioners on Uniform State Law. It has been enacted by ten states: California, Pennsylvania, Idaho, Indiana, Kentucky, Minnesota, Nebraska, South Dakota, Utah, and Virginia. Additional states are likely to adopt implementing legislation in the near future. A similar exercise has been conducted in Canada where the Uniform Electronic Commerce Act was adopted in 1999 by the Uniform Law Conference of Canada, and where it is being considered for enactment in a number of provinces and territories, including Saskatchewan, Ontario, Manitoba, and Yukon.

Draft legislation based on, or influenced by, the Model Law is under consideration in a number of countries, including: Brazil (draft Law on Electronic Commerce); Chile (draft Law on Electronic Documents); Guernsey (UK); India (draft Electronic Commerce Act); Israel; Kuwait; New Zealand (Electronic Transactions Bill); Peru (Proyecto de ley que regula la contratación electrónica; Proyecto de firmas electrónicas); and Thailand (draft Electronic Transactions Bill, 1999).

The Model Law can be regarded as establishing a set of model principles that are drafted in the form of legislative provisions to facilitate consideration by legislators and assist in the development of laws. Those principles do not necessarily form a discrete set in the same way as the Model Law on International Commercial Arbitration, but address a number of existing rules that may be scattered throughout various parts of different national laws in a typical enacting state. Accordingly, an enacting state may not necessarily incorporate the text as a whole into a free-standing law, but may adopt appropriate provisions into existing legislation. Legislation enacting the Model Law is both free-standing law as in Australia, Colombia, and Singapore and as legislation amending existing codes as in France.

III. Current Work on Electronic Signatures

Following adoption of the UNCITRAL Model Law on Electronic Commerce in 1996, the UNCITRAL Working Group on Electronic Commerce undertook preliminary work on the feasibility of preparing uniform rules on the legal issues of digital signatures and certification authorities. The impetus for work on signatures came not only from the discussions on signature that took place in the course of the preparation of the Model Law, but also reflected the increasing interest among Member States in the methods by which signature functions could be achieved by electronic means. For business and governments to function in the new Internet environment, it was widely recognized that a mechanism to authenticate electronic communication reliably and securely was critical.

Work on preparation of Uniform Rules (as the draft instrument was originally called) began in January 1998. As a measure of the speed at which signature technology has evolved and different implementation models have been developed for authentication since the beginning of 1998, the Working Group has experienced some difficulties in reaching a

common understanding of the new legal issues that arise where different electronic signature techniques are used. While some of the signature legislation implemented around the world initially focused upon digital signature techniques used in the context of public key infrastructures involving three distinct parties (i.e., key holder, certification authority, and relying party), it has become increasingly clear that this will be only one of several possible models of electronic signature implementation. At the other end of the regulatory scale, suggestions have been made that no more than the provisions of the Model Law is required to address issues of signature in electronic commerce. There is a growing expectation, however, that UNCITRAL will provide guidance to governments and legislative authorities that are in the process of preparing legislation on electronic signature issues, including establishing public key infrastructures.

For the above reasons, a flexible and expansive approach to the legal issues raised by electronic signatures and authentication techniques is required, not only to ensure the continuing usefulness and applicability of the rules developed by the Working Group, but also to take account of concerns in the business community that the process of rule-making may unnecessarily hinder the development of new techniques. This approach demands not only that the principle of media-neutrality be respected as far as possible, but also that the Uniform Rules cover a diversity of existing techniques offering varying levels of reliability and security, while leaving enough room for techniques that may be developed in the future. It requires, in addition, that ample room be left for party autonomy, particularly in the commercial sphere.

In its current form, the UNCITRAL Model Law on Electronic Signatures (as the instrument has been called since September 2000 at the last session of the Working Group on Electronic Commerce) addresses legal effect of signatures, rules of conduct, and cross-border issues.

A. LEGAL EFFECT OF ELECTRONIC SIGNATURES

Consistent with article 7(1)(b) of the Model Law on Electronic Commerce, article 6 of the draft Model Law on Electronic Signatures provides, as a general rule, that legal signature requirements are met in relation to a data message if an electronic signature is used that is as reliable as was appropriate for the purpose for which the data message was generated or communicated, in light of all the circumstances, including any relevant agreement. The same provision of the draft Model Law also sets forth the objective criteria of technical reliability regarded as necessary in order for an electronic signature to meet legal signature requirements.

1. *Link Between Signatory and Signature Creation Data*

The draft Model Law requires that the signature creation data be, within the context in which they are used, linked to the signatory and to no other person. Where certain electronic signature creation devices may be shared by a variety of users, such as in an employment situation, the device must be capable of identifying one user unambiguously in the context of each electronic signature.

2. *Control Over Signature Creation Data*

Signature creation data must, at the time of signing, be under the control of the signatory and of no other person. This might include authorizing use by another person, but the signature creation data must be of such nature that it is capable of being used by only one person at any given time.

3. *Inalterability of Electronic Signature*

In order for an electronic signature to meet the reliability test of the draft Model Law, the signature method used must be such that any alteration to the electronic signature made after the time of signing would be detectable (thus preserving the distinction between integrity of the signature and of the document).

4. *Integrity of Information to Which the Signature Relates*

Where a purpose of the legal requirement for a signature is to provide assurance as to the integrity of the information to which it relates, any alteration made to that information after the time of signing should be detectable. The integrity of the information to which the signature is attached is not an essential element of signature under the Model Law on Electronic Commerce, being addressed rather in the notion of original in article 8. Thus, the draft Model Law on Electronic Signature refers to this element only where the law requires integrity of the information. This provision is essentially intended for those countries whose law makes no distinction between integrity of signature and of the information to which it is attached. In other countries, including this as a mandatory requirement would result in a signature more reliable than a hand-written signature and thus, the Model Law would go beyond its goal of establishing functional equivalence.

The draft Model Law does not limit the ability of any person to establish in any other way the reliability of an electronic signature or to adduce evidence of the non-reliability of an electronic signature.

The latest draft version rejects the formal distinction of an advanced or secure electronic signature that is the approach followed in Singapore, the European Union, Hong Kong, and Bermuda, but the objective criteria will probably have the effect of making a relatively high level of secure signatures legally equivalent to paper-based signatures.

B. RULES OF CONDUCT

Beyond addressing issues of technical reliability, the Uniform Rules consider the context in which electronic signature techniques may be used and seek to establish the responsibilities or conduct required of parties performing certain functions or services in that context. While the draft Rules address signatories, suppliers of certification services, and relying parties, they do not contemplate that all or any of those parties will be involved in any particular electronic signature implementation model. There is general agreement in the Working Group that parties who fail to meet their responsibilities or to satisfy levels of expected conduct should be liable for that failure, but as no agreement can be reached on the consequences of that failure, those are left to national law.

1. *Signatories*

Draft article 8 addresses the responsibilities of the signatory, including giving notice of compromise of the signature device and exercising due care to avoid unauthorized use of the signature device.

2. *Certification Services Providers*

Draft article 9 addresses conduct in relation to certification services providers. Under the draft provision, a certification services provider must act in accordance with representations made by it with respect to its policies and practices and must exercise reasonable care to ensure the accuracy and completeness of all material representations made that are relevant to the certificate throughout its life-cycle, or that are included in the certificate.

As regards the contents of certificates, the draft Model Law requires certification services providers to offer reasonably accessible means that enable a relying party to ascertain from the certificate: (a) the identity of the certification service provider; (b) that the signatory identified in the certificate had control of the signature creation data at the time of issue; and (c) that signature creation data were valid at or before the time when the certificate was issued. Furthermore, certification services providers are required to provide reasonably accessible means that enable a relying party to ascertain, where relevant, from the certificate or otherwise: (a) the method used to identify the signatory; (b) any limitation on the purpose or value for which the signature creation data or certificate may be used; (c) the signature creation data are valid and have not been compromised; (d) any limitation on the scope or extent of liability stipulated by the certification services provider; and (e) whether means exist for the signatory to give notice that the signature creation data have been compromised and whether a timely revocation service is offered.

Certification services providers must utilize trustworthy systems, procedures, and human resources in performing their services. Article 10 of the draft Model Law lays down the criteria for determining the trustworthiness of such systems, procedures, and human resources, including the following: (a) financial and human resources, including existence of assets; (b) quality of hardware and software systems; (c) procedures for processing of certificates and applications for certificates and retention of records; (d) availability of information to signatories identified in certificates and to potential relying parties; (e) regularity and extent of audit by an independent body; and (f) the existence of a declaration by the state, an accreditation body, or the certification services provider regarding compliance with or existence of the foregoing.

3. Relying Parties

A further article addresses reliance upon electronic signatures and, where relevant, certificates—the relying party is to bear the legal consequences of its failure to take reasonable steps to verify the reliability of an electronic signature, or where a certificate supports the electronic signature, to verify the validity, suspension, or revocation of the certificate and to observe any limitations applicable to the certificate.

4. Cross-Border Recognition

Since the use of electronic signatures for authentication is generally regarded as crucial to the future development of electronic commerce, issues of cross-border recognition of electronic signatures play a central role in expanding the use of electronic signature technologies internationally, especially where those technologies depend upon some form of certification. National electronic and digital signature laws, in focusing on domestic signature requirements and certification services, may impose restrictions on the recognition of foreign signatures and certificates, limiting the development of electronic commerce and creating a potential barrier to trade. The objective of the draft Model Law is twofold: first, to establish the general principle of non-discrimination, so that the legal equivalence of foreign and domestic signatures and certificates is certain; and second, to address the essential criterion of equivalence upon which recognition could be based. These basic provisions on cross-border recognition aim at ensuring the legal interoperability that will be essential for the smooth and seamless operation of electronic authentication worldwide.

Thus, the draft Model Law provides that for the purposes of determining legal effect of a signature or a certificate, no regard should be had to the geographic location of the issuer of the certificate, the signatory, or their places of business. Foreign certificates and signa-

tures shall be accorded the same legal effect if they offer substantially equivalent levels of reliability. Equivalence should be determined by reference to recognized international standards and other relevant factors. These standards are not simply those such as ISO standards but rather include technical, commercial, and governmental standards, with explanation as to what those might include being set out in a guide to enactment.

These basic provisions on cross-border recognition aim at ensuring the legal interoperability that will be essential for the smooth and seamless operation of electronic authentication worldwide.

IV. Possible Future Work

While UNCITRAL's work on electronic commerce has, to date, focused on developing a set of legal principles to provide a basic legal framework for communication through electronic means, the growth in the use of electronic commerce has seen the emergence of a number of other pressing legal issues that are increasingly identified as requiring consideration and resolution. A number of those topics, such as privacy and taxation, are outside the trade law focus of UNCITRAL's mandate. On other issues, however, the position of UNCITRAL's Working Group on Electronic Commerce as a recognized international forum for the exchange of views regarding the legal issues of electronic commerce and for the preparation of solutions to those issues, suggests that UNCITRAL may be an appropriate organization to undertake work. Such issues might include: legal obstacles to the increased use of electronic commerce that might stem from existing international conventions; electronic transfer of rights in tangible goods; electronic contracting; applicable law and jurisdiction, possibly in cooperation with the Hague Conference on Private International Law; and dispute resolution.

A. LEGAL OBSTACLES TO ELECTRONIC COMMERCE IN EXISTING INTERNATIONAL CONVENTIONS

At its thirty-second Session in June 1999, the attention of the Commission was drawn to a draft recommendation adopted on March 15, 1999 by the Centre for the Facilitation of Procedures and Practices for Administration, Commerce and Transport (CEFACT) of the Economic Commission for Europe. That text recommended that "UNCITRAL consider the actions necessary to ensure that references to 'writing,' 'signature,' and 'document' in conventions and agreements relating to international trade allow for electronic equivalents." Support was expressed for the preparation of an omnibus protocol to amend multilateral treaty regimes to facilitate the increased use of electronic commerce.

B. ELECTRONIC TRANSFER OF RIGHTS IN TANGIBLE GOODS

Transfers of rights by computer while goods are in transit, warehoused, or otherwise available currently occurs largely within closed or limited access network systems and within narrowly defined sectors. If such transfers were supported by an appropriate international framework for electronic bills of lading, title documents, or security interest transfers, trade in goods across a wide area could be facilitated more efficiently and at lower cost. Such a framework could build upon recent international experience and existing UNCITRAL work.

C. ELECTRONIC CONTRACTING

The UNCITRAL Model Law addresses some basic issues relating to electronic contracting: article 11 addresses the formation and validity of contracts and the form in which an offer and acceptance may be expressed; article 13 addresses attribution of data messages; article 14 addresses the use of acknowledgements of receipt, a system widely used in electronic commerce; and article 15 addresses the time and place of dispatch and receipt of data messages. Article 5b addresses incorporation by reference, often regarded as essential to the widespread use of electronic communications, which much more frequently than paper documents rely on references to information accessible elsewhere. The purpose of these articles is not to deal comprehensively with electronic contracting issues, but to provide a basic enabling framework and a series of provisions that could form the basis of interchange agreements or system rules, or supplement the terms of agreements in cases of gaps or omissions in contractual stipulations.

The Model Law does not address either aspects of contract formation and performance that may be affected by the ways in which electronic transactions are currently structured, or ways in which those structures are being changed to facilitate electronic commerce, as well as the impact of electronic commerce on the subject matter of contracts. Where contracts are formed, for example, between a person and an electronic agent, the limited scope for statements by the human to alter or vitiate agreement to which the electronic agent cannot react suggests a need for modification of rules on offer and acceptance. With respect to the transactional subject matter of Internet contracts, the laws governing sales of goods may not be appropriate for contracts involving online databases, artificial intelligence systems, software, multimedia, or Internet trade in information, where the emphasis is not upon tangible goods, but upon intangibles and rights in those intangibles.

Uniform legislation recommended for adoption in the United States, the Uniform Computer Information Transaction Act, prepared by the National Conference of Commissioners on Uniform State Law, has been specifically designed to address some of these issues, clarifying the law governing computer information transactions and establishing a coherent contract law base tailored for the types of transactions and transactional subject matter that characterize the information industry. As such, the Act addresses issues of formation and terms of contracts, transfer of rights and interests, performance, warranties, and remedies and may serve as a useful introduction to electronic contracting issues that should be addressed, in addition to those already included in the Model Law, on a global scale.

D. JURISDICTION AND APPLICABLE LAW

The Internet presents many of the same issues as other transnational technologies, but by facilitating the ability to communicate anywhere, any time, and by reducing the importance of geographical and economic boundaries and locations, it facilitates changes to the way companies do business. At the same time it puts stress on efforts by private international law to localize conduct so that questions of applicable law (what law applies to resolution of a dispute) and jurisdiction (which forum has the power to resolve the dispute) can be resolved.

In terms of issues of applicable law, so long as the Internet is no more than another means of communication in the sale of goods, little will change. Where contracts become more complex, however, involving more parties and more places of business or habitual residence, as well as formation, payment, and performance on the Internet, the traditional solutions

seem less satisfactory. This may also apply to torts committed in cyberspace. Answers to questions such as which, of several possible jurisdictions, has the closest connection to the contract or where is the place of performance of the contract, or where did the wrong occur, may be more difficult than they would be in a parallel non-Internet situation where the connections with physical space were not so tenuous.

Issues of jurisdiction have given rise to an increasing number of cases in the United States where one of the principal issues to be considered has been the extent to which establishing a presence on the Internet or entering into a contract online makes a person present in a jurisdiction for the purposes of litigation. Courts have taken the traditional tests of personal jurisdiction and venue and applied them to domestic cases involving the Internet, often with new and unanticipated results, which are not always consistent with decisions on similar facts in other jurisdictions. Recent authority seems to agree that the existence of a website, whether passive or interactive, may not give rise to the requisite level of conduct that subjects a business to jurisdiction in another forum. A website is not automatically pushed to a user's computer without invitation. The user must take affirmative action to access or pull either form of website.

A related question is that of enforcement. In a recent Australian case, the court declined to give a plaintiff injunctive relief against defamatory material placed on a website by a former employee now located in the United States, on the basis that it would be impossible to enforce. Any order would involve all jurisdictions from which the website could be accessed and the server was outside the jurisdiction of the Australian court. A U.S. court, in different circumstances, has ordered that a website be shut down even though operated from Italy.

The imposition of broad territorial concepts of personal jurisdiction on commercial uses of the Internet, both for business and consumers, has the potential to subject it to inconsistent regulation throughout the world. Overreaching jurisdiction has the potential for subjecting national defendants to suit from foreign plaintiffs and compelling national plaintiffs to seek redress in foreign courts, a matter of particular concern for those consumers increasingly participating in cross-border transactions.

E. DISPUTE RESOLUTION

Some of the issues outlined above will lead inevitably to growth in international disputes that may require new and innovative solutions. Whether electronic commerce disputes are referred to conventional arbitration forums, located in existing physical jurisdictions, or resolved online in a cyberspace jurisdiction, a number of procedural and substantive issues will need to be considered.

One issue on which considerable attention has been focused, both in UNCITRAL and elsewhere, and that relates generally to electronic commerce, is that of the arbitration agreement and provisions in national laws and international conventions that require the arbitration agreement to be in writing in order to be valid. Applicable law is also an issue, while online dispute resolution may raise questions of place of arbitration; conduct, language, confidentiality and security of the proceedings; admissibility of evidence; the making of an award; and the jurisdiction of courts providing legal support to the arbitration. In addition, questions such as possible review and enforcement of the award, especially in the face of some of the jurisdictional issues mentioned above, may be raised.

Procedural and substantive issues are currently addressed by existing arbitration regimes of conventions, model laws, and rules; whether or how these will apply to the changing

shape of dispute resolution and, in particular, to online proceedings, remains largely uncertain. As with jurisdictional issues, increasing consumer participation in cross-border transactions on the Internet raises issues of facilitating cheap, convenient, accessible, and effective dispute resolution mechanisms for consumers.

Over the last few years, a number of projects have been established to offer online dispute resolution services. Some are designed to deal with a limited subject matter specifically related to the Internet, such as domain name disputes, while others focus upon online resolution as the means of handling the dispute, regardless of subject matter. The first international body to enter into this field was the WIPO Arbitration and Mediation Center, established to provide an Internet-based, online dispute resolution system that can provide a neutral, speedy, and inexpensive means of resolving disputes without the need for physical movement of persons and things. The system has been developed with the principal aim of resolving disputes concerning domain names and trademarks and, more generally, for all intellectual property disputes. The first administrative panel decision was given in a domain name dispute in January 2000. Another international organization proposing work in this area is the International Chamber of Commerce that is proposing to pool experts from a variety of disciplines in order to encourage the creation of simple, accessible, and equitable dispute resolution options for consumer transactions over the Internet.

One of the most challenging aspects of some of these dispute resolution projects has been establishing rules and procedures that reflect the methods and culture of the Internet. Although many of these initiatives are recent developments, they have already contributed to the development of models for online dispute resolution, but many issues remain to be considered and resolved.

V. Conclusion

With the completion of the Model Law on Electronic Commerce, UNCITRAL's Working Group on Electronic Commerce has become recognized as a particularly important international forum for the exchange of views regarding the legal issues of electronic commerce and for the preparation of solutions to those issues. With the work currently being undertaken on electronic signatures, and with a range of other topics to be addressed, the Working Group will continue to provide this valuable international forum, furthering international knowledge and understanding of electronic commerce legal issues and developing uniform solutions to the many and complex questions that have arisen and continue to emerge as the work develops.