INTRODUCTION

This article addresses the absence of paper and the challenges of transposing the traditional legal concepts of "writing" and "document" into an environment consisting of interactive and interconnected files. Both "writing" and "documents" are concepts that rely on tangible carriers, such as paper. Accordingly, legal principles involving either concept presume not only a certain durability, but also the stability and confinement of the information conveyed. What happens when writing is no longer contained on paper? Can writing exist without documents? Is it correct to speak of a "document" if its contents are transient and its scope is difficult to determine? At the current stage of development, legal analysis is incapable of answering any of these questions. Apart from exposing the inadequacy of popular attempts at replicating writing and documents in Internet transactions, this article provides new points of departure for future legal analysis and regulatory efforts in the area of e-commerce. Despite the intuitive association of the terms "writing" and "document" with formalities, this article has broader implications. Statute of fraud requirements aside, writing and documents serve as tools of conveying contractual intentions. At the most basic level, a contract must be certain and complete to be enforceable; the contents of the statements made by the transacting parties must be identifiable. The fulfilment of formal requirements seems to be of little value if it is unclear what obligations can actually be enforced. The mainstream approaches to the concepts of "writing" and "document" are best tested when confronted with Asynchronous JavaScript and XML (AJAX), a suite of technologies enabling Web pages to partially refresh the displayed content in real time. Admittedly, tying a legal argument to a specific technology may affect its general relevance and condemn it to oblivion once the technology in question declines in popularity. It must, however, be emphasized that AJAX symbolizes an irreversible shift in Web development. Even if the technologies represented by the acronym lose their significance or become obsolete, the World Wide Web will have permanently shifted to more interactive and dynamic interfaces. Accordingly, problems of reconceptualizing traditional legal concepts in light of such developments will persist.
On a broad level, this article questions the validity of the principles of nondiscrimination, functional equivalence, and media neutrality. On a more detailed level, it deconstructs two popular approaches to the concepts of “writing” and “documents.” One approach relates to the increasingly liberal (re)definitions of both concepts, while the other relates to the creation of “electronic equivalents” of “writing.” The latter underlies the regulatory efforts that produced the United Nations Commission on International Trade Law’s Model Law on Electronic Commerce (MLEC) of 1996 [FN2] and the US Uniform Electronic Transactions Act (UETA) of 1999, [FN3] among others. The wide interpretation of the terms “document” and “writing” must therefore be distinguished from the ability of a particular communication technology to fulfill the criteria of a functional equivalent. The point made in this article is simple: neither approach works. The discussion focuses on contract law as a testing ground for attempts at reformulating the concepts of “writing” and “document” but remains relevant to other areas of law.

The existing e-commerce laws were drafted in the infancy of the World Wide Web. The Web consisted of static hypertext markup language (HTML) files, and email was the technology du jour. With the evolution of the simple client-server architecture into a multitiered structure comprising databases as well as server- and client-side scripts, the Web is no longer just a tool for information retrieval. The modern Web provides new ways of presenting, organizing, and interacting with information. The technologies comprising the Web, however, remain misunderstood and unexplored—at least from a contract law perspective. This translates into frequent misidentifications of legal problems and produces incorrect assumptions. Hiding behind the all-encompassing term “electronic,” legal analysis has failed to recognize the conceptual challenges resulting from the use of modern communication technologies in the transacting process. It is not the transmission in the form of electronic impulses that creates the need to rethink some traditional concepts. [FN4] The transmission of electronic impulses is “nothing more nor less than the transmission of electronic impulses.” [FN5] Preceding a noun or verb with “electronic” does not describe the problem and is of no analytical value. One must also be more discerning than referring to “electronic communications” in a general sense. The Internet enables a whole range of communication methods, all of which rely on electronic transmission but vary with regard to the manner of content presentation and the ability to interact in real time. [FN6] Each method creates different legal problems. When attempting to map the concepts of “writing” and “document” onto an environment made of interactive and interconnected files, the first step is to abandon the term “electronic” and shift the focus from the transmission of information to the manner of its presentation.

CONCEPTUAL AND TERMINOLOGICAL TURMOIL

Like most Internet law literature, the following discussion suffers from an unavoidable weakness: the difficulty of selecting the correct terms and of using them consistently. The interplay among “writing,” “document,” and “paper” is plagued by uncertainty. It is not always clear which term is appropriate and which words can be used interchangeably without prejudicing the outcome of the discussion. Is it correct to talk about “pages” and “documents” in an environment characterized by an absence of tangible carriers? It is difficult not only to select the terminology, but also to discern whether a given term constitutes a metaphor or whether it can be taken literally. A Web “page” is not really a page, just as a screen display is not actually a desktop. These are metaphors designed to facilitate human interaction with information systems. [FN7] Ultimately, the question is one of determining the legal effects of a statement. If a statement is made “in writing” or by a “written document,” it is logical to presume that its contents are relatively easy to discern. In the case of Web-based transactions, however, the very problem lies in not being able to do so. Contracts can be pieced together from multiple documents or can be a combination of written and oral communications.
However, what is the document or the writing in an Internet-based transaction? These problems are more pertinent in transactions formed over the Web than by email. The concepts of “writing” and “document” are easier to apply to email, as the latter usually takes the form of a message coming from one source, whereas the content of nearly every Web page raises questions regarding its source and its exact scope. The question boils down to this: What is the information conveyed thereby?

**WRITING AND FORMALITIES**

“Writing” and “documents” are generally discussed in the context of formalities. All e-commerce laws focus on removing obstacles to electronic contracting by enabling electronic messages to meet formal requirements. It is often forgotten, however, that contract law permits intention to be manifested in any manner—including electronic means of communication. Generally, transactions need not be in writing or be signed. Formal requirements are an exception, not the rule. Nevertheless, it must be admitted that writing may constitute a component or premise of legal principles without being a formality. The parol evidence rule does not require a formal written document but rather “writing” in general. Similarly, when a contract is “reduced to writing,” it is presumed that the writing includes all the terms of the contract. There are also innumerable references to writing in statutes, such as those relating to providing specific information. Writing may therefore be unrelated to any formal requirements.

**STABILIZATION AND CONFINEMENT**

Writing is difficult to separate from its traditional, tangible carrier: paper. It is also difficult to disassociate writing from a document. As paper ensures a minimal degree of durability, traditional documents serve as evidence of a transaction. Durability, however, is not a legal requirement. Writing in pencil on a paper napkin can still be regarded as a written document. More importantly, however, tangible media not only preserve but also confine and stabilize the contents inscribed thereon. With paper, it is clear where the information ends and where it begins. Paper pages do not change while they are being read. Their content remains the same (disregarding such issues as the deterioration of paper or the fading of ink). It is therefore an implicit assumption of “writing” (and the legal concepts that rely thereon) that the information conveyed thereby remains unchanged. Writing is by nature-- if not by definition--stable. Stability must be distinguished from integrity. Integrity pertains to unauthorized alteration, the fact that the contents of a document have not been tampered with. Stability, however, has not attracted much debate as legal analysis has focused on static files only. Although both concepts share a common denominator--retaining the contents as originally communicated--integrity carries undertones of authenticity, whereas stability pertains to the constant nature of information. A Microsoft Word document may be edited without authorization. However, it is not programmed to change its content at periodic intervals or in response to the reader’s actions.

Theoretically, it is the content, not the form, that determines the legal effect of a statement. The form, however, determines the scope of the writing and therefore the substance of the statement. Indirectly then, it may affect the legal consequences thereof. In practice, however, the terms “writing” and “document” are used interchangeably; seemingly, one cannot exist without the other. A document without writing is blank and of no legal significance. Writing without a document has an uncertain scope. The point is simple: information conveyed by “writing” has always been media-dependent. Writing conveys information; documents contain writing. Information requires spatial confinement; otherwise, it is difficult to tell which words must be taken into account when establishing the legal effect of a statement, if any.
As for "records," any transaction concluded by email or on the Web can be recorded by capturing the contents of the screen with a screenshot or photograph. While the evidential value of such a record cannot be questioned, it is debatable whether it is synonymous with "writing" or a "document." Records provide evidence of transactions, but they do not create them. \[FN12\] Records indicate the occurrence of certain events without necessarily implying their legal effects. The fixation of contractual statements is usually a question of evidence, not a premise of their validity or enforceability. The existence of "writing" must be regarded as a question of intention—at least from a contract law perspective. \[FN13\] Records must therefore be conceptually distinguished from both "writing" and "documents." Creating a record of a transaction is not synonymous with putting it "in writing."

**ENTER: AJAX**

Clay tablets require no explanation. It can be assumed that any information inscribed thereon is difficult to alter. As has been noted, "AJAX" stands for "asynchronous JavaScript and XML." In the words of one author, "AJAX is easier to say than, I've been using client-side JavaScript, SOAP, and XML to obtain data directly from the server using XMLHttpRequest instead of the standard unload/reload cycle." \[FN14\] The AJAX technology suite enables asynchronous interaction between Web servers and Web clients (i.e., browsers) without the need to reload the entire page. \[FN15\] In laypersons’ terms and without further acronyms, AJAX permits a selective, real-time replacement of the information displayed on the screen in response to predetermined events. It cannot be overemphasized that, despite the naming convention, Web pages are not actual pages but rather are interfaces—visual representations of code that enable the interaction with remote computer systems, which are usually composed of a Web server, an e-commerce server, and a database server. \[FN16\] This structure can be described as the back end of an e-commerce Web site. The front end is the Web site itself: the graphical user interface consisting of HTML \[FN17\] files hosted on the Web server. The user requests a Web page through his or her browser. What is returned and displayed on the screen is the product of the source file and input obtained from external sources, such as databases and/or code stored on the local client’s computer. AJAX-based Web pages maintain continuous interaction between the Web client and the Web server, thus enabling real-time replacement of parts of the Web page. Thus, they share more similarities with DVD recordings of movies and ATM interfaces than with paper pages.

**NONDISCRIMINATION, FUNCTIONAL EQUIVALENCE, AND TECHNOLOGY NEUTRALITY**

Practically all e-commerce laws rely on the principles of nondiscrimination, functional equivalence, and technology neutrality. Each of these principles deserves a thorough examination—mainly because of the fact that, despite their importance, none of them seems fully conceptualized. This lack of clarity regarding their precise meaning sets incorrect points of departure and contributes to the existing state of uncertainty regarding both "writing" and "documents."

The principle of nondiscrimination states that electronic messages cannot be denied legal effect or enforceability solely on the ground of their electronic form. \[FN18\] The fact that a statement is set forth in an electronic message, as opposed to paper, should be irrelevant. The principle of nondiscrimination does not proclaim the validity or legal effect of any information contained in an electronic message. \[FN19\] It is also unrelated to the issue of whether a particular communication meets formal legal requirements. It only emphasizes that there should be no disparity of treatment between electronic messages and paper documents. One cannot help asking: Why not? After all, electronic messages—whether in the form of email or in the form of a Web site—are different from their paper-based equivalents. Seemingly, the whole purpose of e-commerce laws was to address these differences. It must be noted that the term
“discrimination” connotes not only the prejudicial treatment of different categories of things, but also the recognition of differences between one thing and another. In this sense, the principle of non-discrimination encourages an attitude of ignoring the dissimilarities between traditional and new methods of communication. It is one thing to state that an electronic format must not be a ground for denying the validity or legal effect of a statement. It is yet another to disregard the fact that Web pages, unlike paper pages, may selectively change their contents in response to user input. Again, a Web page is not like a paper page. It is easy to be misled by the terminological convention of calling the client-side, processed version of an HTML file a “page.”

The second cornerstone of e-commerce laws, functional equivalence, relies on the functions of traditional paper-based requirements and attempts to replicate them in an electronic environment. [FN20] Presumably, functional equivalence enables the application of existing laws “without necessitating the wholesale removal of the paper-based requirements themselves or disturbing the legal concepts and approaches underlying those requirements.” [FN21] Functional equivalence provides criteria permitting electronic messages “to achieve the same level of legal recognition as corresponding paper documents.” [FN22] Once an electronic message fulfills these criteria, it is legally equivalent to the original concept. To illustrate: If technology (or communication method) X can do (or is) x, y, z, then technology X is an equivalent of the paper-based concept and can perform some or all of its functions. Functional equivalence is predominantly discussed in relation to “writing” and “signatures” and aims to replicate these two concepts electronically. This approach creates two sets of problems. First, a decision must be made regarding the legal constructs that need functional equivalents. Is there a need for a functional equivalent of “writing” or of a “document”? Interestingly, it has never been debated whether what is needed is an equivalent of “paper” or a “page.” The second source of difficulties relates to establishing the criteria that must be fulfilled for a technology (or communication method) to become a functional equivalent. Which criteria are vital? Which features need to be recreated? The ultimate purposes of this exercise must be kept in mind: to enable electronic transactions to function within the existing legal framework and to facilitate the application of those legal principles that rely on the original concepts.

The third principle of e-commerce laws, “technological neutrality,” refers to statutes that do not impose or promote any particular technology. [FN23] A different formulation of this principle states that laws should apply identically, irrespective of the technology used. Theoretically, technology neutrality is not about treating all technologies identically but instead is about ensuring that “only relevant differences result in different treatment.” [FN24] In practice, however, technology neutrality seems to translate into an attitude of ignoring all differences between individual communication methods. Technology neutrality is often discussed alongside media neutrality, which relates to physical carriers only. [FN25] The two concepts are often difficult to distinguish. [FN26] It must be noted that if many legal principles implicitly presume the existence of paper as a physical carrier, it is difficult to call them media neutral. As in the case of recognizing and addressing the differences between the world of paper and the world of hypertext files, it must be recognized that different media (or the absence thereof) raise different problems that may require different legal solutions; it is difficult to treat different things in the same way. Moreover, if many legal concepts are built around paper or paper-related concepts (e.g., letters and mail), it can be questioned whether media neutrality is necessarily a feature of contract law. Why then, should it constitute a cornerstone of e-commerce regulations or serve as a point of departure for mapping traditional concepts onto new transacting scenarios?
Even before the emergence of the Internet, the interpretation of “document” has been liberal. The term has been described as follows:

Any written thing capable of being evidence is properly described as a document and ... it is immaterial on what the writing may be inscribed. It might be inscribed on paper, as is the common case now; but the common case once was that it was not on paper, but on parchment; and long before that it was on stone, marble or clay, and it might be, and often was, on metal. So I should desire to guard myself against being supposed to assent to the argument that a thing is not a document unless it be a paper writing. [FN27]

Until Web sites and email entered the picture, broad approaches focusing on tangibility were not prone to create any analytical difficulties. It is easy to state that it is immaterial what writing is inscribed on, if, at the same time, it is assumed that it is inscribed on something. Difficulties arise when liberal interpretations of the meaning of “document” are mapped onto scenarios involving interactive and interconnected Web pages. This is well illustrated by the case Victor Chandler International v. Customs & Excise Commissioner. [FN28] Notably, the case did not concern the contents of a document, but only the question: Is there a document? The court considered an offense under the Betting and Gaming Duties Act of 1981 of issuing, circulating, or distributing advertisements in documentary form. Advertisements had been placed on teletext, that is, they took the form of “screen frames” displayed on television that were accessed by typing the requested screen number. These “screen frames” were generated on a remote, centralized system and could be updated as frequently as desired. The court held that construing the relevant section of the Betting and Gaming Duties Act as only applying to advertisements in documentary form took insufficient account of the technological advances that had taken place since its enactment. Accordingly, the section was construed to cover advertisements displayed via teletext. It was irrelevant that information contained in the “document” was required to be processed in some way. A “document” was held to include anything in which, or on which, information is recorded or stored. Given, however, that “information alone cannot constitute a document: only the physical object which contains information can,” [FN29] and that the notion of a “document” requires some permanence, the court held that the term “document” relates to the computers, the editing system, and the databases of the claimant; these pieces of hardware contain information. This ruling was based on the rule of statutory construction that an “ongoing” provision should be treated as “always speaking.” [FN30]

Without going into a critique of construction techniques, associating the term “document” with computer hardware appears questionable. Technically, information is always connected with some physical structure, even if only temporarily. It is always possible to “find the physical medium in which the data are embedded at a given point in time. But as a matter of practice, we look to the system, not the medium.” [FN31] Unfortunately, if information is associated with the system as a whole, rather than a single physical subcomponent, there is no piece of the system that contains the “writing.” In other words, it is impossible to establish which writing is relevant. Driven to its extreme and transposed onto Internet transactions, the approach taken in Victor Chandler regards a whole Web server as a document. This approach is further complicated by the interconnected nature of the hardware in Internet communications. After all, neither a Web server nor a database is a stand-alone system. The information contained “in” a Web server may interact with information from another Web server and from a database to produce output in the form of a Web page. What then, is the document? The Web page? All of the servers and the database? Or only the Web server hosting the original HTML file? Unquestionably, the contents of a database or a Web server can be delineated. However, if the database or the Web server is a document, then do all of its contents constitute “writing”?
Ultimately, the notion of a “document” requires not only that it contain information, but also that this information be identifiable as pertaining to a specific transaction. The broader the concept of a “document,” that is, the more hardware that is taken into account and the larger the amount of information contained therein, the more difficult it is to establish which “writing” is relevant when determining the obligations of the parties or the existence of a contract. It must also be noted that in the Victor Chandler case, all content displayed on the screen came from one source, was archived for three months, and was easily printable. Transmitting material from one database to another was described as “the issue, circulation, or distribution” of a document. In adopting such a flexible interpretation, the court assumed that the final “document,” that is, the screen frame on television, was an exact copy of the source “document” on the originating computer. [FN32] Despite the electronic character of the transmission, the information could be “reduced to written form” on receipt [FN33] and the sender was “creating a document on the recipient database.” [FN34] Needless to say and as discussed below, none of these assumptions can be made in the case of AJAX-based Web pages.

A similar, simplistic approach was adopted by the United Kingdom Law Commission, which briefly stated that information stored in electronic form constitutes a “document.” [FN35] A “document” was effectively equated with the medium that stores information. Again, the commission overlooked that, given the breadth of this approach, it is difficult to establish the exact scope of the information that must be taken into account. Interestingly, neither the MLEC nor *10 the UETA define the concept separately but instead treat a “document” as a component of “writing.”

**WRITING**

“Writing” in Internet transactions is generally discussed in the context of formal requirements. The term is described in three different ways: one focusing on the ability to generate a tangible copy, one focusing on “availability for subsequent reference,” and one focusing on visibility. The US Uniform Commercial Code [U.C.C. 1-201(46)] defines “writing” as including “printing, typewriting, or any other intentional reduction to tangible form.” Although the “writing” requirement is easily satisfied by telegraph, [FN36] telegram, [FN37] and telex, [FN38] it has always been associated with a paper document. [FN39] As a result, even in the case of modern methods of communication, the focus has remained on the ability to generate a hard copy on the recipient’s side. [FN40] Although some courts have held that even without being printed, email messages may constitute “writing,” [FN41] the prevailing attitude is that electronic messages can meet the “writing” requirement only if they can be retained or reduced to a “written form.” [FN42] The circularity of reasoning is immediately apparent: A message can be regarded as “writing” if it can be “reduced to writing.” Such reasoning also illustrates the difficulties of establishing a precise vocabulary when addressing concepts that have always been perceived in an intuitive manner and that could be used interchangeably without affecting the outcome of the argument.

It is also interesting to note that one of the most frequently encountered formal requirements, contained in U.C.C. Section 2-201(1), requires “some writing” sufficient to indicate the conclusion of a contract for the sale of goods for the price of $500 or more. This provision focuses on the existence, not on the contents, of a contract. The requirements are therefore quite minimal—the “writing” must only indicate that a contract has been formed and need not describe all its terms. The problem of determining the information conveyed by such “writing” does not arise. Presenting the issue in the form of a simple “yes/no” question regarding the existence of “writing” simplifies legal analysis but avoids confronting the difficult task of establishing the exact terms of a transaction.

The MLEC approaches “writing” from a different angle. Article 6(1) states: “Where the law requires information to be in writing, that requirement is met by a data message if the information contained therein is accessible so as to be usable for subsequent reference.” [FN43] The provision sets the basic
standard for a data message “to meet a requirement that information be retained or presented ‘in writing’ (or that the information be contained in a ‘document’ or other paper-based instrument).” [FN44] The MLEC invariably associates “writing” with “document” and, at the same time, ties a “document” to paper. A similar conflation of “writing” and “document” occurs in the MLEC explanatory notes about the functions performed by “writing” in a paper-based environment. These include, among other things, the provision of tangible evidence of the intent of the parties, the provision of a document legible by all, and the provision of a document that would remain unaltered over time and provide a permanent record of a transaction. [FN45] Given that all of these functions supposedly relate to “writing,” the emphasis on different aspects of tangibility is surprising. Moreover, according to the explanatory notes, the same functions that are fulfilled by “writing” are also fulfilled by paper documents. [FN46] In other words, the MLEC treats “writing” and a “document” as if they were one concept that can be referred to interchangeably. The term “document” is not defined or discussed separately. Article 6 effectively creates the functional equivalent of “writing.” Its sole prerequisite, “accessibility for subsequent reference,” is preferred over “durability” or “non-alterability,” which--according to the explanatory notes--would have established standards that were too harsh, as well as over “readability” or “intelligibility,” which were considered too subjective.

It was also pointed out in the MLEC that “accessibility” might require the retention of the software necessary to render information readable. [FN47] Although the issue is not discussed in the explanatory notes or any literature accompanying the MLEC, it is logical to assume that “accessibility for subsequent reference” requires that the “subsequent reference” provide the same content as was originally viewed. In a case in which this assumption cannot be made, the communication method in question cannot be considered a functional equivalent of writing. It is also logical to assume that to ensure “subsequent reference,” some form of storage is required. At the same time, given *11 the absence of any temporal indicators, it appears that even transient storage would suffice and that the functional equivalent of “writing” need only remain accessible for a brief period of time.

The UETA introduces an interesting variation on the wording of the MLEC. For an electronic communication to be in “writing,” UETA prescribes that it [FN48] be “capable of retention by the recipient at the time of receipt.” [FN49] The relevant provision stresses that an electronic record cannot be retained if the sender inhibits the recipient’s ability to print or store the record. [FN50] The recipient must be able to read the electronic record and “must have the ability to get back to the information in some way at a later date.” [FN51] The UETA supplements “accessibility for subsequent reference” with an explicit requirement that the information be capable of retention and reproduction. This approach effectively prohibits the use of any technology that renders it difficult to capture and store the contents of a Web page as displayed during a transaction. Again, an implicit assumption of this provision is that the stored “writing” conveys the same information as was originally displayed when the transaction took place.

Yet another approach to “writing” has been presented by the UK Law Commission in its advice on meeting formal requirements in e-commerce transactions. Relying on the same premises as the MLEC, the Commission proclaimed the equality of treatment for paper documents and electronic forms of communication. The functional equivalence approach has lead to the belief that, in most contexts, “e-mails (and attachments) and website trading (but not EDI) are already capable of satisfying statutory form requirements existing in English law.” [FN52] This conclusion was based on the definition of “writing” in the Interpretations Act of 1978 and on the functions of “writing” described in the MLEC. The Interpretations Act defines “writing” as including “typing, printing, lithography, photography and other modes of representing or reproducing words in visible form.” According to the Commission, “writing” must involve text perceivable to the human eye. Despite the fact that in the absence of a computer screen the text is imperceptible, the Commission believed that both email and Web-site transactions fall within the natural meaning of writing as they fit within the category of “other modes of representing or reproducing words in a visible form.” [FN53] It must be noted that this definition contains an unintended discrepancy: A “representation” can be temporary and transient, whereas the term “reproduction” implies a minimal
degree of permanence. Given that the definition uses the terms in the alternative, the premises of “writing” are in fact minimal and representation suffices. Presumably, transient or temporary representations of text were historically rare or even nonexistent. Thus, the problem inherent in the Commission’s definition would rarely, if ever, arise. Can writing be transient? How long does text have to remain “represented” for it to constitute “writing”? If both questions are approached in a liberal manner, that is, writing can be transient and only a minimal amount of time on display suffices for text to constitute “writing,” the next question is only rhetorical in nature. How does one apply legal principles that inherently—but not explicitly—presume that writing is stable and constant? Oblivious to these problems, the UK Law Commission equated writing with any visible representation of text. Responding to the view that writing requires some “physical memorial,” the Commission stated that the creation of a tangible form is only one of the functions of paper-based writing. In practice, “both parties will usually be able to store and to print a copy of an electronic communication.” [FN54]

Another issue arises at this point. The Commission apparently assumed that not only is it possible to make a copy of writing, but also that such a copy conveys the same content on the side of the addressee as on the side of the sender. This assumption cannot, however, be made in Web-based transactions as the sender’s side and the recipient’s side of “writing” is, by definition, different. On the sender’s side, that is, the “writing” hosted on the Web server, looks different from the “writing” displayed on the recipient’s computer screen. (Skeptical readers are invited to select the View Source option in their browser menus to see an original source file on the Web-server side and compare it to the Web page on display.) The Commission also underestimated the difficulty of storing and/or printing an electronic communication in its entirety, and as originally viewed.

PUTTING IT ALL TOGETHER

An interesting picture emerges once all of the aforementioned approaches to a “document” and to “writing” are combined and confronted with the 12 technological reality of Internet-based transactions. The first observation that comes to mind is that the two terms, which are frequently used interchangeably, may be more remote conceptually than might be expected. Given the inconsistent terminology and the case-specific observations, it is difficult to draw final conclusions or propose a logically cohesive legal solution. It is, however, possible to make some general observations.

The term “document” is approached in two different ways. It is either regarded as a component of “writing” or as a stand-alone concept. The former approach invariably associates “writing” with tangibility and is difficult to apply in scenarios in which such tangibility is absent. Unfortunately, this approach seems to underpin e-commerce laws and the principle of functional equivalence, which—despite its very purpose of providing electronic equivalents to paper-based concepts—cannot detach itself conceptually from paper. An electronic file is not the same as a paper document. It has different characteristics, which must be taken into account in translating traditional legal constructs into the new transacting environment.

The second approach is exemplified by Victor Chandler. Despite frequent references to this case in Internet literature, its limitations must be recognized. First, as discussed above, the association of a “document” with storage and hardware leads to a dead end as it renders difficult the delineation of the exact scope of the information relevant to a transaction. It can hardly be assumed that all the content of a database or Web server must be taken into account. The “hardware/storage” approach may answer the simple question, Is there a document?; however, it otherwise has no analytical value as it is incapable of pointing to the relevant “writing.” The contours of a document must be clear so as to establish which words describe the obligations of the parties. Second, Victor Chandler focused exclusively on the existence of a “document”--not on the use of the term in conjunction with writing. The case was decided after the Internet became a mainstream phenomenon. Although the judges who heard this case
demonstrated a good grasp of the technologies involved in the dissemination of teletext, there was no discussion of the client-server architecture, which underpins practically all Internet-based methods of communication. When a “document” is stored on a server or when a server is the document, it remains invisible to the addressee of the statement contained therein. From a contract law perspective, the server and anything stored thereon is irrelevant. According to contract theory, every statement (including one made in writing) is evaluated exclusively from the perspective of the addressee. Thus, only the client side of the transaction matters. Even if the Web server or the XHTML file contained thereon are “documents,” only the version of such “document” that is displayed to the addressee is legally relevant. This, however, points to the screen as being the document. Assuming that from a transactional perspective, the information contained in the document matters more than the document itself, the analysis ultimately should shift to the content of the screen and to establishing exactly what part of that content constitutes the relevant writing. While the screen constitutes a smaller and more manageable unit of analysis than the whole Web server, it, too, has problems, such as discerning which elements displayed thereon should be taken into account and establishing whether information contained behind hyperlinks forms part of a statement.

Approaches to “writing” range from the requirement that an electronic message be capable of reduction to a tangible form to mere visibility. Depending on the approach, either every Web page or only static Web sites that can be stored or printed constitute writing. Theoretically, a Web page remains visible until it is closed or a different Web page is loaded in the browser window; as long as a Web page is displayed on the screen, it is writing. The problem becomes more complex, however, once the explicit assumption is made that the information conveyed by the writing remains the same. While one can still speak of visibility, AJAX-based Web pages bear more resemblance to recordings of movies than to the classic concept of writing. Visibility notwithstanding, can there be “writing” if the content of a Web page changes in front of the addressee’s eyes?

More complications arise when “accessibility for subsequent reference” and “storage” are added to the lists of prerequisites for “writing.” Web servers are, by definition, designed to store and maintain Web pages for subsequent reference. However, given the dynamic nature of the Web, a subsequent reference may not display a Web page in the same form as it was originally viewed. Each subsequent reference may display different content. Moreover, capturing the content viewed during a transaction on the user’s side may be difficult. Different methods of saving Web pages preserve different content. The retention of applications, which generate the contents of Web pages, is not only technically complex, but it also may not guarantee the return of the exact contents viewed at an earlier time. AJAX-based Web pages are particularly difficult to store. Although “difficult” does not mean “impossible,” it must be noted that, currently, there is no widely available mainstream application capable of storing the entirety of code and content that makes up an AJAX-based Web page. In fact, AJAX is renowned for “breaking the Back button,” that is, making it impossible for a user to return to the previous page (or the same version of the page) by means of the Back button in the browser. Moreover, AJAX pages, unlike more traditional Web pages, cannot be bookmarked. In other words, the content that was originally displayed is difficult to retrieve later and recreate in its entirety. Regarding the criterion of “reduction to tangible form,” there admittedly is no practical difficulty in making a printout of a Web page, even an AJAX-based Web page. The complete contents of a Web page, however, may not appear on a printout. In sum, all approaches falter when it is taken into account that the contents of dynamic Web pages are difficult to store and recreate at a future time.
INTERIM CONCLUSIONS

Legal concepts that originally developed based on paper documents are not easily transposed onto the current transactional environment made up of interactive and dynamic files. The problems inherent in recreating “writing” and “documents” in such an environment extend beyond the simple questions, Is there writing? and Is there a document? It is pointless to give a positive answer to either question if the contents conveyed by such “writing” or “document” cannot be established. Liberal interpretations provide little certainty. The traditional concepts of writing and documents require more than a slight repackaging to work in this new environment. The essence of writing cannot be captured in such simplistic terms as “storage,” “accessibility for subsequent reference,” or “visibility.” Current regulatory approaches, such as those represented by the MLEC and the UETA, work well with PDF files, Microsoft Word documents, and— to an extent—static HTML. They cannot, however, accommodate the dynamic Web. Moreover, even if the requirements of “writing” can be fulfilled by many Web pages or other forms of electronic communication, it must be established whether such forms of “writing” enable the application of the principles that are built around the original concept. Do they trigger the application of the parol evidence rule? If so, what are the four corners of each of these “documents”? How can the doctrine of integration be applied?

The unforeseen side effect of the e-commerce laws is the indirect prohibition of AJAX, or any technology that does not permit “accessibility for subsequent reference” and/or storage. It cannot be expected, however, that Web developers and the commercial community will take a step back to accommodate existing e-commerce laws and abandon the use of AJAX-based Web pages or the dynamic, interactive Web in general. As technology is not likely to respond to the law, it is the law that will have to respond to technology. The type of legal response required must be preceded by extensive empirical research that is beyond the scope of this article.

The present state of legal analysis and regulatory approaches to Internet-based transactions is characterized by a collective inability to detach themselves from familiar, paper-based concepts and a persistent indifference to the technologies involved in the transacting process. Both characteristics may well be a result of the incorrect assumptions underpinning the principles of nondiscrimination, functional equivalence, and media (and technology) neutrality. Taken together, these three principles provide incorrect points of departure and lead legal analysis to a dead end. The correct point of departure is obvious: It must be acknowledged that it does, in fact, make a difference whether information is set forth in an email, on a Web page, or on paper.

In the future, legal analysis must become more technology sensitive and must be based on correct technical assumptions. Judges and legislators alike must understand the new communication technologies involved in e-commerce. The focus must be taken off electronic transmission and placed instead on the novel ways of presenting and interacting with information. Instead of continuing to compare Internet-based methods of communication to the world of paper, the differences between the two must *14 be recognized and addressed. While this article has posed more questions than it has provided answers, it also suggests a solution. “Writing” in conjunction with a “document” encapsulates certain information. It is this encapsulation that must be re-created so as to be able to apply those legal concepts that historically rely on—or presume—the existence of paper. Without such encapsulation, any attempts to create the functional equivalents of “writing” or any redefinitions of “document” are pointless. Instead of attempts to create functional equivalents of “writing,” what is needed is a functional equivalent of paper. After all, most functions of writing cannot be fulfilled without it. Certainty as to the scope of writing must be regarded as a prerequisite to the certainty of electronic commerce transactions.
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Available at http://www.uncitral.org/uncitral/en/uncitral_texts/electronic_commerce/1996Model.html; see also the UNCTRAL Convention on the Use of Electronic Communications in International Contracts, which largely repeats the provisions of the MLEC regarding “writing.”

Approved by the National Conference of Commissioners on Uniform State Laws in 1999.


See, e.g., the Unfair Contract Terms Act, 1977 §3 (Eng.), which refers to “written” standard terms of business.


See, e.g., MLEC art. 8, which ties “integrity” to “original” and requires a “reliable assurance as to the integrity of the information from the time when it was first generated in its final form.” See generally, W. Ford & M. S. Baum, “Secure Electronic Commerce: Building the Infrastructure for Digital Signatures and Encryption” 113 (Prentice Hall 2001).


E. Woychowsky, “AJAX: Creating Web Pages with Asynchronous JavaScript and XML” para. 2.2.1 (Prentice Hall 2006).


[FN17]. HTML is currently in version 4.1. A related technology is XHTML. At present, HTML is being revised to introduce more interactivity and better multimedia support to become HTML5.


[FN20]. MLEC Explanatory Note 16.

[FN21]. CUECIC Explanatory Note 52.

[FN22]. MLEC Explanatory Note 18; see also UETA Prefatory Note.

[FN23]. CUECIC Explanatory Note 47.


[FN27]. R. v. Daye [1908] 2 K.B. 333, per Darling J.

[FN28]. Victor Chandler supra note 5.

[FN29]. Id. at 1308.


[FN31]. Sommer, supra note 12, at 1170

[FN32]. Victor Chandler, supra note 5, at 1310.

[FN33]. Victor Chandler, supra note 5, at 1309.

[FN34]. Victor Chandler, supra note 5, at 1309.

[FN35]. UK Law Commission, Electronic Commerce: Formal Requirements in Commercial Transactions,
2001, para. 3.41.


[FN43] This wording is repeated by CUECIC art. 9.2.

[FN44] MLEC Explanatory Note 47.


[FN46] MLEC Explanatory Note 16.


[FN48] Although UETA refers to “records,” not “electronic message” or “communication”, it must be assumed that given the definition of “record” (i.e., “all means of communicating or storing information”), the term encompasses messages used to form a transaction, see UETA § 8(a), UETA § 2(7), (13) and Comment 10 thereto.

[FN49] UETA § 8(a).

[FN50] UETA § 8(a)(c).

[FN51] UETA § 8(a), Comment 3.


[FN53] Id., paras. 3.8, 3.18; for a contrary view in the UK see Department of Trade and Industry, Building Confidence in Electronic Commerce, 1999, U.R.N. 99/642, 10 para. 16.

[FN54] UK Law Commission, supra, note 35, at para. 3.18; see also Hall v. Cognos Ltd. Hull Industrial Tribunal Case No. 1803325/97 (1997), in which the printed versions of the e-mail messages constituted writings and the names on the bottom were signatures.