TeraText® Database System

White Paper Series

About Time:

Legislation's Forgotten Dimension

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Introduction

Unlike case law, legislation changes over time. In most jurisdictions, the purpose of the majority of legislation is to amend existing legislation. Traditional legal research tools focus on case law, and paper-based legislation tools are usually out of date before they get into the hands of legal researchers. Current electronic legislation tools add little to their paper counterparts. Legal researchers need more.

Electronic delivery mechanisms can supply researchers with the most current legal material; they can also provide access to changes made to legislation over time ("point-in-time" access). This paper discusses the generation, maintenance, presentation of information, and citation of legislation held in a point-in-time repository. It is part travelogue (discussing issues unique to particular jurisdictions), part philosophical discourse (discussing the nature of time as it applies to legislation), part technical discussion (examining solutions to some of these problems), and part demonstration (showing ways to present temporal information on the Web). Section 1 describes the concept of "point-in-time." Section 2 explores the concept, generation, maintenance, and use of a point-in-time repository. Section 3 examines the limitations of simple point-in-time and explores additional temporal aspects raised by legislation. Section 4 covers a few implications for citing legislation. Section 5 is a brief summary of key points. Section 6 introduces TeraText DBS and TeraText DMS as key components of a legislative solution.

1 The Concept of "Point-in-Time"

Electronic legal research tools have been available for more than 25 years.[1] Whether provided on a commercial basis or as a community service by the government or nonprofit organizations, these tools have focused on case law and commentary rather than legislation. The need for tools to manage the huge volume of case law and supporting commentary has been more compelling because of its size, and legislation's unique requirements have not been thoroughly considered.

Commercial publishers and public access providers are looking for ways to enhance their legal repositories. Because legislation and regulation documentation continues to grow,[2] and public access to case law repositories is becoming more widely available, managers and researchers are looking at the unique characteristics of legislation to enhance the usability of legal research tools.

Generally, published case law is changed only to correct textual errors, and there is no need to retain past versions of the law. Legislation, however, does change over time. In most jurisdictions, more than half of legislation is purely amending. *Amending* laws describe changes to the law as presented in one or more existing *principal* laws. Of the remaining substantive law, the majority includes some amending provisions consequential to the creation of the new law.[3] These consequential amendments, and occasional repeals of entire laws, typically describe minor changes to multiple principal laws. Controversial or major principal laws, for example those concerning taxation, may be amended several times a year. Therefore, unlike case law, legislation is constantly changing.[4]

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[1] Harrington, 1985.

[2] Arnold-Moore, 1998; Cohen, 1990.

[3] Arnold-Moore, 1998.

[4] C.f. AALL, 1998.

This paper examines amendment techniques used in different jurisdictions, how amendments are documented, and the research requirements that the temporal dimension brings to legislation. This paper takes a broad view of legislation, including laws, subordinate legislation, legislative instruments, and other regulatory material of a legislative nature, as this material tends to share common characteristics when compared with other legal sources.

Legislative Amendment Techniques

The U.K. Parliament uses the referential mode of amendment (e.g., "Section 54 of the Substantive Provisions Act 1890 is to be read as though the number '5' is '10'").[5] Virtually every other English-speaking jurisdiction uses either a textual mode (e.g., "Section 54 of the Substantive Provisions Act 1890 is amended by omitting '5' and substituting '10'"), or the repeal-and-replace mode (e.g., "Section 54 of the Substantive Provisions Act 1890 is repealed and the following section substituted …"). Many jurisdictions mix textual and repeal-and-replace modes, and a few rely almost exclusively on repeal-and-replace even where textual amendment would be more descriptive. The federal Canadian Parliament is the most prominent of these.

Referential amendment alters the interpretation of the law, not the text that encapsulates the law. The textual and repeal-and-replace modes are of far more interest because they amend the text of the law, describing alterations to perform on one version of legislation to get the next, updated version of that legislation. Because amendment wording, often referred to informally as *plumbing language*, follows common formulas, there is little room for ambiguity.

1.1 Legislative Artifacts

There are three major artifacts used to publish and maintain legislation in hard copy format: *sessional* or *as-enacted*, *consolidation*, and *code* or *codification*.

The *sessional* or *as-enacted* versions of legislation provide the text of the law as enacted, including all the plumbing language — the language describing how to apply amendments.

A *consolidation* is the original sessional version of legislation with all amendments applied. *Reprints* and *revisions* are types of consolidation. A reprint is a typeset consolidation issued periodically by an authorized government printer. Limited powers may be provided to the printer or the legislative drafting office to correct minor errors in reprints.[6] A revision is similar to a reprint, but is more far-reaching; powers typically extend beyond fixing minor errors to reorganizing or restating the law and are provided to a body rather than an individual. A revision is usually enacted to give changes legitimacy and goes beyond the bounds of consolidation.[7] A *paste-up* is a less formal consolidation that is prepared by taking the latest reprint of a law, including all amendments, and physically cutting out and pasting the inserted provisions into the reprint. Paste-ups are not supplied by the government, although some countries' governments have libraries full of paste-ups. Some publishers provide a paste-up service, either providing a collection of inserts for the customer to paste in or going into the library and pasting the inserts for the customer.

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[5] Renton Report, 1971.

[6] E.g., Legislation Act 2001 (Cth); Reprints Act 1972 (NSW); Reprints Act 1992 (Qld); Acts Reprinting Act 1979 (Tas) now superceded by the Legislation Publication Act 1996 (Tas); Reprints Act 1984 (WA); and Legislative Drafting Service Act 1972 (PNG).

[7] E.g., Statute Law Revision Act 1950 (U.K.); Revised Statutes of Canada Act 1985 (Canada); Statute Revision Act [RSBC 1996] Ch. 440; Statute Revisions Act 1989 [RSNS 1989] Ch 443; and Statute Law Revision Machinery Act 1972 (PNG).

Electronic versions are typically referred to simply as "consolidations," whether prepared by the government or a third party.

The third artifact is the *code* or *codification*, which is used primarily in North America and civil law jurisdictions. A code is a single unified representation of all laws. Provisions are grouped in titles or chapters of related material and reordered or renumbered to better organize the legislation as an entire unit rather than a collection of individual laws. The end result is thought to be a more convenient collection for publication and reference in court proceedings and commentary.

Codes can have either official or unofficial status. Official codes have been ratified by the legislature, and the amendments refer to the code and not to the individual laws that make up the code. With unofficial codes, the amendments change only the underlying laws, and an additional process is applied to make corresponding alterations to the code. That is, a centralized body must decide where in the code to insert new substantive provisions because this decision is not embodied in the vote of the legislature.

Most U.S. states have official codes; a few have unofficial codes. Some jurisdictions have a mixture of official and unofficial codes, most notably, Pennsylvania. The U.S. federal code (USC) has titles that are official (*positive* law) and titles that are unofficial (*nonpositive* law). A number of Canadian jurisdictions have had periodic revisions that have effectively codified the statute book; subsequent substantive laws are not incorporated into the code, but are tacked onto the end of the code. Both situations lead to a mixture of amendments to the code and amendments to individual (consolidated) laws within a single jurisdiction.

Although codification can have some impact on temporal considerations, whether the consolidated statute book at any given time is codified and organized into subject areas or is simply a collection of principal law titles does not really impact the research requirements as they relate to time.

There are a number of additional artifacts that provide information about:

- Identification of laws that have amended a given principal law.
- Timing of commencements of substantive provisions or amendments to them.
- Details of which provisions were amended and how.
- Identification of cases that have judicially considered this law or provision.
- Commentary on the history, effect, and case law regarding a particular law or provision.

Depending on the jurisdiction, these artifacts are provided as separate publications or together with reprints. Many of these, including the provision of appropriate consolidations, are left to commercial publishers. Regardless of how well government fulfills its obligations to provide access to the law (by providing public access to the text of the law), lawyers will always be willing to pay commercial publishers for any tool that will give them a strategic advantage over their adversary, either by providing more information or by providing faster access to it.

1.2 Legal Research Requirements

Different circumstances create different research requirements. There are two main modes of operating that concern practicing attorneys — giving advice on and litigating past activities, and preparing for future activities.

A client might consult an attorney because of a fear of litigation against him or her, or to pursue litigation against someone else. When litigating or preparing for litigation, the parties are interested in the law primarily as it was at the time the events leading to the litigation took place. The parties require consolidated or codified law as it was at a particular time in the past. In other words, they require access to the law at one or more snapshots in time. They want to search and browse through the entire collection of legislation and regulatory material as though they were browsing an updated collection on the day the relevant event took place.

A point-in-time capability allows users to enter any time point in a specified range and have exactly the same functionality as they would for the current time for any time point in that range. For most litigation, versions only a few years old are required because statutes of limitation prevent bringing actions too long after the occurrence of the events giving rise to the cause of action.[8] For some categories of litigation, particularly those concerning real property or intellectual property, the state of the law when an event occurred in the very distant past may be relevant to litigation. Parties interested in past versions of the law include the judiciary and lawyers considering, preparing for, or conducting litigation.

Attorneys advising clients on future activities are interested in the most updated information about current — and likely future — versions of the law. They advise clients on how to avoid future liability to another party to a contract, to other participants in the creation of a legal entity, or on taxation issues. In these situations, the attorney is interested in both the current state of the law *and* the state of the law over the life of the arrangement being considered, which often extends well into the future. While predicting the outcome of any legislative body can be a speculative venture, the lawyer wants to have as much information as possible. Three pieces of information are available:

- Substantive law that has yet to commence
- Amendments that have become law but are yet to commence
- Proposed laws, whether substantive or amending, that are yet to become law.

Other legal practitioners have slightly different needs. Legislative drafters and legislators require current or near-future versions of principal laws from which to prepare draft amendments. Where future versions exist, drafters and legislators also need to consider the interaction between the proposed amendments and subsequent amendments. Occasionally they require a past version of a principal law to draft retrospective amending legislation, most common in taxation legislation. They also want to be aware of other draft amendments that may affect the principal for which they are drafting amendments. While such draft laws are not available publicly until they are tabled (except in the relatively rare case that they are released for public comment), drafters can and usually should have access to these private documents in the same way that lawyers within the same firm have access to privileged documents even if they are not directly working on the case.

The common threads to these requirements are point-in-time access and currency. A sophisticated point-in-time repository is of limited use if it is not immediately updated when a new law is enacted. A current consolidation is of limited use if previous and future consolidations are not also available.

2 A Point-in-Time Repository

2.1 Generating a Point-in-Time Repository

Many jurisdictions have multiple versions of principal laws in electronic form on hard drives or on tape backup. If they have recorded the starting time of each version, they have enough information to create a basic point-in-time repository.

The simplest point-in-time repository stores every version of every piece of legislation and associates two pieces of metadata with each version. These are a time point (a day in most jurisdictions) at which that

[8] Limitation Act 1969 (NSW); Limitation of Actions Act 1974 (Qld); Limitation of Actions Act 1936 (SA); Limitation Act 1974 (Tas); Limitation of Actions Act 1958 (Vic); and Limitation Act 1935 (WA) all substantially based on the U.K. Statutes of Limitations (now the Limitations Act 1980 (U.K.)).

version begins to be in force (VALIDSTART), and a time at which that version ceases to be in force (VALIDEND).[9]

Given a time point 2001-11-29,[10] a snapshot of the entire collection as it was at that time can be extracted by searching for:

VALIDSTART<="2001-11-29" AND VALIDEND>"2001-11-29"

To search or navigate within that snapshot simply requires that any query to extract content must be conjoined (ANDed) with the above query to get the result as it was (or will be) at the specified time.

If the searching technology or repository supports both comparative query operators ("<=" and ">") on either integers or strings and conjunctive fielded queries, this technique, while not optimal, gives correct results. On larger collections containing either large numbers of time points or large numbers of records (in this case whole laws), it is better to use one of the various techniques for indexing time point values and supporting temporal joins.[11] While few commercial systems support both temporal joins and large-scale text repositories optimally,[12] most do a fair job on smaller collections, such as a legislation collection for a single jurisdiction.

By storing whole versions of laws, a large amount of unnecessary redundancy of storage is introduced. Most amendments change a relatively small percentage of the principal law. Storing the whole law for every time point at which even the smallest change is made rapidly increases the amount of storage needed. This is particularly true of taxation legislation, which is usually large and tends to be amended more frequently.

A more space-efficient approach is to fragment the laws and version the fragments individually. The most universal point at which to fragment legislation is at the section level or equivalent. Sections also provide a more meaningful retrieval unit because ranked retrieval performs better where the records are more uniform in size.[13] In addition, most sections are a good size to show as a single screen in a Web browser

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[9] Note that this adopts the convention within the temporal database community of using $[t_0, t_1]$ rather than $[t_0, t_1\text{-}1]$, that is, marking the end of a time point by the moment at which it ceases to be valid rather than the last moment at which it is valid. The reason for adopting this approach is because it works whether you use discrete time (a specified minimum time period, i.e., a day for most jurisdictions) or a continuous time (i.e., time can be divided up into the smallest unit desired: hour, minute, second). The latter form requires changes to the repository if you change the discrete unit or change to continuous representation. This conveniently accords with standard interpretation of commencement provisions c.f. Pearce (1981) [123] referring to Re Flavel [1916] SALR 47 and Dean v. Attorney-General (Qld) [1971] Qd R 391.

[10] The ISO 8641:1988 international standard format is used for representing a time point. The first four digits are the year, the next two digits represent the month, and the final two digits represent the day of the month (the "-" separator is sometimes optional). 2001-11-29 therefore represents 19 November 2001. This format can be extended to arbitrary precision (providing a time zone is also specified) and it has the advantage of not requiring a different sorting function.

[11] Sitzmann and Stuckey, 2000.

[12] Witten, Moffatt, and Bell, 1999.

[13] Raymond and Tompa, 1988; Wilkinson, 1994.

(although some sections are longer, they are consistently closer to "screen size" than other identifiable units within laws).[14]

The fragmentation approach dramatically increases the number of records handled, but it reduces the total storage required and provides a more manageable search and retrieval unit. This approach can still be used to retrieve a whole law, either by reconstructing it from the relevant fragments or by redundantly storing it. However, disk space is inexpensive, at least for the volumes of data required to manage a typical legislation collection, and fragmentation decisions are made primarily on functionality supported by the underlying repository and indexing technology, rather than on space efficiency.

2.2 Maintaining a Point-in-Time Collection

Adding new versions to an existing point-in-time collection, particularly where the collection manages only whole versions, is relatively simple. To insert a new version of legislation that commences on 2001-11-01 and for which the existing version has no VALIDEND time, simply change the VALIDEND field for the existing version to 2001-11-01, then insert the new version, setting the VALIDSTART field to 2001-11-01 and setting the VALIDEND field to the end of time.

This technique works for retrospective amendment or future commencement, providing there are no intervening subsequent amendments. When there are intervening subsequent amendments, more than one version must be created and some preexisting versions may be deleted.

The same principles apply in a collection with fragmentation, except that only the time points on fragments that have changed since the previous version are updated. In most cases, the majority of fragments will remain unchanged and only a few will be updated.[15] Checking for changes can be computationally expensive, but there are various normalization and signature techniques to prune the list of candidates to be checked. Deciding which technique to use depends on the underlying format in which the legislation is being stored. Because of the structural complexity and regularity of legislation and the desire to manage identifiable provisions within a law, XML[16] and its superset and predecessor format, SGML,[17] are the obvious choices. In addition, both formats have been widely used by governments and legal publishers for some time.

This all assumes that the new consolidation is available to store. There are at least three techniques available for updating consolidations: *manual consolidation*, *automatic amendment understanding (template-based consolidation)*, and *automatic amendment generation*.

2.2.1 Manual Consolidation

Manual consolidation is the most common and most resource-intensive method of consolidation. Manual consolidation consists of a trained user manually applying each change described in the amending provisions of the amending law to the principal law. It is the electronic equivalent of the paste-up. The major difference between paper and electronic paste-ups is that the electronic paste-up is done once and shared with many people in different locations. It does not have to be repeated for every library of legislation.

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[14] Arnold-Moore, 1998.

[15] Arnold-Moore, 1997.

[16] W3C 1999. Note also the XML canonical form and XML signature work.

[17] ISO 8879:1986.

Manual consolidation is currently used in Singapore to provide a point-in-time repository for Web delivery; access to this system is on a fee-paying subscriber basis only. A large number of jurisdictions use this approach to provide access to the current consolidation only. This includes Canada (Federal Justice Department), Ontario, most Australian jurisdictions, and many U.S. States. The more forward-thinking have retained all prior consolidations with a future point-in-time repository in mind.

Labor cost for maintaining consolidations manually is potentially quite high, and turnaround times can be limiting. There are two options: (1) wait until the proposed law becomes law and work quickly to consolidate it, or (2) speculatively consolidate larger bills in anticipation of a vote, with the potential of discarding much of the work.

The acceptability of speculative consolidation depends on a number of factors, including:

- Expectations of consumers of legislation (do they expect immediate or near-immediate currency?).
- Predictability of the legislature (how likely are consolidators to correctly guess the outcome of a voting session?).
- Lag time between vote and approval.
- Willingness of the consolidating organization to expend resources on bills that do not become law in order to meet more aggressive consolidation schedules.

An example of the extremes is that Ontario aims for 14-day currency with little or no advance preparation of consolidations and rarely fails to meet its targets. The U.S. Code aims for 12-month currency and rarely achieves it.[18]

2.2.2 Automatic Amendment Understanding (Template-Based Consolidation)

Within a jurisdiction, plumbing language is remarkably consistent and less consistent when compared across jurisdictions. There are only eight or nine different types of amendments and less than 12 variants of wording within each type, which makes template-based consolidation techniques both feasible and machine-friendly.[19] In most cases, a template approach can also be applied to commencement language.[20] These factors make automated consolidation easier than more general natural-language processing tasks. Using template-based natural-language processing techniques or pattern-matching techniques, the amending wording can be converted to a compact, machine-understandable description of the target provision and the exact change to make to the text of that provision. This representation has previously been called a Change Description Document (CDD).[21]

Applying a CDD to a principal law can be relatively simple depending on the format in which the legislation is stored. Currently, most legislation is stored in word processor formats that focus on presentation, describing how the page should look. XML and SGML formats provide a way of representing the logical structure of the document, delineating the different elements that make up the document. By separating the structure of the document from its presentation, these standards facilitate automatic processing. If the document contains information about where section 53 starts and ends, it is relatively simple to delete section 53. However, if one has to search the document to find a line that begins with "53," followed by a period, in 12-point, boldface Roman and mark that as the start, and then search for

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[18] AALL, 1995.

[19] Arnold-Moore, 1995.

[20] Arnold-Moore, 1995.

[21] Arnold-Moore, 1995, 1997; Arnold-Moore and Anderson, 1997; Arnold-Moore, 1998; Arnold-Moore and Clemes, 1999.

the next line that begins with a number followed by a period and spaces or a tab, in 12-point boldface Roman, the processing rules quickly become too complex to manage. A task that is relatively simple in well-structured XML or SGML is virtually impossible in more general word processor formats.

These techniques can be combined to completely automate the production of consolidations. If wording is encountered that the system does not understand, the templates must be extended to cope with the new wording or a manual intervention applied.

Short of this full automation approach, a template-based approach can be used to provide suggestions to a user to assist in consolidating legislation. This semiautomated approach is currently being used in the Quebec provincial government for consolidating legislation, providing consolidation updates every 6 months available on Web and CD-ROM. A similar system is currently being configured for the Canadian federal government (for more information contact Irosoft at www.irosoft.com).

2.2.3 Automatic Amendment Generation

Automatic amendment generation takes advantage of the control many drafting offices have over legislation throughout its life cycle. This alternative approach captures information regarding changes at the time the amending law is created. Automatic amendment generation allows drafters to draft an amendment by marking a principal with changes and automatically generating the amendment wording. Changes are kept with the amendment wording in case the draft becomes law, in which case the changes are applied to produce the new version or versions of the principal.[22] Currently this approach is used in Tasmania and Papua New Guinea to draft acts and statutory instruments. At the time of this writing, Tasmania is the only jurisdiction in the world to deliver a free Web gateway to a true point-in-time legislation repository. Victoria claims to have this capability but does not make it available to the public. Singapore has this capability but makes it available only by user-paid subscription. Quebec provides this capability on a free Web site but does not consolidate at all time points.

2.3 Presenting a Point-in-Time Repository

There are few paper precedents for presenting temporal information, particularly in the legal arena. Because these temporal databases are new, making them usable requires maximizing the limited tools that are available.

One of the paper precedents is the K table. This is a table containing the titles of all acts that have amended the principal, together with the year and act number, and the date on which that act or provisions of that act commenced. In Tasmania for example, this table has historically been printed at the end of each reprint. It is still included in authorized paper consolidations. An electronic equivalent was first included in the Singapore point-in-time repository. The Tasmanian interpretation of this approach is shown in **Figure 1**. The document's short title appears in the left column. Each title is a hypertext link to the sessional version of the amending act. The middle column shows details of the amending act. The right column shows the date of commencement of the amending act or that portion of it. This date is a hypertext link to the version of the principal at that time point.

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[22] Arnold-Moore, 1997; Arnold-Moore and Clemes, 1999.

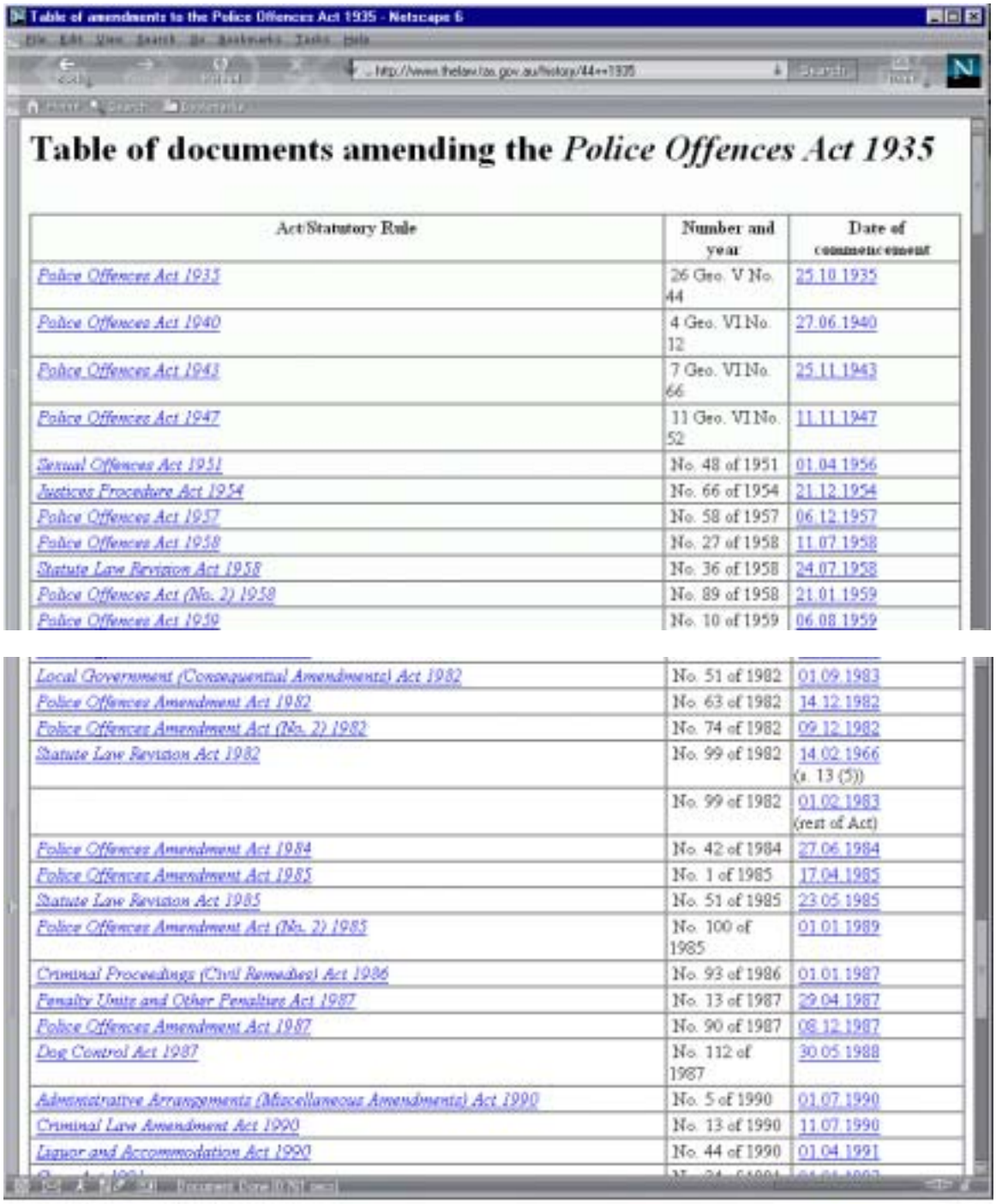

Figure 1

Extending beyond this interface requires going beyond the paper paradigm to a paradigm that is more directly associated with time. Most users are familiar with the buttons on a VCR or audio tape player; the directed triangles on the Rewind and Play buttons indicate movement backward or forward. Although the VCR/audio tape player concept is time-oriented, this paradigm is increasingly being used on other Web sites to move between items in a list. An interface has been devised using the directed triangles both with and without a stylized clock face. The arrows with a clock face indicate moving forward or backward in time. Those without a clock face represent going forward or backward in the document. **Figures 2, 3,** and **4** show three successive fragments.

Figure 2

Figure 3

Figure 4

Rarely used in a legal context, timelines are commonly used in other disciplines for representing temporal information. Time is portrayed on a left-right axis. Points are arranged on the timeline to portray their relationship to each other. Points to the left occur before points to the right. A table (shown in **Figure 5**) is used to represent this in HTML for Web viewing. Each time point at which a fragment in the repository changes is shown as a border between columns. Because of the variable times between changes, a uniform scale of time is not used; rather the same distance between successive time points is portrayed regardless of the actual time between events. Each fragment is represented by a row in the table. The row is broken only where there is a new version of the fragment. Clicking on any cell of the table takes the user to the corresponding version of the appropriate fragment. Uncommenced fragments are viewed like any other fragment, but inserted fragments have a grayed-out portion of the row.

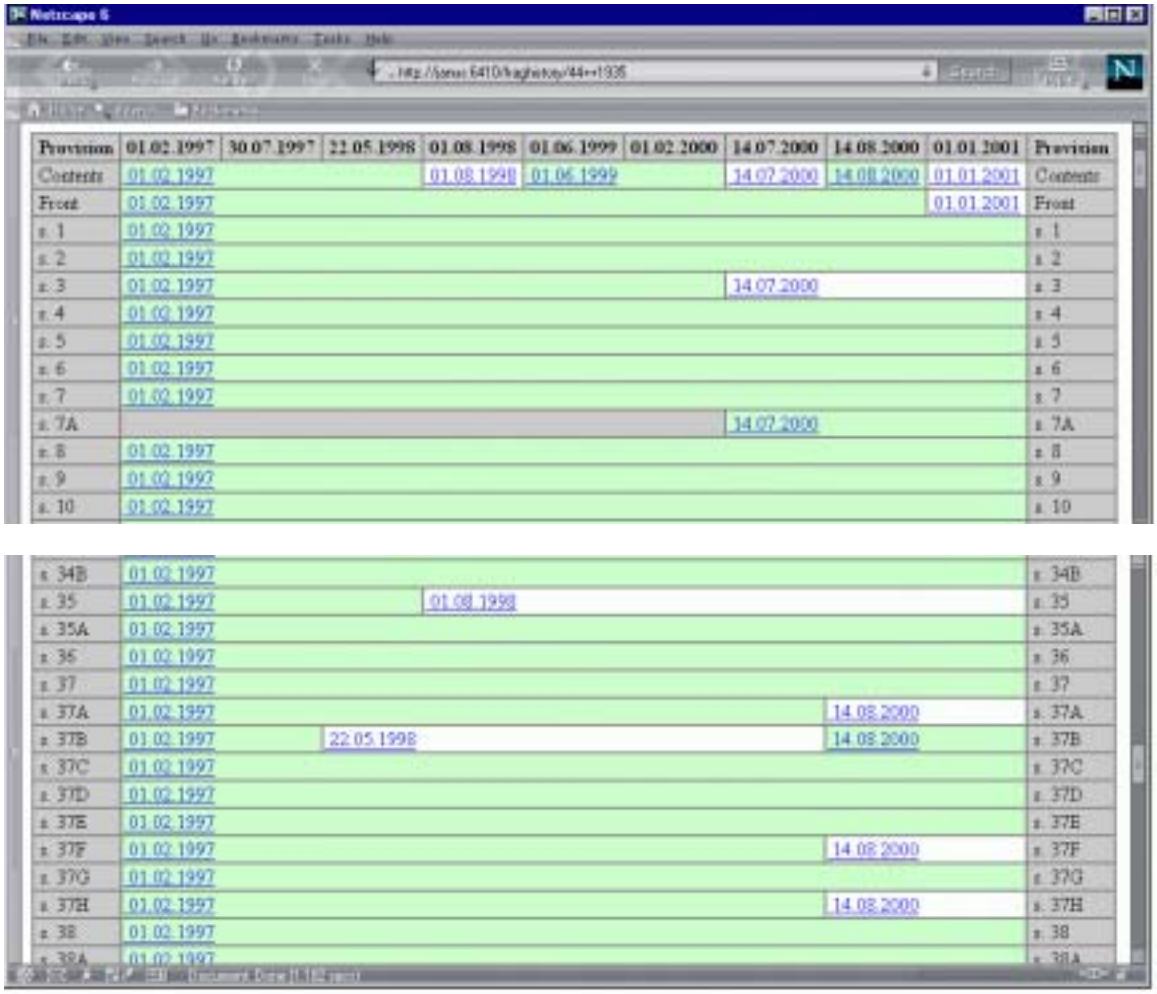

Figure 5

Feedback on these representations of temporal data has been very positive, but user studies need to be conducted to determine which, if any, of these representations has a positive impact on the usability of temporal information.

3 Temporal Database Concepts

Legislation is not the only area concerned with temporal factors. Considerable research has been done to explore temporal aspects of more traditional databases. From this research, a consensus has been reached on terminology for describing often extremely fine distinctions between concepts.[23]

The two most crucial concepts of interest are *Valid Time* and *Transaction Time*. Valid Time records the time interval over which an object stored in the database models reality. In a legislative context, this equates most naturally to "in force." The Valid Time interval for a fragment or law is the time between its commencement and the time at which the next version of that fragment or law commences. That is why the names VALIDSTART and VALIDEND are used for the time-stamp fields.

[23] Jensen et al., 1994.

Transaction Time, by contrast, specifies the time at which a fact is recorded. In a legislative context, it could correspond either to the time of enactment or to the time the information is recorded in the repository. Ideally these times would coincide, but there is often a lag between them. Any of these temporal dimensions are orthogonal — they are independent of each other — so a repository can choose to record only Transaction Time, only Valid Time, or both. It is even possible to manage multiple layers of Transaction Time, for example, if it was necessary to record both the time of enactment and the time of storage in the repository.

These details might seem to be of importance only to database managers in managing repositories with backup and rollback capabilities. However, these concepts are also vital to consumers of legislation.

The EnAct system in Tasmania takes a one-dimensional view of time. Transaction Time is always assumed to be current. Only Valid Time can be used as a variable for evaluating queries — for searching and browsing the temporal landscape of the Tasmanian legislation. It is possible to capture and manage more than one temporal dimension. However, if temporal information in just one dimension raises difficulties in presenting the information to the user, multidimensional temporal information may be even more confusing to the user. Consider that law librarians, whose vocation is to consider such issues, need to be convinced that more than one temporal dimension is even necessary. It is unlikely then that casual users of a Web interface will appreciate the new capabilities these extra dimensions might provide.

4 Implications for Citing Legislation

While the library community has long been concerned with proper citation, this discussion recently has extended into the broader community. A desire for vendor- and media-neutral citation schemes,[24] citation of resources available only in electronic form,[25] and citation from electronic media to other sources has initiated renewed interest in discussing citation schemes. One task force that has focused on legislation is the Citation Task Force of the American Association of Law Librarians (AALL).

AALL has clearly recognized that a citation of legislation is incomplete without temporal information.[26] While this is a commendable achievement compared with other efforts,[27] AALL incorrectly assumes that a single date is sufficient to uniquely identify the text of a consolidated or codified law. In comparing their two published reports on legislation citation, the first identifies what appears to be an “in force” or Valid Time date.[28] The second superficially discusses the deficiencies of this approach and suggests a “current through” date either by use of a specified date or the completion of a session of the legislature, which is logically equivalent.[29] This concept is actually a form of Transaction Time. It completely ignores any commencement provisions. The AALL failed to recognize that these two dates are actually potentially independent. It is extremely rare for two titles to be released on paper with different content and the same date, so librarians are used to equating the two concepts. However, in an electronic legislation

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[24] Mowbray, Greenleaf, and Chung, 2000; Canadian Citation Committee, 1998; LISC, 2000.

[25] Rozenberg, 1997; Walker and Taylor, 1998; and many others.

[26] AALL, 1995; AALL, 1998.

[27] MULR, 1999, does not even mention temporal aspects of legislation in passing and explicitly states that a date is NOT required for a legislative citation, despite stating that legislation is assumed to be “as amended.”

[28] AALL, 1995.

[29] AALL, 1998.

environment, two versions of the same act with the same Transaction Time can have different content depending on the Valid Time and vice versa.

An example would be an act that commences on 2000-01-01. In this example, today is 2001-11-29 and the legislature enacts a retrospective amendment commencing 2001-01-01. If the user views the legislation with ValidTime = 2001-06-01 on two different dates, for example yesterday (TransactionTime = 2001-11-28) and again tomorrow (TransactionTime = 2001-11-30), the user gets different resulting content. To guarantee a unique specification of the content of a piece of legislation, which is the primary purpose of a citation, two dates are required — the "in force" date and the "current through" date. Authorized versions of Tasmanian legislation in paper form and in the Web view include both dates on all displays.

Valid Time and Transaction Time usually coincide, but they can get out of synch in a number of different ways. Retrospective amendment is one way. Any variation from commencement results in a difference. Commencement by proclamation is a deliberate choice to separate the two concepts. Even when commencement and enactment coincide, nonpositive law or other delays in official codification can create gaps between Valid Time and Transaction Time. This results in differences in the content of the target of a citation. These differences are rare, but when they do occur, they are important. Any citation scheme claiming to completely consider the implications of electronic resources in the legal arena must consider the possibility that two dates (however rendered) are necessary to uniquely determine the text to be considered.

5 Summary

The temporal dimension is extremely important in managing a repository of legislation. The value of a point-in-time repository has been established, and this paper describes how such a repository can be generated and maintained. This paper also explores ways of rendering the contents of such a repository that makes the temporal dimension usable by consumers of legislation and electronic search services. It shows some of the limitations of a one-dimensional view of time, illustrating the limitations of first-generation point-in-time systems such as the EnAct system in Tasmania. One time dimension is not always enough to capture the rich history of a legislative provision, and citation standards must recognize the need for capturing these finer distinctions.

6 TeraText DBS, XML, and Legislation: an Ideal Partnership

TeraText DBS supports the logical evolution of legislation database systems - namely providing accesses to the correct state of the law at any point in time. By using XML to represent the structured text inherent in legislation TeraText DBS solves the challenge of maintaining a consistent structural representation for the documents while allowing the data base designer to reuse the same information for multiple purposes. By using a combination of XML and sophisticated search/indexing capabilities TeraText DBS effectively supports point in time access to legislation.

Because the structure and content of the legislation is available to the application, in a form separate from presentation information, it is possible to develop powerful end-to-end solutions, not easily achievable when using proprietary data representation standards.

The technology underlying the TeraText DBS and TeraText DMS products was used in the creation of the Tasmanian legislative site.

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The Web paradigm is useful for navigating to the previous or next fragment in the current version of a document.