

Study of

Automatic Compilation

and

Related Technology Issues

August 2001

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1. Introduction

Automatic compilation has been recognized as a goal for several legislation drafting, compiling and publishing offices. The purpose of the study is to provide sufficient information on developments relating to automatic compilation and related technology issues to allow the Parliamentary Counsel Office (PCO) to make, during stage one of the access project, informed decisions about future technology, systems and related processes. The principal focus for the study is what is happening in other drafting offices.

2. Our Approach

The main method in carrying out this work was to consult known contacts in relevant legislation drafting or compiling offices in selected countries. A sample copy of the introductory e-mail sent is attached as Appendix I. Where no known contacts were known attempts were made to establish these on behalf of the PCO. Relevant specialists both within these offices and in organizations such as universities or business consultancies were also briefly consulted as required. Relevant literature, websites and other information were also referenced. Appendix 2 contains a list of the contacts made as part of the study.

Internet and library searches were also carried out to confirm that there had been a reasonably thorough survey of the relevant information sources. Some of the more relevant papers and reports identified are noted in Appendix 3.

3. Research Findings

3.1 Overview

All the people we emailed or talked to from drafting or related offices had the goal of improving the turn-around time of making fully compiled legislation available to their citizens. For this reason it may be best to consider the terms rapid or instant compilation instead of the phrase automatic compilation when talking about the ultimate goal. Nearly all offices surveyed were taking steps to make compiled statutes available on the internet. This appears to be within ever-diminishing time frame expectations. However, even with a certain commonality of ultimate goal there was broad differences in the approaches being taken and the stages different offices were at in actually implementing processes and systems that provided for rapid or automatic compilation.

All offices studied have undergone substantial changes over the last 10 years. The main reason for these changes is the shift from traditional paper based publishing to various forms of electronic publishing or internet based legislation delivery. A wide variety of approaches to this transition have been adopted and

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no “one size fits all” solution is apparent. In all cases solutions are precisely tailored to the unique circumstances of the individual offices involved.

3.2 Summary of Key Developments

The following is a summary of developments regarding automatic compilation and related technology issues in selected legislation drafting and compiling offices. These offices were selected because:

- they were considered the most relevant to the New Zealand situation.
- they were perceived as being the most advanced.

[Note: This study did not examine developments in Australia, since the PCO already has extensive knowledge of initiatives in Australian drafting offices.]

The Canadian Federal Government (Ottawa)

Overview

The Canadian Federal Government, in the form of the Ministry of Justice has what is probably the most comprehensive and advanced project underway. Their work as regards improved access including automatic compilation has a very long history although the most significant progress appears to have been made in the last 12 –18 months.

Ottawa is actively working to put in place systems that will provide for rapid or automatic compilation. Currently work is underway developing user requirements for authoring and publishing systems.

It is worth noting that they also had a project underway which they referred to as their "content management and delivery system" (CMDS). This includes version control, granular data management, point-in-time storage and retrieval, Internet delivery, semi-automated consolidation. Although it was in its early stages they saw this project as being central to their planned developments.

They also have a revised data conversion project underway to adapt an earlier conversion to their latest DTD. Our contact made the observation that DTD's do change and he noted that “a DTD, by definition, is never really finished.” He added that the NZ PCO should look at as many legislative DTD's as they can in order to assess the pros and cons of various approaches, especially as regards New Zealand legislation and the associated environment.

Key Technology Issues

Ottawa has purchased the RMIT/MDS product SIM (Structured Information Manager). It appears that SIM has improved dramatically in recent months and is now able to be integrated more easily with other modules or with other systems.

In Ottawa a fundamental decision was to use XML as the data encoding mechanism. DTD development has been ongoing (sporadically) for more than 2 years. Along the way numerous significant decisions had to be made as regards

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the DTD's. The initial conversion effort helped identify numerous shortcomings in the original DTD.

Ottawa is using Arbortext Epic for authoring, with considerable customization for their needs. They consider that XMetaL is also well worth considering. Their reason for moving from XMetaL was its inability to handle bilingual text as well as Arbortext. Nevertheless Epic has impressed the Ottawa office mainly because it has a lot of useful "out-of-the-box" features and a lot of other advantages of a mature product. Our contact in Ottawa noted that they did not ever seriously consider using a non-XML application like Word and doing conversions back and forth, as was done in Tasmania.

Ottawa is using Advent 3B2 for publishing largely because it addresses their very complex bilingual side-by-side needs. They suggest that Arbortext's print environment would be adequate for non bilingual needs.

Ottawa will be using RMIT's SIM product for their content management and database system, with a possible exception for the consolidation part of the system, which may be done using an RDBMS like MS SQL-Server. This latter decision will be made after their local developers learn more about SIM, and see whether they can adapt their existing semi-automated consolidation system (that was built for the Quebec government and adapted for a commercial publisher) to SIM or not.

Current Situation And Perspectives On Automatic Compilation

Ottawa is aiming for as much automation as possible, with the recognition that it is unlikely that they can ever completely automate consolidation. Their view is that there are just too many unusual cases, and they consider that they have no possibility of changing the fundamentals of their existing base of legislation. An example of the difficulty is the potential need to number all the rows in a table to make them "addressable" for an automated consolidation routine. However, they do think that they can probably achieve 90% or so automation in the bills environment.

Ottawa is planning to proceed to a form of automatic compilation via parsing the amending provisions. Their amending wording is highly standardized (in most cases), and they amend entire logical "chunks" (structural components) even if only one word in the chunk is being changed (again, in most cases!). This is an issue of granularity which it appears is still to be finalized.

Key Issues for the NZ PCO to Consider

The key points to note from the Ottawa experience are:

- the evolutionary nature of developments over an extended time frame – on occasions events as early as 1986 were referred to.
- the substantial funding involved over a 2 year period

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- the open approach taken that included consultation with a wide variety of experts and colleagues.

Ontario Provincial Government

Overview

Ontario is currently in what they loosely term Phase II of the e-Laws project. The project is jointly sponsored by the Ministry of the Attorney General and the Ministry of Consumer and Business Services. The e-Laws project is a fairly comprehensive programme of work intended to improve the processes and systems used to create legislation and to provide access. The current work involves a major review of requirements by a group that includes industry experts such as Tim Arnold-Moore.

Key Technology Issues

For Ontario the key technology issues include:

- data conversion and development of a DTD
- requirements for an authoring tool – most recently they have included XML based tools to their assessment
- requirements for a database repository - They will be evaluating SIM as a database management tool. They noted that SIM as now proposed by RMIT has advanced from what was put in place in Tasmania several years ago.

Current Situation And Perspectives On Automatic Compilation

Ontario has moved from a paper-based system whereby the laws were fully consolidated every 10 years to making the fully compiled laws available on the internet within 14 days. The team is currently defining requirements for compilation but will be looking to have the compiled laws available on the internet 24/48 hours after enactment.

Key Issues for the NZ PCO to Consider

The key points to note from the Ontario experience are:

- that the type of work required to truly improve access to legislation requires a very long (5 years plus) planning horizon
- there are very positive benefits to be gained from building up in-house resources.

United States - State Governments (especially Michigan)

We have made preliminary contact with the Michigan State Government which we understand from our literature search is one of the most advanced States in regard to compilation and making laws available to their citizens. Recently they

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have converted all their Statutes to XML, which they claim has dramatically improved the accessibility of the Statute book.

We have not heard back from Michigan at the time of writing this report.

United States Federal Government - Law Revision Office, House of Representatives

Overview

We talked at some length with a contact from the Law Revision Group of the US House of Representatives. This group is responsible for publishing the US Code (a compiled version of the US statute book of Federal law arranged by subject matter). The Code is updated by supplement annually and is reprinted every six years.

Key Technology Issues

Within the Law Revision Office there appears to be very little emphasis on technological innovation – the revision process, which includes compiling Statutes into the Code is almost entirely a manual task. Custom developed and now rather dated tools (called Microcomp) are used for some basic editorial tasks.

However within other related Offices there were strong moves towards XML. The recent COAX Conference organized by the LegalXML group highlighted this. The House Administration Committee appears to be one of the key drivers for adoption of XML in the US legislation environment. These moves are a response to the need to provide greater flexibility of access for all users of legislation.

Current Situation And Perspectives On Automatic Compilation

This office does not use or have plans to move to automatic compilation. However our contact noted that this was due mainly to the constraints imposed by the organisational framework and the diversity of organisations involved as well as the dominance of the Government printer.

Key Issues for the NZ PCO to Consider

The key points to note from the US Federal experience are:

- The organisational framework plays a vital role in the development of access and the potential for automatic compilation.
- If there is no champion or other incentive to move to automatic compilation, the status quo – in this instance manual processes, will prevail.

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United Kingdom Lord Chancellor's Office – Statutory Publication Office (SPO)

Overview

In the UK there are three main organisations directly involved in providing access to legislation and which potentially have a view on automatic compilation. They are:

- The Office of Parliamentary Counsel which is part of the Cabinet Office and which drafts legislation
- The Lord Chancellors Department complies, edits and provides access via the Statutory Publications Office to the Statute Law Database
- The printer – in this case Her Majesty's Stationery Office

Our research revealed that the SPO was the office that was most relevant as regards automatic compilation so we focused our attention there.

Key Technology Issues

The SPO is well advanced in consideration of XML and automatic compilation. They have an environment whereby they do not directly have to consider drafting tools (this is the concern of the OPC) and of publishing (this is the concern of the HMSO for printed material and the new E-envoys office for electronic access).

This separation of responsibilities is reflected in the choices of technology. The OPC has opted for a Framemaker+SGML environment whereas the SPO is looking at XML base solutions such as XMetaL. Our assessment is that these choices reflect a mix of influences especially the point in time the respective projects started and the relative state of the respective technologies as well as the specific needs of each office – authoring for the OPC and editing and publishing for the SPO.

Current Situation And Perspectives On Automatic Compilation

Automatic compilation is a real consideration for the SPO. A reason for this could be the freedom the office has from any constraints imposed by authoring or full scale paper based or multi channel electronic publishing. In our view this does not diminish the contribution the SPO can make to the area of automatic compilation.

Key Issues for the NZ PCO to Consider

The key points to note from the SPO experience are:

- The organisational framework plays a vital role in the development of access and the potential for automatic compilation
- Automatic compilation is harder to achieve if a segmented, as opposed to a comprehensive view of the legislation process is taken
- Whilst Framemaker+SGML may satisfy a drafting office, if broader considerations (i.e. editing, publishing or even automatic compilation) are

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brought into play other tools, especially those with an XML basis may be more appropriate.

Ireland – Office of Parliamentary Counsel

Overview

This office appears not to have taken any significant steps towards automatic compilation.

Key Technology Issues

The focus in Ireland is on putting in place the supporting mechanisms and infrastructure for improved access. This includes establishing or modifying the legislative framework, the creation of a separate Statute Law Reform group in the Attorney General's office, and the strong progress made in making electronic versions of legislation available. Although they are not under active investigation now this probably means that consideration of automatic compilation and related matters such as XML are not too far away.

Current Situation And Perspectives On Automatic Compilation

This office noted that automatic compilation is very much a longer term goal. The current position is to maintain a watching brief.

Key Issues for the NZ PCO to Consider

The key points to note from the Irish experience are:

- That issues other than technology need to be considered before automatic compilation is put in place. This includes access to a suitable electronic repository and legislation that allows the relevant offices to make the necessary alterations (if any) to the statute book.

3.3 Other Areas of Investigation

In carrying out this research it became apparent that sources other than legislation drafting, compiling or publishing offices could offer valuable information about the topic under investigation. For this reason a series of internet searches was carried out. References to some of the key documents found are provided as Appendix 3. Some of the phrases used in these searches were:

- "automatic compilation" – 2,240 hits on Goggle.com
- "automatic compilation"+legislation – 26 hits
- "automatic consolidation"+legislation – 42 hits
- "expert system"+legislation – 3,210 hits
- "expert system"+"legislation drafting" – 1 hit
- "legislation drafting" - 700 hits
- legimatics – 22 hits.

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The low number of hits for some items show the specialized nature of some of these topics – however the higher numbers show the opposite and in particular that there is a wealth of experience and expertise to draw upon both within legislation drafting and compiling offices and in relevant academic or research environments. It is noticeable that legal publishers do not feature in any of these results.

From a review of the relevant documents it is clear that emerging technologies and fields of expertise, possibly beyond the current mainstream, (with the mainstream taken to include technologies such as web browsers, HTML, SGML, proprietary word processors and content authoring tools) will become increasingly important in the not too distant future. The offices contacted are expressing a wish – some at a general level, others more specifically, to move into the areas that academics and researchers are currently working in (and it appears have been for at least 3-5 years). These technologies or methods, all of which are relevant for drafting, editing, compiling and publishing of legislation, include:

- Isomorphic (precise) modeling of legislation – especially highly prescriptive statutes such as some Inland Revenue or Social Welfare Acts
- Use of natural language representation in computer systems dealing with legislation
- Legimatics – the use of computer tools to assist with drafting of legislation
- Semantic web pages and ontologies – the embedding of intelligence in web pages or textual documents
- The use of expert systems, artificial or machine intelligence to assist with previously exclusively manual tasks – such as compilation.

3.4. *Main Trends and Influences Identified*

The main trends and influences identified during the course of the study are:

- The organizational or institutional framework for each office has a critical influence on the direction taken, the nature of overall developments and the progress (if any) towards automatic compilation.

This influence appears to be even more important than the point in time at which individual offices examined the issues or when they put in place projects to change the way they provide legislation.

Key organization types that make up the institutional frameworks in various jurisdictions were identified and these include:

- departments and/or Ministers, i.e. those who require bills to be drafted and who provide drafting instructions (or who may even draft bills or amendments themselves.)
- drafting offices. This may or may not include an editorial and/or compilation, or other updating function.

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- agencies that support the drafting office, e.g. those that provide legal advice services, legal research facilities or a law library function. Some agencies have extended this to include specialist technical and IT support and development functions.
 - Offices of the Parliament (or legislature), e.g. Clerk of the House etc
 - printing or publishing functions, e.g. the Government printer or similar agency. This may include retail operations, records and archive management functions or more recently web based “government on-line” functions as well.
- Technology that provides for greater flexibility or which maximizes the choices users of legislation have especially as regards access channels are preferred.

Although there is a high level of comfort with longer standing technologies (e.g. SGML) many offices are showing a willingness to at least consider, if not actively embrace, new technologies such as XML. The main driver for moves towards XML is the improved flexibility it provides for alternative methods of access – i.e. print, internet or other delivery channels. It also appears to be a platform upon which more sophisticated services can be developed because of the ability to associate intelligence with the tags that “mark up” the basic legislative text.

- Automatic compilation and XML are inextricably linked in terms of current developments. Some commentators suggest that the link is even more fundamental in that it is the demise of paper and the rise of the electronic that has given most impetus to, and creates the very real prospect of fully automatic compilation. XML is simply one of many tools, albeit currently a dominant tool, that makes this transition possible.

Essentially it is the flexibility and “intelligence” of XML that makes rapid or automatic compilation possible. In particular the ability to define tags or a markup specific to a document and where practical to standardize these across many documents, and in turn to create “intelligence stores” such as DTD’s or Schema’s all make useful contributions to automatic compilation. The reason for this is that if automatic compilation is to be achieved the documents to be compiled, say the amendment into the original text, must have the ability to store the relevant intelligence that indicates where and how and with what modifications the original text should be modified by the amending text and possibly, vice versa.

The term automatic implies that there may be a degree of machine intelligence used to carry out such compilation – XML is simply a language that can be used to set out the necessary instructions that are required for a computer, rather than a person, to carry out the act of compilation.

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Other means can be used to carry out automatic compilation – SGML or EDI could be seen as it predecessors. However XML is a means that is becoming reasonably universal and one that was created with the internet, multi channel electronic publishing and sophisticated service delivery specifically in mind.

- A growing body of relevant XML based tools is becoming available with some having at least a 12 to 18 month track record of commercial (not necessarily legislation drafting or compiling) use. E.g. SoftQuad's XMetal, the Arbortext products, Advent 3B2 and SoftwareAG's Tamino (XML Database) product.
- The overall picture as regards the offices surveyed suggests that there is a three-stage progression towards increasingly sophisticated legislation production, delivery and access regimes. These will be characterized by features such as freely available point in time access, advanced searching capability, instantaneous availability by the application of rapid or automatic compilation especially during the legislation process, diminished importance of traditional print based intermediaries, and provision to consumers of a wide variety of legislation access channels. The three stages in this progression are:
 - Stage 1 – This was the movement from traditional paper based publishing to electronic publishing (CD-ROM and later on the internet). Nearly all offices have achieved this stage. The main consequence of this stage is to improve access to legislation by lowering the cost to users and shortening timeframes for availability of legislation.
 - Stage 2 – This is the development of internet publishing and the beginning of "improved access" whereby flexibility, in terms of output media, and immediacy or a focus on being as up to date as possible is achieved. Generally this involves a reasonably thorough examination of processes and systems as well as a comprehensive overview of the organisational framework and consideration of technologies such as SGML and XML, as well as rapid or automatic compilation. The offices that formed the main focus of this study are mostly at this stage.
 - Stage 3 – This will be the active implementation of more sophisticated delivery and access regimes. No offices were at this stage although the more advanced offices recognize it as the logical next step and are actively taking steps to progress towards this stage. Within the next 12 months several offices can reasonably be expected to be at this stage. Our research indicates

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that the legislation access services these offices will provide will be substantially different from what is considered the norm at present.

4 Conclusions

Five key conclusions can be drawn as a result of the research. These are:

- Rapid compilation of statutes, probably leading to some form of automatic or machine-assisted compilation is a very likely (short term) future scenario for several drafting or compiling offices. In this context reference can readily be made to Tasmania, Ottawa, Ontario, parts of the United States Federal and state systems and some European jurisdictions.
- There is very rapid movement towards XML and it is reasonable to assume that this technology will be mainstream within the expected duration of the Access Project.
- Significant advances have been made by some of the offices contacted in recent months. Most noticeable is the example of Ottawa and the adoption of a new version of SIM and the willingness of Ontario to consider XML based authoring tools. The experience of the SPO in the UK and parts of the US legislature are also relevant and should not be discounted.
- Those offices that are most advanced appear to have taken a large amount of responsibility, especially as regards technology developments, in house. At least two of the leading organisations spoken to appeared to have substantial in-house technology expertise, (e.g. Ottawa and Ontario). These offices appear to have been fortunate enough to obtain the funding necessary to invest in this area.
- Improved access was seen as an ongoing process and not something to be viewed as a project with a defined end point.

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5 Appendices

Appendix 1 - Copy of Introductory E-mail

Appendix 2 - List of Contacts Made

Appendix 3 – Examples of Relevant References Used

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Appendix 1 Sample of Introductory E-mail

Dear

We met in the offices of the NZ PCO about one year ago when you were visiting this part of the world. We have been meaning to catch up for some time to have an exchange about developments. We recall some of the information you provided about the e-laws project especially the separation of consolidation and updating. We would be interested to know whether there have been developments on this topic.

In the last week we have been engaged by the New Zealand Parliamentary Counsel Office to carry out a research study about Automatic Compilation and related technology issues. We are making contact with about 8 to 10 legislation drafting and law compiling offices around the world on this topic.

The following outlines the nature of the research study we are undertaking. We would be grateful if you or one of your people could contact us as soon as possible to discuss the study and to establish the most useful way to exchange relevant information.

The New Zealand Parliamentary Counsel Office (PCO) is currently undertaking a project to improve public access to legislation. The project has reached the stage where 11 work streams have been identified and work has begun on several key elements such as an analysis of the structure of NZ legislation and user requirements for a legislation authoring tool. The objectives of the project and the 11 streams of work that make up the Access Project are attached to this e-mail. My firm Business Technology Consulting (BTC) has been engaged by the NZ PCO to assist with a research project entitled "A Study of Automatic Compilation and Related Technology Issues". BTC consists of two consultants, Ian Sliper and Geoff Steel. We have assisted the PCO with the Access Project over the last two years. This included preparing the Request for Expressions of Interest document, development of a business case to Government and managing a Request for Implementation Partner process. Background information is available at www.pco.parliament.govt.nz

One of the key considerations in this work is to ensure a degree of "future proofing" for decisions that are proposed to be taken in the next few months, in what is acknowledged to be a rapidly evolving environment. In particular the PCO wants to ensure the issue of automatic compilation has been adequately researched and that decisions are made that are consistent with current and proposed developments in comparable legislation drafting offices.

Automatic compilation is recognized as a possible longer term goal for the Access Project. The purpose of the study is to provide sufficient information on developments relating to automatic compilation and related technology issues to allow the PCO to make informed decisions as regards technology, systems and related processes. The PCO has therefore asked us to carry out research as regards developments in comparable legislation drafting offices.

The main deliverable for the research study will be a report that sets out for each relevant drafting office the following:

- a brief overview of current processes and future directions and where necessary brief commentary on the relevant organisations and the extent of their involvement in various parts of the process.
- identifies the key technology and other issues relevant to automatic compilation (as opposed to manual or computer assisted compilation).

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- briefly documents the current situation as regards legislation drafting and compilation in selected comparable and relevant jurisdictions and their views and perspectives on automatic compilation
- identifies the key issues, with regard to compilation, associated processes and relevant technologies, that the PCO should take into account when considering future directions for the Access Project.

An initial response by return e-mail indicating if you are willing to share some of your experiences over recent years might be a good way to start. It is likely that we would follow this up with further more specific e-mail exchanges, a telephone conversation/ conference call at a mutually agreeable time or an exchange of relevant documentation where appropriate.

We are looking to establish contact as soon as possible as we hope to have some initial thoughts gathered by the end of July. For this reason we would welcome a opportunity to discuss this email with you as soon as possible.

Hope to hear from you soon. Our contact details are listed below.

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Appendix 2 List of Contacts Made

Jurisdiction	Website Visit	Contact	E-mail Address
Primary Contacts			
United Kingdom	http://www.hmsso.gov.uk/legislation/lexhome.htm http://www.lcd.gov.uk/ http://www.lcd.gov.uk/lawdatfr.htm	Tony Hopkins	Tony.Hopkins@lcdhq.gsi.gov.uk
Ireland	http://www.irlgov.ie/ag/parliamentarycouncil/index.html http://193.120.124.98/	Kieran Mooney	Kieran_Mooney@ag.irlgov.ie
United States - Federal	http://www.house.gov/ http://thomas.loc.gov/	John Miller	John.Miller@mail.house.gov
Canada - Ontario	http://www.e-laws.gov.on.ca/	Marilyn Leitman	Marilyn.Leitman@jus.gov.on.ca
Canada - Ottawa	http://laws.justice.gc.ca/en/index.html	Ed Hicks	ehicks@justice.gc.ca
United States - Michigan	http://www.michiganlegislature.org/	Brian Breneman David Lamb	brian@thebrenemangroup.com dflamb@gw.libofmich.lib.mi.us
RMIT/MDS	http://www.mds.rmit.edu.au/~tja/papers/index.html	Timothy Arnold Moore	tja@mds.rmit.edu.au
Other Agencies Referenced			
Canada - Saskatchewan	http://www.gov.sk.ca/service/publications/ http://www.qp.gov.sk.ca/ http://www.legassembly.sk.ca/legassembly/docs/docs.htm		
Hong Kong	http://www.justice.gov.hk/index.htm		
Singapore	http://www.agc.gov.sg/legis.html http://www.lawnet.com.sg/ http://www.gov.sg/minlaw/hq/		
South Africa	http://www.jutastat.com/		
Papua New Guinea	http://www.niimedia.com.au/pnginlaw/		
United States - California	http://www.leginfo.ca.gov/legcnsl.html		
Netherlands / Europe	http://cwis.kub.nl/~frw/people/voermans/wimcv.htm http://www.minjust.nl:8080/	Wim Voermans	Voermans@kub.nl
LegalXML	http://www.legalxml.org	Gary Pointdexter	gpointdexter@kpmg.com
"Legislative Drafting" by Garth Thornton			

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Appendix 3 Examples of Relevant References Used

Automatic Generation of Amendment Legislation.

Timothy Arnold-Moore

<http://www.acm.org/pubs/citations/proceedings/ai/261618/p56-arnold-moore/>

For other articles by Tim Arnold Moore including a copy of his thesis "Information systems for legislation" refer to: <http://www.mds.rmit.edu.au/~tja/papers/index.html>

Formalization of Legislative Documents Based on a Functional Model.

Daniela Tiscornia, Fabrizio Turchi:

Electronic Edition ([link](#))

Automated Drafting of Self-Explaining Documents.

Karl Branting, James C. Lester, Charles. B Callaway

Electronic Edition ([link](#))

The Other Formalization of Law: SGML Modelling and Tagging

Daniel Poulin, Guy Huard, Alain Lavoie

Electronic Edition ([link](#))

Ontologies in Legal Information Systems: The Need for Explicit Specifications of Domain Conceptualisations.

Trevor J. M. Bench-Capon, Pepijn R. S. Visser

Electronic Edition ([link](#))

Knowledge for Automated Legal Problem Solving: Theory Versus Practice.

Anja Oskamp, Maaïke Tragter,

Electronic Edition ([link](#))

A Method for the Development of Legal Knowledge Systems.

Pepijn R. S. Visser, Robert W. van Kralingen, Trevor J. M. Bench-Capon:

Electronic Edition ([link](#))

Tools for Automated Legislative Drafting (Abstract).

Nienke den Haan:

Electronic Edition ([link](#))

The Logic of Enactment (abstract).

Lambèr Royakkers, Frank Dignum:

Electronic Edition ([link](#))

A Model for Rule Based Legal Knowledge Representation (Abstract).

Raf van Kuyck, Beatrice Van Buggenhout:

Electronic Edition ([link](#))

Bringing IT Support for Legislative Drafting one Step Further: From Drafting Support to Design Assistance (Abstract).

Wim Voermans, Robert van Kralingen:

Electronic Edition ([link](#))

Automatic support of legislation aiming at an efficient electronic management.

Jos Dumortier, member of research team Centre for law and information technology
Katholieke Universiteit Leuven

<http://iaup.vlir.be/research/P/3H00/project3H000105.htm>

A first goal of this research is an in-depth analysis of the formal - and partly the content bearing - aspects of the Belgian and Flemish legislation. The focus is upon these aspects that are essential

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in an automatic processing of legislation. The purpose of this study is to produce a set of guidelines for drafting legislation including a possible standardization of the formal aspects of legislative texts. In connection with this goal, the second goal of the research is the development of model systems - prototypes - which support the creation of legislation and the automatic analysis of it. This study equally concerns the original texts of the legislation as well as amendments. This project will also study the communicational and organisational aspects of the different players involved, making a possible implementation easier.

Law, Computer Science, and Artificial Intelligence

Ajit Narayanan and Mervyn Bennun

<http://www.intellectbooks.com/authors/narayan/law2.htm>

The interaction between the disciplines of law, computer science and artificial intelligence are attracting increasing attention within the academic and commercial communities, especially in the areas of "intelligent" computer fraud, copyright of software, data protection, representing law on the computer, and legal liability of producers of intelligent and nonintelligent software. The chapters in this volume are representative of the debate and of the central issues. They include material concerning the way that the discipline of law will affect computer science and AI and also how computer science and AI will affect law. The chapters lend support to the hypothesis that in years to come law will have a severe impact on computer science (via data protection and copyright); that computers will have an effect on law (via legal databases and electronic presentation of evidence); that law will impact on AI (via liability of intelligent software writers and codes of conduct); and that AI will have an impact on law (via models of legal reasoning and implementations of various statutes). By grouping the chapters into theory, implications, and applications sections, the authors make an initial attempt to identify separate, but interrelated methodological stances.

Information Technology Support For Legislative Development: Tools For The Legislative Engineer

Andrew Tjay Kwie Lim

A paper submitted for the Research Unit, Faculty of Law, The Australian National University, 11th October, 1993

<http://actg.canberra.edu.au/actag/Expert/dev/legtool/legtool2.html>

Automatically processing amendments to legislation

Timothy Arnold-Moore

International Conference on Artificial Intelligence and Law

Proceedings of the fifth international conference on Artificial intelligence and law May 21 - 24, 1995, College Park United States

<http://www.acm.org/pubs/citations/proceedings/ai/222092/p297-arnold-moore/>

Support for policy makers: formulating legislation with the aid of logical models

T. J. M. Bench-Capon

International Conference on Artificial Intelligence and Law. Proceedings of the fifth international conference on Artificial intelligence and law May 21 - 24, 1995, College Park United States

<http://www.acm.org/pubs/articles/proceedings/ai/41735/p181-bench-capon/p181-bench-capon.pdf>

High quality legislation a precondition for credible government action.

High quality legislation is necessary for the credibility of the legislator in a constitutional democracy. Legislation by which the citizen is expected to abide must be transparent, accessible and consistent. These principles are generally accepted but are not always automatically observed in practice." This was stated today by the Minister of Justice, Winnie Sorgdrager, in her opening speech to the Conference on the Quality of European and National Legislation.

http://www.minjust.nl:8080/C_ACTUAL/PERSBER/PB0094.HTM

Connected to the Law: Tasmanian Legislation Using EnAct

Timothy Arnold-Moore, Jane Clemes ISB, Dept of Premier & Cabinet, Tasmania

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<http://elj.warwick.ac.uk/jilt/00-1/arnold.html#4>

Legimatics in Europe: the LEDA-project

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In this paper recent theoretical and practical developments in legimatics, i.e. the field that concerns the study of and the research into the possibilities of informatics for legislative drafting, are discussed. It is argued that legimatics warrant a different approach than traditional legal informatics. Legislative reasoning and legal reasoning differ substantially, and therefore the approach in building knowledge based or expert systems that will assist legislators needs to be different. In this article special attention is paid to the so-called drafting support systems. In the Netherlands recently two IT-drafting-support systems have been developed (LEDA, developed for the Ministry of Justice and OBW developed for the Ministry of Education, Culture and Science). This article elaborates on the LEDA-system in particular. In discussing the development, the structure and particular functionalities of the LEDA-system some general characteristics and possibilities of legislative IT-drafting-support systems will be illustrated.

<http://www.qub.ac.uk/mgt/alans/abst3.htm>

Computer-assisted legislative drafting in the Netherlands: the LEDA-system,

in: P. Pagano, et al. (eds.) Conference proceedings Drafting in the Global Village, 16-17 November 2000, Canadian Institute for the Administration of Justice, Ottawa, Canada, 10 p.

Automated Analysis of Natural Language Texts

Sergei Ananyan, Alexander Kharlamov

<http://www.megaputer.com/tech/wp/tm.php3>

XML for legislation drafting, management and Web delivery—How structured document representation facilitates automatic processing

Timothy Arnold-Moore

<http://www.mds.rmit.edu.au/~tja/papers/wise00.pdf>

The Semantic Web

A new form of Web content that is meaningful to computers will unleash a revolution of new possibilities

By Tim Berners-Lee, James Hendler And Ora Lassila

<http://www.sciam.com/2001/0501issue/0501berners-lee.html>

Behind the scenes, XML sizzles

Judith Lamont of Zentek

The Gartner Group projects that 80% of B2B Web activity will be XML-based by 2003. A survey by IDG Research Services Group predicts that XML technology budgets will increase by 86% over last year.

http://www.kmworld.com/publications/magazine/index.cfm?action=readarticle&article_id=1007&publication_id=1

Non-partisan publisher favors XML-based system

Delivering more news to its customers faster is just one of the benefits Congressional Quarterly has reaped from its new XML-based content management system. And those customers can be influential people--95% of the members of Congress are said to be CQ readers.

The nonpartisan news and legislative tracking service, based in Washington, D.C., provides information on government, politics and public policy through many print and online publications. Implemented by Thomas Technology Solutions, the new content management system has streamlined CQ's editorial and production processes, speeding time to print and to the Web. It contains relational data sets that allow CQ to maintain and publish information relating to Congressional members, committees, schedules, events and floor votes, as well as to track the progress of legislation.

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http://www.kmworld.com/publications/magazine/index.cfm?action=readarticle&article_id=934&publication_id=1

For other XML articles refer to:

<http://www.kmworld.com/search/index.cfm?action=searching&maxrows=25&collection=articles&criteria=XML>

SIM Legislation Management Solution

<http://www.simdb.com/simdb%20content%2FSolutions%2FLegislation>