LegalXML eContracts Resource Catalog

The OASIS Legal XML Member Section eContracts Technical Committee formed a Resources Subcommittee to collect and report on information useful to its membership in its standards effort. The scope of resources that are listed below include studies, systems, and schemas which may be relevant to the drafting of standards for legal contracts.

Inclusion on this non-normative list is **not** an endorsement. However, recognizing sensitivities with regard to the use of OASIS resources, citations made to eContracts members' material are annotated as such.

PLEASE CONTRIBUTE WHAT YOU CAN !!!!! THANKS.

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1. Contract Structure Resources

Title	Year	Author	Citation
Scenario - Contract Information Requirements	2003	John McClure(*)	http://www.oasis-open.org/apps/org/workgroup/legalxml-econtracts/download.php/2037/dataconsortium.html

This resource provides markup that would be used to model leases and purchase contracts. However, these contain many of the features of complicated contractual relationships in other domains. This includes lists of events relevant to the contract such as **AcceptanceFailureTerm**, **SurrenderTerm** as well as reports of things that should occur later such as **ScheduledPrePayment** and **ScheduledMaintenance**. An object-oriented inheritance approach is used. That makes these concepts applicable to other forms of contract. For example, there is a **PerformanceTerm** which covers many types of events. Each **PerformanceTerm** can have associated **ScheduledEvents** and **PerformanceFailureTerms**. The latter give the consequences for failure to perform.

These are made more specific in derived types. For example, a **BillingEvent** includes scheduled discounts and escalations. The **PerformanceFailureTerms** correspond to "tolerably unacceptable state" in [Dask00]--see below. Lists of events that occurred previously is discussed in [Bou02]. More specific to the real estate events are derived types such as **EscrowFailureTerm**, **MaintenanceFailureTerm**, and **InstallationFailureTerm**.

This markup includes metadata for the contract such as that from the Dublin Core, "Front and Back Matter." Also, there is markup for formatting such as **Page**, **Paragraph**, and **Caption**.

Title	Year	Author	Citation
Using the DCN To Represent a Contract	2000	McClure, J., Leff, L., Greenwood, D. (*)	http://ecitizen.mit.edu/ecap2.html Massachusetts Institute of Technology Electronic Commerce Architecture, Program Document Two

Uses the Data Consortium Namespace to mark up a purchase order. The Data Consortium Name space was used to record anticipated events and records of events that each party thinks has occurred. This provides a way of determining areas where there is a factual dispute. This is analogous to the Contract Fulfillment Protocol described in [Bou02].

Title	Year	Author	Citation
Business Contracts for B2B		Goodchild, A., Herring, C., Milosevic, Z.(*)	in The Ninth International Conference on Information Systems Development href="http://staff.dstc.edu.au/sachink/files/first_submission_to_ISDO.pdf

Goodchild, et. al. provides markup for electronic contracts. It uses an Event-Condition-Action paradigm which includes states, actions, and triggers. Their example models the deadline to send a purchase order after receipt of a price quote, and when notice is to be paid. They also identify required parts for the contract:

1. A preamble identifying the parties involved and the nature of the consideration
2. Clause elements and groups
3. Approval section
4. Digital Signatures
5. Contract enforcement rules.

Title	Year	Author	Citation
A Standard for Offer and Acceptance and Contract Standard Update	2000	Leff, L.(*)	Legal XML Document: UN_100XX_2000_04_22 and Legal XML Document: UN_100XX_2000_08_22

These are two articles on contract markup posted to the Legal XML Contract Workgroup as "Unofficial Notes." They include markup for basic contract information. This included a list of parties involved including third party beneficiaries and service providers. Other markup included choice of law, choice of venue, and the deadline for acceptance. Most interestingly, it modeled obligations as a series of conditional

clauses, where a condition could be one party's performance--B will pay A when A delivers the item or an external event--B will supply S if it is not raining.

The second unofficial note on this proposals discusses a mechanism for specifying the handling of exceptions such as "force majeure" and commercial unfeasibility. This is modelled after the exception mechanism found in languages such as C++ and Java. It also included "intervals" that modelled activities that started within a certain time period of other events. See also [Mar00].

2. Contract Drafting Resources

Title	Year	Author	Citation
A Constraint-Driven System for Contract Assembly	1995	Daskalopulu, A., Sergot, M.	*The Fifth International Conference on Artificial Intelligence and Law: Proceedings of the Conference*, May 21-24, 1995, College Park Maryland, Association for Computing Machinery, New York City, 1995, 62-70

They developed a contract assembly system and graphical user interface "at the macro-level" where clauses are "assembled" to form engineering contracts. Their software works at various levels of detail (sections, sub-sections, paragraphs, and sub-paragraphs, This reports on work with large scale engineering contracts, using the model-form contracts of the Institute of Electrical Engineers. The most interesting part of the system is the constraint between parts of the contract. Three types are defined:

1. Constraints between different possible parts of the document. If one clause is included, then a constraint could enforce the requirement that another type of clause be included or not included if it were incompatible.
2. There could be constraints between data items. For example, one parameter *p* could be the length of time for a suspension of payment. *q* might be the length of time for suspension of work. A constraint might specify that *q* would be longer than *p*.
3. And lastly, certain parameters could require the presence of certain clauses. For example, if the parties are in different countries, then the currency for payment must be specified.

Title	Year	Author	Citation

Contract Editor		Ponton Consulting	http://www.ponton-consulting.de/

Ponton Consulting provides a contract editor for trial and non-commercial use at their web site www.ponton-consulting.de Here are the steps to use it. If desired, click on "English." Then, click on to "Products" and "Ponton X/E". The sample clauses used in this system are the property of their project partners and their system includes parameterized clauses.

Their document shows how their contract wizard could be used to select clauses from a hierarchical tree to create a contract for the sale of a car. And their system will detect problems such as inappropriate clause types or required clauses that are not present in the contract.

Title	Year	Author	Citation
Contract Editor		SpeedLegal (*)	http://www.speedlegal.com/

A test drive of several contract drafting tools on its web site. They sell specialized services for contracts in domains such as leasing, intellectual property assignment, and "memorandum of understanding." Each of these ask the user questions. One example question is whether the terms should be drafted to favor the leaser or leasee. It then drafts a proposed document, providing XML for it.

Note that Speed Legal also sells their "Smart Precedent" software that users can use to create automated drafting systems. These software produces several formats including XML and RTF.

Their document shows how their contract wizard could be used to select clauses from a hierarchical tree to create a contract for the sale of a car. And their system will detect problems such as inappropriate clause types or required clauses that are not present in the contract.

3. Contract Workflow Resources

Title	Year	Author	Citation
Cross-Organizational Workflow: CrossFlow Esprit E/28635	1999	Koetsier, M., Grefen, P., and Vonk, J., eds.	http://www.zurich.ibm.com/csc/ebizz/oldprojects/crossflow.html and http://www.crossflow.org/

Esprit funded a project to develop contracts and examine the organization of work flows between organizations, using the contract to manage cooperation and specify quality of service. The crossflow web site includes a requirements analysis for a logistics vendor, TNT Post Group, and an insurer. More importantly, they include XML for contracts specified as a DTD. Some interesting features of their markup includes:

1. parameterized markup for clauses
2. Maintenance of partially-filled in clauses allowing for several phases in creation and negotiation of the contract
3. specification of work flows, which may overlap other standards such as the WorkFlow Management Coalition

Title	Year	Author	Citation
On Expressing and Monitoring Behavior in Contracts	2002	Milosevic, Z., Dromey, R. G.,	in Sixth IEEE International Enterprise Distributed Object Computing 2002, Lausanne, Switzerland, September 17-20, IEEE Press, 2002. (http://staff.dstc.edu.au/sachink/files/milosevic_monitoring.pdf)

Another modeling technique for contract terms is behavioral trees.
These clauses might include

1. The "purchaser shall present supplier with a purchase order within seven days after the receipt of a price list."
2. The goods will be available within one day of the purchase order's receipt.
3. The purchaser shall pay the invoice within seven days.

Behavior trees would allow one to determine that a relationship is missing from the contract. An example discussed in the paper is discovering that the following situation was not accounted for in a contract: the invoice shall be issued after the goods are available.

Title	Year	Author	Citation
Contracts in the Virtual Enterprise		European Union	http://elegal.vtt.fi/

The European Union funded a project to research the feasibility and to implement software for contracts in the "virtual enterprise." Their work includes sample contract clauses, a UML model of a contract, a virtual negotiation model, and the use of electronic signature technology to speed the time to contract. They have also specified a contract wizard. This specification discusses how XML would be used. And it has a detailed design of Java classes and methods that it would use.

4. Contract Management Resources

Title	Year	Author	Citation
Contracts in the Construction Industry	2000	Internation Alliance For Interoperability	http://www.iai-na.org/aecxml/contract.php

A draft sample instance document for a contract that concerns a construction project. It uses an XML namespace called "pcXML". It includes elements such as contractNumber, contractDescription,contractDate, buyerExecutionDate, sellerExecutionDate, project, projectNumber, originalContractSum, retainagePolicy, scheduledValues. Its participants element allows one to identify these roles: Buyer, Seller, and Certifier.

However, it is its inclusion of the element "changeOrders" which cause this resource to be catalogued as a contract management item.

5. Contract Litigation Resources

Title	Year	Author	Citation
Interoperability from Electronic Commerce to Litigation Using XML Rules	2003	Han, Z. Z., et. al.	http://www.wiu.edu/users/mflll/rules/Interop3.doc

This resource reports on the relationship between electronic commerce, contracts, and litigation. To understand this context, realize ebXML's (Business Process Specification) XML standard specifies the exchange of documents between multiple business partners. For example, the exchange of a purchase order and purchase order acknowledgment is a simple "binary transaction" involving two parties and one complete exchange. They may be viewed as forming a legal contract. It also enables other activities between the parties such as the invoice and shipping advice. And in a multi-party collaboration, it enables the involvement of customs authorities, insurers, international shippers, etc. It also shows how these standard XML exchanges can be mapped by expert system rules into a contract. That contract was drafted in the XML suggested to the old Legal XML Contracts Workgroup.

An interesting workflow is the court. Should the contract give rise to

a dispute, then various documents are prepared by the participants and the judge. There are constraints between one document and another. For example, a summary judgment could not be given by the judge until the plaintiff files certain affidavits, a complaint, and a "request for summary judgment." This intermeshing of workflows is explored in detail.

7. Business Rules

Title	Year	Author	Citation
Automated Negotiation from Declarative Contract Descriptions	2001	Reeves, D. M., Wellman, M. P., Grosof, B. N.	in *Fifth International Conference on Autonomous Agents*, Montreal, Canada, May 2001 (see http://ai.eecs.umich.edu/people/dreeves/research.html)

D. M. Reeves modelled contract formation and auction arrangements using the Business Rules paradigm. Their work includes rule-based specification of different kinds of auctions such as chronological match, Dutch-type, and Vickrey style auctions. Their work also maps the results of these auctions into contracts and parameterized contracts, where the parameter space can be input to the auction. This allows reasoning about the types of auctions needed to complete the contracts.

Title	Year	Author	Citation
Diplomat: Compiling Prioritized Default Rules into Ordinary Logic Programs, for E-Commerce Applications	1999	Grosof, B. N.	IBM Research Report RC 21473 (96901) (Many of Dr. Grosof's articles on this theme can be found at http://domino.watson.ibm.com/libraryCyberDig.nsf/home)

Common Business Rules, developed by B. Grosof, provides a way of expressing possibly conflicting rules as logic programs. Dr.

Grosof's contribution is algorithms for identifying conflicts between rules, and representing priorities of rules. Examples include computing a discount rate based upon a company's payment history, purchasing history, and whether they choose to join a loyalty club. These rules might conflict for certain customers. Priority rules would specify which rules override others. From these, the system can compute the discount for a particular customer. More importantly, they can determine if there are any possible conflicts.

Title	Year	Author	Citation
The Rule Markup Initiative,	2001		http://www.dfki.uni-kl.de/ruleml

This group is looking at markup for rules, for example in exchange between different artificial intelligence programs, and their home page provides many valuable links.

8. Modeling for Markup and a Downstream Application

Several reports on techniques for modeling contracts provide requirements and techniques for representing and reasoning about contracts. These provide good inspiration and ideas for the XML markup that this Technical Committee plans.

Title	Year	Author	Citation
Towards Formal Modeling of e-Contracts		Marjanovic, O. and Milosevic, Z.	http://staff.dstc.edu.au/sachink/files/FormalModelingOfEcontracts-by-OMarjanovic_and_ZMilosevic.doc

An important task is determining whether contracts clauses conflict, both within a contract and between contracts. For this purpose, one must know what obligations and prohibitions might be in a contract and the times to which they apply. For a simple example, an employment contract might specify that a person could not work for a competing company for a year after leaving. This could be checked against the start date of an employment contract with the competing company.

This paper by the Distributed Software Technology Center in Australia lists the types of information that should be captured in order to do this. He also explains the relationship between how this can be done and temporal and deontic logic. Temporal logic and constraints include modeling of

- relative time, these are used to specify that one item should occur after another. For example, delivery must occur two days after the submission date.
- absolute time, e. g., something must occur before April 12 2003
- periodic time, e. g., a payment should be sent monthly
- duration constraints

If contract information is specified in this way, one can determine whether contract clauses are mutually inconsistent, and whether the requirements from different contracts conflict. They also can be used as inputs in resource allocation algorithms such as those available as part of project management software.

Deontic logic is used extensively in the Artificial Intelligence and Law community. In electronic communities, it specifies role obligations, permissions, and prohibitions. Here, they combine deontic and time obligations together allow modeling of contractual relationships, creating the concept of "role window" so that one can understand how the relationships and responsibilities interact for any interval of time. [Bou02] also modeled contracts in this fashion using normative statements such as Obligation, Permission, or Prohibition. There were two SOAP protocols implemented. One is a Contract Negotiation Protocol for forming the contract. The other is a Contract Fulfillment Protocol. The latter keeps track of the obligations, whether each party believes one of the obligations is violated, and coordinates this via the ebXML Business Process Specification.

9. Contract Formation and the Exchange of Contracts

Title	Year	Author	Citation
Modeling Legal Contracts as Process	2000	Dakalopulu, A.	*Proceedings of the Eleventh International Conference and Workshop on Database and Expert Systems Applications* IEEE CS Press, pages 1074 - 1079

A contract can be modelled as a state diagram. Some of these states represent the normal operation of the contract. For example, in a contract for the sale of goods, S may send the goods by the agreed-upon time, and B pays for the goods on time. Other states represent the party not fulfilling the expected conditions, but paying a penalty. For example, S might deliver the goods late but accept a

payment minus the agreed-upon liquidated damages. Or B might pay late, but pay the agreed upon interest. These are termed "tolerably unacceptable states." Of not provide for a specific penalty or the party involved as not engaged in that penalty action. These are termed "intolerably unacceptable" states. These are referred to in [Dask02].

Title	Year	Author	Citation
Evidence-Based Electronic Contract Formation Monitoring	(to appear)	Daskalopulu, A., Dimitrakos, T., Maibaum, T.	*The Informs Journal of Group Decision and Negotiation*

This discusses approaches to managing the evidence that might be sent to an arbitrator deciding issues related to a contract. She cites [Dask00], [Kent92], and [Maib93] as predecessor papers for the idea of state diagrams in contract fulfillment.

Title	Year	Author	Citation
Specifying Deontic Behavior in Modal Action Logic	1992	Kent, S. J. H., Maibaum, T. S. E. & Quirk, W. J.	Forest Deliverable Report WP1.R2.

Basic Contract law teaches about offer and acceptance. Other classes of documents exchanged include the "invitation to treat," counter-offers, and an offer to modify an existing contract.

Title	Year	Author	Citation
The Artificial Intelligence Approach to Legal Reasoning	1987	Gardner, A. L.	Bradford Book, Cambridge, Massachusetts, 1987

Dr. Anne Leith Gardner, in her classic book, shows how these and the rules about them are treated by artificial intelligence. They form a state diagram starting from a null state where nothing is happening or pending. As an offer is received, the state is now "offer pending." If there is an "offer-pending" and an "acceptance" arrives by the indicated deadline, then the contract moves to the "contract formed" state. Of course, other things could happen. While in the "offer pending" state, one might receive a rejection which moves the state back to the "null" state, so an acceptance document would no longer have an effect.

Title	Year	Author	Citation
Legal Aspects of Electronic		Gisler, M., Stanoevska-	in *Infrastructures for Dynamic Business-to-Business Service*

Contracts	2000	Slabeva, K., Greunz, M.	*Outsourcing (IDSO '00)*, Stockholm, June 5-6, 2000.

This models this using Secure Contract Containers. This contains a content section which would be the XML markup for the contract. The SeCo container contains electronic signatures and X509 certificates. More importantly, it contains a log describing the historical evolution of the contract. This includes information on various documents that would constitute an offer or acceptance. But the SeCo container might also have related documents such as shipping receipts.

Title	Year	Author	Citation
Integrated Contract Management	2002	Boulmakoul, A., Salle, M.	*Proceedings of the Ninth Workshop of the HP OpenView University Association*, http://www.hpovua.org/PUBLICATIONS/PROCEEDINGS/9_HPOVUAWS/

Some Themes

An important issue is keeping track of the time order of events, and how events depend upon previous ones. For example, XML markup might specify that one action is required or permissable after the other party did things on time. "On time" for the second action is defined in terms of the completion time of the first. XML markup in [Good99], [Leff00a], [McCl00], and [McCl03] provides ways to express these concepts in a contract. Also, see the modelling in [Mar00], [Bou02], and [Mil02]. Some proposals keep track of related documents or each parties view of what has occurred. This would allow the resolution of disputes. See [McCl00] [McCl03], and [Gis00]. Many of the reports of modeling activities in the contract space use forms of state tables. See [Dask00], [Dask02], [Gard87].

And, lastly, parameterization of contracts and contract clauses has shown up in several contract drafting systems such as [Dask95], [Reev01] and cited in [WP3]. Also, see the system by Ponton Consulting described in the first section. This is important in several of our scenarios.

Bibliography

Title	Year	Author	Citation
B2b eContract Handling--A Survey of Projects, Papers, and Standards"		Angelov, S., Grefen, P.	http://citeseer.nj.nec.com/478312.html

This is an excellent bibliography