

Requirements for technical specification

OASIS Legal XML eContracts TC

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1 Introduction

1.1 Purpose of this document

The mission of the TC is to provide a standard for XML markup that should enable “the efficient creation, maintenance, management, exchange and publication of contract documents and contract terms”.

This mission statement provides a broad scope for the TC's work but does not define specific problems to be addressed or why the use of XML markup or a standard may be beneficial. If the TC is to be able to develop a specification that will be useful, it is necessary to identify the real problems that occur in relation to contract transactions and a practical specification that is based on an understanding of the way relevant transactions are carried out and the needs of relevant users.

This document identifies the business problems relating to the preparation and management of various kinds of contracts, the persons affected by those problems and the business needs of those persons to overcome those problems. Within that framework, it defines the functional characteristics an XML application must have to meet those needs.

Those requirements will enable the TC to design a technical specification to satisfy the identified requirements.

It is expected that these requirements will continue to evolve as new insights are gained and as market and technological conditions change.

1.2 Revision history

Document versions are listed in the table in reverse chronological order.

Date/version	Description	Author
Draft 0.05 9/5/2005	Incorporated minor corrections proposed at TC telephone conference on 4 May 2005, other minor corrections and added new scope assessment to section 6.3.4 based on contribution from Daniel Greenwood.	Peter Meyer
Draft 0.04 20/4/2005	Added further contributions from Dr Leff, Dr Milosevic, Dave Marvit & Jason Harrop. Made extensive revisions to the text.	Peter Meyer
Draft 0.03 23/12/2004	Editorial changes following suggestions by Dr Milosevic.	Peter Meyer
Draft 0.02 21/12/2004	Extensive revisions after TC comments on first draft, including contributions from Rolly Chambers, Dr Leff, Dr Milosevic and Jason Harrop.	Peter Meyer

Date/version	Description	Author
Draft 0.01 5/10/2004	Initial draft after San Francisco face to face meeting with background information, vision statement and outline of requirements topics.	Peter Meyer

2 Interpretation

2.1 Definitions

In this document:

assent to a contract means the manifestation by a party that it wishes to be bound by the contract. Assent may be signified by a wide range of conduct or actions and is not limited to hand written or electronic signatures.

authoritative contract document means the document or documents adopted by the parties as the authoritative record of the terms of their contract. This document is also the document that the parties would use to prove the terms of their contract to a court or other arbitral tribunal.

contract means an agreement between parties that is intended to be legally enforceable. A contract may be oral, partly oral and partly written or wholly recorded in writing. The terms of a contract may be contained in many contract documents.

contract document means a document that records some or all of the draft or agreed contract terms. Contract terms are traditionally expressed in a natural language but it is assumed that some or all the terms of a contract could be expressed in a deontic contract language. In these requirements, contract terms are assumed to be expressed in natural language unless otherwise stated.

contract metadata means information about a contract, particular contract terms or embedded data values that is not part of the contract narrative.

contract narrative or ***narrative*** refers to the terms of a contract expressed in natural language.

deontic contract language means a language that can express the rights and obligations of parties to a contract in a form that can be parsed by software applications and processed with other data to determine state information about matters governed by the contract.

document includes information in printed (hard copy) or electronic form.

embedded data value means a piece of information such as a product or service description, date, name, address, quantity or monetary amount that is embedded in the natural language expression of the contract terms.

generic structural markup language defines an ordered hierarchy of natural language components of a document such as clauses and paragraphs in a way that enables processing applications to determine that a marked up component belongs to a particular genus such as a clause, paragraph or list item. Such a language does not usually, on its own, define anything about the (legal) function of a particular marked up object. For example, in a contract document, the generic structural markup would not differentiate between a payments clause or a warranties clause. Generic structural markup is commonly accompanied by metadata and embedded data value markup that may provide information about the function of particular objects.

machine readable information in a contract document refers to information about contract rights, obligations or states, that can be extracted from the document by a computer system. It includes information represented in deontic contract language, contract metadata and embedded data values. It does not refer to the computer readable characters in the text unless the meaning of that text can be determined by the computer system. For example, a monetary amount that can be read from the text is not machine readable information unless the system can determine useful information about the statement of that amount in the contract such as who must pay it, to whom it must be paid, at what time is it to be paid or for what purpose is it paid.

natural language includes the mode of expression of contract narrative as it is commonly written by lawyers.

precedent contract means a document that is used by the drafter of a new contract document as a starting point or template to assist in creating that new contract document.

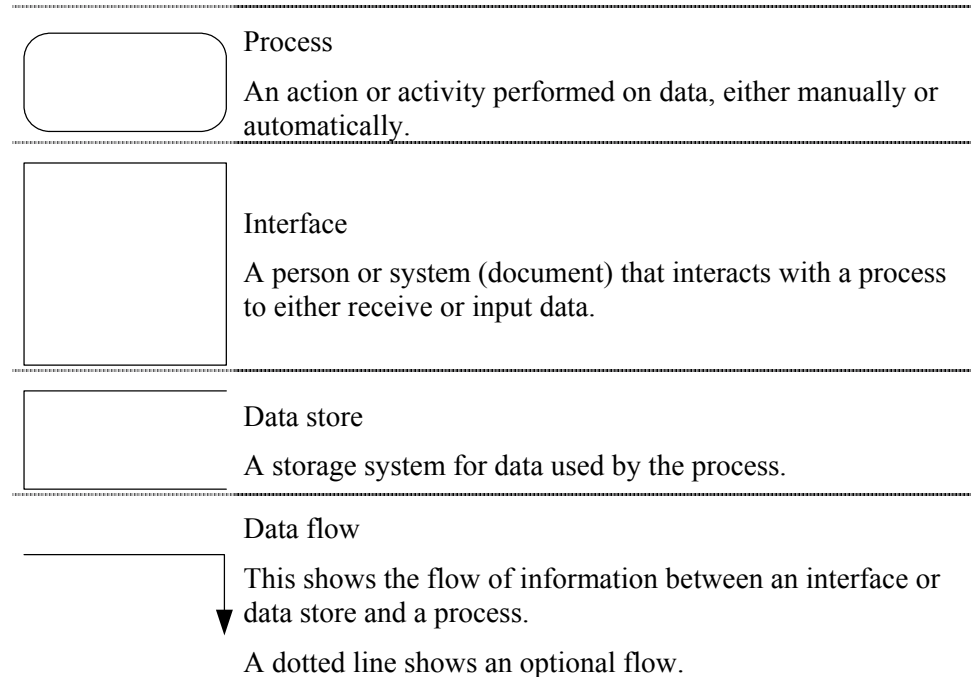
rendition means the output of a transformation or styling process by which XML documents conforming to a particular schema are rendered with human readable layout in a particular file format such as RTF, PDF, HTML or are displayed by a computer using a particular kind of software.

TC means the OASIS Legal XML eContracts Technical Committee.

2.2 Use of data flow diagrams

Data flow diagrams are used to identify the important processes, data flows and interfaces for each type of contract transaction considered in these requirements. They provide a generalised view of common situations for analytical purposes.

The symbols used in the data flow diagrams are explained in the following table.



2.3 Horizontal vs vertical focus

The TC is endeavouring to develop a specification that meets the needs of a broad community of persons interested in contract documents. It is not attempting to meet the individual needs of a particular industry sector or sectors. Consequently, it does not aim to develop vocabularies that are specific to particular industry sectors.

3 Relevant contract transactions

3.1 Sources of information

In 2003 various TC members contributed scenario documents describing contract transactions and their anticipated needs from the specification. These are available for inspection at in the Technical Committee documents section at http://www.oasis-open.org/committees/documents.php?wg_abbrev=legalxml-econtracts.

In August and September 2004, some TC members prepared use case statements to define in more precise terms the actions undertaken by users in particular contract transactions. These use cases are available with the Technical Committee documents.

The overall framework used in this document is based on the use case analysis undertaken at the face to face meeting of TC members in San Francisco on 19 and 20 September 2004.

3.2 Types of contracts

The following sections define the contract types identified as posing business problems that may be addressed by an XML technical specification.

The TC is concerned only with those contracts that are at least partly evidenced in a document. Wholly oral contracts are outside the scope of the TC's work.

3.3 Contracts with negotiated narrative terms

3.3.1 Case description

This case describes contracts that involve a negotiation over some or all the narrative terms of the contract. By way of example only, it may be necessary to negotiate narrative terms of real estate purchase contracts, joint venture or partnership agreements, shareholder agreements, confidentiality agreements, employment agreements, business finance agreements, construction contracts and software development and licensing contracts, as well as many others.

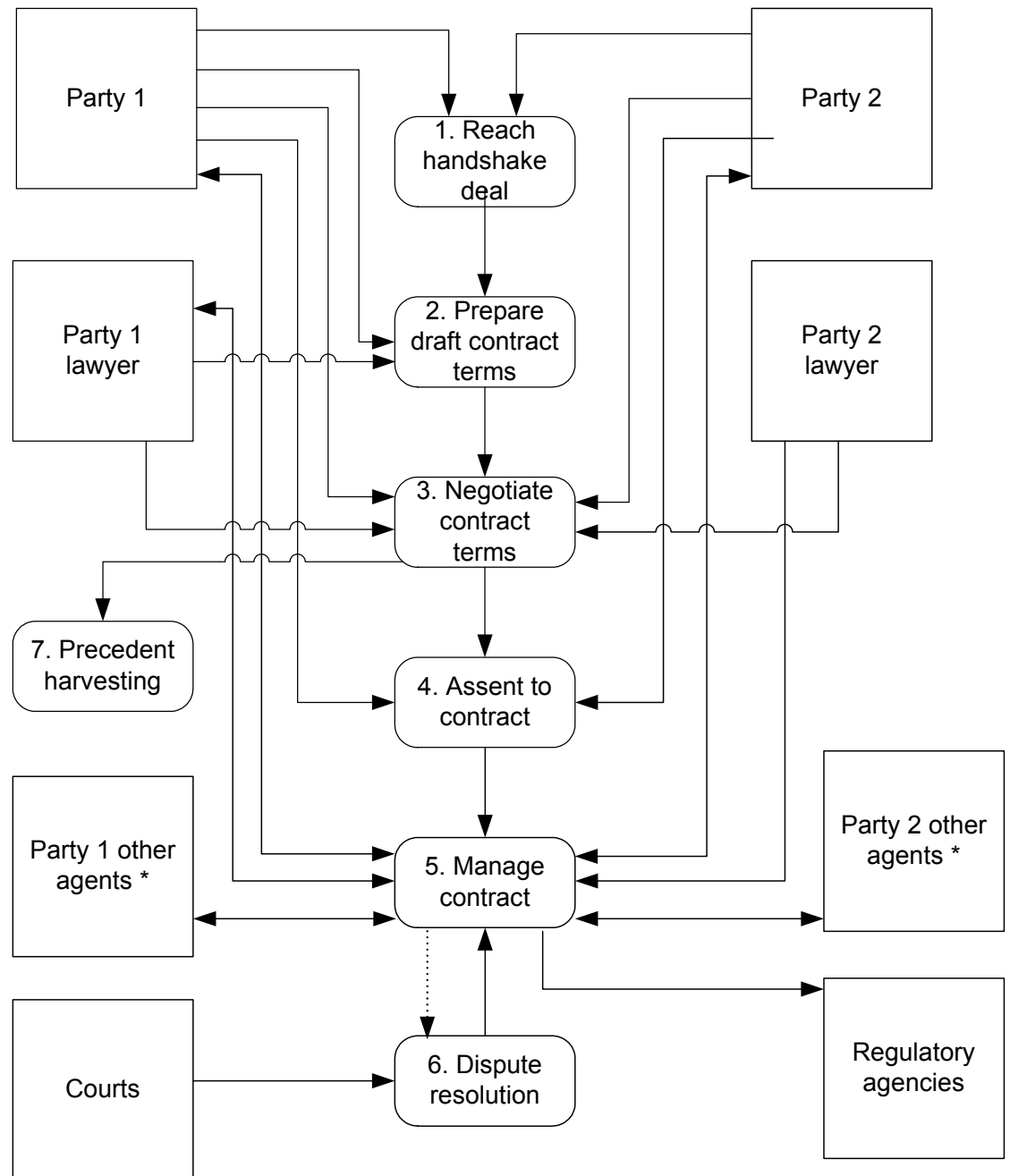
Contracts with negotiated narrative terms are usually, but not exclusively, prepared by lawyers on behalf of their clients. These contracts are the most common contract documents created by law firms and corporate and government legal departments. They may include contracts with negotiated terms where a lawyer or legal dept. has drafted a precedent contract but a non-lawyer, such as a contracts manager, then negotiates the final narrative terms and prepares the final contract document.

In these requirements, this category does not include standard form contracts in which the only matters negotiated are those such as the description of goods, quantity or price.

3.3.2 Negotiated contracts life cycle

The life cycle of contracts with negotiated terms is shown in Figure 1. This figure and those that follow in section 3.3 make no assumption about the use of XML markup or otherwise in the preparation of the contract document. The processes described are generic and quite simplified so as to provide a convenient way to analyse the issues considered relevant to the TC's mission. Many, but not all of the processes shown apply to other to other transaction types discussed in later sections.

Figure 1 Overview of negotiated contracts life cycle



* Other agents of the parties includes persons such as architects, accountants and other consultants etc. assisting with or interested in the transaction.

Explanation of Figure 1 processes

The following numbered items relate to the processes shown in rounded rectangles in the preceding figure.

1-1 Reach handshake deal

During the negotiation of a new transaction it is common for the parties to reach a business agreement or understanding before a contract document is prepared.

In commercial transaction it is common for the parties to prepare a term sheet or heads of agreement document that records the key features of the transaction. Such documents may or may not be legally binding contracts, depending on such factors as the expressed or implicit intention of the parties and the degree of certainty of the recorded terms. Even if a contract exists, the parties may proceed to replace the initial heads of agreement with a formal document that provides a more complete coverage of their agreement.

Term sheets or heads of agreement documents can be prepared using the same processes as contract documents. The handshake agreement process does not raise any distinct issues for these requirements.

1-2 Prepare draft contract terms

This process is described in detail in section 3.3.3.

1-3 Negotiate contract terms

This process is described in detail in section 3.3.4.

1-4 Assent to contract

Assent may be manifested in many ways. Laws in most jurisdictions require that certain kinds of contracts must be signed in a particular way by the parties before they can be bound by the contract. Where these laws do not apply it is generally up to the parties to determine the manner in which assent may be signified.

Assent to a contract with negotiated contract terms is usually manifested by the parties signing a printed copy or copies of the contract document. It is relatively uncommon for parties to apply digital signatures to electronic contract documents under this scenario.

It is not uncommon for the parties to make last minute changes to contract terms at the time of assent. This may involve correction of a drafting error, an agreed change or the insertion of information that is dependant on the actual time of assent. Such changes may be noted by hand on the printed contract document if there are no facilities for editing the electronic source files and printing new documents.

The document bearing the signatures of the parties becomes the authoritative contract document.

1-5 Manage contract

Many, but not all, negotiated contracts are executory and involve ongoing obligations of the parties that may need to be monitored and managed until

the transaction contemplated by the contract is completed or the comes to an end.

Contract management may involve providing information to a range of interested persons within and outside the contracting enterprise. Outside persons may include professional advisers, consultants and government regulatory agencies.

The contract management process is considered to involve two key sub processes:

- (a) manage the transaction activities (rights and obligations), as described in section 3.3.5.
- (b) manage the contract document and its publication to the parties, as described in section 3.3.6.

1-6 Dispute resolution

If a contract dispute arises, a formal dispute resolution process may be invoked by the parties. Alternatively, a dispute may involve litigation before the courts.

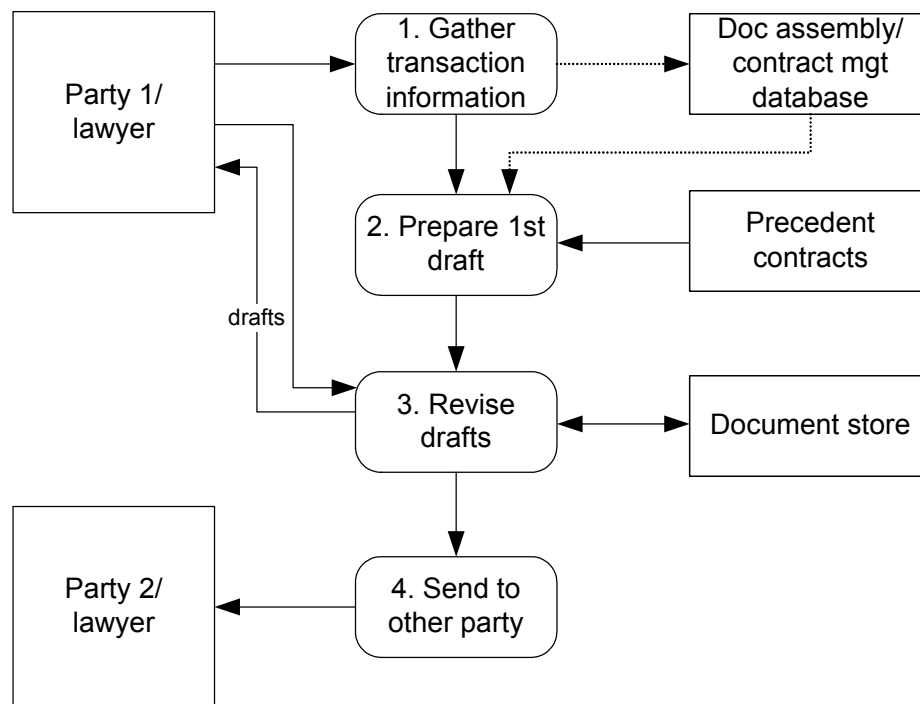
The TC is not concerned with the dispute resolution process generally. Dr Leff, proposed a use case that involves automated dispute resolution for electronic business contacts where the contract rights and obligations are expressed in machine readable form using a deontic contract language and there is no factual dispute between the parties. At this time the TC is not aware of practical examples of this activity being undertaken. The use of deontic contract languages is discussed in detail in section 5.

1-7 Precedent harvesting

This process is described in detail in section 3.3.7.

3.3.3 Prepare draft contract terms

The common components of this process are described in Figure 2.

Figure 2 Contract drafting processes**Explanation of Figure 2 processes**

The following numbered items relate to the numbered processes shown in rounded rectangles in the preceding figure.

2-1 Gather transaction information

Before drafting can begin, the drafter must gather the necessary information. This may be provided in various ways, depending on the nature of the transaction:

- (a) If drafting is undertaken by a lawyer, the client may supply a term sheet or heads of agreement document plus additional explanatory information. Often the lawyer will have been involved in the preparatory stages and will have much of the necessary information.
- (b) In other cases involving higher volume transactions by the client, instructions may be provided in a logical format designed to facilitate entry of the information into a database. In some cases, the information may be transmitted from one database system to another.

2-2 Prepare 1st draft contract

Commonly, the first draft of a new negotiated contract document will be based on a precedent document derived from other similar transactions. The extent to which the precedent provides a complete set of terms will depend on the volume and degree of standardisation of the transaction.

The draft contract document so created may be based entirely on precedent contract terms, entirely on custom drafted terms or a mixture of precedent and custom terms.

Almost without exception today, the drafting of custom contract terms is carried out using word processing software such as Microsoft Word.

In larger organisations, the contract drafter may have document assembly software that assists the drafter to gather the most suitable terms from available terms in a precedents database. This software may also assist the drafter to complete transaction data values such as names, addresses, monetary amounts and dates. These data values may be automatically inserted into the draft contract document as embedded data values, either from a database system or via direct data entry.

When creating contract documents, authors commonly need to create other transaction documents such as letters, forms, notices and minutes of meetings. These documents may be created using the same precedent and document assembly systems as are used for draft contract documents.

Today, few, if any persons who draft contracts are using XML based editing tools for this purpose. The reasons for this are explained in section 4.3.

Some software tools for document assembly may rely on precedent documents being stored in XML format to facilitate software processing. Contract drafters using such software normally would be unaware of the use of XML behind the scenes. In this document, use of XML in this way is referred to as **back end XML**.

A possible exception involves contract management systems that are able to provide two way conversion between, say, XML and Word. This can be achieved where the authoring environment is tightly controlled to produce Word documents that strictly conform to a desired template.

2-3 Revise drafts

During the revision process, the drafter will send the drafts in various formats to the initiating party (usually the client or employer of the contract drafter) for review.

It is common for the contract to pass through many draft stages to ensure that it meets the initiating party's requirements. Often this involves modification to standard contract wording and the addition of original drafting. Sometimes it may require the drafter to locate additional precedent terms to add to the draft.

It is becoming more common for law firms to provide shared access to draft documents to their clients for review. This provides reliable, instantaneous access and allows access to version histories and annotations.

2-4 Send drafts to other party

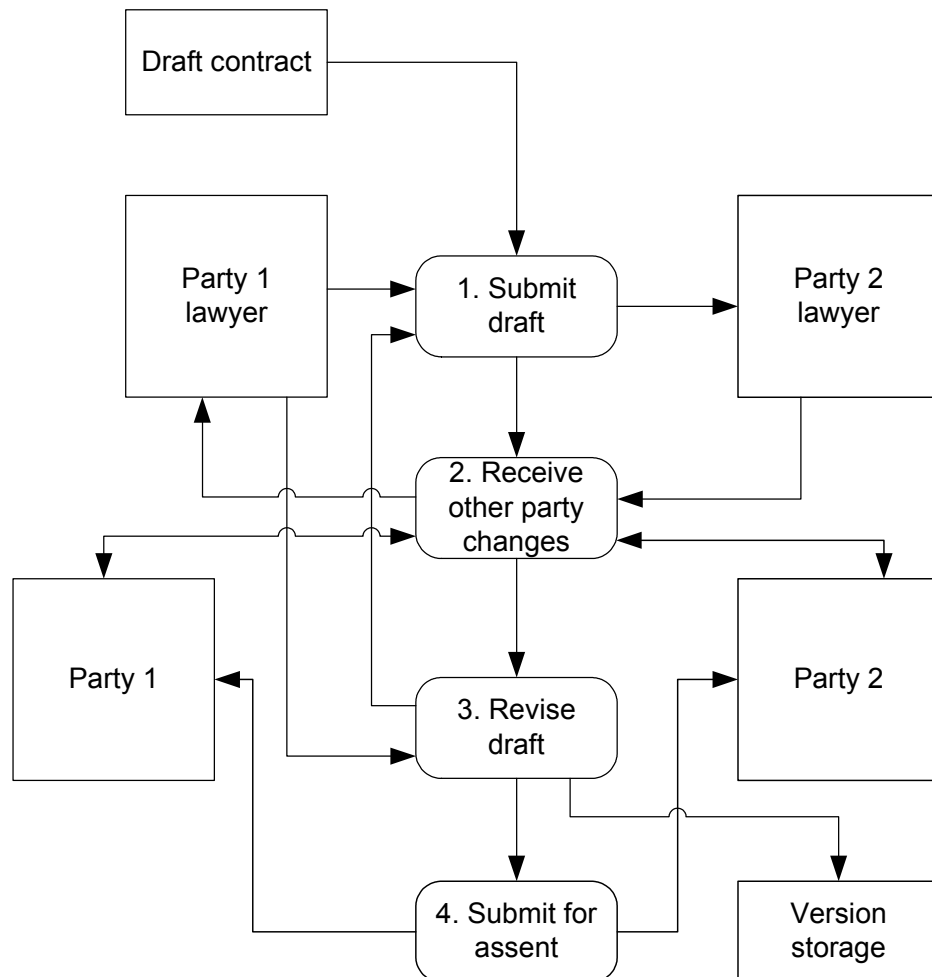
Once the draft contract document is approved by the initiating party, it must be submitted to the other party or parties for review. It is possible it may be sent to other interested persons at the same time, including financiers, financial advisers etc. Draft contract documents are commonly submitted in

various formats such as print, Word/RTF or PDF according to the circumstances.

3.3.4 Negotiate contract terms process

This process is described in detail in Figure 3.

Figure 3 *Negotiating the terms of a draft contract*



Explanation of Figure 3 processes

The following numbered items relate to the processes shown in rounded rectangles in the preceding figure.

3-1 Submit draft to other party

A draft contract is submitted to the other party for approval. Where the terms are not highly standardised, the other party may propose changes to the draft. Often this will involve clarification of the actual commercial terms of the deal.

This process of submitting the draft is described in section 3.3.3, figure 2-4.

3-2 Receive other party changes

The other party may propose changes to the draft contract. These may be communicated in the form of marked changes on a copy of the contract document using word processing software, a separate list of changes, by hand annotations on a printed copy of the contract document or orally.

It is common for the parties to exchange word processing documents with marked changes but this is not invariable.

In some larger transactions the negotiating parties may want shared access to draft documents so they can contribute amendments, new terms and comments. Software collaboration platforms may be used to assist this process. This approach can be more convenient than the traditional approach where one party makes all changes to a draft document, sends it to the other party for review and awaits return of a package of comments and suggested amendments before repeating the process. This collaboration process may involve making draft contract terms available in a way that allows changes to be marked up, annotations added and version histories to be retained. This is the same process as is used for review with the instructing client in section 3.3.3, figure 2-3.

3-3 Revise drafts

Changes proposed by the other party must be reviewed with the client by the contract drafter. Typically, some changes will be accepted, some rejected and new terms may be added.

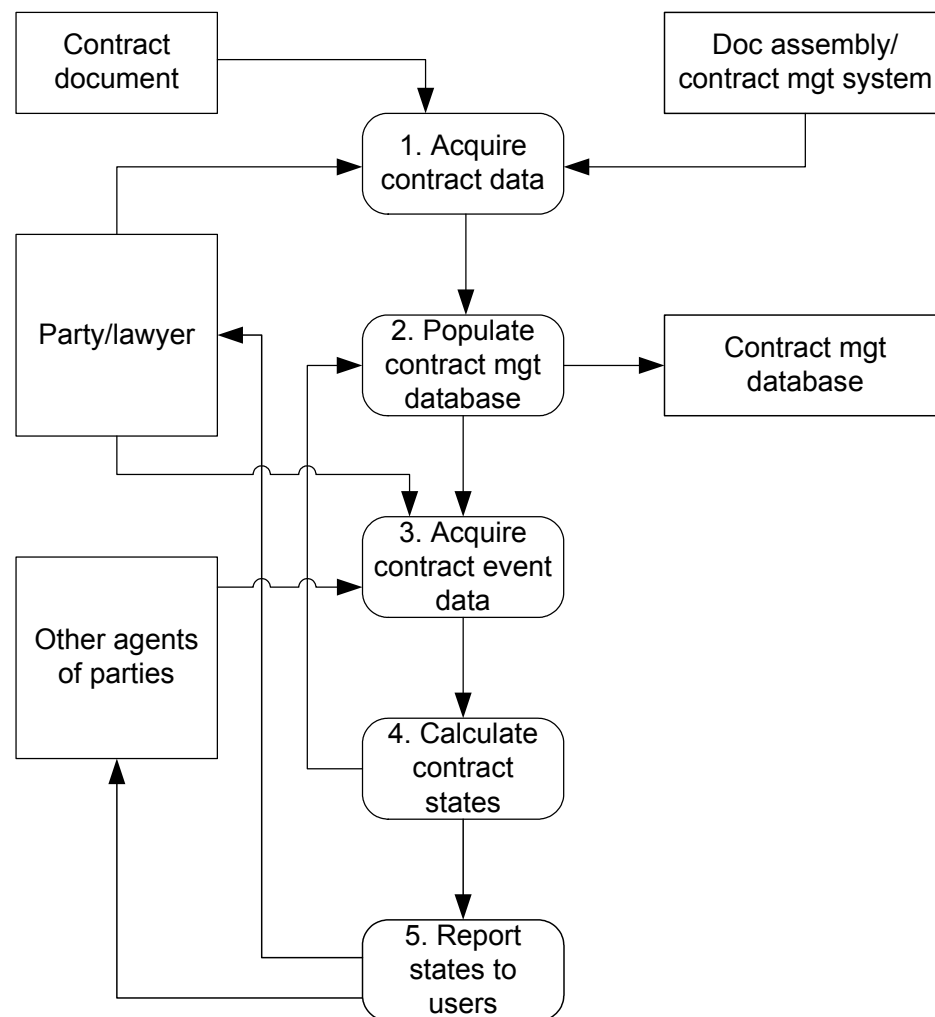
The revised draft contract document is again submitted for review. This process continues until both parties are satisfied that the contract document reflects the deal. A formal contract document is then prepared for assent by the parties.

3-4 Submit for assent

Today, most negotiated contract documents are submitted in printed form for assent by the parties. This reflects the needs of the parties to sign the contract and to have a permanent record for ongoing reference.

3.3.5 Manage contract transaction activities

This processes involved in the management of the continuing contractual obligations of the parties are described in Figure 4.

Figure 4 Overview of transaction activity management**Explanation of Figure 4 processes**

The following numbered items relate to the numbered processes shown in rounded rectangles in the preceding figure.

4-1 Acquire contract data

For contract management purposes, contract data may be acquired from multiple sources:

- (a) The contract document is likely to be the source for only some of this information. At the very least, it will be common to input new information as contract events occur and as terms are varied.
- (b) Some information may already exist in a database system used to generate the contract document, as described in section 3.3.3, figure 2-1.

Information cannot be extracted from the contract document automatically unless that information is in a machine readable form. Few, if any, negotiated contract documents produced today provide machine readable

information. Most contract documents are either printed on paper or are held in an electronic format that does not provide any way to reliably extract meaningful information about the contract.

Contract management can be undertaken at certain levels without software tools. At other levels, simple software tools such as spread sheets or desktop project management software (eg, Microsoft Project) may be used. In more complex situations, specialised contract management database applications are required to capture and manage the relevant information, calculate contract states and provide the reports desired by the interested persons.

4-2 Populate the contract management database

Information in a contract management database will need to be updated repeatedly as the transaction proceeds. Initially, information may come from other database systems and from data entered by the parties.

4-3 Acquire contract event data

Throughout the transaction, new information will be generated as the parties or other persons perform or fail to perform various obligations or conditions under the contract. Information about these events must be entered into the contract management system if it is to continue to provide useful information to the parties. While the context for this information may be defined by the contract, the information itself is external to the contract document.

4-4 Calculate contract states

The calculation of contract states may involve simple management of project timetables or it may involve more complex calculations of contract performance as is proposed by systems discussed in section 5.1.

4-5 Report states to users

Reporting operations performed by contract management systems are outside the scope of the TC's interest.

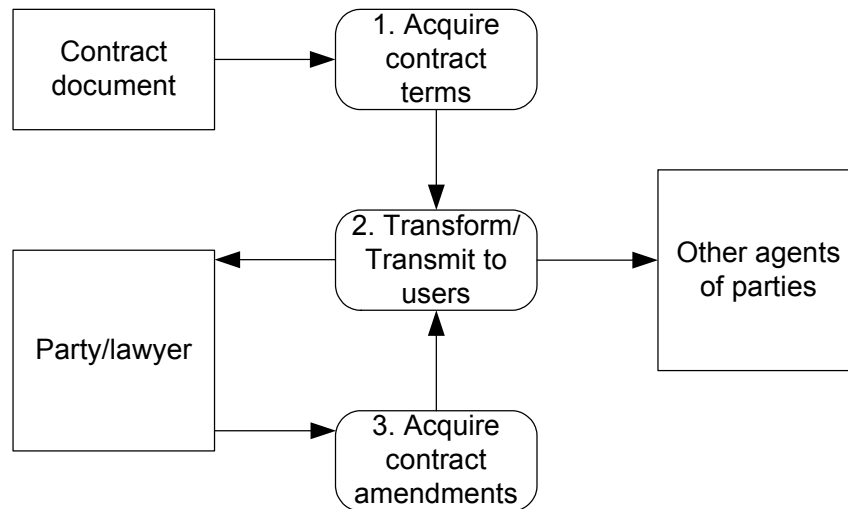
3.3.6 Manage the contract document

The contract document management process is described in Figure 5.

Management of the contract document is important in transactions that run for a lengthy period with multiple persons who must perform obligations under the contract. Construction contracts are a good example. During the course of the project, there may be amendments to the contract terms that must be communicated to relevant agents of the parties. These persons may be operating under diverse conditions and may require access to the contents of contract documents in formats convenient to their

circumstances. These include hard copy, searchable and browseable electronic copies, portable device access and even text to speech access.

Figure 5 *Managing the contract document*



Explanation of Figure 5 processes

The following numbered items relate to the numbered processes shown in rounded rectangles in the preceding figure.

5-1 Acquire contract terms

Today, this process is likely to be undertaken by copying the contract documents and distributing copies, scanning and imaging or by publishing electronic versions on the world wide web. The approach taken will depend on the form in which the contract document is prepared. Very often, negotiated contracts documents will only be available in the printed form that records the assent of the parties.

If parties to a printed, signed contract use an electronic version derived from the input files used to create the printed contract document, there will always be questions about the accuracy of the electronic version. It is not uncommon that late changes are made by the parties that are not incorporated into the electronic document. At the very least, if an electronic version is required, it will be necessary for one of the parties to prepare an updated compilation that includes details of the contract date and parties signatures so that a published document is accurate.

5-2 Transform and transmit terms to users

If the contract document is available in electronic form, it may be possible to convert it into other formats that can be used by parties with different access needs.

XML documents would be particularly well suited to this purpose, provided that the parties can be confident that they contain the complete contract terms and not an outdated version that is superseded by changes noted only on the printed assent copy. There is no reason to expect that parties to

a negotiated contract will use an XML document as the authoritative contract document. In the vast majority of cases the parties will use a rendition in another form.

5-3 Acquire contract amendments

During the course of the transaction, the parties may agree to amendments to the contract. These may be amendments to specifications under a contract, as in the case of a building contract or amendments to the core contract terms. Amendments to the core contract terms are commonly recorded in a similar way to the original contract.

Both kinds of amendments may be relevant to the contract management system. To be effective, the system must be able to gather amendments from a variety of sources.

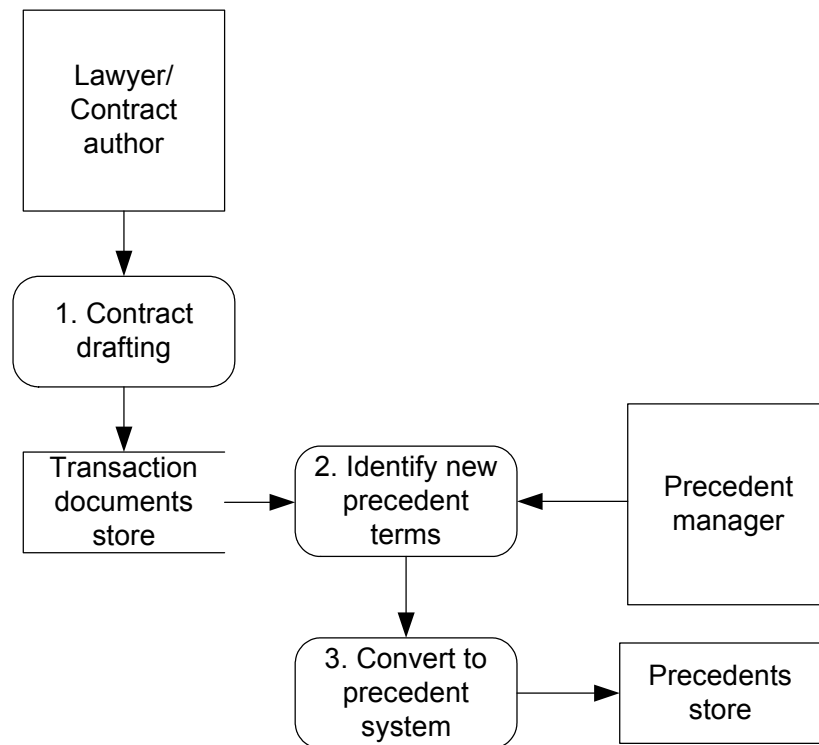
3.3.7 Precedent harvesting process

A high level view of the precedent harvesting process is shown in Figure 6.

Contract drafters often wish to capture new contract terms for later re-use in other, similar transactions as part of their knowledge management process.

The precedent harvesting process does not apply only to contract documents. Lawyers apply the same process to other documents they prepare, including advices and litigation documents.

Figure 6 *Harvesting precedent contract terms from transaction documents*



Explanation of Figure 6 processes

The following numbered items relate to the numbered processes shown in rounded rectangles in the preceding figure.

6-1 Negotiated contract drafting

Precedent harvesting may be undertaken at various times in relation to the preparation of contract documents. Most commonly, harvesting occurs once the transaction documents are finalised.

6-2 Identify new precedent terms

Precedent harvesting may be carried out by contract drafters but in larger organisations this is managed by a precedents manager.

The harvesting process is quite difficult because of the bulk of content that must be reviewed manually. In practice it is difficult to require contract authors to categorise specific contract terms during the drafting process. Their attentions are directed to meeting the immediate needs of their clients and there is often little time to undertake additional work categorising contract terms.

Once useful terms are identified, they often must be revised to remove dependencies on other terms or on a particular drafting style so than can be incorporated into other documents.

6-3 Convert to precedent system

Precedents must be in a form that enables them to be efficiently incorporated into draft contract documents.

If the enterprise uses back end XML for its precedent and document assembly systems, it will need to convert harvested content to that XML markup vocabulary. This conversion process may make it difficult to publish new precedent content quickly and it may add to the expense of maintaining the system.

3.4 Ticket contracts

Ticket contracts are those where a printed set of contract terms is offered to a buyer at or near to the time of purchase of a good or service. Examples include public passenger travel and parking station tickets.

Assent to ticket contracts is usually manifested by purchase of the ticket or a step in use of the relevant goods or services.

This category also covers contracts such as “shrink wrap” software licenses that are included in physical software packaging.

Narrative terms for ticket contracts are normally prepared for the supplier by a process that is effectively the same as that described in Figure 2 (Contract drafting processes). Once prepared, the ticket contract terms are offered by the supplier to the customer without any opportunity for negotiation of any aspect of the transaction except to accept or reject the goods or services.

If the contracts are offered online in electronic form, ticket contracts are the same as click through contracts.

Printed ticket contracts raise no distinct issues relevant to the work of the TC and are not considered further in these requirements.

3.5 Standard form business and consumer contracts

This case describes contracts offered with a service in circumstances where the offeror will not accept negotiation of narrative contract terms. Broadly, they most often occur in high volume transactions between business enterprises and consumers. Examples include housing finance, car financing and most insurance contracts. The offered services may be available from many suppliers on different terms. Consequently, the negotiation is effected by shopping around different service providers.

Standard form business contracts may be established for business transactions such as procurement by large corporations or government or service level agreements for technical systems. In such cases, they may

form master agreements in electronic commerce contracts as described in section 3.7.

Unlike the ticket contracts, contract documents produced under this case bear more resemblance to negotiated contracts in the way they are produced. Some may be generated by document assembly systems to align the contract document with selected service options. Data values may be directly incorporated into or attached to the contract terms.

These contracts may be assented to in paper form or in an online transaction. If the contracts are offered online in electronic form, these contracts are the same as click through contracts discussed in the next section.

The standard form contract documents are normally prepared for the supplier by a process that is effectively the same as that described in Figure 2 (Contract drafting processes).

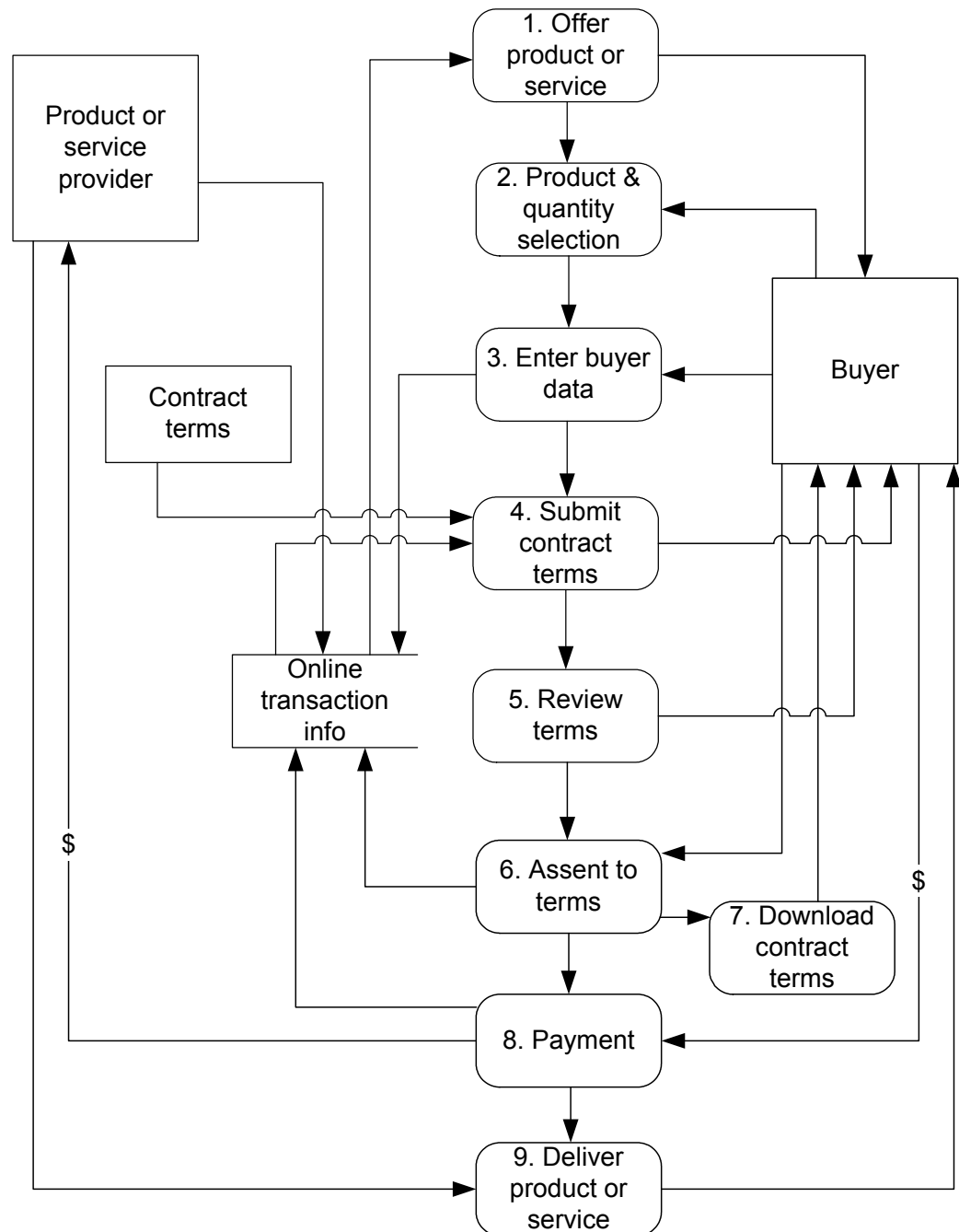
Standard form contracts may be the most suitable class of contracts to be represented in machine readable form using a deontic contract language (see section 5). Otherwise, these contracts raise no distinct issues for the TC's work.

3.6 Click-through contracts

Click-through contracts are really just electronic versions of ticket contracts or standard form business or consumer contracts, usually conducted on the world wide web. They involve a standard form contract document that is offered to a purchaser of goods or services during an on-line transaction or during software installation. Common transactions in this case include software, music and book purchases. Increasingly, this case also applies to purchases of a wide range of goods and services, including clothing, groceries, and insurance.

The processes involved in a completed on-line click-through contract are described in Figure 7.

Figure 7 Click-through contract overview



Explanation of Figure 7 processes

The following numbered items relate to the numbered processes shown in rounded rectangles in the preceding figure.

7-1 Offer product or service

In this class of contracts, the product or service is offered via the world wide web. This system usually eliminates any practical interaction between

the customer and a human representative of the provider. Consequently, there is no scope to negotiate any aspect of the transaction except where specific options are provided for selection by the customer.

7-2 Product & quantity selection

The customer must select an offered product or service before the following processes are invoked.

7-3 Enter buyer data

The customer will be required to provide information for billing and delivery purposes. The site should provide privacy terms for review by the customer.

7-4 Submit contract terms process

The service provider presents its standard contract terms for the selected service. Depending on the approach taken by the site, the buyer may have to view a display of the terms or a link may be provided that the customer may or may not follow.

Some sites provide a way to access the standard contract terms at any time so they can be reviewed in advance, if desired. This is not invariable.

The contract terms presented are normally prepared for the service provider under a process that is basically the same as that described in Figure 2 (Contract drafting processes). The contract document is prepared once and used many times.

It is possible that the site may generate a tailored set of contract terms according to the product or service options chosen by the buyer. This may involve similar processes to those used in document assembly except that the user will not be aware of the process. This kind of system may be similar to that required to generate contract documents in computer negotiated contracts discussed in section 3.8.

7-5 Review terms

The customer should be able to review the terms but is not able to negotiate these terms. The customer must either accept the terms in full to receive the product or service or reject them and do without.

7-6 Assent to terms process

Assent is usually signified by the buyer clicking an "I agree" button or something similar on screen with a copy of the contract terms displayed. The online transaction system records this event to initiate the next steps in the transaction.

7-7 Download contract terms

The buyer may or may not have a convenient method to download a copy of the contract terms as a record of the transaction. Commonly, sites allow users to save a copy of the terms in HTML or PDF format and to print them. The document so created usually does not represent the complete terms of the contract between the parties. The transaction data values such as product, quantity, price and date are likely to be held in a database system and reproduced in a separate, automatically generated invoice or receipt.

7-8 Payment

Usually, the final step is for the customer to pay for the goods or services, using a credit card or other payment intermediary.

7-9 Deliver product or service

Once payment is finalised, the provider will arrange delivery of the product or service. In the case of software or music purchases, the customer will usually be able to download the property immediately.

3.7 Electronic commerce contracts

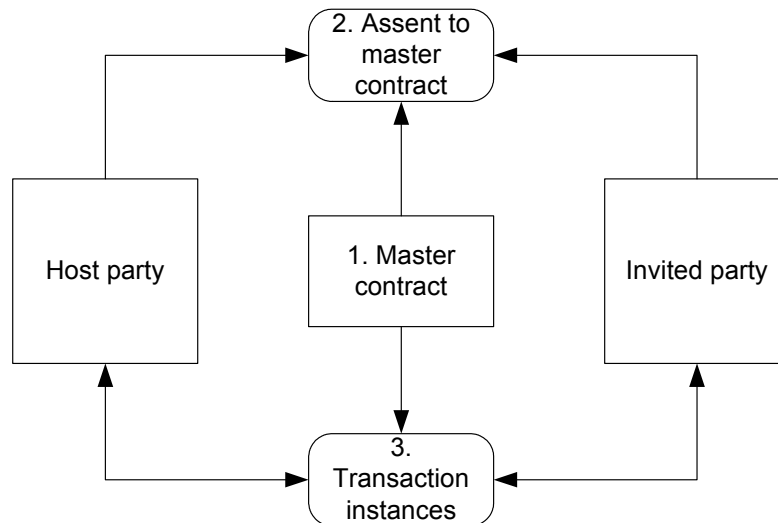
Commonly, electronic commerce contracts are set up between a large enterprise that wishes to do business electronically with its customers or suppliers for procurement of particular goods and services. Under this model, there is a host party that initiates the formation of the system and invited parties who must join the system and assent to the host's master contract if they wish to do business with the host.

Alternate models involve peer to peer exchanges under which all parties are essentially equal in bargaining power.

Electronic commerce transactions of this kind are not yet widespread. They are mainly confined to use by very large corporations such as aircraft or motor vehicle manufacturers and their suppliers. There are already several standards dealing with electronic commerce contracts, including ebXML (<http://www.ebxml.org/>) and UBL (http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=ubl). Broadly, these standards provide XML models for the transmission of data in the form of orders and invoices to create transaction instances under a master contract. They do not seek to represent the narrative terms of that master contract.

An overview of the hosted model is described in Figure 8.

Figure 8 *Electronic commerce contracting system overview*



Explanation of Figure 8 processes

The following numbered items relate to the numbered interfaces and processes shown in rounded rectangles in the preceding figure.

8-1 Master contract

The master contract is typically prepared by the host party and presented to the invited parties. In the early stages of the establishment of the system, it is likely that negotiation will occur over the terms of the master contract. This will take place outside the system.

The master contract is usually expressed in natural language and would be prepared in the same way as a draft contract described in Figure 2 (Contract drafting processes).

8-2 Assent to master contract

The parties could assent to the master contract by signing paper copies in much the same way as the negotiated contract terms scenario or by signifying their assent online in a similar way to the click-through contracts scenario. This may involve use of digital signatures.

8-3 Transaction instances

Transaction instances occur when the parties wish to buy or sell a product or service provided by the master agreement. The master agreement specifies the procedures that must be followed through enquiry, offer and acceptance to create a binding transaction. The electronic trading system allows the parties to transmit machine readable messages to effect these transactions. Protocols for the machine readable messaging are provided by standards such as ebXML.

3.8 Computer negotiated contracts

Several researchers have proposed systems that will enable computer systems to automatically negotiate contracts to buy or sell commodity goods. Suitable transactions are likely to be a subset of those where electronic commerce systems may be used.

The suggested model involves these elements:

- (a) The parties must agree on and define the negotiable parameters for the transaction. Parameters will involve matters such as description, quality, price, delivery time and similar terms. The process does not involve negotiation of narrative contract terms but may result in the selection of particular terms, say where the law of the jurisdiction in which one of the parties resides is selected as the proper law of the contract.
- (b) Each party determines its value functions for each negotiable parameter. These are recorded in a form that can be read by the software but are kept private. Value functions define the relative importance each party places on particular parameters and are central to the negotiation process. The objective of the computer negotiated process is that the computer can handle many more parameters than can be managed by a human negotiator.
- (c) Each party operates the same software application to negotiate the contract. The transaction is undertaken directly between computers without the aid of a transaction server.
- (d) The system must define the rules of negotiation. The aim of the system is to obtain the highest value for both parties. In human negotiations it is common that parties cannot retreat to a previously rejected offer. In a computer negotiated contract, this may be allowed. Otherwise the highest value for both parties may not be achieved.
- (e) The computer parties make offers to each other until a set of parameters is defined that represents the highest value to both parties.

The set of agreed parameters that results from the negotiation must be mapped to a set of contract terms to provide a complete contract. This could occur simply by referring to a master agreement in the same way as for the electronic commerce case. Alternatively, the parameters may map to a set of contract terms derived from an agreed set of available terms in a way that is similar to a document assembly process for contract document drafting.

Regardless of how it is achieved, both parties must be able to know the exact contract terms that apply to their transaction.

4 The use of XML markup for contract documents

4.1 The purpose of this section

It is envisaged that various aspects of the TC's specification will be based on the use of XML for the preparation of natural language contract documents and contract management. This section provides a brief review of the key factors affecting the use of XML markup for contract documents.

4.2 Why use XML for narrative contract documents?

The use of XML for markup of narrative contract documents may provide some or all of these benefits:

- (a) If documents are to be kept over an extended period for re-use, the use of XML may avoid data obsolescence that occurs with proprietary word processor documents.
- (b) XML allows terms to be stored in granular form so they can be managed in a database and automatically incorporated into new documents, ready to publish, without the need for manual re-application of styles or formatting. This facilitates the use of document assembly and collaboration systems.
- (c) XML documents can be automatically and reliably output into multiple renditions.
- (d) By separating document structure from presentation, standard layouts can be applied to renditions to suit corporate image.
- (e) Many business documents can be presented using a standard formatting model that suits all documents of a class. Authoring in XML may simplify the work of drafters of these documents by freeing them from the need to manage document layouts.
- (f) XML documents provide machine readable information that can be extracted at later stages in the contract lifecycle.

The application of these benefits to each transaction type and stage in the contract lifecycle is considered in section 7.

4.3 The use of XML markup in contract authoring today

As far as the TC is aware, almost all contract documents today are prepared in formats used by conventional word processing software such as Microsoft Word, Corel WordPerfect and other similar applications.

XML is being adopted for the production of legislation and in legal and technical publishing. It appears to be gaining in popularity with large enterprises responsible for the maintenance of technical documentation.

The TC has no evidence that contract drafters such as lawyers in law firms and enterprise legal departments are using XML authoring applications to create contract documents.

There is evidence that XML is used to markup precedent contract documents for use as *back-end XML* in some document assembly systems. These systems must rely on the product vendor's proprietary XML schema since there are no applicable standard schema at this time. Authors interact with the precedents through an interface that shields them from the underlying document markup. Once the assembly process is complete, the document is converted to a word processing format so that any custom editing can be completed using common word processing applications familiar to the authors.

4.4 Why is XML not used more widely for narrative documents?

There are serious problems with common word processing tools. Ask any serious user of a word processing application and they will report problems they encounter with automatic numbering, style management and header, footer, contents and cover page creation. A large amount of time is spent by authors doing amateur desktop publishing work that is inefficient and ineffective. In some documents layouts must be adjusted to suit the content of each particular document but this is rarely the case in common business documents such as contracts and associated documents. The case for something better should be compelling.

Most authors know of no other way to create their documents. If they are aware of alternatives, they may be reluctant to trade the apparent freedoms of the word processor for the potential convenience and restrictions of an XML authoring environment. As explained in the following paragraphs, few XML authoring applications provide the necessary convenience to make the trade-off worth considering.

Anecdotal evidence suggests these reasons for the low impact of XML for narrative documents such as contracts:

- (a) Office workers have been raised on word processing software and are familiar with it. Alternative approaches based on the use of XML have not been widely promoted outside of specialist content authoring groups. There is no perception of a business problem at either the enterprise or user level.

- (b) Few, if any, available schema for narrative documents are designed with author convenience in mind. They have not identified the simple patterns found in virtually all narrative documents. Rather, they require authors to make decisions about element usage that unnecessarily complicate their work, make it difficult for developers to create simple XML authoring interfaces and provide little real semantic value. In some cases, schema designed for use in machine generation of markup are coopted to human authoring. There has been a widespread failure to appreciate the practical limitations of the amount of markup authors are prepared to create while preparing new content. If narrative document schema design is treated as an exercise in database design, it is little wonder that it will not appeal to human authors. Except where specialised content authors are involved, if the schema design is oriented more to achieving publishing objectives, it will be more convenient for authors.
- (c) Available schema require extensive customisation to meet the needs of contract drafters. Most user enterprises are unwilling to expend effort developing a proprietary schema.
- (d) Substantial effort is required to develop all components of an XML based authoring environment around a new schema. Tailoring of the drafting application and development of rendering applications requires considerable planning and development work. Most enterprises cannot identify a return on that investment.
- (e) The use of an XML authoring application requires that authors understand the schema and basic XML concepts. These are different skills to those developed in common word processing applications. Without a clear business case, few enterprises are prepared to train authors to use an XML authoring system and provide ongoing support as new users enter the enterprise.
- (f) Enterprises who prepare contract documents must collaborate with other parties. Until they too use an XML authoring system, there are difficulties in managing document revisions based on quite different authoring tools or different word processing styles.

The net effect of these factors is that there must be a radical rethinking of the approach taken to XML authoring of narrative documents or we must accept that the use of XML for narrative document authoring will always be restricted to niche applications. Technology is most readily adopted when it is essentially invisible or presented via a simple interface that makes few demands on its users. This principle must be applied to the design of XML schema for narrative documents.

4.5 Human created markup and machine generated markup

XML standards have been developed for electronic business transactions which do not involve the production of narrative documents. The ebXML (<http://www.ebxml.org/>) and UBL (http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=ubl) standards are designed to represent electronic business transactions and business documents such as purchase orders and invoices. They are not intended to represent narrative contract documents, although often there will be a contract document behind the transactions. It is reasonable to expect that most ebXML or UBL documents will be automatically generated from enterprise financial management systems.

Schema for these types of business documents may be human readable but they are designed for use by machines. They are not particularly concerned with human authors or readers. This has several consequences:

- (a) vocabularies can be extensive; and
- (b) users can expect a high degree of accuracy and consistency in the information encoded in the XML documents.

Contracts with negotiated narrative terms (section 3.3) must be created in whole or part by a human author for a specific transaction. As indicated in section 3.3.7, figure 6-2, contract authors have little time for or interest in adding metadata during the drafting process. It is clear from the discussion in section 4.4 that authors of these contracts will only use XML authoring tools if the use of XML actually makes their work easier, not harder. A schema for such contracts must be simple and easy to apply. There is no point expecting these authors to create contract metadata for machine processing at later stages in the contract lifecycle. Such metadata will be either absent or, if present, unreliable. It can be expected that the XML created by authors of narrative contract documents will be useful for publishing the contract documents in desired renditions but little else.

Contracts that are based on a standard form narrative such as ticket contracts, standard form business or consumer contracts and click through contracts may include more reliable contract metadata, if this is considered useful. The re-usable nature of the documents may justify the expense of having skilled personnel add the metadata. Whether it is desirable to add it to the narrative document or to maintain it separately is to be determined.

It is possible to generate a contract document in XML markup, either from another XML document, from chunks of text in a database or by attempting to transform a styled word processing document. These approaches are unreliable and unsuited to negotiated contracts where a contract author must modify the draft terms using commonly available desktop software.

4.6 Schema models

Schema for the markup of narrative documents may vary greatly in the approach taken. Common models are as follows:

(a) **Unstructured, format dependant**

This approach is followed by Microsoft WordML and the OASIS OpenOffice (www.openoffice.org) schemas. The markup defines chunks of text based on word processor paragraphs (each time the Enter key is pressed). Layout properties are applied in style based attributes. These closely mimic the operation of word processing applications. Authors may apply arbitrary style as they create markup, just as in a word processor. These schema provide little information about the structure of the document. The hierarchical relationship between text objects is not captured. If content objects consisting of multiple paragraphs are to be handled as a single object, extra work must be undertaken to ensure the object retains its integrity during storage and processing. Essentially, WordML is an XML version of the RTF format. Its principal advantage over RTF is that it allows the markup to be parsed and processed as XML, albeit with limited knowledge of what that markup represents. These schema provide only some of the benefits identified in section 4.2.

(b) **Structured with naming for a specific document set**

This type of schema defines a hierarchical relationship between content objects in the document using names that are specific to a narrow class of documents. These types of schema cannot be used for other document classes. There must be a consensus among users about the names used and their meanings.

(c) **Structured with generic naming**

This is the generic structured markup schema defined in section 2.1. Such schema define the hierarchical relationship between content objects using names that define those objects in a way that they can apply to a wide range of documents. The W3C's XHTML 2.0 and the OASIS DocBook schema fall into this category.

Categories (b) and (c) schema provide essentially the same functionality for processing. They each allow a complete separation of structure from presentation and therefore offer the greatest flexibility and benefits for long term data storage and single source publishing where different layout properties are applied over time or in different renditions. Category (b) schema are necessary for very distinct document types and provide the greatest amount of semantic information about the content. If applied to contracts, category (b) schema will likely encounter difficulty because of the widely different terminology used for contract components. They

would be inconsistent with a general vocabulary that could be used for other legal documents created by contract authors.

4.7 Available schema for authoring contract documents using XML

The TC is not aware of any open source or standard XML schema that are specifically designed for marking up narrative contract documents. All available schema would require substantial modification to be useful.

It may be possible to develop a schema based on an existing vocabulary such as:

- (a) DITA (http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=dita and <http://xml.coverpages.org/dita.html>)
- (b) XHTML 2.0 (<http://www.w3.org/TR/2004/WD-xhtml2-20040722/>)
- (c) DocBook (http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=docbook).

Each of these schema is designed for markup of narrative content. The TC should again review each of these schema to determine which, if any of them, can be adapted to the TC's requirements.

It is possible for users of Microsoft Office 2003 to create XML documents using the Microsoft WordML schema, provided that the enterprise concerned develops the necessary style mappings and import and export scripts. The WordML schema is a proprietary schema, owned by Microsoft.

It is also possible for users of OpenOffice and StarOffice to create XML documents using the OpenOffice Schema.

Neither WordML or OpenOffice XML are generic structural markup language schema. Because of the styling mechanisms they employ, both are essentially tied to particular software applications used to create them (Microsoft Word and OpenOffice/Star Office).

It is not the TC's role to promote a particular application suite but it may be necessary to determine how the TC's specification relates to those applications and XML vocabularies.

4.8 Available tools for authoring contract documents using XML

There are commercial and open source XML authoring applications that can be configured to create documents using any XML vocabulary.

Microsoft Word in Office 2003 is able to create documents using the Microsoft WordML schema as well as user selected schema.

To overcome the problems described in section 4.4, an XML authoring application must be carefully configured to the chosen schema to provide a user friendly interface for the author. It may be necessary to define the editor screen rendition in addition to publishing renditions. Automatic numbering, cross references and other facilities must be added. This configuration process is specific to each DTD or schema. It often involves considerable effort and expense.

4.9 Current use of contract metadata

Contract metadata is used extensively to categorise content for retrieval purposes, to manage versions and to support publishing processes.

Word processing applications make it difficult to associate metadata with individual content chunks. Currently, document assembly systems may store chunks of word processing documents and manage metadata in a database system.

XML markup makes it easy to add metadata to any chosen component. Metadata is commonly used with generic structural markup in XML documents.

4.10 Current use of embedded data value markup for contracts

Embedded data value markup is used with word processing documents by common document assembly and variables substitution applications. In the absence of standards, these applications use proprietary formats for the definition of embedded data values.

The use of embedded data value markup is confined to document creation from precedent documents. Once the document is created, the embedded values are likely to be indistinguishable from other natural language content.

4.11 Creating renditions from XML documents

On their own, XML documents are not convenient for reading by humans. Transformation or style rules must be applied to XML documents to create necessary renditions (RTF, PDF, HTML, etc) using desired layouts and styles. A variety of methods and tools exist for doing this. At this time, there is no universal approach that provides all the functionality required. The TC expects that for the foreseeable future, various enterprises may wish to use different tools to generate renditions from XML documents.

The desire to create multiple renditions from a single source is one of the key reasons why enterprises might use XML markup for documents. However, based on currently available tools, the planning and development of transformation rules or styles for a new DTD or schema requires specialised expertise and involves considerable effort and expense.

4.12 Exchange of XML contract documents between the parties

4.12.1 Exchange during negotiation

As explained earlier, contract drafters do not use XML authoring tools to any appreciable extent at this time. Opportunities to exchange XML documents between contracting parties or their representatives are limited.

If a party does draft a contract document using an XML editor, that party has a choice of providing the other party with the source XML or a rendition that is convenient for the other party.

If the other party wishes to edit the document but does not use an XML editor, the original party may have to re-enter the changes when the document is returned. This may be quite inconvenient.

To solve this problem, both parties may need to use XML authoring applications, using a common schema. The recipient must be able to format the document for editing and review purposes (not necessarily using the other party's styles). The recipient may wish to use automatic numbering and cross references. This requires a high degree of standardisation or coordination.

4.12.2 Exchange during assent

Exchange of XML data at assent may occur in automated electronic business systems. The XML exchanged is likely to be quite different to that created for conventional contracts with negotiated terms.

Exchange of XML data is unlikely to occur with negotiated narrative contracts because the parties will assent to a rendition from the XML document.

4.12.3 Exchange after assent

Outside of automated electronic business systems, there is no obvious way in which an XML document will become the authoritative contract document. Normally, assent is signified by the parties signing a paper version. Less commonly, an electronic document may be adopted but this is likely to be a PDF or other rendition, rather than an XML document.

This means that even if the contract document was created in XML, that document is no more relevant to the resulting contract than a Word document is to the paper contracts signed in everyday transactions today. The XML document may or may not accurately reflect the final terms of the contract, depending on events after the assent version was prepared, as discussed in section 3.3.2, figure 1-4.

4.13 Likely future developments

Many new standards and products are being developed that may affect the way XML may be used for document production.

On the evidence available to the TC, it is apparent that law firms and other enterprises with corporate legal departments are not demanding to create documents using XML authoring tools. On the contrary, they need to be convinced there are good reasons to do so. They need to be convinced that suitable tools exist to make it easier, rather than harder, for authors to create documents to justify undertaking the change management and development effort.

Microsoft has introduced XML capabilities into Word 2003. It is extending the tools available for the use of XML and it is likely to make further changes to its Office applications in future releases. This will greatly affect future directions because it directly affects the tools most contract authors use today.

If the use of XML markup of narrative contract documents is to be beneficial beyond the areas of precedent management and document assembly, these developments will need to occur:

- (a) XML will have to become more widely incorporated into back end contract authoring processes.
- (b) Contract drafters will need to start using XML editors in place of word processing software. Law firms, government agencies and corporations will need to introduce new authoring systems and train their staff. To do this they must perceive very substantial benefits that justify the cost and effort involved.

If parties are to exchange XML documents at any stage in the contract lifecycle, there must be sufficiently widespread use of XML for contract authoring that it is feasible for them to implement the systems needed to exchange XML contract documents and process them.

It is reasonable to assume that in a few niche industry sectors, XML will be used for contract document preparation. It is also reasonable to assume that there will be some use of back end XML for precedent system maintenance. At this time it is difficult to forecast that the use of XML for contract authoring will become widespread in the near term, if ever.

4.14 Implications for the TC's work

The TC's work may make it easier to implement XML authoring of contract documents by providing a suitable schema and encouraging developers to develop products that make it easier. Notwithstanding these efforts, the inertia of existing document authoring practices is so great that it would be extremely daring to expect that change will occur in the way we can anticipate now and that it will occur quickly.

The implications of this should fundamentally affect the way that the TC approaches its specification to deal with contract related activities after the initial drafting process. There is no point in the TC devising a specification for persons to extract information from contract documents if there are no XML contract documents with which to work. This will not address the very real problems that users are experiencing in managing contract transactions.

The TC will need to determine whether it wishes to provide a framework that can benefit the widest range of persons interested in contracts or just a few persons in niche areas who *might* adopt XML contract authoring systems in the next few years.

4.15 Conclusions on the use of XML markup for narrative contract documents

- 4.15.1 There is little likelihood that contract authors will prepare narrative contract documents using XML authoring applications in the near future. They will continue to create narrative documents using word processing applications and exchange word processing, PDF or printed documents with other parties.
- 4.15.2 There is no established infrastructure in place for parties to exchange and process XML format narrative contract documents. This situation is unlikely to change in the near future.
- 4.15.3 Even where back end XML is used to facilitate document assembly and other automated processing, there is no immediate prospect that narrative contract documents in XML format will be distributed outside the enterprise.
- 4.15.4 Metadata and embedded data value markup can be utilised at the contract drafting stage by enterprises that use back end XML systems but this markup can only be available to other parties or interested persons if there is an exchange of XML documents.

- 4.15.5 The TC should develop a specification that supports back end XML and also enables authors to prepare narrative contract documents using XML authoring applications.
- 4.15.6 The TC should not develop a prescriptive specification for the exchange of XML narrative contract documents at this time. The TC can await further market developments to determine the best way to do this.
- 4.15.7 The TC may develop a specification that enables persons to extract metadata and embedded data values from narrative contract documents in XML format, if they wish.
- 4.15.8 The TC should develop a framework that allows persons to collate, transmit and manage information about contracts for contract management purposes that does not assume the presence of a narrative contract document marked up using any XML schema.

5 The use of deontic contract languages

5.1 Review of current use

The term *deontic contract languages* was adopted by the TC to assist discussions among committee members with different backgrounds and perspectives on the business problems affecting contracts and the possible application of XML technologies to those problems. It is recognised that the term may not be widely used or understood without the benefit of some background explanation.

The purpose of deontic contract languages is to provide machine readable ways to express the substance of what each party promises, gives or accepts. A system that can reason about obligations, rights, permissions, prohibitions, delegation, authority and similar concepts that underpin contracts could assist with contract management activities such as performance monitoring.

Deontic contract languages are inspired by deontic logic (see <http://mally.stanford.edu/deontic.html>). Three examples of deontic contract languages have been brought to the attention of the TC.

The Business Contract Language (**BCL**) has been developed at Distributed Systems Technology Centre, University of Queensland. The BCL is conceptually similar to the Enterprise Contract Language (**ECL**) developed at the University of Kent.

Dr Zoran Milosevic, a member of the BCL development team, states “the BCL has been developed for the purpose of specifying contract conditions

so that the contract execution can be monitored against these conditions”. BCL syntax is said to closely resemble natural language expression of contracts, namely the expression of deontic constraints such as obligations, permissions and prohibitions. The BCL is expressed using XML. It is a declarative language to be used by domain experts to specify those constraints that are required to be interpreted by a computer system.

Currently, there are no commercial implementations of the BCL.

The Contract Expression Language (**CEL**) is developed by the Content Reference Forum (www.crforum.org). It is based on the MPEG Rights Expression Language and is also expressed in XML. The CRF is a consortium of hardware companies, software companies, content owners and service providers working to develop standards for the legitimate distribution of content (licensed intellectual property) in peered environments. The CEL is used to express the contractual terms between participants in unambiguous, machine readable form.

A description of the CEL and its conformance to the Business Collaboration Framework (BCF), developed by the Techniques and Methodologies Group (TMG) of the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) is contained in the white paper *Contract Expression Language (CEL) – An UN/CEFACT BCF Compliant Technology* <http://www.crforum.org/papers/CEL-BCF-Whitepaper.pdf>. This paper includes examples of the markup of simple contractual promises.

The TC's resources section includes references and links to other systems that implement deontic logic.

Although not included in the formal deontic logic, many of these systems also support specification of times, deadlines and temporal reasoning. For example, a construction contract might state that phase one of the construction would start within three days of the receipt of the deposit and be completed with ten days of when the construction started.

There are a number of dedicated contract management vendors, including DiCarta (www.dicarta.com), Upside Contracts (www.upsidecontracts.com) and iMany (www.imany.com) who aim to support the full contract life cycle management, ranging from collaborative contract drafting and negotiation, storage, milestone driven notification and analytic features. These systems generally follow the database approach typical of most ERP systems, whereby the contract semantics is implicitly encoded in proprietary software systems. These systems are hard to maintain, difficult to extend to new contract models and they do not permit inter-organisational collaboration. Deontic languages such as BCL and CEL aim to overcome these problems.

Based on information available, it appears that deontic contract languages are still subject to ongoing research. There appear to be several communities anxious to achieve commercial implementations.

The assessment of the TC is that these languages are best suited to represent contracts that meet some or all these criteria:

- (a) contract execution is to occur over a period of time that justifies the effort of setting up a monitoring system;
- (b) the contract is one of many similar contracts that are highly standardised so that, even if contract execution is short, there is no overhead in formalising contract terms into a deontic contract language;
- (c) both parties have an interest in automated monitoring;
- (d) performance of obligations can be defined by events that can be monitored by a computer system.

5.2 Relationship between deontic contract language and natural language

Examples of deontic contract language markup indicate that a natural language contract document and a machine readable contract document ought to be distinct documents that may be closely related. The deontic contract language does not need to encapsulate by markup the natural language terms in the contract. To do so would make the task of markup more difficult. If the natural language contract document is marked up using a generic structural markup language, the overlapping and interleaving of the two forms of markup would appear to be impracticable.

5.3 Likely developments with deontic contract languages

Although there have been several research projects in using deontic logic and representing the general case of contract semantics, it is unclear whether the market will accept such systems or when money will be invested to implement these ideas as software that can be applied in business.

5.4 Conclusions on the use of deontic contract languages

- 5.4.1 There is no obvious basis on which the TC can incorporate a deontic contract language into its specification at this time.

- 5.4.2 Where it possible to incorporate deontic contract languages into the specification, it appears likely that deontic contract language markup will be more easily implemented if it is maintained separately from the human readable contract documents.

6 Problems, objectives and scope

6.1 Purpose of this section

This section firstly identifies the problems encountered by various users involved in processes identified earlier.

High level objectives are then defined to deal with those problems. These statements provide a reference point against which all requirements can be validated.

Finally, each contract type or process is assessed to determine its relevance to the TC's mission.

The problem and objective statements are based on the discussions at the face to face meeting in San Francisco in September 2004, with some minor adjustments.

6.2 Contract drafting and negotiation

6.2.1 Reported problems

Its difficult to trace contract changes at the level of contract terms.

It is hard to re-use content from transaction documents, reducing knowledge management benefits and increasing costs.

The drafting cycle during negotiation is slow, adding to cost.

Lawyers are expensive and clients would like to be able to do more contract drafting themselves.

Precedent maintenance is expensive, thus limiting access to precedents, increasing risk and cost.

There is no available mechanism to translate narrative contract terms into machine readable language.

6.2.2 Problem statement

Today, contract documents are created using word processing applications. These documents can't easily be processed at convenient levels of granularity. It is difficult to process these documents outside the creating application. This inhibits automated document creation, information reuse, information extraction and change traceability.

6.2.3 Objectives

The TC specification will enable:

- (a) contract terms to be managed and manipulated at convenient levels of granularity to facilitate:
 - (i) improved access to precedent contract terms and contract documents
 - (ii) better searching and discovery of relevant contract terms
 - (iii) improved document assembly systems
 - (iv) easier harvesting of re-usable contract terms from transaction documents
 - (v) collaborative authoring and negotiation
 - (vi) Revision history management
- (b) consistent, automated, enterprise wide formatting of contract documents
- (c) contract documents to be automatically published in multiple renditions.

6.2.4 Scope assessment

Contract drafting and negotiation is within the scope of the TC's mission. These processes underpin the production of contract documents that may be used in almost all transaction types. It is expected that a specification to facilitate these processes will provide a broad foundation for the widest range of users.

6.3 Click-through contacts

6.3.1 Reported problems

End users don't know:

- (a) what contracts they have entered into;
- (b) their obligations under those contracts.

In particular, enterprises have no way of knowing the contracts entered into on their behalf by their employees.

The service providers have no obvious interest in helping the buyer solve these problems.

All the systems for accessing the contract are provided by the service provider. If changes are to be made, some inducements may be required to ensure cooperation from service providers.

6.3.2 Problem statement

Parties to click-through contracts cannot easily identify or manage the contracts they have entered into or the terms of those contracts.

6.3.3 Objectives

The TC specification will enable individuals and enterprises to:

- (a) identify click-through contracts prior to assent;
- (b) store contracts assented to; and
- (c) identify the contracts and terms assented to.

6.3.4 Scope assessment

The entire agreement related to click-through contracts includes session based transaction information such as price, quantity, delivery terms or subscription privileges, software licence periods and so forth. The contract management issues relating to this transaction information are similar to those involved in electronic commerce transactions. They are quite different to those affecting the preparation and management of narrative contract documents.

If service providers are to make transaction information available to users in a machine readable form, it is possible that the electronic commerce standards would provide a foundation. Service providers would need to establish systems to facilitate the supply of transaction information to users. There would need to be a demonstrated demand from users to receive this information before service providers would make the necessary investment. The TC proposes to confine its initial specification to narrative contract terms. The transactional aspect of click-through contracts is outside the scope of the TC's initial specification.

The stored contract terms discussed in section 3.6, figure 7-4 to 7-7 are essentially the same as any other standard form contract. A standard for the XML markup of narrative contract terms can be readily applied to represent those terms for click-through contract transactions, if the parties perceive there will be benefits. As discussed in the previous sections, there is a demand by business and government users of online transaction systems for improved access to these terms. This aspect is within the scope of the TC's initial specification.

The TC's initial specification will not describe the transaction process by which customers of on-line systems will access contract terms held by the service provider. The TC does not have sufficient representation from interested parties to develop a model for those transactions. This may be undertaken in a later version of the specification.

6.4 Contract management – transaction activities

6.4.1 Reported problems

There are frequent disputes over change authorisation in construction contracts and similar transactions where frequent variations occur.

It is difficult to ensure all parties have reliable information about upcoming obligations under the contract.

It is difficult to extract terms and embedded data values from the contract into content management systems.

It is difficult to access the content of external documents that are incorporated into the contract.

There is no reliable way to determine the state of contract events, obligations and processes.

It is difficult to monitor and analyse performance of parties over extended time periods.

6.4.2 Problem statement

At the moment, parties to contracts and other users of contract information have no way to exchange machine readable contract information for importing into contract management systems.

6.4.3 Objectives

The TC specification will enable:

- (a) parties to contracts to exchange machine readable contract information, particularly embedded data values, for importing into contract management systems
- (b) machine readable contract information to be associated with relevant human readable contract terms.

6.4.4 Scope assessment

Contract management is considered within the scope of the TC's specification.

6.5 Contract management – contract document

6.5.1 Reported problems

Interested persons don't have access to the content of the contract in a convenient form (paper, RTF, PDF, web, text to speech etc).

It is difficult to ensure that all interested persons have access to fully up to date versions of contract documents.

6.5.2 Problem statement

At the moment, it is not practicable to provide interested persons with the content of contract documents in different formats that suit their access needs.

6.5.3 Objectives

The TC specification will enable parties to contracts and authorised agents of the parties to access the content of contract documents in formats convenient to them where the contract document is prepared using XML markup and maintained in an up to date form as amendments are made.

6.5.4 Scope assessment

Contract management is considered within the scope of the TC's specification.

6.6 Electronic commerce contracts

6.6.1 Reported problems

Electronic commerce standards such as ebXML provide for only part of the contract transaction. The master agreements or transaction protocol agreements are only available in human readable form.

There is no way for new parties to automatically assent to the master agreement.

6.6.2 Problem statement

In electronic commerce transactions:

- (a) there is currently no way to map or validate electronic transactions against their master agreement
- (b) there may be no way to automatically determine if there is a master agreement
- (c) human negotiation of bi-lateral master agreements is too time consuming.

6.6.3 Objectives

The TC specification will enable:

- (a) electronic commerce systems to establish machine readable master contracts that will permit automatic validation of subordinate electronic transactions
- (b) automatic contractual opt-in to participate in the system
- (c) (consider whether the eContracts standard can provide a lingua franca for processing data values created from various e commerce standards such as ebXML etc).

6.6.4 Scope assessment

Having regard to the existing standards work, such as ebXML and UBL, for electronic commerce transactions it is unclear how any work of the TC would relate to those standards. Issues dealing with preparation of the master contract document may be within scope but will not be covered by the TC's initial specification.

6.7 Computer negotiated contracts

6.7.1 Reported problems

Contract negotiation is slow and expensive. The inefficiencies inherent in human contract negotiation limit the value of the transaction, particularly where rich parameter sets are involved.

Currently, there is no way to ensure that both parties to the negotiation can generate identical contract documents from the same set of negotiated parameters.

6.7.2 Problem statement

There is no standard way to map a given set of negotiated contract parameters to a unique set of contract terms.

6.7.3 Objectives

The TC specification will enable a 1 to 1 mapping between a set of parameters and a contract representing an agreement with those parameters.

6.7.4 Scope assessment

Processes involved in automated negotiation are outside the scope of the TC's work. Processes involved in relating contract parameters to contract terms are likely to be within scope but will not be specifically covered by the TC's initial specification.

7 Functional requirements

7.1 Approach to requirements development

The following table summarises how the processes discussed in section 3 relate to each relevant contract type. A check mark is shown under a contract type if the process can occur with that contract type, although it may not be common. The points shown by the check marks are the key intersections for which requirements are to be considered.

Functional processes and contract types

	Negotiated	Standard form	Click through	E commerce master	Computer negotiated
Processes					
(1) precedent creation, storage & retrieval	✓	✓	✓		✓
(2) document assembly for new drafts	✓	✓	✓		✓
(3) variables substitution in new drafts	✓	✓	✓		✓
(4) custom authoring of contract terms	✓			✓	
(5) collaborative editing of draft contract terms	✓				
(6) publish draft contract documents in multiple renditions	✓	✓	✓		
(7) assent to contract terms	✓	✓	✓	✓	✓
(8) retain or preserve assent documents	✓	✓	✓	✓	✓
(9) extract contract states, party obligations and rights into an exchange format	✓	✓		✓	
(10) communicate contract obligations, rights and states to interested persons	✓	✓			
(11) prepare variations to contracts	✓				
(12) maintain variations and contract versions	✓				
(13) publish contract terms and related information to interested persons	✓				
(14) validate electronic commerce transactions against the transaction protocol agreement				✓	

	Negotiated	Standard form	Click through	E commerce master	Computer negotiated
(15) map negotiated contract parameters to contract terms					✓

Requirements will be stated once, in the first process in which they arise. Later processes that would support an existing requirement will refer to the applicable requirements in a note.

7.2 Precedent contract documents

7.2.1 Overview

There is nothing distinctive about precedent contract documents compared to other precedent documents prepared by lawyers.

The systems used for contract documents should be applicable to other kinds of precedent documents.

7.2.2 Precedent creation, storage & retrieval

7.2.2.1 Background to requirements

If precedent documents are to be maintained in XML format, users will need to be able to convert word processing documents into XML markup.

The key problem identified in relation to precedent documents in section 6.2 is the lack of ability to work with word processing text content in various levels of granularity to suit automated processing needs.

Precedents may be created to work with specialised document assembly software. The TC is not attempting to analyse these in depth or to define a standard for the way in which that software operates.

7.2.2.2 Issues for contracts with negotiated terms

Precedent documents are derived from transaction documents and enhanced by subject area experts to provide reliability and flexibility for users. Precedent documents must be regularly updated. New precedent terms are added as transactions evolve and new experiences encountered.

7.2.2.3 Issues for standard form contracts

A standard form contract may be managed as a complete document or as a collection of discrete terms that can be assembled into a contract document to reflect transaction options. This does not appear to raise any issues different from those applicable to precedents for negotiated contracts.

7.2.2.4 Issues for click through contracts

As for standard form contracts.

7.2.2.5 Issues for computer negotiated contracts

It is understood that the precedent terms would need to be accessible in a way that a system could access them by reference or copy them into a

contract document instance. Current understanding is that it will be sufficient if contract terms can be stored and retrieved as distinct objects.

7.2.2.6 The role of XML markup

XML markup of precedent documents could provide these benefits described more fully in section 4.2:

- (a) reduce the risk of data obsolescence;
- (b) provide granular content management for document assembly and research purposes; and
- (c) provide for automated production of renditions according to standard layouts.

There is no evident difference in the needs of the markup for each contract type considered.

The use of XML for precedent creation, storage and retrieval will provide a foundation for the adoption of XML in other stages of the contracts lifecycle. Unless XML is adopted at this stage, there is little prospect that XML will be adopted at any other stage, except in niche sectors.

For precedent storage and management, the maximum advantages would be obtained from the use of a generic structural markup schema. Such a schema provides the maximum separation of structure from layout information and most reliable model for the definition of content in granular form.

7.2.2.7 The role of a standard

A standard would provide these benefits:

- (a) The cost of implementation of XML based authoring and publishing applications could be reduced if applications are developed around a standard schema.
- (b) The costs of switching between document assembly and other processing software applications would be reduced if those applications are developed around a standard XML schema. However, enterprises may still incur some costs in adapting precedents to suit the more specialised interfaces of document assembly applications if they are not standardised.
- (c) Document assembly systems should be accessible to more enterprises who create contract documents.
- (d) It may be easier to develop and maintain processes to convert word processing data to XML markup if the target is standardised.

7.2.2.8 Specific requirements

- R-1 The specification must include an XML schema for generic, structural markup of contract documents.
- R-2 The generic, structural markup schema must conform to W3C XML 1.0.
[note: We are not specifying here whether the schema is expressed in RELAX NG, XML Schema or DTD syntax.]
- R-3 The generic, structural markup schema must define common content objects such as paragraphs and clauses that may be processed as distinct objects or content chunks in document assembly or other processing systems.
- R-4 It must be an aim in design of the generic, structural markup schema that the common content objects defined by the schema could be adopted by another standards body responsible for developing a schema applicable to other legal documents that are commonly prepared by the same people using the same systems as contract documents.
- R-5 The generic structural markup schema must provide a model for users to add semantic metadata and embedded data values to contract documents and to distinct content objects defined by the schema. The schema must make provision for common metadata fields required by document management, document assembly and publishing applications such as:
- (a) document identifiers, the author, version and dates;
 - (b) the legal subject matter or categorisation of distinct content objects.
- The schema must not restrict the metadata that users may add to contract documents or content objects.
- The specification will not define a legal classification vocabulary for metadata values. These may be developed as required by industry or regional users.
- R-6 The specification must not require the use of any particular XML processing technology. As far as practicable, it must be designed to allow users to adopt any processing technology of their choosing.

7.3 Contract document creation

7.3.1 Document assembly for new drafts

7.3.1.1 Background to requirements

There are various approaches to document assembly. Essentially, the process involves a software application presenting a drafter with choices about the terms to be included in a draft contract or other document. As the user signifies his or her choices, the application builds a document to reflect those choices.

The proposed specification will not promote any particular approach to document assembly. Different applications will have particular requirements for markup in the precedent documents. While this may diminish the value of a standard to users, it is unavoidable at this time. If software vendors can work with the proposed generic, structural markup there will be significant advantages to user enterprises who use that schema.

7.3.1.2 Issues for contracts with negotiated terms

Typically, the document assembly process produces only a first draft contract document. The author must then modify the draft to tailor it to the particular transaction at hand. Since authors work with word processing applications, it is assumed that an XML precedent must be translated to a word processing format or that an XML editor must be used for further drafting. If this approach is to work, the resulting word processing document must be of the same standard as one created from scratch in a word processing application. For example, it must have named styles and automatic numbering.

7.3.1.3 Issues for standard form contracts

In this case, the document produced by a document assembly process will be the final document submitted for assent. It is assumed in this case that there is no negotiation over narrative terms of the contract.

In this case, it is necessary only to transform the XML precedent document into a suitable rendition for assent.

7.3.1.4 Issues for click through contracts

As for standard form contracts.

7.3.1.5 Issues for computer negotiated contracts

As for standard form contracts.

7.3.1.6 The role of XML markup

While document assembly processes are undertaken without XML, there are many disadvantages, as previously stated. XML provides the benefits described in section 7.2.2.6.

7.3.1.7 The role of a standard

The benefits of a standard are the same as those listed in section 7.2.2.7.

7.3.1.8 Specific requirements

Requirements R-1 to R-6 apply to this process.

R-7 The schema must provide sufficient definition of content objects in contract documents that user applications can:

- (a) define and apply automatic numbering schemes to those objects;
- (b) generate desired renditions, including but not limited to print, RTF, PDF, HTML and text to speech ready formats.

R-8 The schema must enable users to include all content necessary to create a contract document that could be used as an assent document. This does not require that attachments such as plans and other documents created by other persons must be marked up using the schema.

7.3.2 Variables substitution in new drafts

7.3.2.1 Background to requirements

Variables substitution involves the insertion of data values into placeholders in the narrative text of a precedent document or contract.

Variables substitution may occur with or as a separate process to document assembly. When highly standardised documents are used, variables substitution with a precedent contract may be the only process needed to prepare a contract document.

7.3.2.2 Issues for contracts with negotiated terms

Typically, the contract author will enter or import data values into a database format suited to the available processing software. Precedent documents may contain named placeholder markers which are replaced by the data values. The software provides a facility for the author or a system administrator to map named placeholders to data values in the database. When the draft document is otherwise complete, the data values are inserted into the document.

This process does not require the use of XML. It is commonly performed with word processing documents using a range of different software applications. The proposed specification is not concerned with word processing based operations.

If precedent documents are maintained in XML format, it is possible that variables substitution may be performed on the XML document or on a word processor version after translation. The proposed specification is not concerned about how or when variables substitution is carried out.

In word processing formats, some software vendors can read placeholder markers from other software vendors. This mitigates the lack of standards but does not reduce the need for costly data conversion from time to time.

There would be advantages to user enterprises if the placeholder markers in XML documents are standardised to provide greater interoperability of precedent documents with software from multiple vendors. It is not clear if this is practicable at this time. Consequently, it is proposed that the specification for markup of placeholders is non normative in the first version.

The placeholders for variables substitution in precedent documents are essentially placeholders for embedded data values. If marked up in the XML, the values can be extracted by processing applications.

7.3.2.3 Issues for standard form contracts

The issues are essentially the same as for contracts with negotiated terms.

7.3.2.4 Issues for click through contracts

As for standard form contracts.

7.3.2.5 Issues for computer negotiated contracts

As for standard form contracts.

7.3.2.6 The role of XML markup

XML markup may provide a way to standardise placeholder variables in precedent documents, if supported by software vendors.

XML markup of placeholders in precedents would make it easy to automatically markup embedded data values for later retrieval in downstream processing applications.

7.3.2.7 The role of a standard

A standard would be advantageous, for reasons canvassed earlier. It would be difficult to expect compliance with so few software vendors represented on the TC. It is proposed that this part of specification will be non normative.

7.3.2.8 Specific requirements

Requirements R-1 to R-6 apply to this process.

R-9 The specification must define one or more elements as placeholders in XML precedent contracts that can be used for variables substitution. Variables substitution includes the insertion of markup to permit the extraction of embedded data values from contract documents.

R-10 The specification must include the facility for persons who prepare precedent contract documents to define the content that is required to be inserted for each variables placeholder.

7.3.3 Custom authoring of contract terms

7.3.3.1 Background to requirements

All new or original contract terms have to be drafted by a person with relevant legal, business and technical skills. Contract terms in all negotiated or standard form contracts begin life in much the same way. Once they are incorporated into standard form contracts, they can be re-used in many instances of that standard form contract.

When contract terms are to be incorporated into standard form contracts, it is realistic to expect that frequent users of those terms may make the effort to enhance the value of those terms by applying metadata or by developing deontic contract language versions to provide various levels of machine readability considered useful by the parties.

When the terms are created for a single contract instance, it is unlikely that these value adding activities will be undertaken, as discussed in section 4.5. Human authored documents that have not been subjected to specialist review will not provide reliable machine readable contract information.

7.3.3.2 Issues for contracts with negotiated terms

The assumption in the negotiated contracts case is that negotiated contracts may contain some custom drafted or original contract terms. Very often these are combined with precedent terms.

Custom terms can be prepared by a wide range of authors. It is difficult to require that they use any particular software applications. Contract authors will be expected to use commonly available tools such as word processing applications to draft new contract terms.

Authors of custom terms will commonly have little incentive or need to develop complex metadata for those terms. It is highly unlikely that the parties will prepare deontic contract language versions of custom terms. Consequently, any contract with custom authored terms is likely to have limited value for machine readability, even assuming it is prepared using a machine readable format such as XML. As discussed in section 4, this is not likely to be widespread within the near future.

7.3.3.3 The role of XML markup

The use of XML markup for authoring new contract terms would provide these advantages:

- (a) It would facilitate precedent harvesting by avoiding the need to convert from a word processing format to XML markup for precedent storage(section 3.3.7).
- (b) It would allow automated production of renditions according to standard layouts.
- (c) It would permit more efficient document authoring by freeing authors from the need to manage document layouts.
- (d) It would facilitate the publication of contract terms to interested parties for contract management purposes (section 3.3.6).

7.3.3.4 The role of a standard

A standard XML markup for custom contract terms would make it easier for parties to undertake the activities described in the previous section. Software development costs will be reduced.

7.3.3.5 Specific requirements

- R-11 The specification must be designed with the objective of making it easy for authors to prepare custom contract terms using a standard XML schema (refer to section 4.4). However, for the reasons canvassed in section 4, the specification must not assume that negotiated contracts will be prepared using XML markup of contract terms.
- R-12 The specification must permit users to enter clause-level metadata in order to facilitate clause harvesting. Such metadata would include:

- (a) clause author
- (b) source (new, precedent, other party)
- (c) legal character (indemnity, warranty etc).
- (d) precedent value assessment.

However, the specification must not require that authors define any machine readable contract information in the contract document.

- R-13 The TC should make recommendations as to how clause level metadata may optionally be attached to clauses within Microsoft Word, for round-tripping with XML-based systems.

7.3.4 Negotiation and collaboration over draft contract terms

7.3.4.1 Background to requirements

The negotiated drafting process is central to contracts with negotiated terms. All contract types initially may undergo some negotiation when first developed. After that stage, the negotiation process is not relevant to standard form contracts, click through contracts or computer negotiated contracts.

The negotiation processes are described in section 3.3.4.

7.3.4.2 Issues for contracts with negotiated terms

Usually, one party is responsible for maintenance of the contract document during negotiation. The negotiation may proceed by any of these means:

- (a) verbal discussions and revision of the draft;
- (b) written submission of changes in a document separate from the draft terms;
- (c) by exchanging drafts by email and making changes to a copy of the draft contract document using the same kind of editing application used by the contract drafter, typically a word processing application; or
- (d) by suggesting changes within a collaborative editing environment where changes and associated annotations may be tracked in a database system.

Collaborative editing environments are now part of more feature rich content management systems. Alternatively, specialised collaboration platforms are available. These applications allow participants to control access to documents, manage versions, collect suggested changes and

annotations and may provide version comparison features. They may involve publishing the document in other formats, such as HTML.

The advantage of doing this include:

- (a) authoritative version management so there is one source for all versions, including the current version;
- (b) the parties can access the document at their convenience, from anywhere;
- (c) it is easier to manage security, including to encrypt the document in transmission.

In most cases today, the contract document is accessed and edited as a whole, rather than at the level of the individual clause. This is because non-XML word processing representations of a contract document do not lend themselves to that sort of manipulation [see section 6.2.2]. This makes it difficult to trace changes as the draft undergoes major changes when clauses are relocated in the document and re-numbered.

7.3.4.3 The role of XML markup

XML markup of draft contract documents that are to be managed in collaborative editing environments will allow drafts to be more easily managed at the level of individual clauses. This will allow:

- (a) clause level versioning, regardless of how the clause is re-numbered or re-located within the document;
- (b) clause level audit trail and history;
- (c) at-a-glance reporting on the status of a negotiation;
- (d) clause level access control, meaning other parties can see a modified clause as soon as it is approved, rather than having to wait for the entire document to be approved;
- (e) simultaneous editing of multiple clauses by different authors.

Not everyone will want to work with XML content. The use of XML for draft contracts will enable those organisations to meet the needs of all parties by providing drafts in renditions that suit their needs.

7.3.4.4 The role of a standard

Today, the shared workspace is typically owned and managed by one of the parties to the contract. The other parties may be unable or unwilling to entrust their own records and working notes to it.

One role of a standard would be to make it easier for parties to maintain their own record of versions and annotations from the collaborative

process. For example, they parties may be able to exchange content chunks between systems using technologies such as WebDAV/DeltaV, JCP 147 & 170, XML:DB and Montag.

Another role of a standard would be to facilitate the production of a wide range of renditions to suit the needs of parties where the collaboration environment is unsuitable.

7.3.4.5 Specific requirements

Requirements R-1 to R-3 apply to this process.

- R-14 It must be possible for processing systems to attach unique identifiers to distinct content objects defined by the XML schema described in requirements R-1 and R-3.

7.3.5 Publish draft contract documents in multiple renditions

7.3.5.1 Background to requirements

One of the main reasons why contract authors may draft contract documents using an XML authoring application is to facilitate the use of a collaboration system, as described in section 7.3.4. However, a contract authoring party may have other reasons for using XML.

Regardless of the reason, if a party uses XML, it must be able to publish the draft in a variety of renditions to suit the needs of other parties and to create renditions for assent.

7.3.5.2 Issues for contracts with negotiated terms

These contracts are frequently published in draft form.

7.3.5.3 Issues for standard form contracts

Standard form contracts must be presented to the party in a human readable form before the contract can be finalised.

7.3.5.4 Issues for click through contracts

As for standard form contracts.

7.3.5.5 The role of XML markup

The use of XML should allow the automated production of multiple renditions from a single XML source document.

7.3.5.6 The role of a standard

A standard should facilitate the development of inexpensive applications to generate renditions.

7.3.5.7 Specific requirements

Requirements already stated are sufficient for this section.

7.4 Assent by parties to the contract

7.4.1 Assent to contract terms

7.4.1.1 Background to requirements

The way in which the parties may assent to a contract varies widely according to the legal requirements and the nature of the transaction. Common transaction types are described in section 3. This section considers each transaction type to determine the possible role and benefits of XML and a standard.

7.4.1.2 Issues for contracts with negotiated terms

Most commonly, the parties to a contract with negotiated terms will wish to signify assent by applying a conventional signature to a printed contract document. Because the terms have been subject of negotiation, it is imperative that the parties clearly identify a record of the exact terms agreed. There is no evident reason for this to change.

7.4.1.3 Issues for standard form contracts

Except in the case of click through contracts, it is most common for a printed contract to be submitted for assent. Assent may be signified in a variety of ways, according to the nature of the transaction.

7.4.1.4 Issues for click through contracts

An electronic version is usually presented or made available at the end of a link for the purchaser to view before completing the transaction. Usually, assent is manifested by clicking an "I agree" button or similar (see section 3.6, figure 7-6). The purchaser will be presented with a rendition of the contract, not the source XML document. If an XML document is retained by the online service provider and not an ephemeral rendition displayed in a web browser, it may be necessary to ensure that the versions of the relevant terms held by the service provider can be related to the exact contract terms accepted by each particular customer. Depending on the frequency of changes to the contract terms, this may be more efficient

for the service provider than permanently storing large volumes of complete renditions of contract terms. This can be managed in database systems provided that each version of each term in the contract is permanently stored and uniquely identified.

7.4.1.5 Issues for e commerce master contracts

As discussed in section 3.7, figure 8-2, assent may be manifested by signing a printed contract or by entering an electronic acceptance. It is possible this could utilise a digital signature mechanism.

7.4.1.6 The role of XML markup

Based on the analysis in section 4.12.2, the TC has not identified a generally applicable role for XML markup in this process.

7.4.1.7 The role of a standard

The TC has not identified a generally applicable role for a standard in this process.

7.4.1.8 Specific requirements

There are no additional specific requirements.

7.5 Contract management – contract activities

7.5.1 Extract contract states, obligations, rights etc into exchange format

7.5.1.1 Background to requirements

The problems affecting contract management are listed in section 6.4. There is a need for parties to a variety of contracts to be able to communicate information about their rights and obligations under contracts to other persons or to collate this information for contract and financial management purposes.

It is clear from the analysis in section 4 that narrative contract documents are not currently prepared using XML and that this position is unlikely to change to any material degree in the near future, except in niche situations. If the TC were to develop an XML standard for the extraction of machine readable information from executed contract documents, it is highly unlikely that the standard would benefit many persons with contract management needs. An XML document on which a narrative contract document is based will not be the authoritative contract document (section 4.12.3). Even if an XML contract document is available, the limitations inherent in human authored documents discussed in section 4.5

will limit the value of any machine readable contract information. While it is possible to conceive of particular cases where the position may be different, these are highly specialised. Another approach is required if the needs of a wider community are to be met.

Further exploration of the issues relating to contract management is required with input from parties involved in the development of contract management applications. The TC does not have a working commercial model for the exchange of machine readable contract information by contract parties. For example, it is unclear whether all parties to the transaction share information maintained by one party or that each would wish to maintain their own contract management systems.

If several parties maintain these systems, do they need to work from a common information resource but then add particular information that may be relevant only to that information? For example, one might want to extract financial details into its accounting system while the other may not need this.

7.5.1.2 Issues for contracts with negotiated terms

These contracts are the least suitable for extraction of machine readable information or for the definition of associated machine readable information.

7.5.1.3 Issues for standard form contracts

Standard form contracts may justify the effort of creating reliable machine readable contract information, possibly by use of a deontic contract language. It is not obvious to the TC that this information should be embedded in the narrative contract document. Due to the multiple sources of contract information (section 3.3.5, figure 4-1), it is likely to be more efficient to maintain the machine readable information separately to the narrative terms.

7.5.1.4 Issues for e commerce master contracts

These contracts are similar to standard form contracts.

7.5.1.5 The role of XML markup

XML should provide a useful transport layer to communicate contract information to persons who can import it into their own contract management or financial management systems.

If a party to a contract wishes to communicate contract information in machine readable form to another person, the party may need to generate the XML data from its own contract management system or manually

create it as an XML document or by a combination of these processes. It is not envisaged that the parties could expect to extract this information from a XML narrative contract document defined by the TC's specification.

7.5.1.6 The role of a standard

A standard would be essential to the effective transmission of contract information between contract management systems.

7.5.1.7 Specific requirements

Further analysis is required to determine the exact requirements for this process.

- R-15 It is desirable that the TC develop an XML schema to define contract information that may be transmitted by a contracting party to other persons who require that information in machine readable form.

7.5.2 Communicate contract states, obligations & rights to interested parties

This process is covered by section section 7.5.1.

7.6 Contract management – contract document

7.6.1 Retain or preserve assent document

7.6.1.1 Background to requirements

The problems affecting management of the contract document are described in section 6.5.

Few, if any, circumstances have been identified where the assent document will be an XML document. If the contract document is prepared as an XML document, the assent document will almost always be a rendition from the XML document that provides convenient human readability and a suitable form for assent by the parties.

However, there may be cases where a set of standard form contract terms are required by the parties after assent. As discussed in section 6.3, this may occur with click-through contracts.

7.6.1.2 Issues for contracts with negotiated terms

It is unlikely the assent document will be an XML document. However, the parties may preserve the XML document used to generate the assent rendition. No specific requirements are raised by this prospect.

7.6.1.3 Issues for click-through contracts

If an on-line service provider maintains the narrative contract terms for the click-through contract in XML format, this may be useful to persons who wish to later retrieve those terms, particularly terms dealing with a particular subject matter. As discussed in section 6.3.4, the initial specification will provide only for the representation of the narrative contract terms. Initially, the parties will need to determine a transaction framework for customers to access those terms. Some users may want an XML document to import into a contract management system. In many other cases the customer will prefer information extracted from an XML document to be rendered in a more human readable form.

7.6.1.4 The role of XML markup

Except in the case of click-through contracts, there is no identified role for the use of XML in preserving the assent document. It is possible that an XML document used to create the final renditions used for assent may be retained and verified as still being an accurate statement of the contract terms. It may be useful in providing a source for delivery of a particular renditions desired by the parties or other persons who need continuing access to a copy of the contract terms.

In the case of click-through contracts, service providers may be persuaded to hold the narrative contract terms in an XML format to facilitate extraction of information by the customer. The use of XML may assist customers to look up terms dealing with a particular subject matter and to find relevant historical versions in much the same way it would facilitate document assembly processes discussed in earlier sections.

7.6.1.5 The role of a standard

Except in the case of click-through contracts, there is no identified role for a standard.

For click-through contracts, preservation of narrative contract terms in a standard form would facilitate information retrieval by customers. It would be particularly important that metadata such as the categorisation and version information for contract terms should be in a standard form.

7.6.1.6 Specific requirements

Requirements R-1, R-2, R-5 and R-7 apply to this process. No additional specific requirements have been identified.

7.6.2 Prepare variations to contract

7.6.2.1 Background to requirements

Variations to a contract terms are normally prepared using the same processes as the original contract.

In some contracts, such as construction contracts, provision may be made for variations to specifications. These ought to be managed in accordance with the contract procedures but this does not always occur. It is possible that details of variations ought to be retained by a contract management system as a parallel process to the preparation of variation documents.

There are no identifiable different issues affecting variations under each contract type, if they occur. Variations are less likely for standard form contracts, click through contracts and e-commerce contracts.

7.6.2.2 The role of XML markup

The role of XML markup in the preparation of contract variations is essentially the same as for the original contract document.

7.6.2.3 The role of a standard

The role of a standard in the preparation of contract variations is essentially the same as for the original contract document.

7.6.2.4 Specific requirements

No additional specific requirements have been identified.

7.6.3 Maintain variations and contract versions

The issues and requirements for the maintenance of contract variations and versions are much the same as for the original contract document where the parties desire to maintain a record of versions developed during contract negotiations. This will be handled by document management systems.

Details of variations and versions may be retained within a contract management system.

7.6.4 Publish contract terms to interested persons

This issue is dealt with in section 7.6.1.

7.7 Other processes

7.7.1 Map negotiated parameters to contract terms for computer negotiated contracts

7.7.1.1 Background to requirements

Human negotiation is slow, expensive, and inefficient. Automated negotiation promises to speed up the negotiation process for commodity transactions while increasing the value all parties derive from the transactions.

The output from an automated negotiation process is a set of parameters or 'business terms' that the parties have agreed to.

What is then needed is a system that allows a 1 to 1 mapping between this set of parameters and a contract representing an agreement with those parameters.

It is not clear how a set of contract terms will be maintained by the parties to a computer negotiated contract. A master contract may be established that provides the terms for all possible outcomes from the negotiation process. Alternatively, a process similar to a document assembly process may be undertaken and a document generated that contains only those terms necessary to the negotiated contract. In the absence of a commercial implementation it is difficult to envisage the approach which should be taken.

7.7.1.2 Issues for computer negotiated contracts

As long as there is a unique representation for each parameter ('business term') the standard should allow the 1 to 1 mapping described above.

7.7.1.3 The role of XML markup

XML seems an appropriate technology to provide support for the extensible set of name value relations required to represent business terms resulting from automated negotiations.

7.7.1.4 The role of a standard

Where multiple parties need to access a common data source, it is highly desirable that the data is stored in a standard form so that reliable and inexpensive interfaces to business systems can be established. If the narrative contract terms are retained in XML format, a standard should be specified for that format.

7.7.1.5 Specific requirements

- R-16 The standard must support a method that allows parameters ('business terms') resulting from an automated negotiation process to be unambiguously linked to the corresponding narrative terms.

8 Overview of the proposed specification

The TC aims to develop a specification that can be used by the widest range of users at all stages of the contract life cycle. The specific needs of users and the systems they use are diverse. There is only very limited use of XML for document markup at present and processing systems are immature. The proposed specification will set out to achieve core, common objectives with minimal prescriptiveness. Feedback from use of the specification will guide its future development.

The specification will define an XML conforming schema for the generic, structural markup of narrative contract documents. This will include a framework to add contract metadata and embedded data values markup to suit particular contract transactions. It will be up to interested industry sectors to define particular semantic XML vocabularies for metadata and embedded data values markup relevant to those industry sectors.

The generic, structural markup will support all document creation and publishing processes described earlier. It will be important that the schema is designed to make it easy for document authors to facilitate the widest possible adoption.

For the foreseeable future, the TC expects that structural markup will be used mainly inside contract authoring enterprises and that there will be little, if any exchange of XML contract documents between parties or other interested persons. Where exchange of XML document does occur, it is as likely that it will be based on industry specific schema, the Microsoft WordML schema or the OpenOffice schema as on the schema developed by the TC.

The structural markup schema will facilitate the use of XML markup in contract documents that can be exchanged between the parties. It can be adopted to support contract management requirements as the relevant exchange protocols and processing systems are implemented by software developers and the parties.

The initial version of the specification will define normative components only as far as necessary to promote support from software vendors.

The specification may define protocols for the exchange of contract metadata and embedded data values between the parties and other interested persons for contract management purposes independently of the

narrative contract document. These protocols would make no assumptions about the use of XML markup for narrative contract documents or the schema used for XML markup of those documents. It will be up to the parties to extract this information from database systems, XML documents or to create the exchange data manually, according to the systems available.

Exchange protocols for metadata and embedded data values will be of limited utility unless implemented by contract management system vendors. The TC does not have any contract management vendor representation. This part of the specification will be non normative. Dr Leff proposed that such features might be marked as "for experimental use and preliminary adoption".

In a future version, the specification may define protocols for the use of deontic contract language markup separately from the generic structural markup of the narrative contract documents and for the exchange of deontic contracts language markup between interested parties. Again, it is highly desirable that the TC establish representation from contract management system vendors before undertaking that work.