

# **DRM USE LICENSE NEGOTIATION USING ODRL V2.0**

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## Abstract

This proposal uses the latest draft of the proposed ODRL v2.0 rights expression language to create and demonstrate negotiation protocols for DRM. In [7], Camp discussed why DRM is not equivalent to copyright enforcement. Last year, we discussed in [5], how DRM is in fact the enforcement of licensing agreements, and promoted the use of negotiation in DRM as a mechanism to handle fair use scenarios.

In this proposal, we discuss the legal framework required for handling contracts, and how these requirements are currently handled in ODRL v2.0. We then detail our proposed negotiation protocols for two of the three types of negotiation – bidding and bargaining (the third type, auctioning, can easily be handled without any new technology). We also provide a full bargaining example that demonstrates the power of our proposed protocol. By using a REL in the protocol specifications we remove the need to translate between the protocol and the rights expression language, thus speeding up the overall license acquisition process and reducing the risk of translation errors.

## 1 Introduction

Rights Expression Languages (RELs) are often referred to as the most crucial component of DRM systems [9]. For this reason, there has been a lot of focus on developing RELs. In [8], Coyle distinguished RELs into three different categories:

1. expression of *copyright*
2. expression of *contract* or *license agreements*
3. control over *access* and/or *use*

In [5], the authors argue that DRM should not be seen as a mechanism to enforce copyright law but rather as a mechanism to enforce contracts on access and usage of digital data. In such a view, the primary role of a REL is not to express copyright but rather to express contractual agreements. Consequently, DRM systems can then be seen as the enforcement of such contracts. In [8], Coyle concluded that none of the current RELs – including general purpose RELs such as ODRL and MPEG-21/5 – have the full functionalities required for such purposes. For example, the lack of bi-directional expression (from the user to the rights holder) has been cited as a deficiency in RELs by Mulligan et al. in [10]. This problem was addressed in [4, 3], and used as a basis for creating a basic negotiations protocol for DRM in [5].

The Digital Media Project (DMP) has identified various technologies as requirements for IDP-3 technologies. These technologies include:

1. Represent License
2. Protocol to negotiate license

In a separate proposal, the Open Digital Rights Language (ODRL) WG motivates the use of ODRL v2.0 as a technology to satisfy “*represent license*”. In this proposal, we make use of ODRL v2.0 together with some negotiation protocols to motivate its usage as a technology to satisfy the second requirement: “*protocol to negotiate license*”. We believe that negotiation of use licenses is closely linked with representation of the license and have thus linked our proposal closely with a rights expression language (REL). It should be noted however that the protocols could be used with any REL and have demonstrated similar capabilities (although very basic and undeveloped) using XrML and ODRL v1.1 [3, 5].

As discussed previously, licenses are a specific type of contract, while negotiations can be defined as a process that concludes a contract between two or more parties. For this reason, we start of our proposal with an examination of the legal frameworks needed for a valid contract<sup>1</sup>. We then expand the simple negotiation protocol discussed in [5] to a complete negotiation protocol and extend the requirements for bi-directional communication for a REL. We then examine how our proposal meets the requirements of the DMP and provide a complete negotiation example.

## 2 Legal Perspective

In [12], Sharrock defines a contract as “*an agreement which creates an obligation or obligations between the parties to the agreement*”. He further adds that while all contracts are agreements, not all agreements are contracts as agreements do not necessarily give rise to obligations. In the DRM arena, there are usually two parties to an agreement – the rights holder (usually represented by the distributor like Apple, Napster etc.) and the user. Typically, in a DRM use license, the user agrees to pay for the right to access and use a digital resource, which is provided by the other party, under the terms and conditions laid out in the use license. This creates an obligation from the user in addition to the obligation created by the rights holder/distributor with respect to the supply of the digital resource. Thus, use licenses can be considered as a contract between the user and the rights holder/distributor.

Licensing contracts can be formless, and there is very little (if any) information that is mandatory in a licensing contract. However, in most legal systems, it is often recommended for a licensing agreement to have some information that removes ambiguities should a dispute arise. We discuss these elements in this section, and how ODRL v2.0 meets this requirements.

For a contract to be valid, it needs to be understood and accepted by both parties (“*meeting of minds*” [12]), be complete, lawful<sup>2</sup>, possible<sup>3</sup> and both parties must be of contractable age<sup>4</sup>. These issues do not impact directly on our proposal but have wider implications in the implementation of DRM systems. In the remainder of this section, we detail the requirements posed by most contracts and the effect on REL requirements.

Although the negotiation of licenses is primarily a commercial transaction, there is also a legal aspect to the transaction. For this reason, the legal aspects of a license needs to be catered for in RELs and these aspects need to be negotiable.

### 2.1 Jurisdiction and Dispute Resolution

Jurisdiction and the dispute resolution mechanisms go together and are very useful in resolving contract disputes speedily and efficiently. In dispute resolution, the parties resolve to go to a mutually agreed party to arbitrate their dispute and is often a cheaper avenue to pursue than full litigation. Should this fail, or if a party does not wish to take this route, they can choose to sue the other party. Jurisdiction determines where a party can be sued.

### 2.2 Choice of Law

Because of the international nature, it should be possible to choose which law governs the licensing agreement. This is potentially very important in DRM. For example, in EU copyright directive, the rights holder does not have to provide for fair use clauses if the work is provided under a licensing agreement [1]. However copyright

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<sup>1</sup>In this proposal, we have used South African contract law as the basis for the legal requirements. Since we are only looking at the core requirements of a contract, there should be very few (if any) differences between South African law of contract and other laws of contract especially as South African law is largely based on Roman-Dutch law. This section has also been reviewed by a leading South African law academic who specialises in commercial and electronic law.

<sup>2</sup>The contract itself should not involve actions that break the law. This could be problematic due to the scope of international law. These aspects are not fully discussed in this paper, but we do try to cater for it as much as possible.

<sup>3</sup>Terms and conditions of a contract should be possible to achieve by both the parties concerned.

<sup>4</sup>For licensing agreements, a party could be younger than the contractable age but there is always a possibility that the contract could be cancelled if the minor’s guardian objects. In such a case, all the parties need to return the objects exchanged.

law in most other countries does not have such restrictions. Thus, it would be advantageous for music labels to base their licensing agreements under EU law rather than, say South African or Australian law. The choice of law would be influenced by the chosen jurisdiction.

### **2.3 Liabilities**

Many contracts related to the provision of goods and services limit the liability of the provider (for example: “vehicle parked at owner’s risk”). Like dispute resolution, current products offered with DRM protection probably do not require such statements, but future works might. It could also be interesting to provide different pricing models according to the liability risk carried by the supplier. For example, if the license covers software, the rights holder could provide the software at a very low price but with no guarantees on performance while at a much higher price with guarantees on performance or number of bugs.

### **2.4 Time of Contract**

Some recent laws governing electronic commerce, like South Africa’s Electronic Communications and Transactions (ECT) Act of 2002, provide guidelines to determine the time of a contract if the information does not exist on the contract [2] (using timestamps on email messages for example). However, not all countries have such guidelines, and parties may wish to draft their own time of contract. A time of contract is also crucial if the license is valid for a specified period (such as one year) or the parties are in different timezones.

### **2.5 Signatures**

In most countries, valid signatures are not required for a valid contract. However, signatures are often seen as the primary mechanism for proving non-repudiation of the parties in a contract. In recent times, many countries have passed regulations authorising digital signatures (utilising encryption and message digest algorithms) as equivalent to the traditional signature. Digital signatures are also useful in proving the integrity of a digital object. Most RELs including ODRL already provide for digital signatures.

### **2.6 Lifetime**

An offer usually lasts until either a specified time or a “reasonable time”. After that, the offeror is not bound to honour the terms and conditions specified in the offer. However, in an electronic medium, there are very few (if any) precedents that can be used to determine a reasonable time for an offer. For this reason, it is useful (and good practice) to specify the lifetime of an offer.

Contracts also have lifetimes, and current DRM systems choose to have “never ending” use licenses. The lifetime feature for offers should therefore be extended to also cover the final use license.

### **2.7 Offer, Counter Offer and Requests**

An *offer* can be defined as a “*a proposal of certain terms of performance made with the intention of being agreed to by another person*” [12]. A *counter offer* could be then be defined as a “*a proposal from the offeree accepting the offer but on different terms*”. In [12], Sharrock explains that a *request* is different to a counter offer, because a counter offer effectively voids the previous offer while the request has no legal effect.

However, offers and counter offers create specific requirements themselves. Specifically, electronic transaction law in some countries (like South Africa’s ECT Act [2]) insist on certain regulations, especially regarding consumer protection from the party that makes the offer. Thus, when a client makes a counter offer, (s)he would be required to abide by such regulation removing certain features like the potential for anonymous negotiations (from the client).

For this reason, Request, Offers and Counter-Offers have been made available for use in ODRL v2.0.

## 2.8 Country of residence (for offeree)

Regardless of the nationality of the offeror, the offeree's country of residence places obligations for the offeror in terms of some laws especially consumer protection laws and tax implications. For example, in the case of a EU citizen, a rights holder outside the EU cannot store personal information unless they have signed a safe harbour agreement.

## 2.9 Fair Use Policy

In [5], the authors detailed a mechanism to enable a degree of fair use through the use of negotiations. This element in the license allows the offeror to detail their approach to fair use. Thus, if the license agreement is based in Europe, the offeror can state that fair use is not offered. This approach also removes the ambiguities present in current DRM systems.

# 3 Negotiations

Negotiation can be defined as the process whereby a contract is concluded. In [13], the authors distinguish three types of negotiations:

1. **Bidding:** The buyer specifies the service or product that he needs and asks bids from potential suppliers. The buyer then selects one or more of the suppliers to provide the service or product. Currently, no REL can support bidding.
2. **Auction:** The auction can be viewed as the opposite of bidding where the supplier of the product or service promises to perform the service or deliver the goods to the customer with the highest bid. There are a variety of auction types, and current RELs should be able to handle auctions as price is the only "negotiable" component of an auction.
3. **Bargaining:** Bargaining is the most flexible type of negotiation allowing all the parties involved to dynamically change the terms and conditions to suit their needs. The extensions proposed in [4] are the first steps to creating a REL that supports bargaining.

Current RELs only support "auction like" transactions where the suppliers determine a fixed price for the product under fixed terms and conditions. While these types of transactions are largely fine for most consumer oriented digital data (for example music), they are not useful for automating business use of digital data or for more non-consumer oriented use of digital data (for example large volume purchases for academic usage). As discussed in [5], bargaining could also be used as a mechanism to assure fairer usage of digital media, and opens up possibilities for allowing "fair use" scenarios not possible with current RELs.

In [13] Su et al. also discussed two important components for electronic negotiations:

- a formal protocol, and
- an effective AI agent to carry out the task.

In [6], Bartolini et al. added two further requirements for automated negotiation:

- a language to define rules of negotiation, and
- a language to express negotiation proposals.

We contend that ODRL v2 is a REL that is able to express negotiations and the final use license, as required by the DMP. Thus, we have used ODRL v2 as the basis for our negotiation protocols. In the remainder of this

section we present structured protocols to conduct negotiations (we are currently investigating the possibility of formalising the protocols using formal description languages). We then use these protocols as a base to determine the requirements for such a language which is discussed later in this paper. We do not consider the negotiation agent nor the mechanisms to determine its actions in this proposal.

### 3.1 Bidding

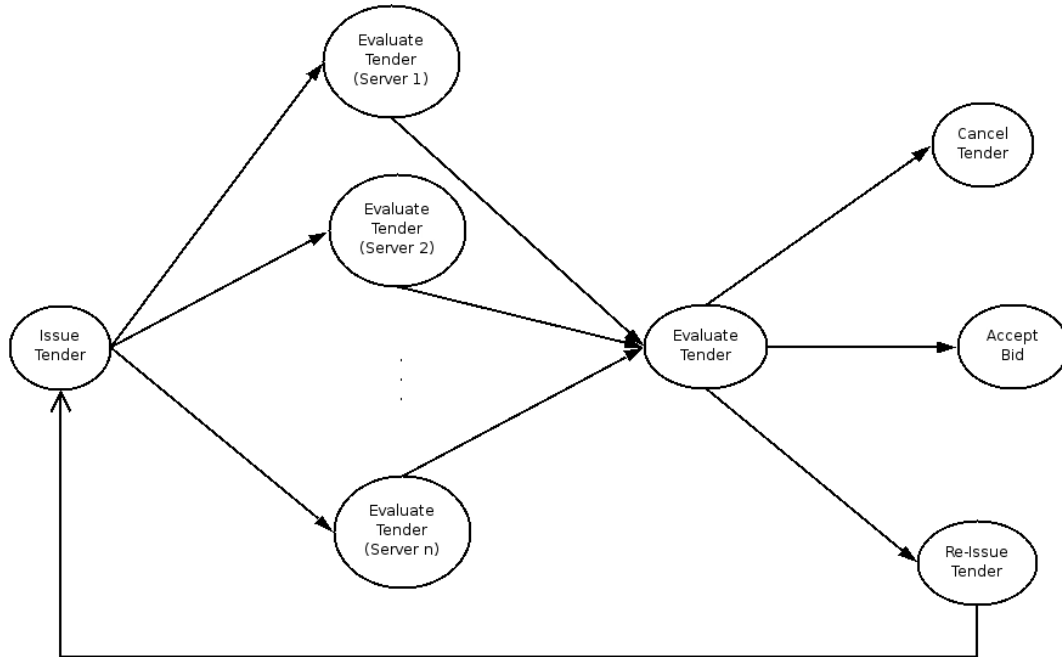


Figure 1: Bidding Process

Bidding does not have much impact for consumer oriented DRM products, but could have massive impact in business transactions conducted over the Internet. For example, an advertising agency could be looking for classical music to accompany their television advertisements. For this purpose, they create a tender inviting musicians, groups etc. to supply the music under certain terms. Prospective groups can then formulate their offers, possibly offering different terms (for example a larger catalogue of music) and their prices. The advertising agency can then consider the offers and make their choice accordingly. This type of scenario cannot be handled by current DRM systems, nor by the simple negotiation protocol proposed in [5].

A flowchart showing the bidding process is presented in figure 1. The client issues a *tender* outlining the data they are interested in, the terms and conditions they would like for having access to such data and the time limit for responses to the set of servers. The servers then evaluate the tenders and create appropriate offers (if interested) outlining their price. The client can then evaluate the various offers and choose a winner, re-tender or close down the tender process and not choose any of the bids. Feedback is not mandatory, although it could be good business practice to outline why a tender is rejected.

### 3.2 Auction

Auctions can be easily accommodated on existing online auction infrastructures like those provided by eBay.com and others. This is because, the terms and conditions attached to the data is fixed and only the price is subject to change. In general, auctions do not make much sense for digital data as digital data is easily reproducible and thus do not offer “uniqueness” that is often associated with auctioned items.

### 3.3 Bargaining

Bargaining is the most complex negotiation strategy, but it is also the most powerful as it can be used not only for new use licenses but also to change existing use licenses. In [5], the authors discussed the use of bargaining as a mechanism to enable fairer use licenses for consumers, and as far as we are aware, this is the only technical approach to fair use for DRM systems.

A bargaining protocol is shown in figure 2 and is a refinement of the simple negotiation protocol discussed in [4, 5]. The protocol assumes that the client communicates with the correct rights holder (or appropriate representative). It also assumes that the rights holder is willing to offer a license agreement to the client. Catering for the above two scenarios is not shown in the protocol but is trivial to handle.

Analysis of a request, or counter-offers, from clients should depend on the business scenario presented by the client. The protocol can handle anonymous clients, but anonymity may not be an ideal bargaining position for the client. For example, a well established client, with a long history of business association, could get more favourable terms and conditions compared to a new client. In such a case, the knowledge of the client's identity is required before the rights holder makes their decision. Similarly, a client wanting a transaction of high monetary value could be allowed a discount. In this case, anonymity of the client can be preserved unless there is a legal requirement forbidding anonymity of the client. The business logic used for negotiation is not discussed in this proposal, but needs to be addressed before the full power of bargaining is realised.

There is a possibility for a deadlock condition if the client refuses all the offers offered by the rights holder but continues to attempt to negotiate a favourable license. This does create an added problem should the client be automated as it could create a potential denial of service attack. To avoid such a scenario, it could be useful to extend the protocol to keep count of the number of negotiation requests from a particular client during a particular session and stop negotiations after a predetermined number of negotiation cycles, but such decisions would depend on the business logic and the scenario of the negotiations.

## 4 Protocols

The protocols are a representation of the flowcharts presented in the previous section. Most of the messages in the protocol can be expressed in ODRL, and these sections are contained in [ ] brackets. The legal and signature elements in a license are always optional. ODRL can express legal, communication and the license requirements for a DRM rights transaction. ODRL licenses can also contain XML digital signatures providing data integrity. Because ODRL licenses are expressed in XML, they can be communicated via SOAP messages. Additional data not expressible in an ODRL license can therefore be communicated through the SOAP messages.

### 4.1 Notation

Communication: The set of communication data (like request and accept).

Legal: The set of legal documentation required for the process (like jurisdiction).

License: The terms and conditions being negotiated (like permission to play, read, modify etc)

Signature: The digital signature of the document (encompassing everything in [ ])

### 4.2 Bidding

By its nature, bidding is not an interactive, instantaneous process. As shown in figure 1, there are only three parts to a bidding process:

1. The *announcement* of the tender requesting offers
2. The *submission* of offers

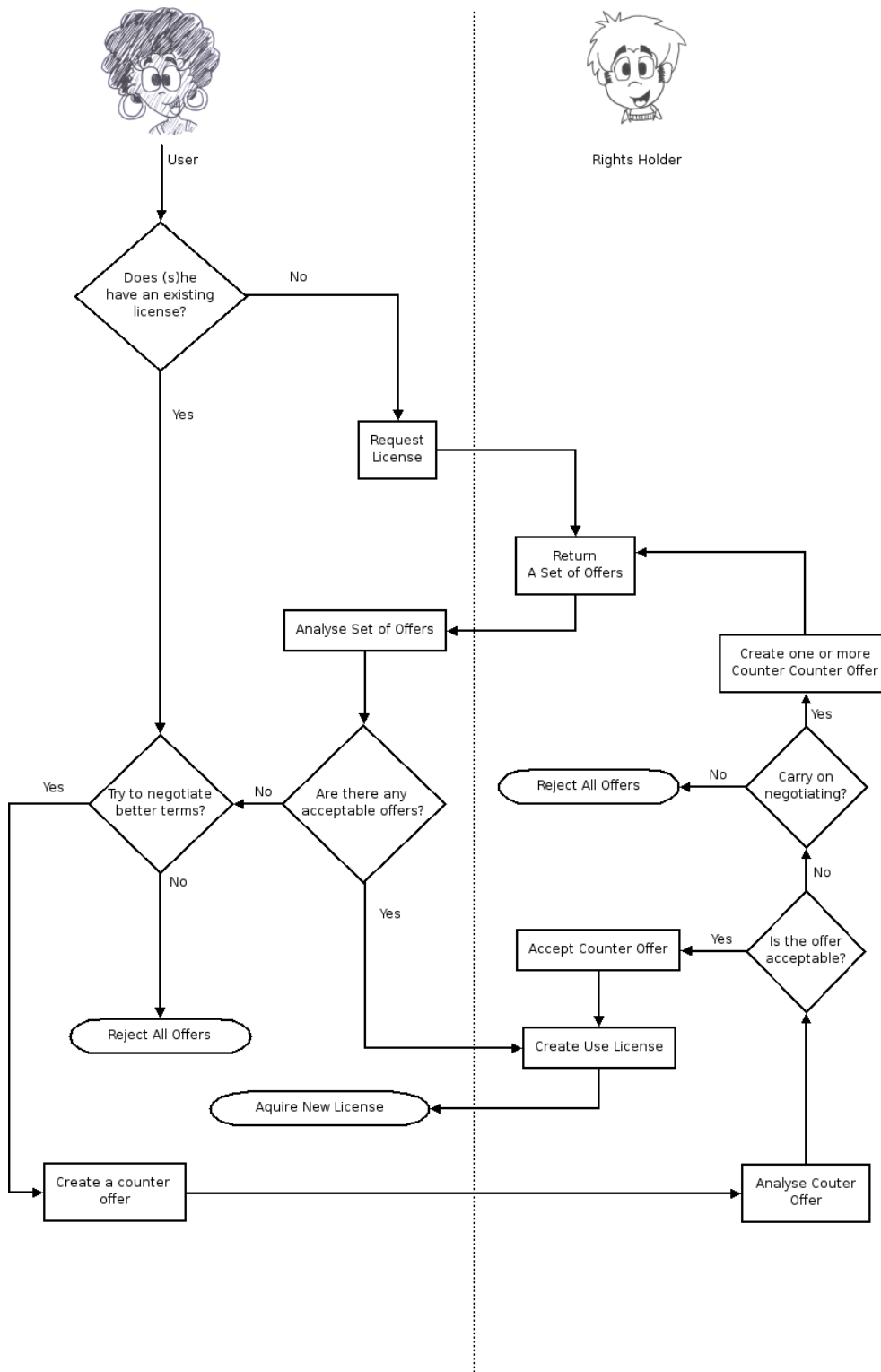
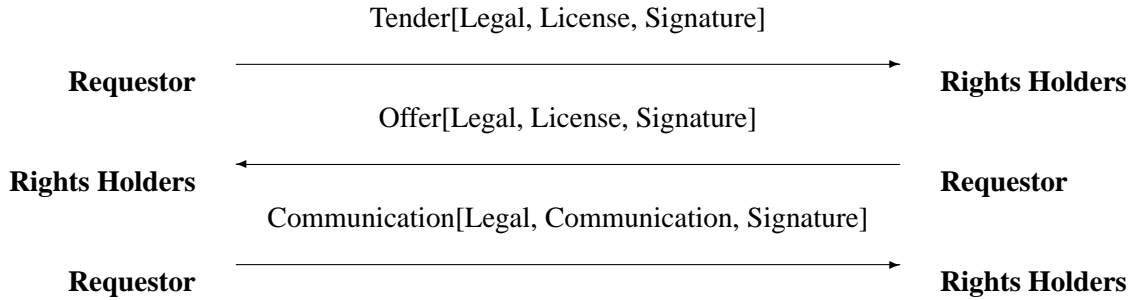


Figure 2: Flowchart for a bargaining protocol

3. The *notification* of the outcome

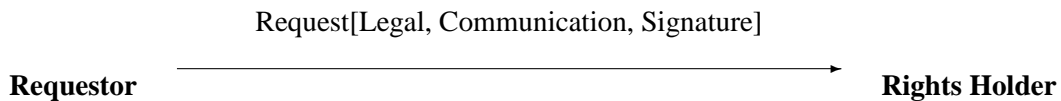
For this reason, the bidding protocol has the following simple high level structure.



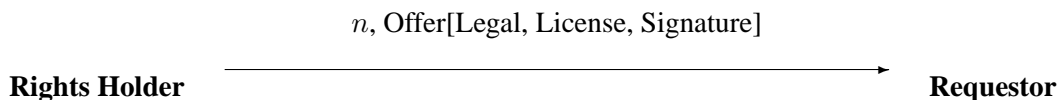
### 4.3 Bargaining

As shown in figure 2, the bargaining protocol is more complicated than the bidding protocol, mainly due to the two different start and end possibilities. But, since one of the start possibilities is also part of the general bargaining protocol (does the client have an existing license), we need to show only the one path for the protocol.

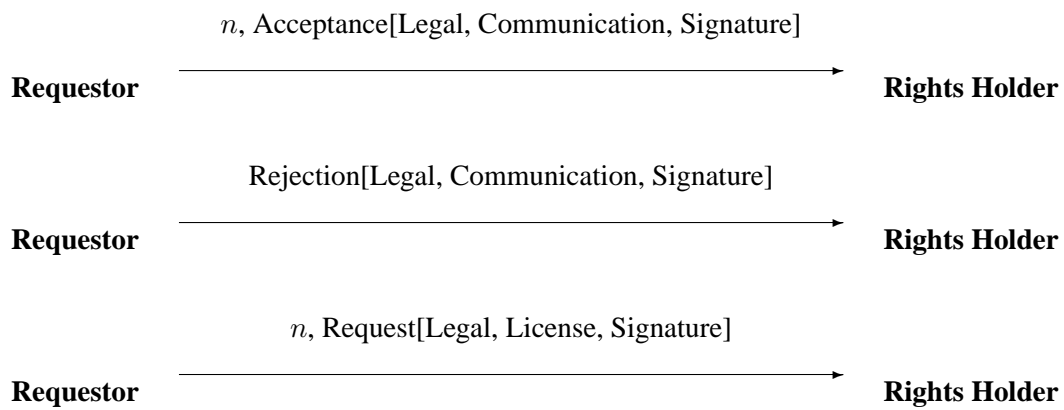
1. The client requests for a new license. The identifier for the digital resource can be communicated using the “communication” element.



2. The rights holder sends back  $n$  offers (where  $n$  is a positive integer) to the requestor.

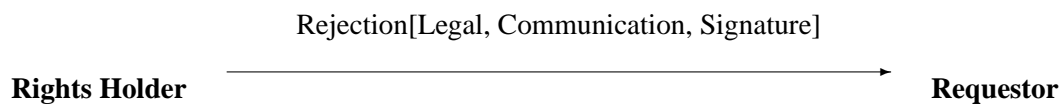


3. After analysing the offers, the requestor can do one of the following:
  - (a) Accept one or more of the offers. Use of multiple licenses for the same digital resource is currently not handled by any DRM system, but there should be no reason why this should not be possible.
  - (b) Reject all the offers, and quit negotiations.
  - (c) Reject all the offers, and enter negotiations, based on one of the offers or create counter offers from scratch. In the later case, a Counter-Offer is created instead of a Request. The requestor can create multiple requests or counter offers.
4. Depending on the requestor’s response, the rights holder does one of the following:
  - (a) If the requestor rejects all offers, the rights holder closes down the negotiation system.

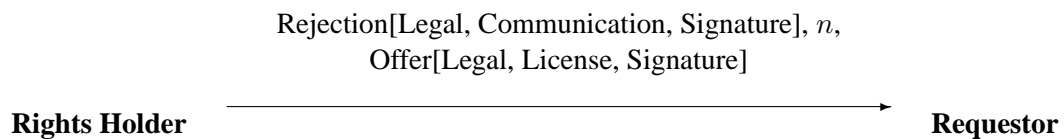


(b) If the requestor proposes a counter offer, the rights holder can:

- i. Reject all proposals and close down negotiations.

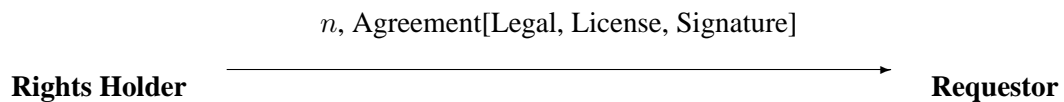


- ii. Reject all proposals, but carry on with negotiations by creating offers that try to satisfy the counter offers.



- iii. Accept one or more of the proposals (see the next step).

(c) If the requestor accepted an offer, or the rights holder accepts one or more of the counter proposals:



All other offers are deemed to have been rejected.

5. Depending on the rights holder's actions:

- (a) If the rights holder wishes to close down negotiations, the requestor also closes down its negotiation system.
- (b) If the rights holder wishes to carry on with negotiations, the protocol goes back to step 1.
- (c) If the rights holder offers agreements, store the agreements and close down the negotiation system.

#### 4.4 REL Requirements imposed by Negotiation Protocols

1. Client Communication

- (a) Create tenders (for bidding)
- (b) Create counter offers
- (c) Request a set of offers

- (d) Request to start negotiation of an existing contract

## 2. General Communication

- (a) Accept an offer (or counter offer)
- (b) Reject an offer (or counter offer) and provide reasons
- (c) Request information (if possible)

## 4.5 Satisfying DMP Requirements

### 4.5.1 *End-Users can express their agreement or disagreements with proposed License terms*

Both end users and rights holders can express their agreement or disagreement over proposed license terms. This is handled through the “Acceptance” and “Rejection” elements in the ODRL license.

### 4.5.2 *The Protocol shall support changes to any parameter of the License*

Because the protocol makes use of the full ODRL v2.0 specifications, any aspect of the license can be negotiated.

### 4.5.3 *The Protocol shall support automatic negotiation of license terms*

The protocol has been designed to support automatic negotiation of license terms. One of the authors is currently involved in a project to create agents that aim to investigate various negotiation strategies.

### 4.5.4 *At every step a human readable license must be provided*

An ODRL license can easily be transformed into a human readable licenses, and techniques have already been developed for ODRL v1.0 for this purpose [11].

### 4.5.5 *The protocol shall enable the setting of certain parameters as non subject of negotiation*

ODRL v2.0 elements have a “tradable” attribute which can specify which parameters are non negotiable.

### 4.5.6 *The protocol shall allow the determination of the degree of confidentiality (no eavesdrop) of the protocol*

The protocol can easily be run through a secure communication tunnel (example SSL) or through encrypted SOAP messages. The level of security can be determined by individual systems concerned.

### 4.5.7 *The protocol shall not require revealing the real identities until the protocol has been successfully concluded*

The identity of the rights holder is always required, but there is no such requirement for the end user. In fact, ODRL allows for totally anonymous end user licenses. The protocol does not require end user identities, but end user identity could help in negotiation decisions (for example, frequent customers getting better deals).

## 5 Examples

In the attached XML files (example 1 to example 7) we provide a complete negotiation cycle, which also demonstrates the power of ODRL.

**example1.xml:** The user, John would like a license for an ebook.

**example2.xml:** The license server replies to John with an offer which gives John the rights to access, display and open the ebook for a period of 6 months.

**example3.xml:** John however would like to acquire a license that lasts for 12 months and would like the right to modify. This is phrased as a request and not a counter offer.

**example4.xml:** The license server rejects the counter offer, because a only one type of agreement is allowed if the user wants the right to modify. It sends this offer in example5.xml.

**example6.xml:** John accepts the offer.

**example7.xml:** The license server generates the final agreement.

## 6 Future Work

We are currently modelling the protocols using petri-nets to formally prove completeness of the protocols. We also have a sub project that is using the protocols presented in this paper to investigate a number of different negotiation strategies for agents.

## 7 Conclusion

Negotiation of licenses is a commercial transaction, and like all commercial transactions in the modern world, it requires a legal framework to operate in. In this proposal we presented the legal requirements for licensing then explored the different types of negotiations including bidding, auctioning and bargaining. We then presented protocols for negotiations together with complete example using ODRL v2.0. We believe that our proposal is complete and satisfies all the requirements set by the DMP for its general DRM technologies.

## 8 Acknowledgements

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