A Data Model for Next Generation Online Dispute Resolution Systems for Cross-border E-Commerce

Pravir Chawdhry, David Norheim and Marc Wilikens

Abstract
This paper presents a data model for developing the new generation of Online Dispute Resolution (ODR) systems with sophisticated end-user service and standard protocols needed to establish confidence in a cross-border e-commerce environment. An analysis of the various activities in the ODR business process have led us to identify the underlying entities that capture the information content of the ODR process. The result is a data model that can be deployed for building a new generation of ODR systems. The data model has been implemented in XML and tested on a simple claim filing process.

1. Introduction: First Generation ODR Systems

Alternative dispute resolution (ADR) is an established mode of conflict resolution in the off-line world to avoid the costly and time-consuming legal procedures of court-based systems. The key ADR mechanisms are: facilitated negotiation, mediation, and arbitration, which involve varying degree of procedural formality. For the disputes between consumers and traders involving the e-commerce transactions, the online version of ADR, known as online dispute resolution (ODR), has emerged in recent

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years [1],[2]. Among the early experiments in ODR were the projects Online Ombudsman [3],[4] and Virtual Magistrate [5] which were soon followed by commercial ODR services for specialised disputes involving online auctions [6], insurance claims [7], domain names [8] and other more generalised disputes [9].

With the growth of e-commerce, new ODR services are still emerging, both on the national and international basis. The extent to which various ADR mechanisms have been implemented in ODR depends on three factors: technological means, compatibility of the online paradigm with the dispute resolution process, and maintaining user trust. Some of the common features of ODR systems include the following:

**Operational features:**
- automated bid – offer strategy for simple financial disputes
- human-assisted case analysis for non-trivial disputes
- little automation, mostly human-assisted mediation
- mostly English-language based

**Business features:**
- specialised v. generalised ODR services
- rigid (non-configurable) DR processes offered
- free-text based complaint description for generalised ODR services

**Technological features:**
- based on the existing internet technologies
- form input, email, online chat, text-based conference
- web-to-database interface to manage dispute information

**User Trust Features:**
- unknown quality of mediators
- non-verifiable impartiality of mediators
- concerns about confidentiality and data protection
- lack of enforcement mechanism for the settlement

A recent survey of 30 ODR systems found that all of these systems under-performed in terms of establishing trust and confidence in e-commerce [10]. Moreover, present-day ODR systems are stand-alone, and cannot inter-operate with other trust enhancing systems, e.g. for private data protection, and other ODR services. A versatile e-commerce environment requires a set of technical standards to which ODR systems must conform to enable a matrix of comprehensive trust and confidence services for e-commerce [11]-[13].

The ODR technology is relatively new and the present ODR services are based on what can be termed as the first generation ODR systems. Like most first generation IT systems, the present day ODR systems are elementary, bespoke, rigid, monolithic and stand-alone, with a specific view of the underlying process. However the future trends can be seen in some implementations such as OnlineResolutions.com where the Resolution Room is a licenced off-the-shelf module integrated into the rest of
the system [14]. However, the ability to integrate off-the-shelf components requires the open systems approach based on certain standards in technological and business processes [15]-[16].

2. Next Generation ODR

This paper presents an ODR data model, which is an essential component of a technical framework to support a new generation of ODR systems. These systems will be characteristically different from the first generation systems in terms of the sophistication of end-user service, ODR processes deployed within the systems, and external protocols to establish consumer confidence within a broader e-commerce environment.

Several distinctions can be made between the present-day ODR and the ODR services anticipated in future. The main one will be a clear separation between a commercial ODR product (a software system that implements an ODR process) and an ODR service provided by an ADR professional practice by using an ODR product. This is similar to the distinction between an e-commerce business and an e-commerce toolkit available at various e-commerce portals.

Whereas the present day ODR systems are mostly designed and implemented in-house and are technologically driven, the future ODR services will be based on commercial ODR systems in which the dispute resolution process could possibly be reconfigured by the ODR service provider (typically, an ADR practice). The ODR systems themselves will be based on commercial off-the-shelf modular components such as a customer interface tool, a case management tool, a mediation room, a trustmark certification tool, a mediator interface tool, a billing tool and several decision-support tools. The offerings of such tools is still limited at the moment, partly due to a lack of technical standards for interoperability and partly due to a lack of understanding of the generic technological requirements of ODR processes. However, examples do exist of new software tools, e.g. the Resolution Room [14], the Mediator [17], Zeno [18], and Negotiator Pro [19] aimed at ODR services. Several new research projects are also addressing this long term goal [20] – [23].

The future ODR systems will need to be intuitive to use by the customers and ADR professionals, like the word processors, spreadsheets and web browsers. However, some customer training could be required for an effective use of the ODR process. The tools could have a common look and feel as to the ODR process, regardless of the ODR service provider involved. As an early attempt, many initiatives already exist to try and define a standard claims form to initiate the ODR process [24], [25].

Whereas some of the first generation dispute resolution systems can deal with simple disputes automatically by deploying techniques such as blind bidding, they have to rely on human intervention for analysing non-trivial complaints. It is clear
that in the near future, ODR systems will have to act as intelligent agents in the performance of the first stage ODR tasks such as complaint analysis and problem classification. This requirement is imperative in view of the growing number of B2C e-commerce transactions, expected to reach $2 trillion in 2005, and an expected 2-3% of such transactions resulting in disputes [26]. The next generation systems are expected to embrace many of the following features due to highly increased case load, greater competition in the ODR market, evolution of ODR codes of practice, access to advanced technological solutions and higher customer expectations:

**Evolution of existing features:**
- commercial case management tools
- global reach, multiple language support
- virtual collocation of stakeholders
- virtual mediation room
- virtual arbitration room

**New service-level features:**
- case presentation tools to help customers present their case logically
- support for validation of the complaint before submitting
- preliminary case analysis
- intelligent machine-assisted mediation – going beyond blind bidding
- customer support in rational decision making on complex issues
- tools to assist customers in choosing a negotiation strategy
- allow the ADR professionals to configure their DR process

**Interoperability features:**
- integration of ODR within existing e-commerce business processes
- interaction with other ODR services
- emergence of ODR service brokers (gateways/portals)
- ODR case exchanges services
- ODR referral services

**Trust and confidence features:**
- integrated trust service providers (e.g. ODR + Privacy + Payment + Quality)
- availability and use of ODR trust marks by e-traders
- ODR ratings services (published data on customer satisfaction surveys)
- integration of DR standards in ODR services, e.g. national / international / industry norms
- verifiability of adherence to standards and codes of practice
- performance and conformance test services for the ODR service providers
- enforcement information (aggregate case history)
- ODR ombudsman

**IT features:**
- use of online audio and video conference between parties
- case-based reasoning for machine-assisted ODR
- consistency checking tools for the decision process
- customer training by dispute simulations for the effective use of ODR systems and processes
- machine translation of ADR domain specific text in natural languages
- dispute case databases

There will be various stakeholders in the next generation ODR environment who will represent the multitude of these interests, as shown in Table 1.

<table>
<thead>
<tr>
<th>Interest, role and perspective</th>
<th>Stakeholder, role player</th>
<th>Example(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promoting e-commerce; guidelines, principles and policies</td>
<td>Governments, international organisations</td>
<td>European Union, United States, EC, ABA, ICC, GBDe</td>
</tr>
<tr>
<td>Code of practice</td>
<td>Professional bodies</td>
<td>CPR, ABA, BBB, …</td>
</tr>
<tr>
<td>Trust in e-commerce, in general</td>
<td>Trustmark owners for privacy, data protection, payment protection</td>
<td>TrustUK, WebTrader, …</td>
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<td>Trust in case of disputes after e-shopping</td>
<td>ODR trustmark owners</td>
<td>BBBOnline, SquareTrade, …</td>
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<tr>
<td>Professional competence</td>
<td>Mediators, arbitrators, trainers in conflict resolution</td>
<td>Independent professionals, Professional practices</td>
</tr>
<tr>
<td>Profession’s reputation</td>
<td>ADR professional associations</td>
<td>AAA, CPR, SPIDR, …</td>
</tr>
<tr>
<td>Issues in E-commerce, law and technology</td>
<td>ODR researchers, academics</td>
<td>UMassCDR, UWash, UOttawa, JRC/EC</td>
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<tr>
<td>New software systems</td>
<td>ODR systems developers, researchers</td>
<td>Zeno, ECODIR, …</td>
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<td>New applications of technology</td>
<td>ODR tools developers</td>
<td>Mediator, ResolutionRoom</td>
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<td>Promote uptake of ODR</td>
<td>ODR standards developers</td>
<td>JRC/EC, FTC</td>
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<td>Customer/user training, dispute simulations</td>
<td>ODR service providers, ODR system vendors</td>
<td>ODR website demos</td>
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<td>Market share</td>
<td>ADR practices and law firms</td>
<td>numerous</td>
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<td>ODR access to cross-border customers</td>
<td>National governments, international organisations, chambers of commerce</td>
<td>EU, US DoC, GBDe, …</td>
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<td>Multi-lingual access to ODR</td>
<td>Governments, ODR service providers, language translators</td>
<td>European Commission</td>
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<td>ODR Business</td>
<td>ODR service providers</td>
<td>SmartSettle.com</td>
</tr>
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<td>Resolving disputes</td>
<td>ADR professionals</td>
<td>numerous</td>
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<td>Preserve trade reputation</td>
<td>Trade organisations, ombudsman</td>
<td>UK Financial Ombudsman</td>
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<td>Preserve customer base</td>
<td>e-traders</td>
<td>most</td>
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<td>Seeking dispute resolution</td>
<td>e-consumers, e-traders</td>
<td>2% of all e-transactions</td>
</tr>
<tr>
<td>Enforcement of decisions</td>
<td>ODR providers, chambers of commerce, governments</td>
<td>Legal instruments, international treaties</td>
</tr>
</tbody>
</table>
3. An Open Architecture for ODR

The proposed ODR framework is based on a number of technical criteria derived from the business requirements of the ODR process [15], [16]. The business requirements themselves are based on the core elements of out-of-court dispute resolution found in traditional ADR, and are augmented by those elements arising from the online environment of e-commerce. The framework is therefore based on a layered model for a trustworthy e-commerce environment. This will allow the end user to view his online purchase and (possible) dispute resolution activities in an integrated electronic market place, offered by seamlessly interconnected service providers.

The interoperable ODR architecture is based on the following key considerations:

- alignment with the internet
- web-based user interface
- adoption of XML approach to information exchange standards
- compatibility with database technology

The main thrust of the framework is to encourage the ODR services to adopt the standards as an integral part of their systems. It is hoped that the future ODR systems will adopt these industry standards for mutual benefit. The strategic advantages of adopting XML and XSL as the core standards for data integration and presentation are well known. This would allow in future the definition and central provision of standard XML schemas for use throughout the ODR sector. This strategy aims to reduce the cost and risk for developing components of the future ODR systems by aligning them to the global Internet standards.

4. An ODR Data Model

The various activities in the ODR business process have led us to identify the underlying entities (objects) that capture the information content of the ODR process. The result is a data model for ODR process that can be deployed for building a new generation of ODR systems.

The top-level entity of the proposed data model is CASE. It consists of two main objects: PERSONNA and DOCUMENT. A CASE represents a complete record of the dispute and its resolution. PERSONNA represents the parties and other actors involved in a dispute, such as the mediator. DOCUMENT is the record of all communications during a dispute resolution process. Fig. 1 shows the attributes of CASE, PERSONNA and DOCUMENT in an integrated data model.
**Definition 1:** A CASE is a complete record of an attempt to resolve a dispute. A dispute involves two or more parties, all of whom have agreed to use a particular ODR SERVICE in search of a resolution. A CASE always involves a CLAIMANT, at least one RESPONDENT, an ODR PROVIDER, a CASE OFFICER or a MODERATOR, and a REQUEST FOR SERVICE.

**Definition 2:** A PERSONNA is a formal notion that encompasses both individuals and organisations. It represents a party involved in a dispute.

**Definition 3:** A DOCUMENT is a record of a statement made during a CASE. Among its several subtypes are the initial CLAIM and subsequent RESPONSE, ARGUMENT, NOTICE and REQUEST.

Further details of the ODR data model and the definitions of various entities can be found in [28].
5. Evaluation of the Data Model

The ODR data model has been implemented in XML1.0 [29], a non-proprietary open standard defined by the W3C consortium. The data model was evaluated through the implementation of a schema test process. This consisted of filling a claims form, that initiates the CASE. The claims form embodied two instances of the entity PERSONNA and a subset of the DOCUMENT. The schema test process is shown in Fig. 2 and has been implemented in an ODR demonstrator [30].

The result after FILE A COMPLAINT process is shown in Fig. 3 as it appears on the user’s screen. Corresponding XML code of the CASE is generated by the system automatically, and is shown in Fig. 4.
Fig. 2: ODR Schema Test Process for Complaint Filing

As a result of complaint filing, there are three actions: give feedback to the customer (Fig. 3), instantiate a CASE (Fig. 4), and communicate the complaint to the respondent. Several possibilities exist as to the content and format of this notification:

- Full complaint in text format included in the body of the email
- Full complaint as an HTML file included in the email
- Full complaint as a Word file included in the email
- Email the reference link to the complaint stored as an HTML file at the ODR server (this is the method used in the current implementation).

Fig. 3: Show Case: Customer screen after filing a complaint
The advantage of storing the complaint in XML version is that any of the above (and indeed other) formats can be generated by the system automatically using appropriate style sheets written in XSL. This gives the flexibility in the presentation format of the complaint contents, a well known advantage of XML.

For a cross-border complaint handling mechanism, it is further required to log the complaint in the customer’s language (e.g. French) and automatically translate it into the merchant’s language (e.g. English) before sending the notification to the respondent (i.e. the web merchant).

6. Conclusions

Trust and confidence in global e-commerce requires adequate online dispute resolution (ODR) mechanisms that are accessible, flexible and interoperable with broader e-commerce and e-customer processes. This requires development of open standards for ODR message exchange and adoption of these standards in the next generation ODR systems. An open message exchange data format is being developed towards achieving the interoperability of cross-border ODR systems accommodating multip-
le languages and enabling integration of various ODR stake holders, including the ODR service providers, the ombudsman, web traders and customers.

The message exchange data is part of a generic CASE data model which is based on the XML standard. This allows the CASE data to be machine-processed as well as independent of the presentation format. Key elements of the proposed data model have been presented and evaluated through a schema test process in an ODR demonstrator [30]. The experience shows the feasibility of the XML based approach for interoperable ODR. More comprehensive tests will be required to show the interoperability with an external software package for dispute resolution in a multi-lingual cross-border environment.

References


