

An Architecture for a Smart *Fourth Party* in an Online Dispute Resolution Platform

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Abstract—Disputes involve two different people or parties. Because of cost or time constraints, the two parties may wish to avoid a lengthy court case and, instead, involve a mediator or arbitrator to help them resolve the dispute. This mediator or arbitrator is often called the third party with the two original participants being called the first and second parties. As this mediation or arbitration process becomes an online process (as in the case of Online Dispute Resolution - ODR), the platform used for the ODR has been called the *Fourth Party*. This paper looks at a technology architecture for creating such a Fourth Party. This paper looks at different types of Alternate Dispute Resolution systems. The paper then progresses to ODR systems. Different facilities of various ODR systems are itemised and a few examples of ODR systems which have already been used or developed are described. A brief discussion of a pilot program is provided including comments about the data which was collected during this pilot. Finally, a proposed IT architecture is provided for an ODR system including a fully fledged Fourth Party as defined by Katsh and Rifkin – including algorithmic support.

Keywords—arbitration, the fourth party, ODR

I. INTRODUCTION

Arbitration can be defined as a “binding resolution of disputes accepted with serenity by those who bear its consequences because of their special trust in chosen decision-makers” [1]. This definition implies that there is a dispute which needs to be resolved. The resolution is accepted by the parties which are part of the resolution because they have trust in the person making the resolution. The resolution process is done with serenity and is not adversarial.

It is the “with serenity” and the non-adversarial characteristics which separates arbitration from traditional legal battles in courtrooms.

In the case of a commercial environment, the common reasons given for the need for arbitration include speed, lower expense for the parties, more expert decisions, and greater privacy [2]. In other words, the parties in a commercial dispute may find that arbitration offers faster resolution at a lower cost with a better quality private decision than a courtroom environment.

Arbitration has been used for many years to resolve disputes arising out of insurance policies. These disputes can involve disagreements between insurance companies and their policy holders and can also involve disagreements between two or more insurance companies. The types of

claims include personal injury, medical malpractice, and property damage [3].

The term *ODR* refers to *online dispute resolution*. ODR allows the technological capabilities of the internet to be directed to the challenge of resolving disputes. Traditional dispute resolution systems are often ill equipped to provide redress [4]. It could be that the parties were a large distance apart – even, possibly in different countries. It could be that the courts are overloaded with a long wait time for a hearing. It could be that the courts were unexpectedly closed as happened in many countries during the early Covid-19 lockdowns in 2020 [5].

ODRs, however, need a technology platform. This technology platform consists of many things including servers (virtual or otherwise), databases, back end software, and front end graphical interfaces. Katsh and Rifkin coined the term *The Fourth Party* in their 2001 paper to describe this technology platform [6]. The first two parties are the original parties in the dispute – traditionally called the claimant and the defendant. The third party is the arbitrator or mediator as the case may be. The *fourth* party is the technology.

This paper specifically looks at architectural designs for this *Fourth Party*. In addition, however, this paper describes work towards creating a *smart* Fourth Party.

As background, Section II describes different forms of Alternate Dispute Resolution (ADR) including mediation, arbitration, and negotiation. Section III provides a brief history of specifically Online Dispute Resolution (ODR). Section IV provides information about the *fourth* party in the case of ODR. Section V describes a handful of existing ODR systems. An initial pilot program was executed during 2020 and 2021 and that pilot is briefly described in Section VI. Issues regarding data privacy are discussed in Section VII. In Section VIII the author presents an architectural proposal for a Fourth Party. Ideas about the future of the platform are included in Section IX. And conclusions can be found in Section X.

II. ALTERNATE ONLINE DISPUTE RESOLUTION MECHANISMS

Kaufmann-Kohler identifies three traditional dispute mechanisms used in online situations: negotiation, mediation, and arbitration [4].

Negotiation can be subdivided into two categories: automated and assisted. In an automated situation, a system of blind bidding is created. Prior to the bidding, the parties agree to an acceptable spread in the bids. For example, they

may agree that a spread of 20% is acceptable. In an automated negotiation, each party makes a offer for settlement unaware of the other party's offer. If the two offers are within the agreed upon spread (20% in this hypothetical case), then the mean value of the two offers is calculated and the dispute is settled at this mean value. If the two offers are not within the agreed upon spread, then another round of negotiation is initiated.

In an assisted negotiation situation, a web-based platform assists the negotiation process by offering communication channels between the parties. The communication channels allow the parties to articulate their issues, vent, and see opportunities for compromise. If the parties fail to come to a negotiated settlement using these online tools, human facilitators can be made available to the parties via the platform [7].

Gibbons *et al* argue that mediation always requires a neutral third party-facilitator who assists the parties to arrive at a mutually agreed upon resolution [8]. There is a fine line between assisted negotiation processes and mediation processes.

Typically, negotiation and mediation generate non-binding decisions which are not actually enforceable after they are created. Arbitration, on the other hand, often creates decisions which are legally binding on one or both parties. The arbitration route is often agreed upon between the parties when the original sale (or source of conflict) is negotiated. For example, Dell's consumer terms of sale include the paragraph "You and Dell agree to resolve any disputes between us exclusively and finally by binding arbitration on an individual basis, which means you and Dell waive any right to litigate disputes in a court or before a jury, or as part of a class action, a representative action, a consolidated action or in a private attorney general capacity" [9]

III. HISTORY OF ONLINE DISPUTE RESOLUTION

Online Dispute Resolution arose from the Alternate Dispute Resolution movement in the 1990s as a mechanism to resolve commercial transactions which were conducted over the nascent internet where the parties had never met face-to-face [10]. Ecommerce market systems such as Ebay needed to provide a fast and fair way to resolve disputes in order to generate trust in online purchases [11].

Because Ecommerce transactions can easily be international transactions, the UN Commission on International Trade Law (UNCITRAL) created a working group in 2010 with representatives from 66 countries to discuss how ODR can be used to resolve disputes in cross-border matters [12].

Ecommerce transactions also are not limited to the sale of tangible objects. Companies such as Uber and Airbnb which sell transportation services and accommodation services respectively also face disputes. TaskRabbit (which is a market place for handymen) and Upwork (which is freelance market place) also face disputes. Each of these companies build their own ODR to settle these disputes. Rule argues that insurance cases are also a great fit for ODR where an insurance company disagrees with a policy holder on how much money should be reimbursed. In addition, if such cases actually went to court, it may take years to get resolved [10].

IV. ODR AND THE FOURTH PARTY

As mentioned previously, Katsh and Rifkin coined the term *The Fourth Party* in 2001 and have subsequently published widely on this topic. This section documents some of the expected characteristics of this *Fourth Party* [13]:

1. The Fourth Party does not replace the third party (the arbitrator or mediator)
2. The Fourth Party functions as an ally, collaborator, or partner
3. The Fourth Party can assume responsibilities for communication between all the parties
4. The Fourth Party *could* help facilitate face-to-face communication via video-conferencing (depending on technology)
5. The Fourth Party stores information and documents
6. The Fourth Party *could* schedule meetings between the parties
7. The Fourth Party keeps the process going by sending reminders to other parties
8. The Fourth Party keeps track of payment and billing processes

As technology becomes more powerful, the role of the Fourth Party also becomes more powerful. Newer roles for the Fourth Party include [14]:

1. The Fourth Party could provide algorithmic tools to guide negotiations and/or findings
2. The Fourth Party could provide machine learning facilities
3. The Fourth Party could provide rule-based systems for generating settlement offers
4. The Fourth Party could issue decisions especially in high-volume, low-value cases

As technology evolves, the Fourth Party will evolve also.

V. EXISTING EXAMPLES OF ODR

Christofilou has itemised a number of ODR systems which are operational [15]:

1. Cybersettle is a blind-bidding system (automated negotiation) which helps insurance adjusters and lawyers accelerate settlement of insurance claims. It has been used in both property damage and bodily injury claims.
2. SquareTrade is an assisted negotiation system originally used by eBay and now used by PayPal. It offers both assisted negotiation as well as mediation.
3. The Internet Corporation for Assigned Names and Numbers (ICANN) has published a domain name resolution policy and has claimed to resolve over thirty thousand domain name disputes.

Christofilou also investigated some stand alone computer applications to help with negotiations but those computer applications do not necessarily resolve disputes. Christofilou also finds that while ODR has expanded in the United States, ODR has not flourished in Europe possibly due to patent restraints (Cybersettle has patented its algorithm), opposition by lawyers, or a difference in culture.

VI. ORIGINAL PILOT AND DATA

The architecture proposed in the forth coming Section VIII is based on a pilot project which ran in the UK during 2020 and 2021 including just over 150 cases which were arbitrated. The cases were for personal injury with relatively low award values. The pilot was not open to the general public. It was a pilot between a group of law firms and insurance companies. The actual data itself is company private.

The data included anonymised codes for the claimant, the defendant, and the arbitrator. Additional columns included the amount being claimed by the claimant, amount offered by the defendant, and the actual award amount. The various values were subdivided into a number of categories.

An exercise was initiated to explore this data in order to better understand it. In addition to the anonymised participants, all of the remaining data consisted of numeric values representing offers, counter offers, and awarded values. There was no data which represented the location of the personal injury, characteristics of the individual (such as gender, age, and ethnicity), timestamp of the incident (which would also provide information about time of day, possible holidays, day of the week, etc).

A second iteration will ensure that additional types of data points will be included.

VII. DATA PRIVACY

Countries and groups of countries around the world are enacting and have enacted legislation to protect the personal data and information of their citizens and residents. Examples of this include the General Data Protection Regulation (GDPR) of the European Union and the Protection of Private Information Act (POPI) in South Africa.

For applications dealing with personal information, there are at least two types of solutions which can be implemented for adhering to such legislation. Two of these types of solutions are 1) technology solutions and 2) legal solutions.

This section is subdivided into two subsections. Subsection A itemises some solutions which could be implemented in technology and Subsection B itemises some solutions which could be implemented by legal methods.

A. Possible Technology Solutions

Two possible technology solutions could be implemented to assist in situations where data should not cross country boundaries and where data must expire or be deleted after a certain period of time.

There are a number of libraries and products available which give the location of an internet user by IP (internet protocol) address. Many of these libraries and products offer three levels of geolocation including country, state or

province, and metropolitan area. In the case of the UK (which is a more complicated jurisdiction), this includes the country (such as England or Scotland) within the UK.

The users' geolocation can be used to mask or hide personal information when necessary.

In the case of data which must expire or be deleted after a certain period of time, care must be taken to date stamp all data when it is received in order to facilitate the expiry thereof.

B. Possible Legal Solutions

Every reader of this paper has had the experience of signing up to a website or app service and receiving a screen of pages and pages of terms and conditions which must be agreed to before the user is given access to the website or service. This is an example of a legal solution to the data privacy requirements.

In the case of this specific pilot described in Section VI, various aspects of handling personal information was included in the legal documents and protocols arranged between the parties to ensure GDPR compliance.

VIII. ARCHITECTURAL PROPOSAL

This section is subdivided into two subsections. Subsection A provides a general description of the architecture. And Subsection B provides specific suggestions for the architecture.

A. General Architectural Description

The proposed general architectural design for a *Fourth Party* or an ODR platform can be seen in Figure 1.

The three traditional parties to an arbitration (along with a platform administrator) are on the far left of the figure. The First Party is traditionally the claimant. The Second Party is traditionally the defendant. The Third Party is traditionally the arbitrator. The platform administrator ensures the smooth running for the platform. The Fourth Party is the entire platform excluding the actual users.

All of these different types of human users communicate with the Fourth Party through a graphical user interface (most likely a web interface). The frontend communicates with the backend through an industry standard.

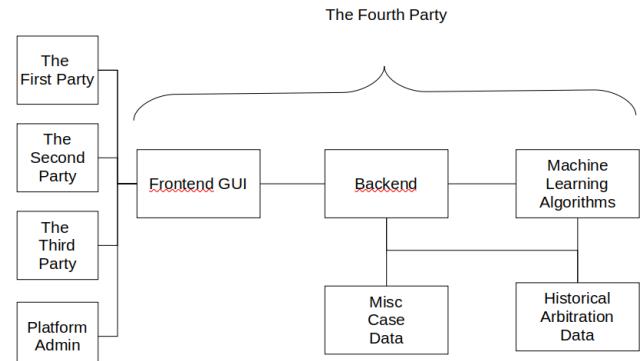


Fig. 1: Architectural design for a Fourth Party

The backend system stores all data on a database. This data includes all legal requirements for the locality in which the ODR is operating. Special care, however, is taken to ensure that the actual historical data of awards made by the arbitrators is kept in a format which can be processed by a machine learning system. This provides a feedback system where the outcomes of previous cases can be used to guide the parties in new cases.

B. Specific Proposed Architecture

The specific application is designed to run on a Linux VM in the cloud. The main portion of the platform (ignoring the machine learning portions) is a Spring Boot application with an Angular front end. The two portions communicate using REST.

For the initial implementations, data collected during the pilot will be used to build a number of different models using R. R is a statistical language and compute framework which supports a wide variety of models. As more and more data is collected, better models will be generated by R.

The Spring Boot application and the R applications will communicate initially through operating system CSV (comma separated value) files.

IX. GOING FORWARD

A number of enhancements are envisioned after the initial pilot. These include

1. A more modern GUI. This new GUI should communicate with the same REST calls so the Spring application should not need to change. This new GUI could be done in a more modern version of Angular, or React, or Vue, for example.
2. Integration with some third party software such as Amazon Textract which can easily extract information from PDFs. (NB: Textract is not free but has minor costs if a company is also using AWS VMs)
3. Federated authentication where users can authenticate with their own company's IT infrastructure and not need to keep separate login information on the *Fourth Party* itself.
4. Develop more *smart* tools for the parties. As more cases are settled using the platform, more data can be used to train models which can help the parties negotiate and settle cases.
5. Develop more *smart* tools to assist with quality assurance or quality control of the arbitrators.
6. Allow unrepresented users to access the platform. In the original pilot only insurance companies and law firms were allowed to use the platform.

X. CONCLUSION

This paper presents initial work towards an architecture for a fully fledged smart *Fourth Party* in an online dispute resolution system. In this proposed architecture, various machine learning algorithms and/or models can be created

and used to assist the participants in resolving the dispute. Data from a pilot program will be used to initially provide guidance to the parties.

Initial data collected indicates that additional types of data must also be collected in order to make any useful predictions. The historical data, however, can be used to guide participants in the dispute.

This is an ongoing project and an iterative approach is being used to create a smart *Fourth Party* which can assist all of the three other parties into finding an optimal solution to the conflict.

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