

Towards a Platform for Online Mediation

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Abstract: In this paper we describe a prototype for a generic platform to support actual on-line mediation. The immediate purpose of the prototype is to provide working examples of the computer artifacts that may be implemented to support current and foreseeable mediation practices. The ultimate objective, however, is to facilitate the deployment of appropriate ODR environments. The proposal is motivated by the production of the *White Book on Mediation in Catalonia* commissioned by the Catalan Government. This paper illustrates how different ODR processes—such as negotiation protocols of different types, arbitration or non-intrusive mediation—plus the preparatory and ancillary sub processes—like convening the parties, caucuses, anonymous proposal registration, mediator selection—may be specified and then assembled into more or less elaborate mediation support systems tailored to the needs and preferences of each mediation provider. This proposal is based on the notion of electronic institution and is being implemented using the IIIA's EIDE platform.

Keywords: Mediation, electronic institution, multiagent systems.

1. Introduction

There is widespread agreement about the need of alternative dispute resolution procedures to address the overflow of litigation that is received by courts. There is also agreement about the convenience of supporting some of these ADR procedures through on-line dispute resolution technologies. This paper explores these two matters through the design of a generic mediation platform that may be tailored to the specific needs of different mediation domains and modalities. The platform we propose is based on the notion of electronic institution and assembled through the EIDE tools developed in the IIIA.¹

The paper is organized as follows. We first sketch the type of IT technology that is currently being used for on-line mediation and explain the mediation environment that motivates the proposal. In Section 3 we give a brief description of the “Electronic Institution” framework that we use to specify the prototype presented in section 4. We finish with a brief discussion of the salient features of the prototype.

¹ <http://e-institutions.iiia.csic.es>

2. Background

In this paper we will talk mostly about mediation that is IT-supported to some extent and focus on a subset of ODR that includes the type of agreement mechanisms usually associated with mediation, namely, standard non-intrusive mediation, arbitration and some forms of negotiation —mediated or not.

The motivation of our proposal lies in the on-going Catalan regional government effort to produce the *White Book on Mediation in Catalonia*.² This White Book includes a chapter on technology for mediation with a description of the state of the art of IT technology in applied mediation and guidelines for appropriate uses of technology in the Catalan mediation environment. As part of that reflection, we are developing the prototype we report on in this paper.

A quick survey of active on-line mediation services shows interesting variations from an IT perspective. There is a group of services that limit their IT content to the use of conventional asynchronous communication to activate, acknowledge or keep track of mediation landmark stages, or support documentation of the mediation process. In any case, the IT uses in this group are so undifferentiated that aside from the fact that there is a website to inform and in some cases to establish contacts with parties in conflict one can hardly say they are IT supported mediations. A second group uses IT to control the mediation flow process and make available on-line, to the mediated parties, some sort of "agreement device" such as a bracketed text, a structured complaint form or a synchronous meeting place or caucus possibilities (chats, IP video conferencing). Finally there is a third group of mediation services that rely on a fully automated system in which the process flow is IT mediated, party interventions are IT mediated as well, and even in some cases, some agreement devices are IT enabled (for instance, simple blind bid-crossing, anonymous "brainstorming" records, iterated negotiation or even automatic last resource arbitration). From a business-model point of view, services range from those with a very focalized mediation domain to the quite generic; some service providers build their model around a software platform while other use such platforms as a support for their core business. None of the service providers reviewed seems to have truly sophisticated ODR technologies like the ones reported in academic *fora*.

Technological maturity is rather uneven in the Catalonian government mediation instances, and although some have functional mediation case-management and archiving, and rather mature IT corporate environments, others provide mediating services within considerably rudimentary IT conditions. The prototype we are developing is intended, thus, to be flexible enough to adapt to a wide range of sophistication levels and to, ideally, all mediation domains; and rich enough to provide thorough support to most activities involved in the mediation process. We claim electronic institutions are an appropriate technology to use for this purpose.

² <http://idt.uab.cat/lilibreblanc/>

3. An Electronic Institution approach to an on-line mediation environment

Electronic institutions are computational artifacts that correspond to a given extent to what traditional institutions are. They are, first of all, a collection of artificial constraints imposed on the behavior of individuals, or *agents*, who participate in a collective activity. They are also the entity that enforces those conventions and, thirdly, they are software systems that facilitate interactions among those participating agents. That is, they are a means to establish, enact and enforce “the rules of the game”, so that that game may be played on-line. Because electronic institutions embody prescriptive and governance features, and these may be applied to activities involving software or human agents that may be independent, autonomous and self-motivated, electronic institutions may be reified as a form of regulated open multi agent systems.

Although these intuitions are more or less shared by different technical proposals we will adhere to the specific electronic institutions framework developed in the IIIA which we shall refer to as EI from now on. The EI framework includes a *conceptual model* to describe an institution, a *computational model* that explains how an institution is enacted and a *pragmatic model* that establishes how it is implemented. For the purpose of this paper we will only be concerned with the conceptual model, that we shall quickly describe here and note that the EI framework includes software tools to specify and run arbitrary electronic institutions.³ Those are the tools we use for this prototype.

In the EI conceptual model we assume all interactions are among autonomous agents and all interactions among agents *within the EI* are speech acts (that *count as* actions in the world). We further assume that interactions are repetitive and thus may be structured as one would organize the scenes of a play. We further assume that agents may be humans or software agents who are able to use and react to the institutional acts.

With these assumptions in mind, we may specify an electronic institution through three components:

1. The *dialogical framework* that specifies the content and interpretation of the admissible speech acts. It defines a *set of roles* agents may play in the institution, the *domain ontology* involved in illocutions and the *information model* on which institutional actions are based.
2. The *performative structure* that specifies how the interactions are organized within the institution. It is formed by a network of *scenes*, (or conversations agents may participate in), that are joined through *transitions* (that state how agents may change scenes, or more precisely, the causal and temporal interdependencies among scenes). Scenes are conversation protocols or dialogue games, which are specified as directed graphs where arcs are labelled by speech acts schemata and nodes thus institutional states.
3. The *rules of behaviour* that put *constraints* on the actions (illocutions) that individuals who are playing a given role may take at some point in the enactment

³ The EIDE platform, available at <http://e-intitutions.iiiia.csic.es>.

of the institution. More prosaically, these rules are *pre-conditions and post-conditions* associated with each arc, speech act, of a scene or a transition. More formally, these rules establish the normative positions of commitments that arise from agent interactions.

The EI framework includes a graphical specification language, ISLANDER, which may be used to specify electronic institutions whose run-time versions may be enacted by agents. Agents interact in the institution through a middleware layer, AMELI, on top of JADE or similar agent communication platforms.

4. A prototype for a mediation institution

Using the EI framework we are defining a prototype institution that we believe may be appropriate for customizing mediation support environments to the needs of the different mediation instances of the Catalan initiative.

Figure 1 shows the complete *performative structure* of a mediation institution. Boxes correspond to scenes. In this case the eight dark boxes correspond to mediation activities --- a scene where the claimant chooses the type of negotiation she wants to use, four different negotiation conventions, a scene for standard non-intrusive mediation and two ensuing scenes for arbitration and recommendation. The two light boxes are scenes that are needed in every electronic institution as a device to start and terminate enactments. Lines connecting boxes (and widgets) indicate transitions. These transition lines are labeled with the roles that may move from one scene to another. In this institution there are only three roles: *party* (involved in a mediation), *staff* (responsible for institutional functions like time-keeping, record handling, etc.) and *mediator* and they all intervene in all the scenes.

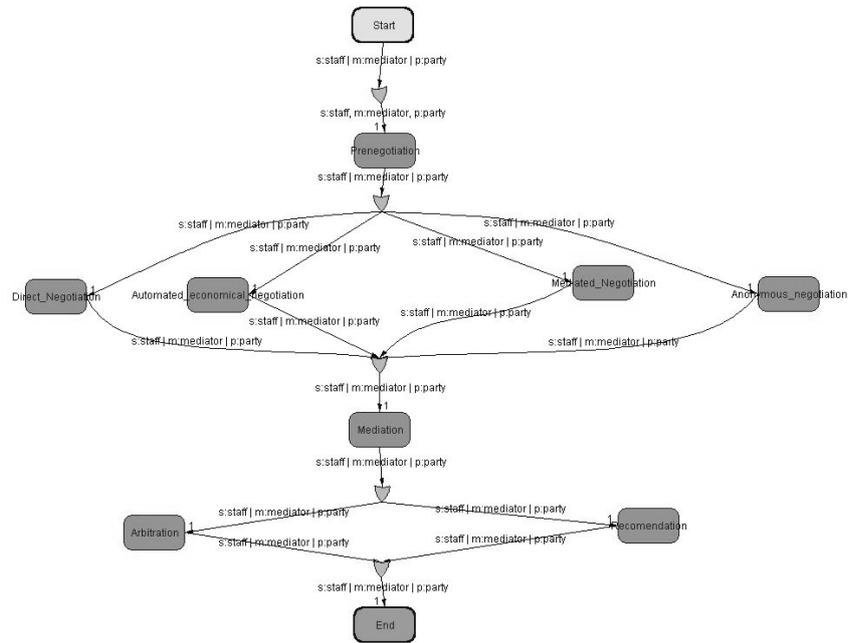


Fig. 1. Performative structure of a mediation institution

Scenes as the one in Fig. 2 are graphical depictions of interaction protocols. In this case it shows a protocol for mediated negotiation. Circles correspond to states of the negotiation and boxes indicate those states where certain roles may enter or exit the scene. Arcs are labelled with illocutions. In this case the scene involves two parties that exchange offers; however, parties do not talk to each other, they talk to the mediator who after the intervention of one party may decide either to pass that communication to the other party or request the original party for a modification of the original communication. Parties may agree or defect and staff keeps track of time so that if a “timeout” period has elapsed without acceptable offers and counteroffers the scene is terminated.

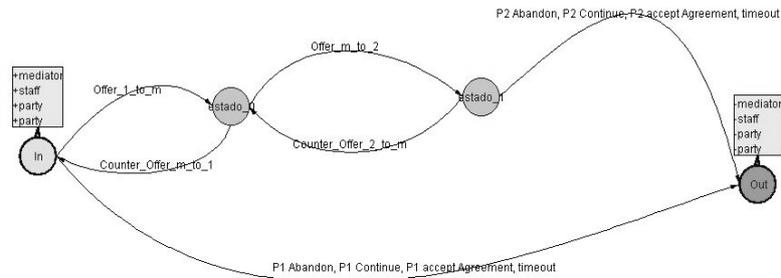


Fig. 2. Mediated negotiation protocol

Thus, for example, the top leftmost arc abbreviates the illocution where party one communicates the mediator and offer, the next line (top, leaving *estado_0*) indicates that the mediator communicates the standing offer to party 2. From that *estado_1*, there are five possible actions, one in which party 2 communicates a counteroffer and four that bring the scene to an end: that party 2 decides to abandon the mediation process, that he decides to leave this negotiation scene but embark into another form of mediation, that he agrees on the standing offer, or that the staff agent declares the scene is over because a deadline has been reached without agreement among the parties.

Figure 3 shows the performative structure of another mediation institution, in this case, one that is mirrored after the EcoDir model (<http://www.ecodir.org>). We have the same three roles as before but a simpler structure of four non-trivial scenes.

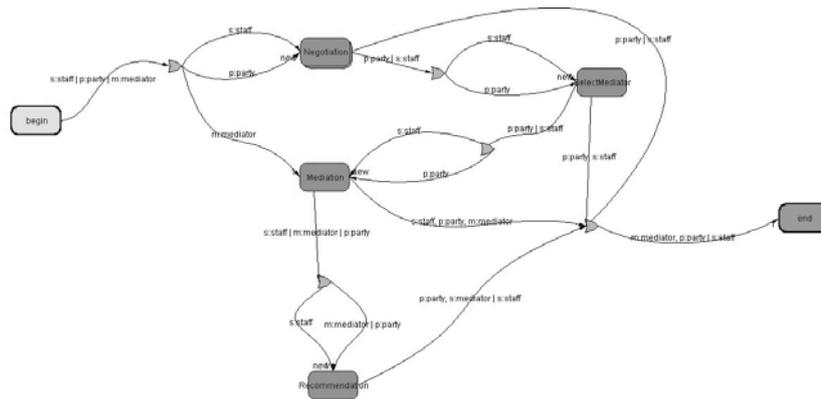


Fig. 3. Performative structure of an EcoDir-like institution

Now let's illustrate what happens when we have agents interacting in this electronic institution by looking at the actual display of a run-time monitor. Figure 4 shows the protocol of the *Negotiation* scene and figure 5 a partial screen shot of those interactions taking place in that scene.

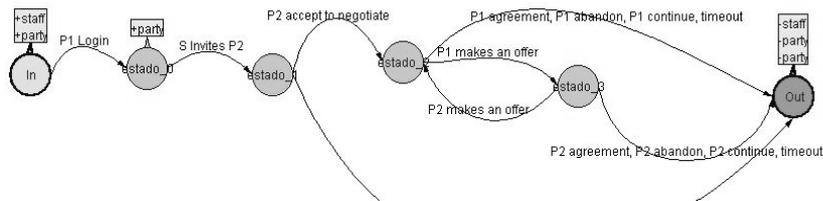


Fig. 4. EcoDir negotiation scene

One may distinguish three main regions in Fig. 5. The one on the right corresponds to the electronic institution as a whole, that is why it shows (on the far right) a list of all the actions that are taking place since the start of the execution and (on its left) a graph of the main actions in the performative structure; for instance that the latest actions are happening in state *estado_2* of the *Negotiation* scene.

The leftmost top region displays what the staff agent *S* sees and does and beneath the same for agent *P1*. In both cases there is their private view of the performative structure on the left and the messages each one hears and attempts to communicate to the institution. What is worth noting is that these two agents are in fact humans that use the rather primitive interface to test the specifications. There is, obviously, a convenient interface for software agents.

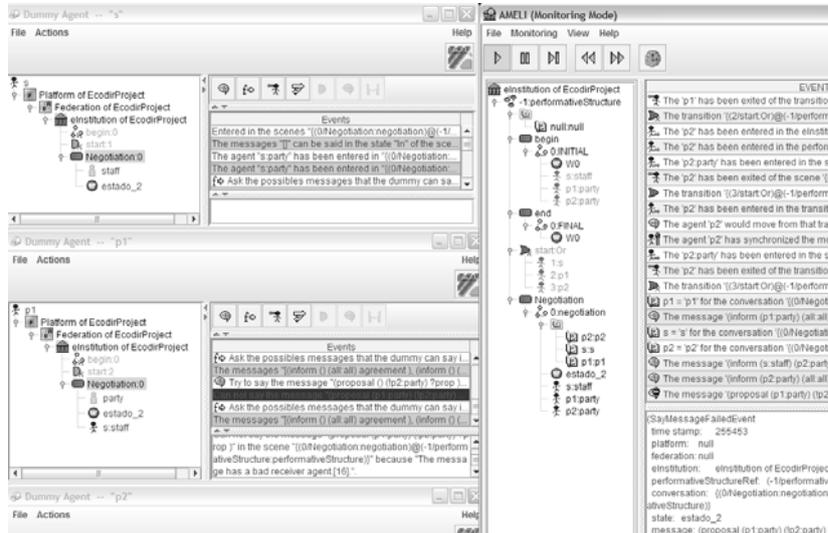


Fig. 5. Screenshot of the enactment of the EcoDir-like institution

5. Concluding remarks

What we have presented here is an exercise in the design of a mediation environment.

We have illustrated how to use the EI conceptual model and tools to describe the main processes involved in mediation and specify the details of the conventions that govern those processes. We have shown two examples of mediation models to give an indication of the flexibility of this approach and how these ideas may result in software programs that automate computer supported mediation. But aside from the software engineering advantages, what are the salient features of this approach for developing ODR environments?

The EI framework is well adapted to deal with interactions that are reducible to compact, univocal, formal messages like those involved in economic transactions and in that case it is a powerful way of implementing systems where software agents are involved, sine these may be focussed to the decisional aspects of the mediation and not to the interpretative or rhetorical ones. There are ODR applications where this conciseness and the use of software agents are a plus.

Notwithstanding this last remark, the EI framework may also work with human agents—as we intended to show with figure 5—and in that case, the need for terse messages may be dismissed altogether. A richer semantics allows for simpler interaction protocols but a richer performative structure may then come handy, for one may conceive innovative ways of facilitating agreement that may be at hand for mediators to use when appropriate. While the total automation may be unlikely and probably unadvisable, having an automated due process that may be documented and used on-line may be quite desirable and, as we tried to illustrate with the crude mediation models, quite easy to accomplish with the EI framework.

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