

# A Note on Modelling Speech Acts as Signalling Conventions

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**Abstract.** This paper presents a fully formal integration of Jones's logical theory of speech acts as signalling conventions with Kimbrough's Formal Language for Business Communication (FLBC). The work is part of a larger programme of logicism in the context of electronic commerce. Speech acts are an especially apt subject for this programme because of their pervasiveness and importance in communication for all commerce, electronic or not. The paper demonstrates that the conventionalist view of speech acts, embodied in Jones's logical theory, fits naturally with Kimbrough's FLBC and with the Basic Messaging Framework for business communications. Further, the paper provides an illustration of how the resulting integrated theory might be implemented in practice through logic programming.

## 1 Introduction

A logicist may hold any of several views on the role and value of formal logic in electronic commerce. Prominent among these views are:

- Formal logic is a useful, perhaps even preferred, tool for analyzing and clarifying concepts of import in electronic commerce.
- Formal logic is a useful, perhaps even preferred, tool for articulating important kinds of specifications pertaining to electronic commerce. Among these kinds are specifications for designing machine-to-machine messaging systems.
- Logic in the applied form of logic programming is potentially a valuable, perhaps even preferred, vehicle for implementation of machine-to-machine messaging systems.

We are logicists, at least in the context of electronic commerce, and we believe that there is much to be said in favor of each of these views. Too much in fact to fit into a short paper. Our present ambitions are more limited. We aim to sketch a formal and logical theory of speech acts as conventional signalling acts. In virtue of being formal the theory affords rigorous, machine-readable representation. In virtue of being logical a well-defined and justified formal inference apparatus is part of the theory. Our strategy for constructing this

theory is to combine Kimbrough's FLBC theory<sup>1</sup> with Jones's theory of conventional signalling acts and its attendant logical framework.<sup>2</sup> Kimbrough's FLBC theory is a representational theory, in first-order logic, that is apt for expressing signalling acts (among other things). It is not, however, an account of what signalling acts are, of what constitutes them. Jones's theory of conventional signalling acts is such an account. With proper attention to details, the two theories fit together hand in glove, as we shall explain.

Speech acts are of fundamental import and enduring interest for electronic commerce, and generally for understanding language and communication. The concept of the speech act is well entrenched in a number of disciplines, including linguistics, philosophy, the computational sciences generally, and particularly in the thinking of researchers in electronic commerce. The underlying notion—originating with Austin [Aus62] and further developed by Searle [Sea69] and others—is that speaking is a kind of doing or acting, and that we should consider the broad range of kinds of things that agents can do with words, rather than one-sidedly focusing on acts of stating that such-and-such is the case.

Speech acts are interesting theoretically because they seem to be so pervasive in language, and because of the logical and conceptual challenges in developing a workable formal theory of them. These two factors also motivate the practical interest in speech acts, evidenced by researchers in electronic commerce. Pervasive in commercial transactions are mundane communications—purchase orders, invoices, receiving reports, etc.—that are required in great volume and that should be, all agree, very profitable targets for formalization and automation. These communications, it is broadly agreed, are properly viewed as cases of speech acts. To issue an invoice is (roughly) to request payment for goods received. To issue a receiving report is (roughly) to assert that such-and-such goods have arrived in good condition. To issue a purchase order is (roughly) to request that ownership of certain goods be transferred to the speaker, in consideration of which the speaker promises to pay the current owner a certain amount of money.

It is a handicap to electronic commerce not to have an adequate approach to formalization of speech acts. Our longer-term goal is to replace that deficiency with a productive, well-founded, formal and implementable theory. This note is meant as a step in that direction.

## 2 Asserting: Two Prototypes

Our purpose in this paper is to demonstrate the coherence, indeed the felicity, of combining Kimbrough's FLBC with Jones's theory of conventional signalling acts. In the interests of ease and clarity of exposition, we will proceed incrementally, and we begin with a discussion of asserting.

<sup>1</sup> E.g., [Kim99], [KM97], [KT00], [Kim01], and [Kim02].

<sup>2</sup> E.g., [Jon02, Jon04, JP04].