eNegotiationプロジェクト進捗状況

**経過：**

2020年12月18日　第1回eNegotiationオンライン会議

* Projectフォーメイション審議
* eNegotiationに関わるLeagal Issue審議

2021年1月28日　第2回

* BRS Draft 0.1審議
* Implementation Guideスケルトン紹介

**課題：**

* Negotiation情報モデルをEDIメッセージにどう組み込むか？



Case 1: Independent eNegotiation Message



Case 2: eNegotiation Message associated with Domain Transaction Component



Case 3: eNegotiation Component included in Domain Message



**[eNegotiation BRS] (Draft v0.1)**

1. Preamble

Prior to the exchange of purchase order information during the BSP “BUY” phase, human staff in both companies negotiate the transaction conditions via email or telephone. However, advances in digital transformation (DX) and artificial intelligence (AI) is changing this negotiation. Therefore, the semantics of negotiation process and exchanged information should be standardized.

The negotiation process is entering a DX era, where both buyer and seller have developed electronic systems. From the buyer side, the system often allows them to develop their own electronic bidding system and bid comparison system. From the seller side, the system has to connect to multiple prospective buyer systems, each with different semantics. Standardized semantics would allow the seller to not only reduce cost, but also set up a decision making system defining which item(s) should be sold to which company(ies).

In addition to this DX, AI and robot process automation (RPA) can ultimately assist in achieving better negotiating conditions. Current human-based negotiations require a human decision at each proposal; therefore, message exchange can increase exponentially in order to reach the best solution among possible conditions of the contract. With an AI negotiator, the exchange can be automated allowing to reach better condition faster. The final approval may still require human approval, but this approach achieves business efficiency and optimality.

ISO/IEC 15944-1 defines five fundamental activities (repeated in the UN/CEFACT UMM User Guide of 2003) of a business transaction: planning, identification, negotiation, actualization and post-actualization. This work corresponds to the negotiation phase.



1. References

　・eTendering

1. Objective

The purpose of this BRS is to establish semantic standards for coordination, negotiation procedures and progress status related to the commercial transaction of business. Commercial transaction conditions of negotiation target is in various domains such as the logistics and manufacturing so, it should confirm to the information model defined by the standard specifications in other CEFACT etc.

This BRS provides a standard for a model of information about the process for adjusting and negotiating the terms of the transaction and a meaningful interpretation of its progress. By using this provision, there will be no difference in the perception of the negotiation status between multiple groups.

1. Scope

This project aims to define the business processes and related data exchange requirements related to electronic contract negotiations. This will concentrate specifically on protocols and data formats rather than internal decision processes. In this way, a human negotiator, an AI negotiator, or a human negotiator assisted by an AI/robot support should use the same base semantic protocols.

The regulation methods of contract is not in the scope. Although the requirements assuming the EDI used by people, AI/RPA etc. based message exchange are taken into consideration, AI/RPA itself is outside the scope.

1. Business Requirements
   1. Business Requirements Elaboration
      1. Negotiation Protocol

The functions of Protocol stack and each layer is established to design a protocol that can comprehensively represent various negotiating use cases. Several protocols will be designed to implement these functions. It will allows you to choose the appropriate protocol at each layer to meet the requirements of the applicable business domain. This will ensure that the requirements for various negotiations can be met with the same protocol stack.

The protocol stack is defined in the following four layers. The first-layer, Bilateral Negotiation layer, manages the negotiation session between the two parties. The second-layer, Multi-counterpart layer defines sync/async between multiple sessions when a party negotiates in parallel with other parties. It also set different parties including cooperative groups and competitive groups, as one group. The third-layer, Multi-group layer establishes a protocol for negotiating between multiple groups. The fourth-layer, Nested Negotiation layer establishes multi-tier negotiation protocols in the supply chain. In this version, only the first layer will be incorporated.



Fig. Protocol stack

* + - 1. Bilateral Protocol

In this BRS, the negotiation protocol between the two parties will be established. The negotiation protocol does NOT depend on whether the actor who makes the negotiation decision is a human or a machine such as AI or RPA.　Since the requirements are slightly different depending on the human or AI, the protocol suitable for each will be specified. However, a human may use a protocol specified for AI. In the protocol stack, higher-level protocols will be designed independent from the lower-level protocols, so that combination of protocols can be implemented.

* + - * 1. Alternating Offers Protocol

The requirements for this protocol will be mainly determined by mechanical negotiations such as AI/RPA. In mechanical negotiations, it is thought that there might be few personal errors. So, the protocol should be simple and that can facilitate mechanical judgment. The Alternating Offers Protocol is a simple protocol with the condition that if one side proposes, the turn will shift to the other party and another proposal cannot be made until the other party proposes it. By establishing constraints, mechanical judgment is facilitated. Although the Alternating Offers Protocol is a constrained protocol, but due to the fast exchange of information, it is expected to search for a large number of candidates.

* + - * 1. Anytime Offering Protocol with Withdraw

The requirements for this protocol are determined mainly by assuming negotiations between human. Human proposals contains personal errors and takes time. So, in Negotiation protocols, flexible protocols are required that can handle the following cases:

- Withdrawal of the proposal once made.

- Before the other party can make an alternative proposal, present your own alternative.

Anytime Offering Protocol with Withdraw is a protocol that satisfies these requirements.

* + - 1. Multi-Counterpart Protocol

When negotiating with multiple negotiating parties, it may be the case of trying to maintain the same proposal status as all negotiating partner, or the case where each negotiates independently. The former is called the Synchronous Protocol, and the latter is called the Asynchronous Protocol.

* + - * 1. Synchronous Protocol

The Synchronous Protocol constrains the transition state for multiple Sessions. In particular, it is managed such that the proposed state is in accordance with the state of proposal made by each party.

* + - * 1. Asynchronous Protocol

The Asynchronous Protocol does NOT constrains the transitions state for multiple Sessions to be handled.

* + - * 1. Competitive Protocol

Competitive Protocol constrains protocol state transitions assuming that there is a conflict between multiple parties. For example, when one party declare that they want to select only one company and start the negotiations at that time it is necessary to control so that they don't end up agreeing with more than one party.

* + - * 1. Collaborative Protocol

Collaborative Protocol provides a protocol for exchanging information to encourage collaboration when there is a cooperative relationship between the parties. For example, in order to purchase a total of 100 items from two different companies together, there are cases when negotiation with both the companies are required. The information exchange here, refers to the following:

- A business operator with total amount will spread the information obtained from one party (with explicit permission) to the other.

- Exchange of information between the two companies without including business operator with total amount.

* + - 1. Multi-Group Protocol

Negotiations between multiple Group can also have synchronous/asynchronous relationships.　For example, negotiating the steering wheel and pedal that are parts of an automobile at the same time, it is possible that different parts can be negotiated asynchronously　and the same parts may be negotiated synchronously.

* + - 1. Nested Negotiation Protocol

When negotiating across tiers in the supply chain, there might be a situation where a party negotiates with its suppliers while negotiating with its customers. In such cases, multiple protocols such as synchronous/asynchronous should be implemented, as described in Multi-Group Protocol.

* + 1. Negotiation Outcome

How to deal with the outcome of negotiations is basically NOT in the scope of this BRS. However, since the outcome of the negotiations is also related to understanding the requirements required for negotiations, therefore only issues will be arranged for reference in this BRS. According to the five activities of business-to-business transactions stated in ISO/IEC 15944-1, actualization comes after the negotiation process. This actualization assumes that the agreed terms of commerce are reflected in contracts as well as in the orders sent and received by EDI.

Therefore, it is assumed that the outcome of the negotiation is the same as the information that is used in the contract and EDI. However, this BRS doesn’t specify whether or not these are allowed to differ, or whether the agreement is valid in the case of any interaction. The reason is that these seem to depend on the granularity of the negotiations and contracts described later. However, in practice, it is necessary for the two parties to agree in advance to negotiate the pre-provisions described in the next section.

There are few issues on the matter of legal opinion regarding the contract associated with this agreement and the exchange of information on the occurrence of such contract. These will be discussed in the Appendix.

In addition, as a result of the negotiations, advance provisions for the next negotiation may be decided. This will be described in the next section.

* + 1. Negotiation Protocol Determination

In negotiating with EDI, participants must agree in advance on the protocols they will using. This prior recognition is also NOT in the scope of this BRS. However, it is assumed that it is defined in one of the later three.

* + - 1. Publication from Initiator

When a company issues RFI, RFP, etc. for the procurement of goods and services, the issuer may be seen as those who have set rules for negotiation and coordination. For example, when there is no underlying contract for the basic agreement etc., this method is often adopted.

* + - 1. Previous Contract

While the basic agreement exists, the contents and orders might be defined in the basic contract for the coordination and negotiation between companies. Thus, in the previous contract, there is a possibility that the rule for next negotiation may be defined.



* + - 1. Business Custom

As a business practice, if certain protocols have already been used, they could effectively be considered as agreed. In particular, for the granularity of the negotiations described in the next section, an operation seems to be done by the adjustment of a short period of time such as physical timing adjustment.

* + 1. Granularity of Negotiation

There are various negotiations and adjustments as the granularity of the negotiations, from negotiating the basic contract to adjusting the timing of physical delivery. This section organizes requirements for each negotiation and coordination. However, this BRS does not provide standard for such granularity, nor does it depend on a specific granularity.



* + - 1. Basic Contract

It is a basic contract between the companies, and it is a document that subjects to sign or electronic authentication. For example, a long-term agreement that continues on a yearly basis.

* + - 1. Demand and Capacity Adjustment

An unofficial announcement on the supply and demand exchanged between companies. Whether the information communicated there or agreed upon becomes an obligation will vary depending on industry practices. For example, this includes medium-term agreements such as quarter-term agreements.

* + - 1. Individual Order

Individual commerce related to goods, services, etc. Specific prices, quantities, delivery dates, etc. are negotiated and adjusted. It varies from industry to industry, but this is mainly a daily and weekly agreement.

* + - 1. Physical Interaction

Adjustments to the timing of delivery of goods and services. This is mainly an agreement in hours and minutes of the day.

* + 1. Raw Representation and Annotation

This BRS defines the semantics of negotiation protocols available for various domains. In the application of general-purpose APIs and message formats, it is necessary to re-implementation the APIs and message formats that are different from the EDI already defined and used in each domain.

Therefore, in this BRS, in order to define them domain-independently, the functions and information models dependent on negotiation are defined as described on the left side of the below figure. The existing provisions of each domain present a framework to be re-defined as annotation.



For example, in the Kanban scenario in Cross Industry Scheduling, adjustments to DemandForcast are defined, which can be considered as negotiations. Therefore, this BRS presents a method for granting annotation to a BRS that already exists. A concrete example of this is presented in the Implementation Guide.

* + 1. Specification of Target Issues

When negotiating the terms of commerce already specified as BRS, sets the ID of the item to the TargetIssue and define its value.



In addition, at the start of negotiations, conditions that are not subject to negotiation can be provided and notified in the same way（ToDo）

* + 1. Definition of Business Terms

In this section, the used terms will be organized.

|  |  |
| --- | --- |
| Term | content・meaning |
| Session | Series of states from the start to the end of negotiations between the two parties |
| Counterpart | Negotiating partner |
|  |  |
|  |  |
|  |  |

* 1. Information Flow Definition
     1. Negotiation Protocols
        1. Bilateral Protocol
           1. Alternating Offers Protocol

In alternating negotiations between the two parties, actors included are Initiator and Counterpart. Each has functions called Offer and AssessOffer. Offer presents potential consent proposals to the other party. AssessOffer looks at the proposed agreement and decides whether to accept it or end the negotiations. In addition, if the prescribed dead line is passed, the negotiations are regarded as Disagreed. This dead line is specified in real time or in the number of steps.

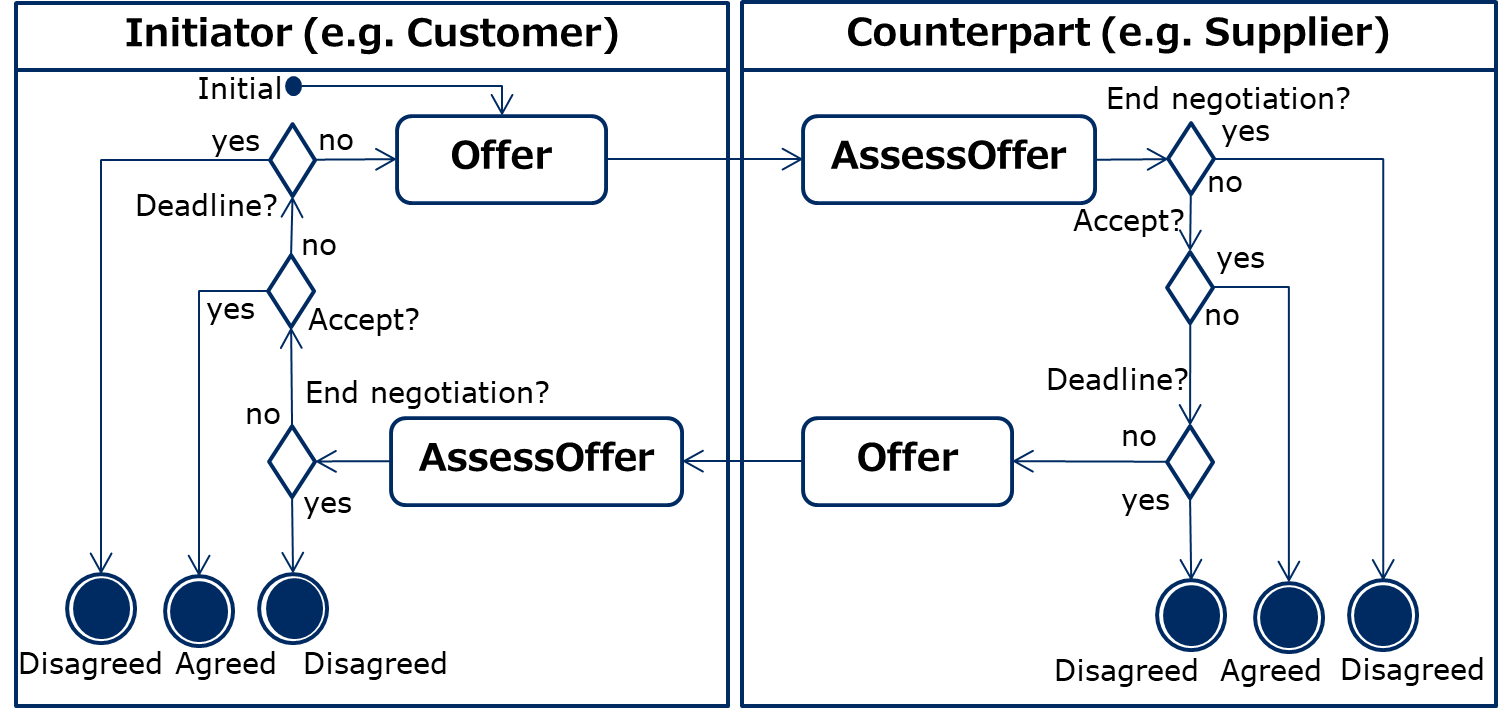


Fig. Alternating Offers Protocol

Messages generated by the Offer activity include the following messages:

- Offer: This message include the contents which means if the other party accepts this offer, the status changes into agreed status.

- Suggestion: It is the one which is accepted but is not seen as an agreement, however it presents the other party with the value the sender desires

- Suggested Direction: It is to present your desired direction to the other party without including specific proposals.　

Fig. Information model exchanged in Alternating Offers Protocol

Offer, Suggestion, and Suggested Direction include TargetIssue, IssueValue, IssueRange, and IssueDirection. TargetIssue identifies the items to be negotiated. IssueValue specifies a concrete value. IssueRange specifies a range, not a value. IssueDirection indicates the direction of the desired value, such as wanting a larger value to be specified. It is assumed that TargetIssue is used in a set with one of the issueValue, IssueRange, or IssueDirection. If only TargetIssue is specified, it may be considered that all ranges are specified.

* + - * 1. Other Protocols
  1. Information Model Definition
     1. Negotiation Protocols
        1. Alternating Offers Protocol

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| UID | Crd | Short Name | Business Requirement | Rationale/Example/Mapping Notes/Status |
| 0101 | 1 | Negotiation Message |  |  |
| 0111 | 1…\* | Offer |  |  |
| 0112 | 0…\* | Suggestion |  |  |
| 0113 | 0…\* | Suggested Direction |  |  |
| 0121 | 1…\* | TargetIssue |  |  |
| 0122 | 0…\* | IssueValue |  |  |
| 0123 | 0…\* | IssueRange |  |  |
| 0124 | 0…\* | IssueDirection |  |  |

* + - 1. Other Protocols