RuleSpeak® Specification for the Organ Donation Challenge

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RuleSpeak®[1] is one of the three reference notations for the OMG standard SBVR[2]. SBVR features behavioral business rules – rules that can be broken – in addition to definitional rules.[3] SBVR also features robust business semantics. This article identifies RuleSpeak/SBVR-style rules and concepts needed to address Decision Management Community's Challenge for March 2019, "Offering Donated Organs for Transplant."[4]

The Organ Donation Challenge is presented as an informative narrative with some examples. It rambles a bit – as descriptive text about business problems always do. The first and foremost concern is therefore what are the exact business semantics of the problem. The rule specifications presented below address that fundamentally important objective. The RuleSpeak/SBVR philosophy is that there is no point in developing a system solution if the business problem has not been precisely communicated.

A second and perhaps even more important aspect of RuleSpeak/SBVR philosophy is that if business semantics are fully captured, a system solution could be generated *automatically*. RuleSpeak and SBVR are about raising the level of person-machine interface *fundamentally*.

The rule specifications below should therefore be evaluated on the basis on whether a system solution that is complete with respect to the business semantics could be generated directly from them. My contention is that they could be. In other words, no additional specification is needed from a business perspective; the generation of the system could be completely automated and hidden (except for platforming, interfaces and tuning).

The rule specifications feature four priority indicators: *highest priority heart candidate, highest priority lung candidate, highest priority TC for a heart and lung block,* and *highest priority TC candidate for a remaining organ.*

Essential for any SBVR-style solution is a concept model to organize the relevant business vocabulary. A concept model diagram for the rule specifications appears in Appendix 1.

Full disclosure: I know of no platform today that can generate a system solution directly and automatically from these rule specifications.

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[1] Refer to www.RuleSpeak.com.
[2] *Semantics of Business Vocabulary and Business Rules.* For explanation and discussion of SBVR, refer to the *SBVR Insider* section under Standards on www.BRCommunity.com.
[3] Definitional rules based on implications are roughly decision rules.
[4] https://dmcommunity.org/challenge/challenge-march-2019/

Rule Specifications[5]

1a. Behavioral Business Rule: A heart must be offered to the highest priority heart candidate.

1b. Definitional Business Rule: A heart candidate must be considered the highest priority heart candidate for a heart if (and only if) all the following are true:

- The heart candidate appears in the high priority heart candidate list before all other heart candidates to whom no offer of that heart has been made.
- An offer of the heart to that heart candidate has not been declined or been rescinded.

2a. Behavioral Business Rule: A pair of lungs must be offered to the highest priority lung candidate.

2b. Business Rule: A lung candidate must be considered the highest priority lung candidate for a pair of lungs if (and only if) all the following are true:

- The lung candidate appears in the high priority lung candidate list before all other lung candidates to whom no offer of that pair of lungs has been made.
- An offer of the pair of lungs to that lung candidate has not been declined or been rescinded.

3a. Behavioral Business Rule: A heart and lung block must be offered to the highest priority TC for a heart and lung block.

3b. Definitional Business Rule: A TC must be considered the highest priority TC for a heart and lung block if (and only if) all the following are true:

- There is no highest priority heart candidate for the heart.
- There is no highest priority lung candidate for the lungs.
- The TC appears in the TC priority list before all other TCs to which no block offer for that heart and lung block has been made.
- A block offer of that heart and lung block to that TC has not been declined or been rescinded.

3c. Definitional Business Rule: A heart and lung block always consists of organs that are donated by the same organ donor.

4a. Behavioral Business Rule: A heart or a pair of lungs must be offered to the highest priority TC for a remaining organ.

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[5] The following notation features are strictly for reference and ease of reading. None carry any semantics.
- The rule numbering.
- The sequence in which the rules are listed.
- The coloration of some vocabulary.
- The indentation of some rules.

Also, the category of rule (i.e., behavioral business rule vs. definitional rule) can be determined by inspection of the RuleSpeak syntax. So, the labeling of each rule by category is also unnecessary.

4b. Definitional Business Rule: A TC must be considered the highest priority TC candidate for a remaining organ if (and only if) all the following are true:

- A block offer of that heart and lung block to another TC has been partially accepted.
- The TC appears in the TC priority list before all other TCs to which no offer of the remaining organ has been made.
- An offer of the remaining organ to that TC has not been declined or been rescinded.

4c. Definitional Business Rule: An organ must be considered a remaining organ if (and only if) all the following are true:

- A block offer of that heart and lung block to another TC has been partially accepted.
- That TC did not accept the organ.

5. Behavioral Business Rule: An offer must be rescinded after the maximum offer response time.

> Enforcement Level[6]: *Guideline* if before the maximum offer response time + x minutes
>
>> Guidance Message [to candidate]: "You still have some time to make your decision. The offer will expire in x minutes."
>
> Enforcement Level: *Strictly enforced* if on or after maximum offer response time + x minutes.

6. Behavioral Business Rule: A party may submit an offer response only if the offer response pertains to an offer made to that party.[7]

Conclusions

A specific implication of these rule specifications is that 'process synchronization', a stated issue for the Organ Donation Challenge, is a 'system' concern. Actually, this problem requires no business-level process *whatsoever*. So, the rule specifications do not (and need not) address 'process synchronization'. (The assumption of 'statefulness' on the other hand is a given for RuleSpeak and SBVR. So, the rule specifications do not address that concern either.)

The rule specifications are completely platform-independent. They 'work' no matter whether the infrastructure is:

- Purely digital.
- Conducted via conversations over phone lines.

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[6] Behavioral business rules require an enforcement level because they can be broken. The default enforcement level is generally taken to be *strictly enforced*. Refer to "Breaking the Rules: Breach Questions" by Ronald G. Ross, *Business Rules Journal* Vol. 14, No. 2, (Feb. 2013) http://www.brcommunity.com/a2013/b688.html

[7] The integrity of offer responses is actually a critical (if unstated) aspect of this business problem (and its 'statefulness'). Seemingly basic rules like this should always be made explicit.

In either case the business logic is the same. For this reason, the rules can be described as true *business* rules.

A general implication of these rule specifications is to bring into question whether this business problem actually should be described as a 'decision' problem at all. It certainly features priorities, but these priorities are just facts that the rules address. In general, a decision approach is best applied only where one or both of the following are evident:

- A true choice exists between outcomes to some business question that is posed.
- Delaying a decision as long as relevant constraints allow can produce better results.

This challenge exhibits *neither* of these characteristics. It is simply a rule problem.

Appendix 1. Concept Model Diagram[8]

A concept model organizes the business vocabulary needed to express the rules (and other business communications) of a business problem fully and precisely. A concept model may also be taken as a blueprint for the base facts about which a solution for a business problem must maintain 'statefulness'.

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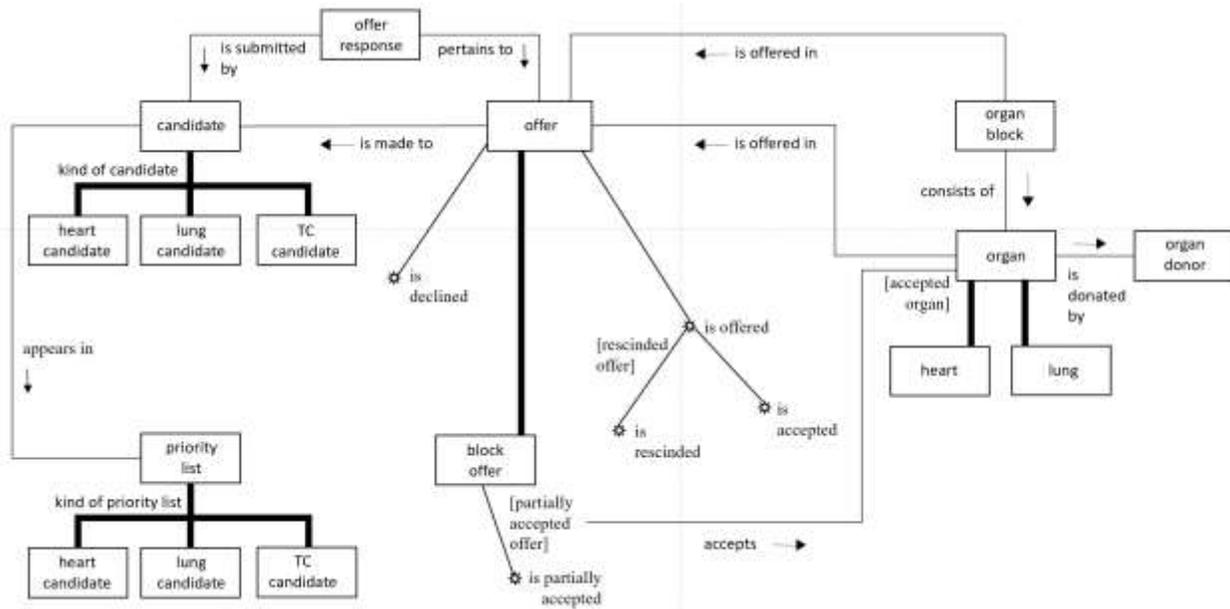
[8] It is assumed the definitions of these terms are self-evident. SBVR does not specify a graphic notation for concept models. The notation used in this diagram follows BRS ConceptSpeak™.