A Proposed Common Decision-Exchange Protocol for Representing, Managing, and Sharing Organizational Decisions

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ABSTRACT

Motivation – Share information; make better decisions. **Research approach** – Explore the use of XML code to document and transmit characteristics of decisions. **Findings/Design** – The paper recommends a CDEP. **Research limitations/Implications** – This work implies that we need an open-standard body similar to OMG in the object-oriented world. This would help to make decisions and their explanations more interoperable across a wide variety of organizations. **Originality/value** – The value of this work will be realized in military and other types of command and intelligence centers where decision tracking serves training and analysis purposes to preserve lessons learned. **Take-away message** – The authors welcome comments on this proposed decision-exchange protocol and suggestions and want to collaborate with others on this effort, which supports a global-interoperability test bed.

Keywords

Decision making, management of distributed computer resources, standards

This paper outlines the need and recommends a format for a Common Decision Exchange Protocol (CDEP). CDEP is an XML, REST-based protocol for representing generic human decisions in an interoperable format. It describes characteristics of decisions that should be expressed using CDEP and specifies a proposed XML format. The purpose is to integrate humans into computer systems to track and manage the decision-making process better, to enable improved information-flow metrics, to maintain an archive of the decisions and the decision-making process, to enable semi-automation of certain decision-making processes, to improve information sharing, and ultimately, to support better and faster decision making. The Common Protocol format should provide concise, generic, structured assessments and decisions that enable “drill down,” support pedigree and confidence, enable approvals and vetting, define options considered, link to previous decisions, and support flexible structuring.

Decisions determine the success or failure of enterprises. Tools should document decisions in a format for sharing and specifying the state of the decision in process. Instrumentation could support the development of a metric of decision flow and help understand and optimize decision processes across organizations. Visibility of decisions in their formation and evolution would enable active management and assistance from others. Therefore, an open-standard format can facilitate representing decisions efficiently for information exchange for situational awareness. Such a standard does not exist, although previous research suggests effective techniques and frameworks for representing arguments and decisions (Conklin, 2008). This paper builds on this significant prior work to propose a CDEP for enabling effective sharing and managing of decisions across an enterprise. Common Alert Protocol (CAP) (Jones & Botterell, 2005) is an example of the type and style of information exchange format recommended. CDEP protocol assumes:

- Most decision makers base decisions on the decisions, assessments, and recommendations of others.
- The higher-level knowledge that decisions represent avoids large raw data sets.
- Knowledge sharing must be concise, hierarchical, and structured to be understood and managed.
- The human component must be integrated into the representation of computer systems and processes.
- The protocol should support decentralized, open-standard and open-source approaches.

The goal of the proposed CDEP is to capture the essence of the decision for information exchange for situational awareness. The CDEP concept suggests the need for an information model with “common” types of things most people

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would like to know about a decision that may be of interest to them. The format should be usable across all domains. “Who, what, where, when, how and why” are basic components of the decision process, which also includes balancing an assessment of pros and cons based on criteria to answer a question or to select a course of action. A decision always has context, a purpose or goal, and some constraints (time, cost, etc.) The following questions pertain to situational awareness in any decision. What was the decision? Who made the decision and when? What options were considered? Who was consulted? What is the confidence? On what criteria was the selection based? What were the pros and cons? How was the decision made, (e.g. individual decision, majority vote, consensus, expert opinion)? Why was this decision made, i.e. what is the context for this decision? What is the state or stage of this decision (e.g. not started, information gathering, evaluating, decision made, preparing decision product, communicating decision, gathering feedback)? Where can I learn more?

Representing decisions under consideration in a sharable format enables others to understand the options considered, contribute, or prepare for implementation. A continuous representation of the current state of the decisions under consideration would enable more agile and optimized decisions through dynamic management of the ongoing decision processes. XML facilitates consistent, dependable, and interoperable data access, data integration, and general information exchange. Figure 1 is an example CDEP XML message representing a decision that needs to be made. Here, Joe needs to decide who would be a transition sponsor for his work. At this point, Joe has just started information gathering on this question, so confidence is low and no options have been defined. The question to be answered is expressed in bold for readability.

```
<?xml version = "1.0" encoding = "UTF-8"?>
<decisions>
  <decision>
    <guid>http://www.spawar.navy.mil/code536210/decisions/114.xml</guid>
    <question>Who would be a reliable transition sponsor for Joe?</question>
    <description>Joe needs a solid transition sponsor for his IAR topic</description>
    <confidence>LOW</confidence>
    <state>Gathering Info</state>
    <eventInfo>
      <who>http://www.spawar.navy.mil/code536210/people/Joe_Smith_13.xml</who>
      <when>2008-04-15T13:00-08:00</when>
    </eventInfo>
  </decision>
</decisions>
```

Figure 1: CDEP Decision At Info Gathering Stage

The decision components include a unique ID in a RESTful format (Fielding & Taylor, 2002), a question, description, confidence, and state. Each question encapsulates the basic components of an event, namely “who, what, when, where,” etc. “Who” is a link in a RESTful format to another “who” resource, containing the full contact information. The RESTful approach is simple and scalable. Everything is represented as a resource. Each resource has a unique URL. Resource state is maintained on the server (but not application state). HTTP (e.g., POST, GET, PUT, DELETE) is used to create, retrieve, update, and delete a resource. The representation of context and the details of the enumerations and subformat remain to be determined. A reworking of key free-text tags, such as <question> and <idea> is desired. The text in these tags is understandable to a human but not to a computer. A format based on Resource Description Framework can provide these tags so that expressive knowledge-representation concepts, such as subject-predicate-object, can support inferencing in knowledge bases. The format includes concepts of decision state, incorporates RESTful concepts for efficiency and visibility, and includes a hierarchical recursive representation of decisions and subdecisions for flexibility and expandability to multiple levels of decision making.

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