View Abstract

CONTROL ID: 2462418

TITLE: Filling in the blanks with ContextItems: how a field operations object model can work internationally but stay lean

AUTHORS (LAST NAME, FIRST NAME): Daggett, Dennis G.[2]; Ferreyra, R. Andres[1]; Reddy, Linga T.[4]; Rhea, Stuart[1]; Tevis, Joe W.[3]

INSTITUTIONS (ALL): 1. Ag Connections LLC, Murray, KY, United States.
2. ProAg Management, LLC, Amarillo, TX, United States.
3. TOPCON, Minneapolis, MN, United States.
4. John Deere ISG, Urbandale, IA, United States.

CURRENT TECHNICAL COMMUNITY: Information, Technology, Sensors, & Control Systems

CURRENT SESSION CATEGORY: Big data, data analysis and APPs (including teaching methods)

ABSTRACT BODY:

Abstract Body: Precision agriculture (PA) is still limited by a lack of hardware/software systems interoperability. AgGateway, a nonprofit consortium of 240+ companies, leveraged its wide cross-section of PA stakeholders to propose a collaborative solution: its ADAPT team created an open-source Application Data Model (ADM) of a superset of field operations data. The goal: replace current systems' need to support multiple, incompatible data formats, with a single integration to the ADM and a system of manufacturer-specific format-conversion plug-ins. This enables reading/writing to new systems with little marginal development cost. The ADM meets requirements from AgGateway's SPADE and PAIL projects, including compatibility with the ISO11783-10 standard (ISOXML) and participant companies' own systems.
Internationalization is important for this work, but conflicting requirements must be reconciled: ADM developers must seek universality, staying free of regionally-specific clutter. However, different geographies' business processes involve context-specific data (e.g., USA EPA product numbers.) If these "context items" are not accommodated, the ADM's relevance suffers. Additionally, it is desirable to use a controlled vocabulary. However, the dynamic nature of business and regulation requires this vocabulary to be easily extensible. ADAPT reconciled the contradictions by defining an object class, the ContextItem (CI), that can be linked to various other objects in the ADM.
ContextItems contain a code, a RepresentationValue (RV), and an optional list of CIs. The code indexes into a table defining what each CI means; the RV encapsulates a value along with data needed to interpret it (such as a unit of measure); the nested list enables complex multi-attribute CIs (e.g. PLSS cadastral information.)
AgGateway's SPADE project implemented a RESTful API to provide a machine-readable vocabulary of CI codes and definitions; its Standards & Guidelines Committee created an ad-hoc group to manage the vocabulary.
The CI system can be used jointly with ISOXML's feature of associating unique IDs to its own locally-scoped IDs (defined in ISO11783-10 Annex E) This enables adding geopolitical-context-dependent data to ISOXML's otherwise generic and highly machine-specific scope, with no modifications.

KEYWORDS: information systems, codes, international, ISO, standards.

Student Status: No

First Time Attendee: No