

A rising tide lifts all the boats: AgGateway's Collaborative Model for Identification in Field Operations

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Contemporary farming requires the continuous exchange of information between growers and partners such as agronomists, retailers, custom applicators, insurance agents and customers. A critical part of this interoperability is identification, where a name or code (the “identifier”) is used to reference a particular instance of an object. This enables farm management information systems (FMIS) to distinguish between that unique instance and other instances, and to recognize an instance when encountering it again. There are multiple motivations for uniquely identifying resources in production agriculture data exchange. Examples include unambiguously specifying the products being applied (or planned for application) in a particular field operation; unambiguously specifying the location(s) where these products are applied; and enabling an audit trail (the aspiration of having farm-to-fork traceability) for all the processes of interest.

Workflows involving identification often break down when a grower (or other actor) imports data into their FMIS from an external source such as a machine-implement control system (MICS) or other FMIS. Incoming data (that may correspond to objects such as farms, fields, and products in the grower’s own FMIS) might contain externally-created identifiers that the grower’s FMIS does not recognize. The user must then manually match these unknown identifiers with known objects in their system. (This process can be supported by spatial overlap checking, string comparison metrics, and so forth). Users do not like this data mapping (also called record linkage, and object identification): it is time-consuming and error-prone, and is ultimately an obstacle to the broader adoption of precision ag technologies, especially given that users increasingly have an expectation of “frictionless data entry.”

A centralized approach to identification might seem like a solution: supply-chain operations increasingly use GTINs (Global Trade Item Numbers), GLNs (Global Location Numbers), and EANs (International Article Numbers), all codes minted by one or more numbering authorities (such as GS1). This makes clear where the identifier originated (henceforth, its “source”) and what its meaning is. This approach seems ill-suited for the current context in field operations, however; a given user might require thousands of identifiers for their farms, fields and documents; those identifiers may be needed in situations of no Internet connectivity, and paying for identifiers may seem counter-intuitive to the end-user. Moreover, agricultural data exchange happens in a context of scant format standardization: different FMIS and MICS systems use a variety of identifier data types, such as integers, GUIDs (Globally Unique Identifiers), URIs (Universal Resource Identifiers), DOIs (Digital object identifiers), and GLNs (Global Location Numbers). This plethora of different identification schemes makes it even harder to interoperate.

AgGateway’s collaborative model for identification is presented as a potential, distributed, solution. It has a technological component and a social component: The technological component is based on the Compound Identifier, a sort of “basket of identifiers” that associates an object with one or more identifier-source pairs, analogous to what is enabled in ISO 11783 Annex E-mediated Linklist files. The social component consists of encouraging the actors in an exchange process to preserve all the identifiers they receive for a given object, and to pass them all along, together with their own identifier (if it exists) to the next actor in the communication process.

Multiple examples are presented detailing the use of compound identifiers to identify different objects within a farm management information system (e.g., grower / farm / field, equipment, documents).

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