



An Overview of Current and Planned AgGateway Work

January 2021

Following is a high-level overview of AgGateway current and planned activities in North America, Europe and Latin America as of January 2021. It may not include work being done by some committees and task forces, such as improvements to AGIIS. For more detail on some of these activities, see the Working Group descriptions starting on page 5.

Current Activities

ADAPT - Interoperability in Field Operations: AgGateway's ADAPT has already been a powerful addition to the digital toolbox. The ADAPT team is now working to prepare the underlying data model to propose as a global standard. We believe this step will increase the adoption of this free, open source software even more. ADAPT enables agriculture-data interoperability, helping ag retailers, agronomists and growers better manage data and apply it to make improvements in their operations.

Lab Data Standardization: AgGateway teams are addressing how to standardize data formatting for soil test results, and laboratory tests in general. Today only about 30% of VRT applications for row crops are based on a soil test. This is partly because there is such a variety of data formats in the industry. AgGateway is working on a common soil test data format across regions and platforms, compatible with the ADAPT framework and existing regional standards. The first step involves integrating with the MODUS format. AgGateway has been working with soil labs and lab software companies; in Latin America, the team is also working with entities that regulate the quality of soil analysis, including Embrapa Soils and the Agronomic Institute of Campinas, as well as other key groups.

Channel Integrity: A group of AgGateway members involved in crop protection is looking at ways to improve product stewardship by increasing their ability to track product. The team is currently looking at the key business processes involved as product flows through the supply chain.

Product Catalog: Some cooperatives in North America plan to offer branded online store services to their retail members. Crop protection and seed manufacturers want to ensure that such online stores have complete, accurate and up-to-date information in their Product Catalog. The first phase – providing the minimum data set required to populate a retail-facing eCommerce catalog – has been completed. Specifically, AgGateway's Standards & Guidelines Committee recently approved the OAGIS Catalog JSON Schema v1.0 profile using the NIST/OAGIS Score Tool. As a result of AgGateway's Product Catalog work, there have been 13 approved enhancements to the OAGIS standard.

Smarter Irrigation (PAIL): AgGateway's irrigation work addresses processes and data requirements that enable more effective water management, thus conserving both water and energy. Members of the precision ag irrigation team have successfully tested implementation of Part 2 of the PAIL data exchange standard. This part of the standard deals with the observations and measurements data. Parts 1 and 3 of the PAIL work are already a national standard (ASABE - ANSI ASC).

Traceability: AgGateway's In Field Product Identification Working Group has identified numerous points in the supply chain to improve digital connections for traceability. The goal is to improve product identification within field work records. Current sub-groups include Seeding & Crop Protection, and Provenance (which includes grain traceability). The teams have documented processes and have begun to identify data requirements. The major benefits of these traceability efforts are obvious: The ability to track and trace product for customer service, food safety and regulatory compliance.

Fertilizer Blend Work Orders (Mix Ticket): An AgGateway team of companies that produce or use fertilizer blending equipment has developed standards to support blending and dispensing processes. This year the group completed an enhanced version of a standard for dispensing work orders and work records. The work order specifies amounts and sources of inputs into a blending operation as well as the output locations. Work records include data about what was actually done. The team has published a .NET library with source code for serializing and de-serializing the JSON messages. Enhancements to the messages, along with workflow rules for an API implementation, are currently under discussion.

Reference Data API: Reference data refers to such data as code lists, identifiers, product information and configuration parameters. The Agrisemantics Working Group is focusing on documenting and recommending extensions to data in order to define interoperable meanings for data. The working group has agreed to basic API principles and has stood up a proof-of-concept service.

Crop Protection Connectivity in Canada: By implementing digital connections between crop protection product manufacturers, distributors and retailers, companies can greatly improve the order process and sales reporting – often with direct and significant impact on the bottom line. Endorsed by CropLife Canada, the Canadian connectivity project is working to create digital connectivity between trading partners. The work builds on AgGateway's successful and proven approach already in wide use in the U.S. crop protection industry.

Standard Reference Data for Crop Protection Products: In Europe, Lexagri's Homologa contains information regarding plant protection products from more than 70 countries. An AgGateway team is working to develop a standard REST JSON interface to exchange the standard master data (reference data) for crop protection products. Users will be able to link to the Homologa database via an FMIS. The interface will also be used by Homologa itself to collect data from the official regional crop protection databases. The first deliverable will be a standard reference data model on crop protection product data. The second deliverable will be the design of the standard JSON request to retrieve information from crop protection reference data repositories like the Homologa database. The reference data model is almost finished and will lead to an

enriched ADAPT data model. Furthermore, a proof-of-concept will be carried out implementing the reference data model as an RDF (Resource Description Framework) implementation.

Farm inputs - Standard Crop Protection Recommendation: Another team in Europe is bringing together companies and ag data specialists to standardize data exchange concerning the use of farm inputs such as seed, fertilizer and crop protection products (Work Order/Work Record). The focus is on exchanging crop protection recommendations between advisory systems and a user's FMIS, and to exchange recordings of applied crop protection products at the crop/field level. By setting a data exchange standard, companies can better support sustainable agriculture, increase transparency and improve interoperability, as well as provide opportunities to boost innovation. For this work, AgGateway's ADAPT data model (Work Order, Work Record) are used as a starting point.

Planned Activities

EU IoF 2020 program: As a participant in the Internet of Food & Farm program of the European Union, AgGateway will bring forward ADAPT solutions in several proof-of-concept implementations in data sharing in arable farming. The goal of participation is to promote AgGateway solutions and to support new initiatives on data sharing.

Engage with GS1 Global: GS1 is the global leading initiative in developing and promoting standards for key identifiers for data exchange in supply chains, such as the GLN (Global Location Number), GTIN (Global Trade Item Number) and GPC (Global Product Classification). GS1 and AgGateway will take the initiative to meet with Copa Cogeca (the European farmers organization) to discuss the need for, and feasibility of a global standard for farm (farmers) identification, using the GS1-GLN.

Soil and Weather Data: The Soil & Weather DDEs (Data Dictionary Entry) project in Europe will assist growers in recording the weather and soil conditions using the tractor cab terminal in the field during spraying. Alignment with the ISO machine standard (ISO11783-11) will leverage relationships with the Association of Equipment Manufacturers (AEM) and Agriculture Industry Electronics Foundation (AEF). This work will also allow compliance with United Kingdom legislation regarding the recording of this type of data.

Biodiversity: AgGateway is looking into options to support the industry in Europe with digital tools to improve sustainable production at the farm level and to improve biodiversity. One idea is to develop a pan-European network of fully automated sensors to capture data on pollinator populations, as a way of monitoring biodiversity. AgGateway is also discussing biodiversity with the Cool Farm Alliance, which develops metrics, key figures and tools for farmers to benchmark their operations in terms of sustainable production; biodiversity is one of the topics to monitor.

Slaughter Results: AgGateway's Europe region is organizing interest to develop a standard for exchanging slaughter reports from slaughterhouses to farmers and

accountancy, for broilers, pork and bovine animals. A first draft for such a standard is being developed by AgGateway's associate Dutch member AgroConnect, in cooperation with European industries.

See also "Pipeline" under Working Groups section.

Other Recent Activities/Assets

Aerial Imagery (PICS): Aerial imagery can be an informative addition to a grower's decision-making process. But much of the aerial imagery produced today lacks sufficient metadata to enable users to get the most value out of the imagery they receive. AgGateway's Aerial Imagery Project (PICS) made significant progress in addressing this issue, defining metadata standards and developing a specification.

Ag Retail Connectivity Planning: The Ag Retail Council and other interested members have been following up on the successful "Quick Connect" sessions to explore other ways to encourage sessions for trading partners to meet and establish concrete plans for implementation.

Automated Identification Data Capture for Products (AIDC): AgGateway teams have done significant work to promote and enable automated identification capture for products throughout the input supply chain. This work has included updated barcoding guidelines, as well as promotional material to encourage adoption. Distributors and retailers have repeatedly asserted that they would invest in automated identification systems once standard barcodes are widely available on product packaging.

Seed Messages: A Seed Messages Working Group last year documented processes and data requirements to support seed returns (after season), transfers (both internal and external), seed replants, and license and zone management. When implemented, these new messages can bolster the steps a company takes for efficiency and customer service. They can also reduce some of the retailer struggles or pain points to manage these processes. AgGateway members involved with seed continue to discuss ways to encourage industry implementation of these new resources. (The messages are available in CLICK and on the AgGateway website.)

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Working Groups

AgGateway produces new digital resources through its Working Groups. The Portfolio Management Center (PMC) is responsible for tracking, providing guidance to, and communicating about the work of Working Groups to members and other industry stakeholders. Details about Working Group activities can be tracked using the PMC dashboard on the [AgGateway Wiki](#).

How to form a Working Group: Member companies identify industry pinch points or opportunities for improving efficiency and interoperability, and come together under AgGateway's antitrust compliant structure to develop, deploy and implement digital resources that address their needs. Working Group participants affirmatively state their intention to join the group and to comply with AgGateway's patent policy (as part of the digital resource development process). For this reason, Working Group meetings are not open to non-participants as a matter of course, but all members are welcome to join by complying with the patent policy.

Current Working Groups

WG00 - AgriSemantics

This group focuses on documenting and recommending extensions to data in order to define interoperable meanings for data. The scope is around metadata, as opposed to format definitions. The work of this group informs other Working Groups. While the intent of the Working Group model for AgGateway is to have short, limited scope activities defined, this group is inherently different. As such we are currently considering this a Working Group (in that it produces digital resources) while noting it as an exception to the current usage of the term because of its longer duration.

- Deliverables
 - Glossary of agricultural terms
 - Common model to enable geo-political context
 - API for context item implementation
 - Controlled vocabularies
 - Units of measure
- Highlights
 - ADAPT cotton plug-ins: created process requested ContextItems
 - ADAPT cotton plug-in process requested: observation codes
 - Incorporate Modus testing codes into overall set of observation codes
 - Created submission process for controlled vocabularies
- What's Next
 - Continued work on controlled vocabularies for WG01 and WG04
 - Test the use of a resource mapper
 - Define a general-purpose data type registry

WG01 - In-Field Identification

This group has identified numerous points in the supply chain to improve digital connections for traceability. Current sub-groups include Seeding & Crop Protection, and Provenance (which

includes grain traceability). The teams have documented processes and have begun to identify data requirements.

- Deliverables
 - JSON payload for Product ID from seed retailer to:
 - Farm Management Information System (FMIS)
 - Planter task controller
 - Mobile App
 - OAGi Portal
- Highlights
 - Completed payload messaging for work orders and work records
 - Developed REST API
 - OAGi portal is up and running
- What's Next
 - Enable product identification in the field
 - Charter data linking as its own Working Group

WG02 - Channel Integrity

The Channel Integrity initiative in North America will allow companies to provide better product stewardship, and significantly boost inventory control and ability to track product. A key component of the program is a shared network that would include manufacturers, distributors and ag retailers.

- Status: The value of an industry implementation was not proven out. Industry executives will meet to discuss a new effort, but goals and deliverables have not yet been defined.

WG03 - Product Catalog

Some cooperatives in North America plan to offer branded online store services to their retail members. Crop protection and seed manufacturers want to ensure that such online stores have complete, accurate and up-to-date information in their Product Catalog. The focus for this group is on defining data requirements and data standards, and developing a Proof of Concept.

- Deliverables
 - Use cases
 - OAGIS schema
- Highlights
 - The WinField-Syngenta product catalog went live November 14, 2020.
 - Nutrien Ag has connected to the Syngenta API in test.
 - The OAGIS Catalog JSON Schema v1.0 profile using the NIST/OAGi score tool was submitted to, and approved by, the Standards & Guidelines Committee.
 - 13 approved enhancements were made to the OAGIS standard as a result of AgGateway Product Catalog work. These enhancements will be released in AOGIS 10.7.
- What's Next
 - A large focus on bringing on additional partners
 - OAGIS 10.7 Release to Handle Extensions
 - GTIN and SKU at packaging level
 - Additional product types

WG04 – Agricultural Lab Data

This group's goal is to partner with the laboratory community and help implement standards and formats that can interoperate with AgGateway's ADAPT framework, along with ISO 11783 files and other existing farm management data standards. The work will initially focus on the MODUS soil testing standard that many labs are already using.

- Deliverables
 - MODUS as open-source test standard
 - Enable geo-political context
 - Controlled vocabularies (working with WG00)
 - ADAPT plugin
- Highlights
 - MODUS license granted to AgGateway
 - NIST support in developing BPMN
 - Latin America and Europe regions are participating
 - Embrapa met with 18 representatives to kickstart lab soil testing standards in Latin America.
- What's Next
 - Mapping libraries so that not only the syntax, but the semantic meaning of the test data is preserved.

WG05 – Mix Ticket

This Working Group has created work order and work record standards that describe a common integration pattern to exchange work orders for blending/dispensing operations to create a finished good product, and to report the work order completions in the form of work records. The work record communicates the actual ingredient and amounts consumed for the manufacturing operation.

- Deliverables
 - Work Order messages
 - Work Record messages
 - .NET library for Work Order and Work Records
 - JSON schema, including guaranteed analysis
- Highlights
 - JSON schema version 1.1 submitted to and approved by Standards & Guidelines Committee.
- What's Next
 - Moving into implementation and maintenance phase.

WG06 – Farm Inputs: Reference Data

AgGateway's European regional group has been bringing together companies and ag data specialists to standardize data exchange for farm inputs, specifically for seed, fertilizer and crop protection products. The goal is to standardize the exchange of agronomic data for farm inputs in Europe, and then harmonize those standards with other AgGateway regional standards.

- Deliverables
 - Data models
 - Reference APIs to retrieve master data from repositories

- Highlights
 - Finalized version 1 of the reference data model on crop protection products
- What's Next
 - Get final report for the crop protection data model; review with the Standards & Guidelines Committee.
 - Finalize the specifications of the use case for the proof of concept. Start implementing the RDF proof of concept.
 - Strengthen connections with WG03 and WG04.

WG07 – Farm Inputs: Work Order, Work Record

Another group from AgGateway's European region has been bringing together companies and ag data specialists to standardize data exchange for Work Orders and Work Records, specifically for seed, fertilizer and crop protection products. The goal is to standardize the exchange of agronomic data in Europe, and then harmonize those standards with other AgGateway regional standards.

- Deliverables
 - Reference data model
 - JSON schema
 - ADAPT enhancements
- Highlights
 - Developing modified version of the enriched SMAG data model for crop protection
- What's Next
 - Continue testing models
 - Define ADAPT requests

Pipeline

Here are some preliminary ideas from members for future Working Groups. These are not prioritized, and this list is not inclusive.

- Interoperability for different initiatives in Latin America
- Potato work record in Europe
- Slaughter results work record for pork and poultry in Europe
- Water management, irrigation (PAIL) next steps
- Semantic infrastructure working group(s)
- Identify opportunities for IoT working groups
- Complete alignment of soil testing standards between Latin America and North America
- Expand footprint of OAGIS-based Product Catalog implementation
- Standardizing access to instance, reference data
- Evaluation of AgXML weights and measures specification to product density requirements in crop protection chemicals
- Pork production interoperability in European meat industry standards
- Farm input data standardization for Europe
- Expanding distributor to retailer connectivity directly and via allied providers
- Retail to FMIS connectivity initiative

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