AgGateway Portfolio Overview

Q3 2023 PMC Overview
PMC Groups

Found within Portfolio Management Center

Advisory Groups
Strategic in nature, providing longer term guidance in a subject area

Working Groups
Shorter in duration, delivering defined digital resources

Member organizations affirmatively join a Working Groups via Join Form
Company participation must be confirmed by AgGateway primary contact per IP policy
Agrisemantics Advisory Group

Purpose and Areas of Oversight:
• Ensure that as data is shared among systems the meaning is also shared enabling better interoperability
• Glossary of Agricultural Terms
• Controlled Vocabularies & Units of Measure
• Common model to express geo-political context

Related Working Groups and Digital Resources:
• WG04, WG11 Ag Lab Data (Modus)
• WG00 Agrisemantic Infrastructure PoC
• Controlled vocabularies for an ADAPT
• Shipped Item Instance Controlled Vocabularies
• Dataset Metadata Controlled Vocabularies

Chair: Andres Ferreyra (Syngenta)
Staff Liaison: Jim Wilson
Member Organizations:
- Agrimetrics
- CDMS, Inc.
- Enterprise Ag Strategies LLC
- FarmBelt North, Inc.
- Lexagri SAS
- ListenField
- Syngenta Crop Protection
Data Linking Advisory Group

Purpose
- Provide scope, direction, and prioritization of data linking related topics in coordination with other organizations and AgGateway efforts
- Allows awareness and linkage of related agricultural data
- Helps farmers who work with more than one data repository
- Enables farmers to share their data to gain insights
- Assist in product recalls, traceability, and consumer confidence

Related Working Groups and Digital Resources:
- Infield Product ID / Shipped Item Instance
- Dataset Metadata
- WG13 Closed Loop Spray
- WG14 Potato Provenance
- WG20 Traceability API

Co-Chair: Joe Tevis (Vis4Ag)
Co-Chair: Scott Nieman (Land O’Lakes)
Staff Liaison: Ben Craker

Member Organizations:
- Agricultural Industry Electronics Foundation
- Bushel
- Combyne Ag
- DTN
- National Institute of Standards and Technology
- Vis Consulting
- Winfield United
Field Boundaries Advisory Group

Purpose

- An unambiguous, core definition of a field and field boundary that can serve as the basis for different business use cases, can reduce effort and confusion across the value chain
- Preserving the meaning of that core definition, while adding relative meaning for different use cases
- Enable farmers to share their field data without having to learn a multitude of terms and meanings
- Assist in traceability efforts

Related Working Groups and Digital Resources:

- WG17 Field Boundaries Use Cases and Definitions
- WG13 Closed Loop Spray
- WG14 Potato Provenance
- WGxx GNSS Accuracy

Chair: TBD
Staff Liaison: Jeremy Wilson
Member Organizations:

<table>
<thead>
<tr>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bayer Crop Science LP</td>
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<tr>
<td>Cerro Solutions</td>
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<tr>
<td>Enterprise Ag Strategies, LLC</td>
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<td>Growmark, Inc.</td>
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<td>Nutrien</td>
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<td>Proagrica</td>
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<td>Raven Industries</td>
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<td>Software Solutions Integrated, LLC</td>
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<td>Traction</td>
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<td>Winfield United</td>
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</tbody>
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Current Working Groups

AgGateway Digital Resource Development Process
Active Working Groups

- WG00 Agrisemantic Infrastructure PoC
- WG04 Ag Lab Data (Modus)
- WG11 LATAM Soil Data
- WG12 PAIL

- WG14 Potato Provenance (on hold)
- WG19 ADAPT Serialization
- WG20 Traceability API
- WG21 European Reporting ADAPT Mapping
**WG00 Agrisemantics**

**Business Value:**
Develop and implement infrastructure to provide the industry with controlled vocabularies or variable-type registries seeking to enable the communication and preservation of the meaning of digital agriculture data as it is exchanged between different actors in agriculture.

**Deliverables:**
- Proof of concept semantic type registry for the ag industry
- Crop list objects and data able to map to other crop lists within the PoC Infrastructure
- Recommended policies and procedures to manage semantic resources administered by AgGateway

**Status:** Refining crop model, recommending policy & procedures

**Planned Completion:** Crop List utilizing PoC infrastructure at MYM June 2023

**Current Estimate:** Policy & Procedure recommendation expected at Aug 10 S&G meeting, Crop model slower than planned, finalized with PoC infrastructure for annual meeting
WG04, WG11 Ag Lab Data (Modus 2.0)

**Business Value:**
Automated test data management to improve labs’ efficiency and enable increased sample throughput.

**Scope:** Soil initially, Water, Plant Tissue, Manure to follow

**Deliverables:**
- Updated Modus Tables
- Observation codes
- JSON and XML Schema

**Status:** v2 soil list finalized, started reviewing manure list, working on v2 schema. Will move to water and botanical lists next.

**Planned Completion:** v2 soil list & v2 schema Q3 2023

**Current Estimate:** v2 schema Sept 2023

**WG04 Chair:** Open
**WG11 Chair:** Ronaldo Pereira de Oliveira (Embrapa)
**Staff Liaison:** Ben Craker

**Member Organizations:**
- AsBraAP
- Centro de Inovação no Agronegócio (CiA)
- Embrapa Informatica
- Fagriculture
- Venturus

- A&L Great Lakes Laboratory
- Aaron Ault
- AGCO Corporation
- Agriculture Laboratory Testing
- Embrapa Informatica
- Jason Ellsworth
- Land O’ Lakes
- Nancy Bohl Borman
- National Institute of Standard
- OpenTEAM
- Syngenta Crop Protection, LLC
- TELUS Agriculture
- Varsa AG
- Winfield United
WG12 PAIL

Business Value:

Improve agricultural irrigation by developing a common set of data standards and formats to convert data for use in irrigation data analysis and precision prescription programs. Effort broken down into three Parts:

1. Core Concepts
2. Observations & Measurements
3. Irrigation System Operations

Status: Parts 1, 2, and 3 promoted to Committee Draft status in ISO/TC 23/SC 19, currently reviewing and incorporating committee comments

Chair: Charles Hillyer (Fresno St.)
Staff Liaison: Ben Craker

Member Organizations:

Charles Hillyer
ListenField
Syngenta Crop Protection, LLC
WG19 ADAPT Serialization

Business Value:
With the widespread adoption of the ADAPT Framework and the ongoing ADAPT Standard work many stakeholders have expressed a need for a common method for serializing data. Once the standardized schema for the data model is complete a need will still exist to better facilitate the exchange of data between parties. This working group will develop a common approach to serializing data conformant to the ADAPT Standard.

Deliverables:
- Standardized method for serializing data conforming to the ADAPT Standard
- Experiment/proof of concept to determine best serialization method based on requirements
- Tools to enable easy human readability of data if a more binary (i.e. protobuf) centric approach is taken
- Controlled vocabularies managed by Agrisemantics group within AgGateway where possible

Status: Documenting requirements for JSON schema to ensure tool generates needed format. Reviewing GEO Parquet as likely solution for high density data

Planned Completion: MYM June 2023

Current Estimate: Behind Schedule, slow progress due to limited development resource time available to benchmark proposed solutions
WG20 Traceability API

Business Value:
Throughout the industry there are a variety of perceptions and needs of data through the value chain. The team will review and model two key elements and their relationship, the Traceable Resource Unit (TRU), and Critical Tracking Event (CTE). This will define the interface between partners for traceability to support general traceability initiatives like sustainability of FSMA (Food Safety Modernization Act) building off previous work in projects like CART (Commodity Automation for Rail and Truck) and Scale Ticket.

Deliverables:
• Analysis of prior work and proof of concept(s)
• Creation of core components in Score that represent the superset of data elements needed across multiple scenarios
• Profile these components in Score needed to support these industry use cases
• Create the RESTful behavior including resource path definitions and verbs needed and path/query parameters

Status: Reviewing container states and implications for API
Planned Completion: MYM June 2023
Current Estimate: Slightly behind schedule, should complete Sept 2023 prior to annual meeting

Co-Chair: Scott Nieman (Land O’Lakes)
Co-Chair: Joe Tevis (Vis 4 Ag)
Staff Liaison: Ben Craker

Member Organizations:
- AGCO Corporation
- CNH Industrial
- Combyne Ag
- John Deere
- Mtech Digital Solutions Oy
- National Institute of Standards and Technology
- StrataBuilt
- Vis Consulting Inc.
- Winfield United
WG21 European Reporting Data ADAPT Mapping

Business Value:
A variety of e-messages are used to transfer data and report farming practices for regulatory purposes across Europe. New regulations are on the horizon that would require additional reporting by farmers making the need to exchange this data much more common and important. This working group will build on the work done by the Closed Loop Spray group by mapping the identified models commonly used in the Europe against the ADAPT Standard data model to ensure it supports the use cases identified by the working group.

Deliverables:
- Recommendation for changes, additions to ADAPT committee based on gap check of specific datasets as listed above, to enhance the ADAPT Standard model to support data reporting use cases.
- Mappings between in scope datasets and ADAPT.
- A first example of an ADAPT standard based JSON message to report the use of crop protection products at farm level.
- Examples of serialized data in the different models to aid in understanding by implementers
- Recommendation on need for plugins to convert to various formats for subsequent WG

Status: Conducted initial review of EDI-Crop, moving to next model

Planned Completion: Limited resources and time slowing progress, competes with ADAPT Standard effort for resource

Current Estimate: Should have a report out for Annual meeting but will not have full mapping to any of the standards in scope, likely will require a follow up effort

Chair: Conny Graumans (AgGateway)

Staff Liaison: Ben Craker

Member Organizations:
- AGCO Corporation
- Agdatahub
- Agro EDI Europe
- FarmBelt North, Inc.
- Prosagrica
- SMAG
Other Activities

Work being done outside of current Working Groups
ADAPT

AgGateway

AgGatewayADAPTFramework by: AgGateway strhea knelson-farmbeltnorth
- 207,722 total downloads - last updated 2 months ago - Latest version: 3.0.2
- aggateway adapt agriculture
AgGateway ADAPT framework

AgGatewayADMPlugin by: AgGateway strhea knelson-farmbeltnorth
- 81,574 total downloads - last updated 5 months ago - Latest version: 3.0.1
- aggateway adapt adm agriculture
AgGateway ADM Plugin for the ADAPT framework

AgGatewayISOPlugin by: AgGateway strhea knelson-farmbeltnorth
- 59,228 total downloads - last updated 2 months ago - Latest version: 5.1.0
- agriculture aggateway adapt isoxml isoxmlv4 11783 11788-10
AgGateway ISO v4 Plugin for the ADAPT framework

Technical Co-Chair: Stuart Rhea
Technical Co-Chair: Kelly Nelson
Business Chair: Dan Danford
Staff Liaison: Jim Wilson

3 Packages
376,150 Total downloads of packages
ADAPT past, present, and future

2014
- Begin ADAPT framework and plugin development

2022-05
- Begin ADAPT Standard development

2022-10
- ADAPT Serialization WG charter development

2022-11
- Kick off ADAPT Serialization WG

2022-12
- Release ADAPT Standard v1

2023+
- Publish ADAPT Serialization specification

*Other
- ADAPT Standards development and maintenance
- ADAPT Framework and plugin development and maintenance
- Explore seamless interoperability among ADAPT Data Model, ADAPT Plugins, and ADAPT Standard
- Consider process for ADAPT Standard → ISO Standard
AgGateway’s approach to developing the ADAPT Standard

- Completely open activity. AgGateway membership is not required.
- Using a GitHub project for issue management.
- Using a cutting-edge tool for model development: Score
  - Developed by AgGateway member NIST and AgGateway partner OAGi
  - Enables creating ISO 15000-5-compliant information models
  - Enables creating ISO 15000-5-compliant message profiles in defined business contexts
  - Enables model expression in multiple syntaxes (currently OAS v3, JSON Schema, and XML Schema; future XMI, RDF, OWL as required)
- Browser-based and multi-user
- Supports versioning, model element state management
# ADAPT Resources

<table>
<thead>
<tr>
<th>Resource</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAPT Homepage</td>
<td><a href="https://AdaptFramework.org">https://AdaptFramework.org</a></td>
</tr>
<tr>
<td>ADAPT Framework Repo</td>
<td><a href="https://github.com/ADAPT/ADAPT">https://github.com/ADAPT/ADAPT</a></td>
</tr>
<tr>
<td>ADAPT ISO Plugin Repo</td>
<td><a href="https://github.com/ADAPT/ISOv4Plugin">https://github.com/ADAPT/ISOv4Plugin</a></td>
</tr>
<tr>
<td>ADM (ADAPT Data Model) Plugin Repo</td>
<td><a href="https://github.com/ADAPT/ADMPlugin">https://github.com/ADAPT/ADMPlugin</a></td>
</tr>
<tr>
<td>ADAPT Visualizer Repo</td>
<td><a href="https://github.com/ADAPT/ADAPT-Visualizer">https://github.com/ADAPT/ADAPT-Visualizer</a></td>
</tr>
<tr>
<td>ADAPT Standard Issue Board</td>
<td><a href="https://github.com/ADAPT/Standard/projects/1">https://github.com/ADAPT/Standard/projects/1</a></td>
</tr>
<tr>
<td>ADAPT NuGet Packages</td>
<td><a href="https://www.nuget.org/profiles/AgGateway">https://www.nuget.org/profiles/AgGateway</a></td>
</tr>
</tbody>
</table>
Completed Work

Completed digital resources delivered by previous Working Groups
Active & Completed Working Groups

- WG01 In-Field Product ID Seeding Pilot
- WG03 Product Catalog
- WG05 Mix Ticket (dispensing Work Order/Record)
- WG06 Farm Inputs: Reference Data
- WG07 Farm Inputs: Work Order, Work Record
- WG08 In-Field Product ID ADAPT Plugin
- WG09 Linked Data (DatasetMetadata)
- WG13 Closed Loop Spray
- WG15 Scale Ticket
- WG16 Crop Protection Product Guidelines
- WG17 Field Boundaries: Terms & Definitions
- WG18 Crop Nutrition 3rd Party Product Management
# Where to find Completed WG Digital

<table>
<thead>
<tr>
<th>WG/Resource</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>WG01 In-Field Product ID Seeding Pilot(ShippedItemInstance)</td>
<td>Private GitHub Repo (AgGateway members only)</td>
</tr>
<tr>
<td></td>
<td><a href="https://github.com/AgGateway/In-FieldProductID">https://github.com/AgGateway/In-FieldProductID</a></td>
</tr>
<tr>
<td>WG03 Product Catalog</td>
<td>Private GitHub Repo (AgGateway members only)</td>
</tr>
<tr>
<td></td>
<td><a href="https://github.com/AgGateway/ProductCatalog">https://github.com/AgGateway/ProductCatalog</a></td>
</tr>
<tr>
<td>WG05 Mix Ticket</td>
<td>Public GitHub Repo</td>
</tr>
<tr>
<td></td>
<td><a href="https://github.com/AgGateway/Dispensing">https://github.com/AgGateway/Dispensing</a></td>
</tr>
<tr>
<td>WG06 Farm Inputs: Reference Data</td>
<td>AgGateway Confluence (Wiki)</td>
</tr>
<tr>
<td></td>
<td><a href="https://aggateway.atlassian.net/l/cp/zPjh3HqN">https://aggateway.atlassian.net/l/cp/zPjh3HqN</a></td>
</tr>
<tr>
<td>WG07 Farm Inputs: Work Order, Work Record</td>
<td>AgGateway Confluence (Wiki)</td>
</tr>
<tr>
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<td><a href="https://aggateway.atlassian.net/l/cp/oGiWwmD5">https://aggateway.atlassian.net/l/cp/oGiWwmD5</a></td>
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<tr>
<td>WG08 In-Field Product ID ADAPT Plugin</td>
<td>Public GitHub Repo</td>
</tr>
<tr>
<td></td>
<td><a href="https://github.com/ADAPT/ShippedItemInstancePlugin">https://github.com/ADAPT/ShippedItemInstancePlugin</a></td>
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<tr>
<td>WG09 Linked Data (DatasetMetadata)</td>
<td>Private GitHub Repo (AgGateway members only)</td>
</tr>
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<td></td>
<td><a href="https://github.com/AgGateway/DatasetMetadata">https://github.com/AgGateway/DatasetMetadata</a></td>
</tr>
<tr>
<td>WG13 Closed Loop Spray</td>
<td>AgGateway Confluence (Wiki)</td>
</tr>
<tr>
<td></td>
<td>Final review &amp; posting in process</td>
</tr>
</tbody>
</table>

Use this [form to request access](#) to private repo.
<table>
<thead>
<tr>
<th>WG/Resource</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>WG15 Scale Ticket</td>
<td>Private GitHub Repo (AgGateway members only) <a href="https://github.com/AgGateway/ScaleTicket">https://github.com/AgGateway/ScaleTicket</a></td>
</tr>
<tr>
<td>WG16 Crop Protection Product Guidelines</td>
<td>Wiki pages, publication in process</td>
</tr>
<tr>
<td>WG17 Field Boundaries: Terms and Definitions</td>
<td>Being added to AgGlossary, ADAPT Standard <a href="https://github.com/ADAPT/Standard/issues/97">https://github.com/ADAPT/Standard/issues/97</a></td>
</tr>
<tr>
<td>WG18 Crop Nutrition 3rd Party Product Management</td>
<td>XSLM file, publication in process</td>
</tr>
</tbody>
</table>

Use this form to request access to private repo.
Future Working Groups

Planned and potential future working group identified by member’s pain points or follow on work from current/past Working Groups
Working groups starting up this quarter

- Weather and forecast data standardized API
  - Standardized interface for sharing weather and forecast data
- Settlement sheet
  - Building off Scale Ticket effort to define a standardized digital settlement sheet
- Booking and pre-pay reporting message
  - Define message to report total bookings and pre-pay at retail location(s)
- Field Boundaries: GNSS Accuracy
  - Define standard accuracy metrics to help a recipient determine how a field boundary may be used
Other Potential Future WG’s

- Agrisemantics: Common controlled vocabularies
  - Find/create common controlled vocabularies identified common between multiple WG’s

- Agrisemantics: Budgeting & infrastructure
  - Evaluations of costs/benefits of various semantic resource management tool implementations

- Data permissioning and stewardship
  - Update the data privacy whitepaper with the latest views pertaining to data access permissioning and stewardship

- ASN (Advanced Ship Notice): Farmer to elevator/processor
  - Standardized message for an advanced ship notice from a farm to elevator/processor

- Scale head to ERP interface
  - Standardized interface between scale heads and ERP systems

- ShippedItemInstance gap check for crop protection, crop nutrition
  - Review ShippedItemInstance for support of crop nutrition and/or crop protection products

- DatasetMetadata controlled vocabularies
  - Identify or create controlled vocabularies needed by DatasetMetadata

- Other ideas? Contact ben.craker@aggateway.org