AgGateway Portfolio Overview

Q4 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
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
- WG24 GNSS Accuracy

Chair: TBD
Staff Liaison: Jeremy Wilson
Member Organizations:
- Bayer Crop Science LP
- Ceres Solutions
- Enterprise Ag Strategies, LLC
- Growmark, Inc.
- Nutrien
- Proagrica
- Raven Industries
- Software Solutions Integrated, LLC
- Traction
- Winfield United
Animal Agriculture Advisory Group

Purpose
• Review the animal agriculture space and identify where AgGateway may be able to help
• Identify industry trends and pain points that could be addressed via standards
• Prioritize efforts either by species, growth stage, or subject area
• Identify existing standards and efforts that AgGateway could collaborate with within the industry

Related Working Groups and Digital Resources:
• WG25 Dairy Feed Data Standards Assessment

Chair: TBD
Staff Liaison: Ben Craker
Member Organizations:
Current Working Groups

AgGateway Digital Resource Development Process

[Diagram showing the process flow of AgGateway Produces a New Digital Resource (top-level process)]
Active Working Groups

- WG04 Ag Lab Data (Modus)
- WG11 LATAM Soil Data
- WG12 PAIL
- WG14 Potato Provenance (on hold)
- WG20 Traceability API
- WG21 European Reporting ADAPT Mapping
- WG23 Weather Data API
- WG24 Field Boundary: GNSS Accuracy
- WG25 Dairy Feed Data Standards Assessment
**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:** finalizing v2 soil list, working on v2 schema. Subsequent WG’s will address Manure, Water, etc. methods

**Planned Completion:** v2 soil list & v2 schema Q1 2024

**Current Estimate:** v2 schema Feb 2023

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

**Member Organizations:**
- A&L Great Lakes Laboratories
- Aaron Ault
- AGCO Corporation
- Agriculture Laboratory Testing
- Embrapa Informatica
- Jason Ellsworth
- Land O’Lakes
- Nancy Bohl Bormann
- National Institute of Standards
- OpenTEAM
- Simplot Grower Solutions
- Soil and Plant Analysis Council
- Soil Science Society of America
- Syngenta Crop Protection, LLC
- TELUS Agriculture
- Varda 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 Committee Draft status in ISO/TC 23/SC 19, currently reviewing and incorporating committee comments by Feb 2024
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:** Finalizing v1 API specification

**Planned Completion:** MYM June 2023

**Current Estimate:** Slightly behind schedule, should have v1 by end of 2023

**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
**WG24 Field Boundary: GNSS Accuracy**

**Business Value:**
Within the context of crop production around the world the concept of the field and its boundary are the fundamental building blocks for all field operations. The boundary is used to define the limits of where inputs should be geospatially applied by modern agricultural equipment. The field boundary is also used to partition data in farm management information systems (FMIS) whether for clipping imagery to the confines of the field or allocating as-applied and yield data to remove erroneous points. This necessity to share consistent and accurate boundaries between systems is increasing in importance in recent years as a systems approach to interoperability with broader adoption of technologies such as section control, individual row on/off, machine coordination and a potential diversity of autonomous vehicles.

**Deliverables:**
- Implementation guideline for GNSS receiver manufacturers, in-cab display manufacturers, and other systems used to define boundaries regarding what data needs to be available and logged about a field boundary
- Required and optional metadata elements and definitions to ensure recipient of a boundary can accurately use and understand the boundary
- Controlled vocabularies required to convey information about boundary collection method, GNSS accuracy, and other related aspects of the boundary
- Recommendations to ADAPT Standard for changes and additions to ensure boundaries are accurately transferred from system to system via the ADAPT mode
- Potential recommendations to other organization(s) if enhancements are required in related/enabling standards e.g. NMEA
- Potential revision to Field Boundary: Definitions and Use Case boundary classifications/types

**Chair:** Zach Leiser (Growmark)

**Staff Liaison:** Ben Craker

**Member Organizations:**
- AGCO Corporation
- Agdatahub
- Agro EDI Europe
- FarmBelt North, Inc.
- Proagrica
- SMAG

**Status:** Call to participation issued 4 October 2023

**Planned Completion:** April 2024

**Current Estimate:** On Schedule, just kicking off
WG25 Charter - Dairy Feeding Data Standards Assessment

Business Value:
Animal agriculture is experiencing a shift driven by consumer demands to understand the greenhouse gas (GHG) impacts of livestock production as well as the commercialization and adoption of new technologies. These forces and others are driving a need for systems and processes to be connected digitally. The cost of one-off connections between systems is expensive and inefficient, standardized interfaces can be employed to help data move more easily reducing maintenance costs and increasing the efficiencies throughout the value chain. There are many aspects to consider and a variety of use cases regarding data movement, having a clear understanding of who needs what data, and when is an important first step. This information can also be used to determine what existing standards are applicable or implemented and what gaps remain, in addition to what areas are “secret sauce” and will remain proprietary. This working group will deliver these core building blocks that will be used to identify and prioritize subsequent efforts and collaborations.

Deliverables:
- High level process diagram
  - Feed Provenance → Procurement → Ration development → mixing → feeding → eating/consumption
- Documented use cases
  - Data coming to balancing software, ingredients, lab test values
  - Ration information sent from balancing software to mixer
  - Documenting the mixing process (Work Order, Work Record)
  - Quantifying refusals to input into balancing systems
  - Capturing production information to input into balancing system(s)
- Key data elements
- Identify any needed controlled vocabularies and if sources exists

Status: Call to participation planned for late Nov

Planned Completion: April 2024

Current Estimate: On Schedule, just kicking off

Chair: Dr. Kristan Reed
Staff Liaison: Ben Craker
Member Organizations:
Work being done outside of current Working Groups

Other Activities
ADAPT

AgGateway

AgGatewayADAPTFramework by AgGateway strhea knelson-farmbeltnorth
207,722 total downloads  last updated 2 months ago  Latest version: 3.0.2
agateway 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
agateway 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 agateway adapt isoxml isoxmlv4 11783 11783-10
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

424,147 Total downloads of packages

9 Nov 2023
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>
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<tbody>
<tr>
<td>ADAPT Homepage</td>
<td><a href="https://AdaptFramework.org">https://AdaptFramework.org</a></td>
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<tr>
<td>ADAPT Framework Repo</td>
<td><a href="https://github.com/ADAPT/ADAPT">https://github.com/ADAPT/ADAPT</a></td>
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<tr>
<td>ADAPT ISO Plugin Repo</td>
<td><a href="https://github.com/ADAPT/ISOv4Plugin">https://github.com/ADAPT/ISOv4Plugin</a></td>
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<td>ADM (ADAPT Data Model) Plugin Repo</td>
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<td>ADAPT Standard Issue Board</td>
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<tr>
<td>ADAPT NuGet Packages</td>
<td><a href="https://www.nuget.org/profiles/AgGateway">https://www.nuget.org/profiles/AgGateway</a></td>
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Completed Work

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

- WG01 In-Field Product ID Seeding Pilot
- WG03 Product Catalog
- WG04 Ag Lab Data (Modus)
- 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)

- WG11 LATAM Soil Data
- WG12 PAIL irrigation, Obs. & Meas. (ISO 7673)
- WG13 Closed Loop Spray
- WG14 Potato Provenance (on Hold)
- WG15 Scale Ticket
- WG16 Crop Protection Product Guidelines
- WG17 Field Boundaries: Terms & Definitions
- WG18 Crop Nutrition 3rd Party Product Management

- WG19 ADAPT Serialization
- WG22 Booking & Prepay Reporting
- WG23 Weather Data API
- WG24 Field Boundary: GNSS Accuracy
- WG25 Dairy Feed Data Standards Assessment

Input manufacturer  Input distribution/retail  Farm  Field operations  Processor
Recently Completed Working Groups

Status and background on recently completed Working Groups
**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 provided Nov 2023, Crop model slower than planned, finalized with PoC infrastructure for annual meeting
WG15 Scale Ticket

Business Value:
Provide electronic proof of receipt from entity to entity, starting at the point of origin in a standardized way (leveraging current standards), to a retailer or cooperative/retailer/processor who has received the commodity at the destination at the time of receipt.

We will define the Minimum Viable Product (MVP) that will help facilitate the financial settlements between the parties and provide sufficient identification that enables traceability.

Deliverables:
• Sequence diagrams showing interactions among parties
• Open API spec addressing the MVP

Status: Approved, v1.1 available in members only GitHub repo
WG16 Crop Protection Product Guidelines

Business Value:
The working group proposes to develop a set of industry agreed-upon documents that allow data owners to consistently load reference data to AGIIIS or similar repositories, as well as providing data owners and consumers best practices in managing and implementing the reference data so loaded.

Scope:
• Industry agreed-upon field-level mapping and examples of crop protection product
• Industry agreed-upon best practices for product maintenance for both data owners and consumers
• Impact assessment for implementing GTINs in eBusiness Messages already in industry use

Status: Approved, publication in process
Business Value:
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 enabling farmers to share their
field data more easily as well as assist in traceability efforts.

Scope:
The Working Group will lead the effort in defining the overall use cases, terms
and definitions surrounding field boundaries. The group will start with existing
content from SPADE artifacts, work already done by WG14 Potato
Provenance, work in the PAIL project as well as leverage existing standards
and methods where possible. Such as ISO 19115 Geographic information —
Metadata and ISO 19157 Geographic information — Data quality.

Status: Approved by Standards & Guidelines, being aligned with ADAPT
Standard effort Issue #97
WG18 Crop Nutrition 3rd Party Warehouse Management

Business Value:
Crop nutrient product manufacturers and distributors have agreements for storage and handling of fertilizer to more readily and efficiently service customers. In order to effectively manage the inventory and resupply, stakeholders desire to implement electronic processes for ordering, shipping, and inventory management that align to existing ebXML processes for the segment.

Scope:
Develop implementation guidelines based on the existing OrderCreate, OrderResponse, ShipNotice, Invoice, and ReceiptNotice messages. ReceiptNotice will require a new profile, while the other messages will likely only need tweaks in implementation rules.

- Messages and process documentation for Receipt into a Warehouse Partner location
- Messages and process documentation for Purchase out of Warehouse Partner location
- Messages and process documentation for Third-Party Sales Order out of Warehouse Partner location
- Messages and process documentation for Warehouse-to-Warehouse Stock Transfer as requested by the product owner

Status: Publishing
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: Polishing documentation to be released with ADAPT Standard v1.0 before end of year 2033

Co-Chair: Chris Ruttencutter (Corteva)
Co-Chair: Stuart Rhea (Syngenta)
Co-Chair: Zac Oler (Corteva)
Staff Liaison: Ben Craker

Member Organizations:

- CNH Industrial
- Corteva Agriscience LLC
- DKE Data
- FarmScape North, Inc.
- Google LLC DBA Mineral
- John Deere
- M2M Craft Co Ltd
- Syngenta Crop Protection, LLC
- Traction
WG22 Booking and Prepay Reporting

Business Value:
Input manufacturers and distributors have a need to understand the grower level booking information for various products at the retailer level as general reports and not specific to individual transactions. They would like to receive this information via an XML message.

Scope:
Seed Bookings reporting (pre-paid or not pre-paid)
Crop nutrition bookings reporting (pre-paid or not pre-paid)
Crop protection bookings reporting (pre-paid or not pre-paid)
Note: When a booking is pre-paid, it is a firm commitment to purchase.

Status: Published in Ag eStards v7.0

Chair: Greg Mikel (Land O’Lakes)
Staff Liaison: Brent Kemp

Member Organizations:
- AGDATA LP
- Growmark, Inc.
- HD Precision Analytics
- Key Cooperative
- Simplot Grower Solutions
- Software Solutions Integrated, LLC
- Winfield United
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<td>Private GitHub Repo (AgGateway members only) <a href="https://github.com/AgGateway/In-FieldProductID">https://github.com/AgGateway/In-FieldProductID</a></td>
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<td>WG03 Product Catalog</td>
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<td>Public GitHub repo <a href="https://ModusStandard.org">https://ModusStandard.org</a>, <a href="https://github.com/AgGateway/Modus">https://github.com/AgGateway/Modus</a></td>
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<td>WG05 Mix Ticket</td>
<td>Public GitHub Repo <a href="https://github.com/AgGateway/Dispensing">https://github.com/AgGateway/Dispensing</a></td>
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<td>WG06 Farm Inputs: Reference Data</td>
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<td>WG08 In-Field Product ID ADAPT Plugin</td>
<td>Public GitHub Repo <a href="https://github.com/ADAPT/ShippedItemInstancePlugin">https://github.com/ADAPT/ShippedItemInstancePlugin</a></td>
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Use this [form to request access](https://github.com/AgGateway/DatasetMetadata) to private repo.
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<td>WG16 Crop Protection Product Guidelines</td>
<td>Wiki pages, publication in process</td>
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<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>
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<tr>
<td>WG18 Crop Nutrition 3rd Party Product Management</td>
<td>XSLM file, publication in process</td>
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<td>WG22 Booking &amp; Prepay Reporting</td>
<td>Ag eStandards to be updated <a href="https://www.aggateway.org/GetConnected/Messaging.aspx">https://www.aggateway.org/GetConnected/Messaging.aspx</a></td>
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Use this [form to request access](https://www.aggateway.org/GetConnected/Messaging.aspx) 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 soon

- Weather Data API
  - Standardized weather data API, starting with some of the most commonly used parameters
- Contract
  - Building off Scale Ticket effort to align on digital contracts
- Dairy Feed and Ration Use Case Documentation
  - Document use cases, data requirements, processes related to data exchange for dairy feed
- Data Stewardship
  - Review and potentially update AgGateway Data Privacy White Paper
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 Quality
  - Investigate a standard regarding data quality metrics so a data recipient can make an informed decision about what data they have received is suitable to be used for

- 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

- GLN Guidelines
  - Guidelines for assigning GLN’s within AGIIS to help reduce duplicates

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