The ContextItem System

ContextItems in a Nutshell

Problem:
It's hard for farm management software to keep up with the changing data-collection needs of different geographies.

Solution:
AgGateway created the ContextItem system, which provides a central repository for definitions of data variables that are specific to a place or "geopolitical context".

It is extensible and easy to add to your software.

See the reverse side of this document for helpful resources and instructions on how to use the system.

"ContextItems open the door for AgGateway's work to truly go global!"

—Andres Ferreyra, Ag Connections, LLC

AgGateway
Collaboration for eConnectivity

Go global: enable local farm data

Recording and communicating local data is a challenge
Current trends in sustainability, traceability and compliance reporting demand that growers gather and report ever-increasing amounts of data as part of their everyday field operations. Specific requirements for what data to collect, how often to do so, and in what format, are constantly evolving and are highly dependent on the grower's farm location or geopolitical context.

Software implementations that handle this geopolitical context-dependent data **(GPCDD)** face an ever-moving target, especially when trying to use standards to exchange data: standards are typically not made to accommodate GPCDD.

Simple GPCDD examples

- **EPA Number:** In the United States, crop protection products have a registration number that must be reported when documenting product use.

- **Cadastral Data:** In many jurisdictions, fields have multi-attribute legal descriptions. For example, in the western United States the Public Land Survey System (PLSS) uses 7-8 attributes (township, range, section, etc.) In contrast, Germany uses only 3 attributes for the same purpose (Gemarkungsschlüssel, Flurnummer, Flurstücksnummer).

AgGateway has a solution!
AgGateway developed the ContextItem system to overcome these challenges. It is usable by AgGateway's ADAPT *(www.adaptframework.org)*, but also by ISO 11783 files and proprietary systems. It is readily extensible to include user-submitted definitions.

Why is this important?
The ContextItem system enables software to tag data objects with regulatory and other business-specific attributes. It enables your systems to communicate these data to your partners, and the "dictionary" that explains the meaning of the ContextItems is available to all.

The API can tell you how to use a particular ContextItem
ContextItems are similar to a data structure called a key-value pair (think "US EPA-N: 123-4567"). The key ("US-EPA-N") has a matching ContextItem-Definition, accessible through an API, that provides additional information, such as how to interpret the value (in this case, "123-4567"), what units of measure to use (if needed), how many characters are valid, and where it is relevant.

Requesting new ContextItemDefinitions:
It's quick and easy to add new items to this system. Contact AgGateway's Controlled Vocabularies Working Group at *cvwg@AgGateway.org.*

The ContextItem API

The operational implementation of the ContextItem System API contains a growing number of ContextItemDefinitions, and uses an OpenAPI (Swagger) UI that you can try out. Find it at *https://bit.ly/2LApWxP* or scan the QR code below.

Questions?

Email us at:
cvwg@AgGateway.org

To learn more about ADAPT, visit:
http://www.adaptframework.org

www.AgGateway.org
Member.Services@AgGateway.org
Phone: (+1) 866.251.8618
Twitter: @AgGateway

Quick intro to the ContextItem system for developers

The simple UML class diagram at right shows the contents of a ContextItem.

ContextItem
Code : String
Value [0..1] : String
ValueUoM [0..1] : String
TimeScopes [0..*] : TimeScope
NestedItems [0..*] : ContextItem

The ContextItem Class

Code is a string, used as the key to get the corresponding ContextItemDefinition from the API; use *https://api.contextitem.org/def/ [code]*.

Value is a string, but can encode a number, a date, an enumerated value, a boolean, etc. The corresponding ContextItemDefinition specifies the data type of *Value*.

ValueUoM specifies a unit of measure, where needed.

TimeScopes can be used to tag the ContextItem with relevant dates (e.g. the expiration date of a license number).

NestedItems enables multi-attribute data like the PLSS example, where a PLSS ContextItem has a nested Township, Range, Section, etc.

Pain points targeted by the ContextItem System

Pain point	Why it hurts	The ContextItem solution
Farmer business processes require GPCDD, but standards don't support it.	If FMIS can't include data the farmer needs (e.g., US FSA field identifier, German Bundessortenamt id for varieties), its value to the farmer is limited.	ContextItemDefinitions can be created for the GPCDD of interest, and a list of ContextItems can be added to software objects.
Different software and hardware have different code lists for crops, operations, etc.	Merely converting from one format to another does not solve interoperability problems, because meaning can be lost. We are still far from having single, canonical lists for crops, operations, etc.	Annotating objects with ContextItems bearing values from widely used lists (e.g., EPPO crop codes) enables FMIS to recognize the content even if the primary identifier is not recognized.
Handling new data requires recompilation, redeployment of FMIS software.	Accommodating frequent software updates can overwhelm companies' software lifecycle management, especially if they have a large number of users (e.g., large retailers).	Adding a new variable to the ContextItem system API, targeted to a particular object model class and geopolitical context, is very quick and simple. Software can query the API for all the information needed to capture / display a new attribute.

How to use ContextItems

- ADAPT objects typically have an optional list of ContextItems you can use to add GPCDD.

- Users of ISO 11783-10 task files can also use the system, attaching ContextItems via the link list file defined in ISO 11783-10 Annex E. *(Contact us for details)*

- You can use ContextItems in your own software: just clone the format! Look at ADAPT source code, and the data model in the paper behind the QR code.

  ContextItem paper
  http://bit.ly/2rWH7Ds

- ContextItems can be nested! The PLSS example shown previously is a good example of this.

What we want from you

Read the paper, look at the source code, try out the API. Consider using this technology in your software solutions and reach out to our team if you have any questions!