



State of Vermont

AGO Open Data Platform Testing Geospatial Data

In Support of the VT Open GeoData Portal
Redesign & Rebuild Project

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AGO Open Data Platform Testing – Geospatial Data

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Revision History

Version	Date	Author(s)	Revision Notes
0.1	6/23/2015	Steve Sharp, VCGI	1 st draft
0.2	6/24/2015	Steve Sharp, VVCGI	Added information about “multi-feature datasets” to Findings section

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Overview - Platform Pilot Testing

VCGI has worked with ESRI and the VT Agency of Natural Resources (ANR) to test ESRI's ArcGIS Online Open Data (AGO OD) Portal platform. VCGI conducted this testing in support of the VT Open GeoData Portal Redesign/Rebuild project¹. The AGO OD test was conducted in accordance with the Platform Pilot Testing Plan² crafted by the VT Enterprise GIS Consortium's (EGC) Open Data Workgroup. Two platforms (CKAN and Socrata) have already been tested under a previous testing plan³.

Objectives

- Test AGO Open Data platform⁴ to see if it could be used to build a new VT Open GeoData Portal.
- Test the degree to which the AGO Open Data platform support the requirements⁵ defined for the new VT Open GeoData Portal.

Scope

In Scope:

- Load/register several VT GIS datasets into the AGO Open Data platform. Included ANR “open data” layers hosted on ANR's prototype AGO Open Data site.
- Test the AGO Open Data platform against the requirements (user/publisher/administrator stories) identified for the VT Open GeoData Portal by the EGC.

Out of Scope:

- Loading all current VT Open GeoData Portal entries into the AGO Open Data platform.

¹ <https://outside.vermont.gov/sites/egcgeo/opendatawg/Shared%20Documents/VT-Data-Warehouse-Project-Charter-final-v0.6.pdf>

² <https://outside.vermont.gov/sites/egcgeo/opendatawg/Shared%20Documents/VT-GeoDataPortal-PilotTestingPlan-AGO-draft-v0.1.pdf>

³ https://outside.vermont.gov/sites/egcgeo/opendatawg/Shared%20Documents/UserStories_Ranking_PlatformTesting_draft20140408.pdf

⁴ <https://opendata.arcgis.com/about>

⁵ https://outside.vermont.gov/sites/egcgeo/opendatawg/Shared%20Documents/VT_DataWarehouse_UserStories_20140408.pdf

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Tested Datasets

- **VT Significant Wetlands:** ANR Wetlands layer – By linking ot ANR’s AGO Open Data.
- **E911 Buildings/Sites:** E911 buildings/sites layer (ESITE).
- **Pavement condition:** VTrans pavement condition data (2012).
- **Broadband data:** VCGI broadband data (6/30/2013)
- **20 ft Contour data:** VCGI 20ft statewide contour data.
- **2 ft Contour data:** VCGI 2ft contour data (lidar based).
- **Aerial Photos:** VT orthophotos (4-band color imagery) – 2014
- **Boundaries:** State, County, Town, Village Boundaries layer (BNDHASH)
- **Road Centerlines:** VTrans road centerline dataset

Procedures

- **Data Preparation:** Published the vector datasets into ArcGIS Server (AGS) Map Services by agency. Orthophotos were published as AGS Image Services.
- **Metadata Preparation:** Existing metadata was referenced and used (<http://maps.vcgi.org/gisdata/metadata/>).
- **Data Loading and Tagging:** Logged into VCGI’s AGO account and registered all vector layers as “Feature Layers” by referencing the AGS Map Services created above using the AGO “Add Item → From Web” option.. Registered imagery (orthos) as “Imagery Layer”. Added URL links to metadata in description since AGO doesn’t harvest the metadata from the Map Service. Assigned specific ISO theme tags to each to enabled searching by ISO theme. Shared registered layers with a group (“VCGI Open Data Test”), and enabled access to group by public and AGO open data portal platform.

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- **AGO Open Data Site:** Created a “VT Open GeoData Portal – Test1”⁶ site within VCGI’s AGO account. Created thumbnail buttons for a subset of ISO19115 themes. Added “VCGI Open Data Test” and “VTANR – Fresh Water Resources and Characteristics” AGO Groups (shared as “open data” groups) to the test site.
- **Capabilities Review:** The goal of this pilot test was to evaluate the degree to which AGO Open Data’s Open Data platform supports the requirements⁷ defined for the new VT GIS Data Warehouse. The results are documented in Attachment B.

Findings

ESRI’s ArcGIS Online⁸ (AGO) platform has a rich set of tools used to register, load, publish, share, and use geospatial data. ESRI’s AGO platform is designed to work hand-in-hand with ESRI’s other products, including ArcGIS Desktop and ArcGIS Online. ESRI’s Open Data Portal platform extends these capabilities by providing a framework for creating a web portal which non-AGO users can use to discover and download geospatial data. ESRI’s Open Data platform is relatively new (less than a year old), and therefore lacks a degree of maturity that one might expect from a product that has been on the market longer. Some key Pros-and-Cons are outlined below. Attachment B includes a detailed review against the EGC’s requirements.

PROS

- **Supports most requirements:** The AGO Open Data platform fully or partially supports (with workarounds) nearly all high and medium priority requirements for users, publishers, and administrative users as defined by the EGC for a VT Open GeoData Portal. Unsupported requirements are generally limited to low priority items.
- **Customizable SaaS solution:** The AGO Open Data platform is hosted by ESRI as a SaaS solution. Administrators can create portals, manage content, and customize the look-and-feel without ever having to install anything. Upgrades are also much easier in a SaaS environment.
- **Platform available to many State partners:** The vast majority of Vermont’s state, regional, and local government entities use ESRI GIS software solutions (eg: ArcGIS Desktop/Server). Many non-governmental organization in the state also use ESRI solutions. As a result, many of these organization already have access to AGO, and could therefore choose to publish their data via AGO and have it harvested/used by a central AGO Open Data portal managed by VCGI.

⁶ <http://test1.vcgi.opendata.arcgis.com/>

⁷ https://outside.vermont.gov/sites/egcgeo/dww/Shared%20Documents/VT_DataWarehouse_UserStories_final.docx

⁸ <http://www.arcgis.com/features/>

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- **Ease of Use:** ESRI AGO platform is relatively easy to use for end-users. Once configured, its realitively easy to publish data (except for metadata and some large datasets).
- **Cost:** As noted above, most government entities in VT using GIS already own ESRI software, and therefore already have permission to post data to AGO. As a result, the incremental licensing cost associated with AGO Open Data is limited (except for data storage if the data is hosted by AGO). Therefore the cost of entry is low. Also, partners can also choose to have others such as VCGI or RPCs (in the case of towns) host data for them.

CONS

- **Handling of large datasets:** Large datasets such as statewide contours, soils, LIDAR, or imagery are supported by AGO Open Data, however, the out-of-the-box SaaS solution by default allows users to attempt a statewide download of these datasets. These attempts inevitably fail and also put significant load on ArcGIS Servers hosting the services supporting these large datasets. There is an option allowing users to “filter by area” to reduce the extent of the download, however, it isn’t obvious and there is no way to enforce this (limit the size/extent of downloads).
- **Handling of multi-feature datasets:** Multi-feature datasets containing multiple feature classes must have a separate AGO “feature layer” item entry for each feature class in the dataset. For example, VT’s Broadband dataset includes 10 feature classes which are all bundled into a single dataset. These would need to be individually registered in AGO even if they are part of a single dataset with a single set of metadata (current VT Open GeoData Portal has it registered as a single item entry). This adds significant overhead of such datasets, albeit there are a limited number of multi-feature datasets in the VT Open GeoData Portal. A workaround would be to make multi-feature datasets only available as pre-packaged downloads (eg: zip posted to HTTP/FTP site).
- **Metadata:** AGO Open Data doesn’t support the import of standards-compliant metadata (eg: FGDC/ISO metadata). At the time of testing it only supports a simple title and description. ESRI has indicated that AGO will support the import of FGDC/ISO metadata in the near future.
- **ArcGIS Service Layer IDs:** The AGO Open Data platform is primarily designed to consume registered AGO “Feature Layers”, which enables the full functionality of the platform (eg: data visualization, graphing, multi-format downloads, etc). These AGO items point to ArcGIS Server Map Service REST endpoints referencing specific feature classes by their ID⁹. However these IDs are not stable. IDs can change when feature classes are added/removed/order-changed in the ArcGIS Server

⁹ Example: http://mapsdev.vcgi.org/arcgis/rest/services/VCGI_services/VTOPENDATA_VTRANS_TEST1/MapServer/1

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Map Service, which breaks any references in AGO Open Data. The inability to assign permanent IDs to ArcGIS Server Map Service layers represents a significant risk that must be proactively managed.

- **Bulk catalog editing:** By default AGO does not provide tools which allow publishers to bulk register or bulk edit new AGO item entries. As a result, publishers must manually enter everything. This is a significant hurdle in cases where hundreds of item entries are required (eg: VT Open GeoData Portal). However, there are some AGO administrative extensions (free and for purchase) that support bulk editing. Limited testing by VCGI suggests that these tools may help, but may not eliminate the need for manual entry/editing (eg: item “descriptions”).
- **Workarounds:** A number of “workarounds” would need to be designed, built, and deployed in order to support the full set of requirements identified by VCGI and the EGC, and to address significant limitations (eg: metadata, large dataset downloads, AGS layer IDs). Doing so would require time and/or money that may not be available. The amount of time/money required to develop workarounds is beyond the scope of this pilot test.

Conclusions

ESRI ArcGIS Online (AGO) Open Data platform shows promise as a viable and readily available solution for the development and deployment of a new VT Open GeoData Portal. Once fully built-out and customized, it is capable of supporting most of the EGC’s requirements for a Open GeoData Portal. A number of “workarounds” would need to be designed, built, and deployed in order to support the full set of requirements identified by VCGI and the EGC, and to address some significant limitations, which would add cost and risk to an AGO Open Data implementation project. Overall the AGO Open Data platform represents a viable Portal solution which VCGI and the EGC should consider as a possible platform for the replacement of Vermont’s existing VT Open GeoData Portal.

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Attachment A – Data Loading Log

Summary

Dataset	Prepared Data?	Registered?	Notes
Wetlands	NA	NA	Referenced ANR's AGO "VTANR – Fresh Water Resources and Characteristics" group. Was able to discover and download data in shapefile-on-the-fly.
E911 Buildings/Sites	Yes	Yes	Created Map Service. Registered and tagged in AGO. Shared via "VCGI Open Data Test" group. Was able to discover and download data in shapefile-on-the-fly (but it was very slow to process the request).
Pavement condition	Yes	Yes	Created Map Service. Registered and tagged in AGO. Shared via "VCGI Open Data Test" group. Was able to discover and download data in shapefile-on-the-fly.
Broadband data	Yes	Yes	Created Map Service. Registered and tagged in AGO. Shared via "VCGI Open Data Test" group. Was able to discover and download data in shapefile-on-the-fly (slow with the large census-block data).
20 ft Contour data	Yes	Yes	Created Map Service. Registered and tagged in AGO. Shared via "VCGI Open Data Test" group. Was able to discover and but download was a problem. By default clicking download attempts to download the entire state and fails. Its possible for filter by area, but it isn't obvious, and it fails anyway.
2 ft Contour data	Yes	Yes	Registered (Linked to VCGI's Custom Download Tool as "web mapping application") and tagged in AGO. Shared via "VCGI Open Data Test" group. This was done as a workaround test for the problem encountered with the 20ft contours, however, it didn't show in AGO Open Data because "web mapping applications" types don't get harvested.
Aerial Photos	Yes	Yes	Created Image Service. Registered and tagged in AGO. Shared via "VCGI Open Data Test" group. Was able to discover and but download was a problem. By default clicking download attempts to download the entire state. Its possible for filter by area, but it isn't obvious, but it worked.
Boundaries	Yes	Yes	Registered as "Document" (URL link to pre-packaged ZIP on VCGI's server). Shared via "VCGI Open Data Test" group. Was able to discover and download. However, clicking on this selection didn't provide more info about the item (as with other registered AGO types). It always resulted in a download.

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Detailed Step-by-Step Processing Log

5/26/2015

- Enabled the Open Data capability under VCGI's AGO account using VCGI's admin account.
- Created/configured an Open Data site (<http://test1.vcgi.opendata.arcgis.com/>). Still more to do...

6/1/2015

- Create an MXD with the following layers
 - **VTOPENDATA_E911_TEST1.MXD**
 - **VTE911 Buildings/Sites:** E911 buildings/sites layer (ESITE).
 - **VTOPENDATA_VTRANS_TEST1.MXD**
 - **Pavement condition:** VTrans pavement condition data (2012).
 - **VTOPENDATA_VCGI_TEST1.MXD**
 - **Broadband data:** VCGI broadband data (6/30/2013)
 - **Contour data:** VCGI 20ft statewide contour data.
 - **Feature Services:** Published all of these as Feature Services on VCGIDEVAPP01 (mapsdev.vcgi.org) under ./VCGI_webapps
- **Aerial Photos:** VT orthophotos (4-band color imagery) – 2014
 - Will reference existing service (http://maps.vcgi.org/arcgis/rest/services/EGC_services/IMG_VCGI_CLR2014_SP_CACHE/ImageServer)
- Loaded/registered data layers into VCGI's ArcGIS Online for Organization account
 - Logged in as Publisher_VCGI
 - Created VTOPENDATA_TEST1 folder to place referenced layers.
 - Created a "VT Open Data Test" AGO Group. Set status to "Public" and "Designate as available for use in Open Data sites".
 - Referenced all vector layers published as Feature Services above as "Feature Layers" in AGO (using "Create Layer" tool). Used current VT Open GeoData Portal naming convention (eg: EmergencyE911_ESITE" for Title of each registered layer.
 - Disable "Editing" for each registered layer

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- Enabled “Export Data: Allow others to export to different formats.”
- Used these ISO theme “keywords” as established by the FGDC for metadata (https://www.fgdc.gov/dataandservices/pub_guidance). Added “ISO_” as a prefix to each. A proper ISO theme keyword convention will need to be established if AGO OD is to be used consistently across VT agencies.
 - ISO_boundaries
 - ISO_biota
 - ISO_climatologyMeteorologyAtmosphere
 - ISO_economy
 - ISO_elevation
 - ISO_emergency (VCGI created...not ISO)
 - ISO_environment
 - ISO_farming
 - ISO_geoscientificInformation
 - ISO_health
 - ISO_imageryBaseMapsEarthCover
 - ISO_inlandWaters
 - ISO_location
 - ISO_oceans
 - ISO_planningCadastre
 - ISO_society
 - ISO_structure
 - ISO_transportation
 - ISO_utilitiesCommunication
- Shared with “VT Open Data Test” group
- **VT 2014 Orthos** couldn’t be registered as a “Feature Layer” and therefore was registered as an “Imagery Layer” using the “+ Add Item – From the Web” and specifying the URL to the Image Service REST endpoint.
- **Config Test1 Open Data Site (<http://test1.vcgi.opendata.arcgis.com/>)**
 - Added “VCGI Open Data Test” and “VTANR – Fresh Water Resources and Characteristics” test site.
 - VTANR results responded to queries. “VCGI Open Data” stuff did not work. Not sure why. May need to index overnight?

6/8/2015

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- Work with ESRI to resolve problem with “VCGI Open Data” layers registered with AGO. Source of problem
 - NOTE: AGO Open Data CANNOT use secured AGS services. Services must be unsecured!
 - NOTE2: Can’t change REST URL for an item registered in AGO if its secured. Only if its unsecured!
- Recreated all test services in unsecure folder (http://mapsdev.vcgi.org/arcgis/rest/services/VCGI_services)
- Re-registered all layers with AGO.
- Re-shared with VCGI Open Data Test group.
- Test site and it works! <http://test1.vcgi.opendata.arcgis.com/>
- Download issue
 - Noted that there seems to be no way to limit the area/size for download, which creates serious issues for large datasets
 - <http://test1.vcgi.opendata.arcgis.com/datasets/24e3b51b2ed74523a75336d3e44c90f6>
 - http://test1.vcgi.opendata.arcgis.com/datasets/fe191730bb904a299354a3c2e6a41b96_1

ESRI Feedback regarding this issue: For downloads what happens is that we query out all the data from your server and build a cache for it. From this cache we distribute the downloads of kml, csv, shp, geojson. While not ideal right now, we only rebuild the cache once every 24 hours. So you should only see that hit once. The problem is that we don’t have a way to schedule this yet, or manage them. For managed, we want to let you choose when to update your datasets. Contours are not likely to change much over the course of a year or more. So we should just build the download 1 time and store it for you until you choose to recache. Other data you may want to cache in real time based on dated updates, or schedule for daily/weekly/monthly updates. By managing your cache, you would also effectively manage the load on your server. For imagery we are looking to allow users to download the raw tiles if export is enabled on the service. If you want to control the export of the images by the image server, there is a default setting you can alter to control the max w/h that can be exported. So some control there Alternative download links... I’ve heard this a bit and something we will have to figure out. Would you provide downloads to your vector data or your imagery through the custom download link?

6/10/2015

- Added a link to ElevationContours_CN2T by linking to VCGI’s Custom Download Tool (http://dware.vcgi.org/cdownload/cdownload_beta1.html?InputLayerName=Elevation_CN2T_line&InputMaxScale=9028&InputFtype=line) in AGO via “Add Item → An Application”.
 - Added iso_elevation tag and other tags.
 - Added links to metadata in description.
 - Shared with “VT Open Data Test” group

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- DATASET DID NOT SHOW UP ON THE TEST SITE (http://test1.vcgi.opendata.arcgis.com/datasets?q=ISO_elevation)

6/16/2015

- Added a link to pre-packed copy of BNDHASH layer (http://maps.vcgi.org/gisdata/vcgi/packaged_zips/BoundaryOther_BNDHASH.zip) in AGO via “Add Item → From Web → Document”.
 - Added iso_boundaries tag and other tags.
 - Added links to metadata in description.
 - Shared with “VT Open Data Test” group
 - Verified that it was visible on the test AGO Open Data Site (http://test1.vcgi.opendata.arcgis.com/datasets?q=ISO_boundaries)
- Uploaded copy of TransRoads_RDS.zip (VTrans Road Centerlines) in AGO via “Add Item → From My Computer”. Specified as a Shapefile. DID NOT publish as a “Feature Layer”.
 - Added iso_transporation tag and other tags.
 - Added links to metadata in description.
 - Shared with “VT Open Data Test” group
 - DATASET DID NOT SHOW UP ON THE TEST SITE (http://test1.vcgi.opendata.arcgis.com/datasets?q=ISO_transporation)
- Create a ArcGIS Layer Package in ArcMap and uploaded into AGO via the ArcMap share option.
 - Added iso_boundaries tag and other tags.
 - Shared with “VT Open Data Test” group
 - DATASET DID NOT SHOW UP ON THE TEST SITE (http://test1.vcgi.opendata.arcgis.com/datasets?q=ISO_boundaries)

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Attachment B – Detailed Results of AGO Open Data Testing

User Stories/Requirements – Results of AGO Open Data Pilot Test

EGC Priority	Story - Requirement	AGO Open Data Test	AGO Open Data Test notes
1-High	As a User, I want "authoritative" datasets to be discoverable and clearly identified.	Fully Supported	With use of tags or thumbnails.
1-High	As a User, I want a browser-based Data Warehouse solution that does not require a browser plug-in.	Fully Supported	Confirmed ESRI notes
1-High	As a User, I want a robust and easy-to-use search engine to help me find the geospatial data, web services, and web/mobile/desktop applications.	Partially Supported	Testing confirms support for Map Services, Feature Services, and Image services as "Add Item - From Web" (AGS service and URL link). However, "Add Item - An Application" is not supported (eg: VCGI Custom Download Tool). Also, "Add Item - From My Computer" is not supported (eg: uploaded zip/shp file).
1-High	As a User, I want access to aerial photos (eg: VT orthos) with no downloading required (ie: as a web service).	Fully Supported	Image services. However, Query Definitions can't be used to limit what is published.
1-High	As a User, I want access to historical aerial photos.	Fully Supported	Confirmed ESRI notes
1-High	As a User, I want access to imagery organized by year (whether for download or web service).	Fully Supported	Confirmed ESRI notes
1-High	As a User, I want access to VT GIS data layers with no downloading required (ie: as a web service).	Partially Supported	When GIS layers are registered as Map Services they user can view in ArcGIS .com map viewer, however, there is no button that allows them to open the layer in ArcMap.
1-High	As a User, I want data and imagery downloads to include embedded metadata.	Workaround Possible	A link to metadata can be provided in "description" section.
1-High	As a User, I want metadata that is easy to read with a quick way to get to attribute descriptions and	Partially Supported	AGO OD does not support ISO or FGDC compliant metadata visualization. It support "Item

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	attribute codes.		Description" metadata. Formatting of this metadata can be difficult to read in the AGO OD interface.
1-High	As a User, I want to download aerial photos (eg: VT orthos) so I can use them on my computer.	Workaround Possible	AGO OD supports Image Services, however, by default downloads attempts to download the entire dataset! It is possible to "clip-ship" but it isn't obvious to the user. Workaround is to register item as "From the Web --> Document" and link to URL to FTP/HTTP containing imagery files for download.
1-High	As a User, I want to download VT GIS data layers and imagery (aerial photos) only for a particular area that I specify (eg: clip & zip).	Partially Supported	AGO OD supports Image Services, however, by default downloads attempts to download the entire dataset! It is possible to "clip-ship" but it isn't obvious to the user. Workaround is to register item as "From the Web --> Document" and link to VCGI's Custom Download Tool.
1-High	As a User, I want to download VT GIS data layers in ESRI file geodatabase format.	Workaround Possible	Out of the box I don't see any support for this within AGO OD. ESRI notes suggests it can be done. Workaround would be to link to pre-packaged FGDC ZIP via URL or VCGI's Custom Download Tool (which supports FGDB).
1-High	As a User, I want to download VT GIS data layers in ESRI shapefile format.	Partially Supported	Yes for registered Map Services (AGO "feature layer) or uploaded shapefile published as "feature layer" (but this create two AGO item entries that need to be managed!). Poor handling of large datasets (eg: statewide contours).
2-Medium	As a User, I want access to "help" resources and media (such as YouTube videos) on how to use GIS data, web services, web applications, products (eg: layer package), and tools (eg: scripts and geoprocessing tools).	Workaround Possible	Unclear how custom help content could be added. Seems possible to add a "text widget" to the body and add links to external help system from there.
2-Medium	As a User, I want access to data and web services which are openly available in a manner consistent	Fully Supported	

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	with OpenDefinition.org's definition .		
2-Medium	As a User, I want access to data standards and data templates for download.	Partially Supported	AGO OD will only expose access to shapefiles/FGDB data templates if they are uploaded and published as a service. Maybe layer package? Standards (eg: PDF document) can only be referenced as a document URL
2-Medium	As a User, I want access to ESRI layerfile packages.	Workaround Possible	Test showed that Layer Packages are not supported by AGO OD. Workaround would be to link to URL of a layer package.
2-Medium	As a User, I want access to ESRI layerfiles (symbology) used to render GIS data layers.	Workaround Possible	Layer Files (which include symbology) not supported by AGO OD. Workaround would be to link to URL layer file or ZIP containing layer file + shapefile.
2-Medium	As a User, I want access to historical "snapshots" of VT GIS data.	Fully Supported	Link to old zipped data via URL
2-Medium	As a User, I want all data that I find to be available for download (not just a link to an external website).	Partially Supported	Really comes down to implementation
2-Medium	As a User, I want all of the data to have the good metadata and keyword tagging.	Partially Supported	AGO OD currently can't harvest/use FGDC/ISO compliant metadata. Entries are limited to "item description" metadata...very limited. However, workaround is to link to external metadata record.
2-Medium	As a User, I want more format/projection options when downloading.	Workaround Possible	Not supported directly by AGO OD. Workaround is to link to external solution such as noted by ESRI
2-Medium	As a User, I want the "posted date" included on the list of new/updated data, web services, or web/mobile/desktop applications.	Not Supported	Post date is limited to the "last modified" data for the AGO. There is no distinction between the last time the data was posted VS the last time the data was updated (which often differ). The only way to do this would be via a metadata link.
2-Medium	As a User, I want to be notified whenever new or updated data, web services, or web/mobile/desktop applications are released.	Not Tested	Seems this is supported, but VCGI didn't test this.

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2-Medium	As a User, I want to download all data as pre-packaged files via FTP.	Fully Supported	Publishers can create a content item in Portal for ArcGIS which references a file available on a ftp site, and share the respective item with users.
2-Medium	As a User, I want to download data in non-GIS formats (eg: CSV, GeoJSON).	Fully Supported	Out of the box supports Excel, KML, Shapefile, GeoJSON, and Geoservice for vector. Supports PNG, JPEG, TIFF, GeoService, OGC WMS, and OGC WCS for raster.
2-Medium	As a User, I want to download thematic data in bulk (eg: all transportation data).	Fully Supported	Thematic Data can be prepackaged and made available for direct download. Publishers can register the link to the repository or upload in Portal for ArcGIS these prepackaged files, and share with everyone.
2-Medium	As a User, I want to download VT GIS data layers in KML format.	Fully Supported	Supports KML
2-Medium	As a User, I want to explore Warehouse entries by the "custom data groupings" created by the Publisher.	Fully Supported	Using AGO groups and/or tags
2-Medium	As a User, I want to find and download Regional-level (RPC) GIS data.	Fully Supported	RPCs could use AGO to register data as "open data" and share with VCGI via VT Open Data Portal.
2-Medium	As a User, I want to find and download town-level GIS data.	Fully Supported	Towns could use AGO to register data as "open data" and share with VCGI via VT Open Data Portal.
2-Medium	As a User, I want to find the latest GIS data releases by agency, by department, by program (eg: permitting/regulatory/monitoring).	Fully Supported	AGO groups and tags. Would probably require some customization of AGO OD interface.
2-Medium	As a User, I want to flag errors in the data and have them submitted to the data steward.	Not Tested	ESRI claims it can be done, but its unclear how
2-Medium	As a User, I want to get to all Warehouse entries that have one or more "custom keyword tags" assigned by the Publisher.	Fully Supported	
2-Medium	As a User, I want to have access to Data Warehouse "capabilities" via a published API (eg: REST endpoint)	Not Tested	VCGI did not test this. ESRI claims it can be done.

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	so I can integrate it into my own website.		
2-Medium	As a User, I want to integrate aerial photos (eg: VT orthos) into my own web mashups.	Fully Supported	AGO viewer supports AGS Image Services. Developers can also access AGS Image Services using ArcGIS Javascript API
2-Medium	As a User, I want to integrate VT GIS data layers into my own web mashups.	Fully Supported	AGO viewer supports all AGS service types. Developers can access these services via AGO or ArcGIS Javascript API. Requires that all VT GIS layers be published as AGS services.
2-Medium	As a User, I want to post comments about a particular dataset, web service, or application and have those comments show up whenever someone discovers the dataset or web service.	Partially Supported	Users can't post comments within AGO OD. However, comments can be added via AGO if user or publisher is logged in.
2-Medium	As a User, I want to search by standard data themes (eg: boundary data, transportation data, etc.) using ISO 19115 Topic Categories standard.	Fully Supported	ISO tags
2-Medium	As a User, I want to see a listing of all available data even if it isn't available for immediate download or if there are access constraints.	Fully Supported	Search results are not limited to downloadable datasets.
2-Medium	As a User, I want web services providing access to aerial photos that render "Google" fast.	Fully Supported	Cached services
2-Medium	As a User, I want web services that work with ArcGIS software (desktop, mobile, and browser-based clients).	Fully Supported	
2-Medium	As a User, I want web services that work with Open Source GIS software (desktop, mobile, and browser-based clients).	Fully Supported	ArcGIS Platform is open and provides different entry points for client applications: ArcGIS REST, OGC Web services (WMS, WMTS, WFS, WCS), KML
2-Medium	As a User, I want to visualize the data before I download it.	Fully Supported	If published as a AGS map service.
3-Low	As a User, I want a button that allows me to "share" things that I discover on the Data Warehouse via a URL link, Twitter and Facebook.	Workaround Possible	We generate a URL you can share, but there is not an option yet for sharing the link directly in app via social media.
3-Low	As a User, I want all technical terms to be linked to	Partially Supported	Can be done via customization of site.

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	explanations so I don't have to be a GIS expert.		
3-Low	As a User, I want to browse thumbnails of available datasets, web services, or web application to give me a quick sense of what is being offered.	Fully Supported	
3-Low	As a User, I want to control layer rendering (symbolology) for VT GIS data layers accessed via a web map service.	Not Tested	
3-Low	As a User, I want to control when and what I get notified about.	Partially Supported	Subscribe to layer via RSS feed
3-Low	As a User, I want to download VT GIS data layers in GML format.	Not Supported	
3-Low	As a User, I want to personalize the site (eg: My Warehouse) for the topics and data that I use most often.	Not Supported	
3-Low	As a User, I want to post my "data wish list" to a website for others to see, rank, and comment on.	Not Supported	
3-Low	As a User, I want to rank (eg: number of stars) datasets, web services, and web applications.	Not Supported	
3-Low	As a User, I want to see a list of all data, web services, and applications associated with a particular dataset.	Not Supported	
3-Low	As a User, I want to see rankings of datasets, web services, and web applications to help me pick the "best" option.	Not Supported	
3-Low	As a User, I want to specify data types (eg: polygon, points, lines, raster) in searches.	Not Supported	

Publisher Stories/Requirements – Results of AGO Open Data Pilot Test

EGC Priority	Story - Requirement	AGO Open Data test	AGO Open Data test notes
1-High	As a Publisher, I want a publishing solution that requires a minimal number of manual steps.	Fully Supported	Pretty easy once things are setup. However, the workflow is somewhat prone to human error.
1-High	As a Publisher, I want GIS customers to have	Partially Supported	Links to web apps aren't supported, but "Document

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	access to my web mapping applications from the data warehouse.		links" to URL are supported in AGO OD
1-High	As a Publisher, I want my data to be discoverable and linked through other catalogs (eg: data.gov, ArcGIS Online, etc.) so that it can be found by users outside of Vermont.	Fully Supported	ArcGIS Open Data provides DCAT 1.1 output for integration with open data platforms such as CKAN, which powers data.gov.
1-High	As a Publisher, I want my metadata to conform to standards.	Workaround Possible	Does not support formal ISO/FGDC metadata but ESRI claims it will be supported soon. Workaround is an external link to metadata.
1-High	As a Publisher, I want the ability to include non-geospatial data files (eg: MS Word document, Excel spreadsheet) with the geospatial data that I share.	Partially Supported	Support for Document links only
1-High	As a Publisher, I want the search engine to be driven from the metadata that I submit.	Fully Supported	The search index currently works off the item Title, Description, and Tags. With addition of formal metadata, the index will grow to account for this additional information.
1-High	As a Publisher, I want the standardized metadata to automatically populate specific attributes of the online catalog entries (website content).	Not Supported	
1-High	As a Publisher, I want the Warehouse to offer a simple data hosting subscription plan for non-governmental organizations and/or individuals.	Workaround Possible	Depends on implementation. AGO charges for account + hosting. However, VCGI can host data, or non-gov can host their own data on their servers and VCGI can point to it.
1-High	As a Publisher, I want to authenticate to my publishing account.	Fully Supported	
1-High	As a Publisher, I want to be able to define groups of users that can collaborate on editing and maintaining the data with me.	Not Tested	
1-High	As a Publisher, I want to be able to post data, web services, applications (web/mobile/desktop), products (eg: layer packages), and tools (eg: scripts and geoprocessing tools).	Workaround Possible	AGO supports all of this, but AGO OD was designed to be vendor neutral in what it offers. Link to external files would be the workaround.

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1-High	As a Publisher, I want to be in control of my own publishing, information management, and publisher account.	Fully Supported	VCGI's partners (state agencies, RPCs, etc) can create their own AGO entries and share them as "open data" with VCGI. VCGI would need to establish standards, but otherwise they would have full control.
1-High	As a Publisher, I want to have access to download statistics of my data so I know how often my data is downloaded.	Not Supported	
1-High	As a Publisher, I want to publish my data as services that work on multiple clients including desktop software, mobile devices, and web browsers.	Fully Supported	Using ArcGIS Servers and/or AGO services
1-High	As a Publisher, I want a Warehouse solution that complies with W3C DCAT and OGC CS specifications.	Partially Supported	AGO OD supports DCAT. OGC CS is not supported
1-High	As a Publisher, I want a Warehouse solution that make it easy for me to comply with data archival procedures defined by the State of Vermont.	Not Tested	
1-High	As a Publisher, I want a Warehouse solution that is able to harvest ISO and FGDC compliant metadata records.	Not Supported	
1-High	As a Publisher, I want a Warehouse solution that allows me to make bulk edits to all of my catalog entries	Partially Supported	Out-of-the-box AGO does not make it possible to make bulk edits across all items beyond "sharing". However, there are some bulk editing "add ons" available via GitHub and the ArcGIS Online Market Place which could help.
2-Medium	As a Publisher, I want a mechanism which allows me temporarily disable access to a particular dataset, web service, or web application.	Partially Supported	This can be done by "unsharing" a data set.
2-Medium	As a Publisher, I want my data, web services, and web applications to be discoverable through Google searches so that it is more likely to be found.	Not Supported	Doesn't seem the be supported at this time.

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2-Medium	As a Publisher, I want my own configurable "space" or "site" on the Data Warehouse with custom branding, content, and messaging.	Fully Supported	You can configure as many sites as you would like, for no additional charges. You can leverage the hosted sites, or create your own using a template we have open sources in github.
2-Medium	As a Publisher, I want the ability to add "custom keyword tags" to my Warehouse entries to help users find what they are looking for.	Fully Supported	
2-Medium	As a Publisher, I want the ability to create my own "custom data groupings".	Fully Supported	
2-Medium	As a Publisher, I want the ability to tag datasets, web services, and web/mobile/desktop applications to one or more ISO 19115 Topic Categories (eg: boundary data, transportation data, etc).	Fully Supported	Using custom ISO tags. Need to standardize across all data providers.
2-Medium	As a Publisher, I want to clearly identify and "brand" data, web services, and applications provided by my organization.	Fully Supported	Can be branded via logo
2-Medium	As a Publisher, I want to have access to statistics showing how often particular web services are used.	Not Supported	
3-Low	As a Publisher, I want a mechanism for managing "data/file locks" when posting data updates.	Not Tested	This is an issue with AGS Services accessing files and locking them. This is a back-end DBA issue. However, AGO allows shapefiles/FGDB to be published as Feature Services, and these can be updated via AGO with lock issues maybe...
3-Low	As a Publisher, I want the ability to "share" datasets, web services, or web/mobile/desktop applications that I publish on the Data Warehouse via Twitter and Facebook.	Not Supported	
3-Low	As a Publisher, I want the ability to assign myself to specific "stakeholder groups" (eg: private sector, government, non-profit, etc.) so that users can look for Warehouse entries by these groups.	Workaround Possible	Tags

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3-Low	As a Publisher, I want to be able to moderate comments about a particular dataset or web service I have published.	Not Supported	
3-Low	As a Publisher, I want to be able to push out data, web service, or application update alerts to subscribers.	Not Supported	
3-Low	As a Publisher, I want users to be notified with a special icon/flag when a particular dataset, web service, or web/mobile/desktop applications is/are temporarily unavailable.	Not Supported	Datasets are either shared or not shared. When shared they are available. When not shared they don't show up.

Administrator Stories/Requirements – Results of AGO Open Data Pilot Test

EGC Priority	Story - Requirement	AGO Open Data Test	AGO Open Data Test Notes
1-High	As an Administrator/Owner, I want a GeoData Portal architecture that allows me to easily scale-up capacity (eg: bandwidth, storage, etc).	Fully Supported	ESRI AGO hosted or your own hosting.
1-High	As an Administrator/Owner, I want a GeoData Portal solution that allows me to assign login accounts as users, publishers, or administrators.	Fully Supported	Custom roles and ArcGIS Online sharing model with Groups.
1-High	As an Administrator/Owner, I want a GeoData Portal solution that is able to ensure proper user, publisher, and administrator account security.	Fully Supported	
1-High	As an Administrator/Owner, I want the ability to “disable” a user and/or publisher account that does not comply with established policies.	Fully Supported	
1-High	As an Administrator/Owner, I want the ability to establish, publish, and enforce “user policies” for the GeoData Portal.	Not Tested	
1-High	As an Administrator/Owner, I want the ability to reset passwords.	Fully Supported	
1-High	As an Administrator/Owner, I want to be able to configure jobs that automatically harvest data from other distributed heterogeneous data repositories via W3C DCAT and/or OGC CS specifications and load them into the GeoData Portal.	Not Tested	
1-High	As an Administrator/Owner, I want a GeoData Portal solution that has an	Fully Supported	ArcGIS Open Data is fully

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	upgrade path (is not a “one off” solution).		hosted, and any migration of sites is automated.
2-Medium	As an Administrator/Owner, I want a GeoData Portal architecture that allows me to easily add functionality (eg: widgets, modules, etc).	Fully Supported	
2-Medium	As an Administrator/Owner, I want the ability to create GeoData Portal login accounts and passwords.	Fully Supported	
3-Low	As an Administrator/Owner, I want the ability to establish, publish, and enforce “publisher policies” for the GeoData Portal.	Not Tested	