

Missouri Office of Geospatial Information

ArcGIS Online White Paper

Version 1.0



Office of Geospatial Information (OGI)
Information Technology Services Division
Office of Administration
State of Missouri
March 2017

ArcGIS Online (AGOL) for State of Missouri – White Paper

AGOL is an online mapping platform upon which organizations can create interactive maps and applications-on-demand and share them within their agency, among organizations, or to the public.

The Office of Geospatial Information intends to maintain the documentation for AGOL as a pair of documents. This document will serve as a white paper, describing the technical aspects of the software. A companion document referred to as the Governance Document will describe recommendations and best practices for the implementation of the software. Each document will be updated as needed to reflect any new information.

This white paper will include:

1. Overview of ArcGIS Online
2. Users, Permissions and Groups
3. Unresolved Issues

Throughout this report, links to Esri documentation and materials related to ArcGIS Online are provided (indicated by the ➤ bullet). At the time of writing, these links are active and relevant.

1 Overview of ArcGIS Online

Introduction

ESRI software is the standard for GIS used by all state agencies. It is the recommended platform recognized through the Enterprise Architecture process. ArcGIS Online (AGOL) is a cloud-basedⁱ product offering from Esri that offers a way to map and analyze geographic data using a web browser. Organizations can create interactive maps and applications-on-demand and share them with other organizations, groups, and/or the public. AGOL is designed to reach a broad audience and be used by people with a wide range of GIS training and skills.

AGOL does not contain all of the functionality that the ESRI ArcGIS desktop products provide, nor is it a replacement for desktop GISⁱⁱ. In fact, for advanced AGOL use, ArcGIS is often required to develop data and tools for use in AGOL.

- [What is ArcGIS? \(Esri Help\)](#)
- [Watch a short introductory video \(Esri\)](#)
- [Sample Maps](#)

AGOL is a Subscription Service

AGOL is an annual subscription-based, fee-for-service cloud-based set of tools that utilizes a fixed number of named users and credits. Every ArcGIS desktop license on maintenance counts as one Named User starting with 100 credits. There are several licenses under maintenance that will give us an initial pool of users. Agencies can purchase named users in units of 5, 50 or 100. Additional service credits can be purchased separately, if needed. Both named users and service credits are currently available on the ESRI state contract.

- [Pricing Overview of Esri's Subscription Plans \(Esri\)](#)
- [Understanding Credits \(Esri\)](#)

Many features of AGOL do not consume any service credits. For activities that consume credits, Esri provides credit budgeting that allows an AGOL administrator to allocate credits by individual user.

Components of AGOL

ArcGIS Online is comprised of web maps, web mapping applications, map services, ready-to-use content like the Living Atlas, and other supporting documents to be stored in this map-centric content management system. Other features within the AGOL system include the ability to embed maps into

other web sites, in-depth geographic analysis, and the ability to embed maps and map tools within Microsoft Office.

In general, Esri is tying more of their desktop product line, such as ArcGIS Desktop and the new ArcGIS Pro to ArcGIS Online accounts. Some desktop functionality already requires authentication with an ArcGIS Online account in order to access it. This trend is expected to continue.

Web Maps

An ArcGIS Online map is a base map and a related set of geospatial data layers that users can interact with to perform a meaningful task. These maps include multi-scale base maps, operational layers targeted to a specific subject matter and audience, and information pop-ups that allow users to drill into specific features they are interested in. The mapping tools support visualization, editing, analysis, and the ability to visualize change over time. Web maps are the basic building block of web apps and can be viewed on a wide variety of clients, including mobile devices, desktop applications, and web browsers.

Important points:

- Maps are responsive across a variety of platforms.
- Map content is not limited to data created or hosted within an organization.
- Map content from a locally hosted map service is dynamic and will change as the underlying database changes.
- The viewing of maps published for the general public does not consume credits (i.e. page views).
- Custom roles are available to limit what a user can do in terms of publishing or modifying existing applications
- To limit viewing to a specific group, a member account is required. Members from other ArcGIS Online Organizations can be members of a group.

Web Applications

Web applications (apps) combine maps with text, multimedia, and interactive functions to inform, educate, entertain, and inspire people about a wide variety of topics. Web applications are built around web maps, providing the ability to 'brand' a map, add additional tools, and refine the display to create a finished product. A wide variety of customizable templates exist to easily create these applications, such as the story map templates, which include graphical user interface (GUI) builder functions that enable a user to create, modify, edit, and publish apps without needing specialized development skills. AGOL provides several apps for staff to collect data in the field using smartphones and tablets.

Application Template Descriptions:

- [ArcGIS Apps for Everyone](#)
- [Story Maps](#)
- [Operations Dashboard](#)
- [Survey 123](#)
- [Collector](#)

➤ [Workforce](#)

Samples:

[Missouri Women, Infant and Children \(WIC\) Locations](#)

[Computer Science Degrees by College](#)

[Missouri State Fair](#)

[Zika Virus](#)

Important points:

- Web Mapping Applications (webapps) are the preferred method for delivering content to end users. The applications “wrap around” a web map, creating a finished product by adding tools that interact with the web map and defining styling.
- Web apps are responsive across a variety of platforms.
- Most templates can be customized through a configurable GUI. Basic features like title and color scheme are defined through a simple interface.
- Some templates are highly customizable and include the basic framework to create our own specialized widgets.
- Some tools that can be included in a web app consume credits. These include analysis tools, batch address matching and routing. Individual address searches do not consume credits.
- Web maps and apps are not shared to anyone when initially authored. All roles over the Viewer role include the option to share with a group, or with the general public (everybody). Content shared with everybody does not require a user login to access.

Cloud Hosted Services

With AGOL, data and web layers can be published in ArcGIS Online, ‘in the cloud’ as opposed to something hosted on local servers. By doing this, ArcGIS Online hosts the layers (as services) and scales to meet demand; hence these are often called hosted layers. When layers are made public, Web, desktop, and mobile apps can access ArcGIS Online hosted layers from anywhere on the Internet. Web layers can be published directly from ArcGIS Desktop without using ArcGIS Server.

Important points:

- Cloud Hosted Services will be used in addition to our local ArcGIS Server environment, not in place of it.
- Hosted layers can also be created directly in an AGOL map from a shapefile, csv/text, or gpx file, or from a table in Maps for MS Office.
- The ability to upload web layers directly from ArcGIS Desktop can be restricted to certain staff through the use of a custom role.
- Data hosting on AGOL consumes credits. Credit consumption is based on the size of the data being uploaded.

- Allowable content is described in the Governance document.

➤ [About hosted features and tiles \(Esri Help\)](#)

Other Features

In addition to purely map services, AGOL supports the inclusion of non-map content and provides the ability to embed GIS maps into other products, such as MS Office.

➤ [What can you add to AGOL? \(Esri Help\)](#)

Embedding maps in web sites

One way to share maps or group of maps and web apps is to include them in a web page such as a blog or an organization's web site. ArcGIS Online provides the code needed and gives options for the layout and display.

➤ [Embed Map in Website \(Esri Help\)](#)

[Example: Missouri Schools and School Districts](#)

ArcGIS Maps for MS Office

ArcGIS Maps for Office adds tools for mapping locations and other geographic data within MS Office. Making a dynamic map from Excel data is no more difficult than creating a graph or chart. PowerPoint presentations can include interactive maps. It is possible to add demographics and lifestyle data within Office for more context to the document you are creating.

➤ [ArcGIS Maps for Office \(Esri Help\)](#)

Perform Analysis

AGOL offers many tools to conduct analysis and measure geographic relationships. Within AGOL, one can summarize data, find locations, enrich data, analyze patterns, use proximity tools, and manage data. Accounts with the default role of "user" do not have access to analysis tools.

➤ [Perform Analysis \(Esri Help\)](#)

2 Users, Permissions and Groups

As a cloud-based platform, it is important for participating agencies to understand its capabilities, its security, and its management. The Governance Document will serve as the guideline for agencies to develop appropriate strategies for sharing GIS data and information with the intended users.

2.1 Named Users

Named Users

Named users will be administered by the Office of Geospatial Information, following guidelines described in the Governance Document. Named users shall have unique, individual login credentials.

AGOL supports active directory but it is not planned as part of the initial implementation for Missouri state agencies under IT consolidation. This may not be an acceptable option for certain participants and should not be considered a long term mandate.

2.2 User Permissions and Group Management

AGOL User Permissions Levels

Permissions in AGOL are controlled by four default permissions levels, or roles: User, Viewer, Publisher, and Administrator. Organizations can use custom roles to define privileges at a more detailed level, if one of the default levels is not suitable. All AGOL subscription members must be assigned a role.

- [Default levels, role and privileges \(Esri Help\)](#)
- [Add or invite members \(Esri Help\)](#)
- [Custom Roles \(Esri Help\)](#)
- [Use Enterprise Logins \(Esri Help\)](#)

Group Management

The creation of a group is an easy mechanism to organize maps and data by subject matter. Content can be restricted, so that editing or viewing can be limited to only group members. Users may be a member of several groups.

- [What is a Group \(Esri Help\)](#)
- [Create Groups \(Esri Help\)](#)
- [Invite Users \(Esri Help\)](#)

The Governance Document outlines how User Accounts and Groups will be defined.

2.3 Access Control

ArcGIS Online offers three independent mechanisms for securing content and limiting access. Participating agencies should consider some combination of these three mechanisms to secure their ArcGIS Online instance in the manner most appropriate for their business needs.

ArcGIS Server Security. Secure GIS services can be created locally using ArcGIS Server. ArcGIS Online supports this authentication and will prompt for credentials when the service is accessed through the web map. A secure ArcGIS Server service can be shared with a group, and credentials stored in that

group. Only members of the group will have access to the service, and will not be prompted for credentials.

User and group access controls. User and group management will generally be the primary methodology for controlling access and securing information published through ArcGIS Online. Items may be left unshared or set to share with specific groups, the organization, or everyone.

Encryption. An ArcGIS Online Organization should have the security settings set to **allow access to the organization through HTTPS only**. This will ensure encrypted communications over the Internet. ArcGIS Online always uses HTTPS for the login process.

➤ [Configure Security Settings \(Esri Help\)](#)

2.4 Subscription Support

Agencies that do not have enough named users or credits through Desktop entitlement will need to purchase additional subscriptions. Pricing is included on the Esri [State Master Purchase Agreement](#). The amount of staff time needed for supporting and administering an AGOL subscription will vary, depending on the number of users and the amount of content created.

2.5 Credit Management

Details for budgeting credits will be outlined in the Governance Document.

There are several tools available to manage credits:

- Administrators can control the maximum credit allocation per named user. There is an option for 'no allocation limit'.
- Credit allocation per user can be adjusted at any time.
- The allocation tool can prevent one user from consuming all the credits assigned to an organization.
- Administrators will be notified when 75 and 100 percent of their total credits have been used, or when a user has reached 100 percent of their credit allocation.
- Analysis tools in the map viewer include a credit estimator, shown before the tool executes to show the approximate number of credits to be used in that task.
- A status page is available to show a dashboard of usage per type and usage over a specified timeframe.

As an annual subscription service, the subscription will be suspended when all credits have been used, or when the renewal date has passed.

Not all functionality consumes credits, for example viewing maps, single address searches or exporting data do not. A few functions consume several credits, while others only a percentage of one. When

creating a web app that contains widgets that may consume credits, a warning notification will appear to the creator. Credits are relatively inexpensive and can be purchased in packs of 1,000 for \$100 (\$0.10/credit). Most simple operations cost less than 1 credit.

- [Credits by Capacity \(Esri Help\)](#)

2.6 Cloud Storage vs. Internal Storage

Cloud Storage refers to storage of data, services, or content on remote ArcGIS Online servers. Web maps and web mapping applications are stored in the Esri cloud. Internal Storage refers to data stored on servers owned by the State of Missouri, irrespective of the agency where that data is actively maintained. Cloud Storage Cost is based on space used.

A complementary product, Portal for ArcGIS, is an alternative to hosting maps, apps and content in the cloud. The implementation of Portal is fundamentally a locally hosted form of ArcGIS Online. Portal has not yet been implemented for any consolidated agency, but may be a business need in the future. Portal is likely to be implemented in addition to, not instead of, ArcGIS Online.

- [ArcGIS Enterprise](#)

2.7 Security

The ArcGIS Online solution has been granted [Federal Information Security Management Act](#) (FISMA) Low Authority to Operate (ATO), and [fedRAMP](#), Moderate Authority to Operate (ATO). It also recently achieved Privacy Shield Compliancy and is listed on the US Dept. of Commerce Privacy Shield website.

- [Esri Security, Privacy and Compliance](#)

About FISMA: FISMA is the Federal Information Security Management Act of 2002. It was passed as Title III of the E-Government Act (Public Law 107-347) in December 2002. FISMA requires each federal agency to develop, document, and implement an agency-wide program to provide information security for the information and information systems that support the operations and assets of the agency, including those provided or managed by another agency, contractor, or other source.

The National Institute of Standards and Technology (NIST) develops IT security standards and guidelines for FISMA. FISMA compliance is mandatory for all federal agencies and any contractors or other organizations supporting a federal agency IT system. *Missouri also asks for FISMA compliance for vendors providing cloud services. True? What else?*

About fedRAMP: [fedRamp](#) is the Federal Risk and Authorization Management Program. It is a government wide program to assess cloud products and services. Products and services that have received fedRamp approval have met a certain set of criteria for security, quality and reliability.

The Office of Cybersecurity generally accepts FedRAMP authority as meeting state cybersecurity standards.

3 Unresolved Issues

This is emerging product and is generally updated quarterly. Each update may have a significant number of changes from previous versions. This section is reserved for any unresolved issue that may be discovered through the course of our implementation.

3.1 Entitlement Tied to Customer Numbers

Each organization's account setup in AGOL is aligned with their ESRI customer number. The state has several ESRI customer numbers, generally aligned per agency. However DNR has several customer numbers, both historically, and because it's easier fiscally when it comes time to pay annual maintenance that might be funded through a variety of means, like grants.

ESRI does not typically allow these entitlements to be pooled. Even though DNR technically has many ArcGIS Desktop licenses under maintenance, ESRI would have to grant us an exception to allow us to treat all DNR entitled accounts under a single DNR umbrella.

Unless ESRI grants an exception, the two alternatives to clean up this situation are either to:

1. Consolidate the DNR accounts under a single customer number or
2. Purchase a pool of 50 named users, for instance, and have this pool act as the single point of centralization for all DNR ArcGIS Online presence.

ⁱ *Cloud-based* refers to a service model where data (including maps and applications) are maintained and stored across multiple servers online rather than a desktop based or local network environment.

ⁱⁱ See <http://www.Esri.com/software/arcgis/arcgisonline/features> for a list of features currently supported.