



How to Create Web Services

Welcome to the **Homeland Infrastructure Foundation-Level Data (HIFLD) Subcommittee** online community. This document provides a guide for data providers wanting to upload or update web service layers as data access conduits. It is part of a Homeland Infrastructure Foundation-Level Data (HIFLD) Support Team effort to enhance and standardize partner data for ease of access and application. The geospatial user community has embraced usage of feature services as data servicing points. These resources enable users to access and consume frequently updated data and metadata online or in desktop applications without needing to download data that takes up redundant storage space and may become quickly outdated. This quick sheet provides references and guidance for uploading feature layers to a user's server. To establish a server, see documentation or contact the HIFLD Support Team¹.

The most common types of web services used are Map Services and Feature Services. Map services permit users to view georeferenced images and metadata within web or desktop maps but do not permit any geoprocessing workflows or querying. Feature layers allow features to be queried, attribute tables to be accessed, geoprocessing operations, and with permissions, dynamic feature editing, creation, and deletion. Users may create service definitions using ArcMap or python, and may publish with ArcMap, python, or ArcGIS server manager (<http://<host>:6443/arcgis/manager>). The HIFLD support team can provide support, scripts, and tools to assist with enabling service capabilities.

ArcMap	Server Manager	Python (arcpy, minidom)
<ul style="list-style-type: none"> -Does not require manager permissions for staging -Can provide complete workflow in graphical user interface 	<ul style="list-style-type: none"> -Server access required (<https://host:6443/arcgis/manager>) -Requires previously created service definition file for upload -Robust modifying tools for controlling service dissemination 	<ul style="list-style-type: none"> -Can create service definitions if server access is limited -May provide complete workflow for publishing with required capabilities. -Increased scalability and custom tool options

Table 1: workflow recommendations based on user needs and permissions

Using ArcMap to Publish/Stage a Service

1. In the ArcMap **File** menu, select  **Share As** and **Service...**
2. If you are uploading new data as an ArcGIS web service, select **Publish a Service**. If you are not the server administrator or otherwise unable to currently publish a service, you will be staging for later upload. Select **Save a service definition file**. If staging, select the **Include data in service definition when publishing** boolean.

3. Select an existing connection to your ArcGIS REST server and name your web service.

4. The **Service Editor** window (Figure 1) appears after the service sharing wizard. The editor allows service permission and attribute modification. It is recommended to enable **WFS** and **Feature Access** (green) to permit querying and exporting in **Capabilities** tab (purple).

User feature permissions are set in the **Feature Access** tab (yellow). By default, users can create, update, delete, and query fields². Query and extract capabilities are recommended; create, update, and delete are not recommended to maintain dataset integrity. Other tabs provide functionality that can be modified to streamline the web service experience.

5. **Analyze** and **Preview** the service to check for issues. Proceed to **Publish** or **Stage** the service.

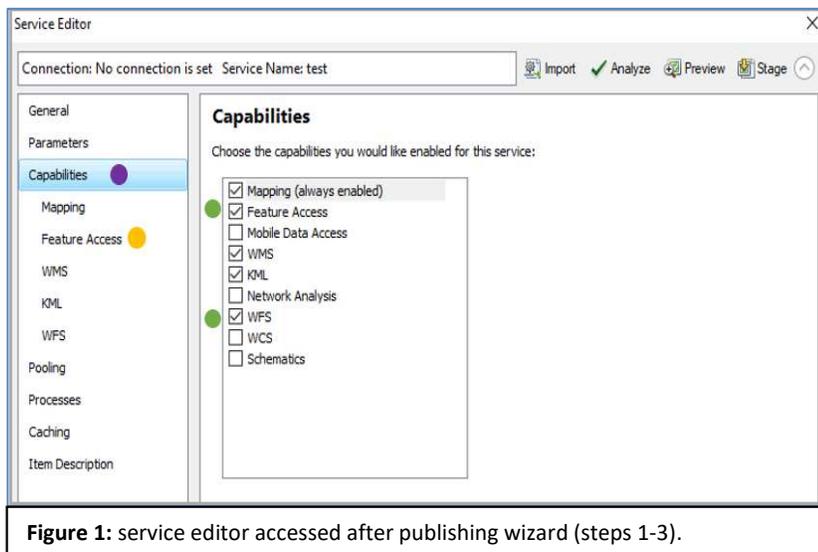


Figure 1: service editor accessed after publishing wizard (steps 1-3).

¹ <https://enterprise.arcgis.com/en/server/latest/install/windows/welcome-to-the-arcgis-for-server-install-guide.htm>

² <http://enterprise.arcgis.com/en/server/latest/publish-services/windows/editor-permissions-for-feature-services.htm>



Using ArcGIS Online (Server Manager) to Publish a Service Definition

Use this workflow if you have previously staged a Service Definition (.sd) file and would like to publish it to the server.

1. Log into your ArcGIS manager homepage (<https://host:6443/arcgis/manager>) using administrator credentials.
2. Select **Publish Service** in the **Services** tab. Use the wizard to establish where the service will reside on your server, and ensure that **Feature Access** and **WFS** capabilities are enabled. When modifying capabilities and properties using the associated tabs, restart your service before testing if the service has been converted properly.
3. Navigate to the service's Representational State Transfer (REST) folder location: (<https://host:6443/arcgis/rest/services/>). If the map server has been converted correctly, two service endpoints should appear (Figure 2). Iteminfo and metadata modifications to one service affects both services.



Figure 2: sample service folder with feature services.

Using Python to Publish a Service Definition

There are a variety of ArcGIS documentation pages focusing on using python modules *arcpy*, *minidom*, *ElementTree*, and others to stage, modify, publish, and append metadata to a web service³. This can enhance scalability and simplify the upload process for large volumes of services. Contact the HIFLD support team for assistance and geoprocessing tools for automated feature service publishing.

Updating Web Service Metadata

Metadata provides essential descriptive data for layers and services. Despite holding metadata on the original layer, metadata is sometimes not fully inherited and must be added subsequent to publishing a service.

1. If you do not already have an available Extensible Markup Language (XML) file with metadata but have complete metadata in the original layer, use the  **Export Metadata** tool in ArcMap to create a metadata file of the desired layer.
2. Verify the completeness of metadata and formatting of the metadata file exported. Use the  **Metadata Importer** tool in ArcMap (a; recommended) or (b) Windows **File Explorer**.
 - a. After accessing the **Metadata Importer** tool, set the **Source Metadata** as the desired complete metadata file, and the **Target Metadata** as the web service. Do not directly import metadata from the original layer, as this will add personally identifiable information.
 - b. Create a backup copy of the metadata file. Navigate to the service metadata location on the server machine (by default, <C:\arcgisserver\config-store\services\metadata>). Rename the complete metadata file to 'metadata' and paste it in the service metadata folder to overwrite the incomplete metadata file.
3. Restart the service using ArcGIS manager, and verify the metadata has been copied correctly by accessing the item with the ArcMap  **View Item Description** tab, ArcCatalog, or the REST endpoint metadata (<https://<host_name>/arcgis/rest/services/<service_name>/MapServer/info/metadata>).

³ <http://enterprise.arcgis.com/en/server/10.5/administer/windows/scripting-service-publishing-with-arcpy.htm>