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GIS Web Services Standards

Effective October 2013

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Purpose

These standards are developed to promote the comprehensive and accurate documentation of GIS web services and their content, provided by the Louisiana Department of Transportation and Development. These standards provide a framework for the metadata required before a requested service will be published or deployed. They apply only to GIS-based web services and the data that support them.

These standards are an important element of DOTD's strategy to publish web-based GIS services to maintain a service-oriented architecture (SOA) that provide data and information across and outside of the Department. Accurate documentation is essential to support the proper use of data through:

- Data Discovery – The ability to identify the nature and content of services and data available from DOTD.
- Interoperability- Proper use of services and data requires knowledge of their content.
- Currency – Current (up-to-date or real-time), as well as, historical services and data play different, important roles.
- Source and Processing – The original information source of services and data, and any modifications are important factors for proper data use.

When GIS services are properly documented, it saves time and effort by users, as well as, the programs and managers who support those resources.

Types of GIS Services

ArcGIS can publish various types of GIS Services, with different functionality. The matrix of service types and capabilities is outlined in Table-1, below. This functionality changes with new

versions of the ArcGIS software. Consult with the IT GIS Manager, for the most current information on service types.

Table-1.
GIS Service Types and Functionality*

GIS Service Type and Causalities	Source GIS Format	Source Application
Mapping, Network Analysis, Web Coverage Service (WCS), Web Feature Service (WFS), Web Map Service (WMS), Web Map Tile Service (WMTS), mobile data, KML, Geodatabase Data Extraction and Replication, Feature Access, Schematics	Map Document	ArcMap
Geocoding	Address Locator	ArcCatalog or ***Catalog*** window in ArcMap
Geodatabase Query, Extraction, and Replication; WCS; WFS	Geodatabase	ArcCatalog or ***Catalog*** window in ArcMap
Geoprocessing, Web Processing Service (WPS)	Geoprocessing Model or ArcToolbox Tool	ArcMap (result from the ***Geoprocessing Results*** window)
3-D Mapping	Globe Document	ArcGlobe
Image, WCS or WMS	Raster Dataset or Mosaic Dataset or Layer file referencing a Raster Dataset or Mosaic Dataset	ArcCatalog or ***Catalog*** window in ArcMap
Searchable Index of enterprise GIS content and Metadata	Folders and Geodatabases with GIS content	ArcMap

*__NOTE:__ Service types and capabilities are subject to change as software versions change. Consult the IT GIS Manger, for the most current information.

To extend access to users outside of DOTD and for DOTD applications that need to consume "open" GIS services, Open Geospatial Consortium (OGC) services are available. Table-2 provides a list of the types of OGC services and which ArcGIS Server services provide them.

Table-2.
Open Geospatial Consortium Services*

OGC Service Type	Supported by ArcGIS Server Service
WCS Web Coverage Service	Map services, image services, geodata services
WFS Web Feature Service	Map services, geodata services
WMS Web Map Service	Map services, image services
WMTS* Web Map Tile Service	Map services, image services
WPS Web Processing Service	Geoprocessing services

*__NOTE:__ The Open Geospatial Consortium (OGC) promotes the development of platform-independent GIS standards to enable the interoperability of geospatial functionality without regard to vendor software and hardware.

Data Documentation

The data that forms the basis of a GIS web service must be properly documented through geospatial metadata. Metadata is the term used for descriptive data about a dataset. Metadata documents the origin and content of a dataset. This includes the currency of the data, format, spatial accuracy, and other factors that allow a potential user to determine if the data are adequate for their use. Likewise, if they use the data, what inherent limitations exist for their application. Another important element of metadata is the authoritative contact for further information about the data.

Metadata standards are continually evaluated and updated to keep pace with the changing technology landscape. Traditionally, the USGS Federal Geographic Data Committee (FGDC), *Content Standard for Digital Geospatial Metadata* (*CSDGM*) have been used for GIS data. The GIS community is moving toward newer standards promulgated by the International Organization for Standardization (ISO). Training and resources are available on how to create, update, and maintain metadata. For more information regarding how to create geospatial metadata for your data, contact the DOTD IT GIS Manger.

Minimum Documentation Required for Publishing GIS Services

The necessary documentation starts with the data that feeds the service. Much of the information required for standard geospatial metadata originate with the data. Some metadata elements are transferred from the data to Feature Layers and do not need to be reentered. Other data will need to be copied from the source data and transferred into the appropriate element in the format being published (Map Document, Globe Document, Geodatabase, *etc*.).

Most GIS services will be published through an ArcMap, Map Document (*.MXD file). However, the various GIS formats, described in Table-1, have different specific features to document. Nevertheless, the service, its origin, and data must be properly documented. This can be done through ArcGIS Desktop software. For details on this, contact the DOTD IT GIS Manger.

Below is a checklist of metadata elements required to publish a GIS web service. First, is the metadata for the data source. The rest of the items are dependent on the source GIS format (as identified in Table-1). Below are the Map Document metadata elements and their descriptions. Many of these are present in the other publishable GIS formats.

1. Any data published to the Internet or Intranet is require to have valid, complete geospatial metadata.

2. Map Document Elements

    a. Provide text for the Map Document Properties (File > Map Document Properties), as follows:

        i. ***Title*** – A short descriptive title for the map/service.
        ii. ***Summary*** – A short précis of the map/service content and purpose (must be less than 160 characters).
        iii. ***Description*** – More detailed description of content, purpose, data sources, *etc*.
        iv. ***Author*** – who created the map/service?
        v. ***Credits*** – Other persons and/or organizations contributing to the map/service
        vi. ***Tags*** – List of keywords.
        vii. ***Thumbnail*** – Create a thumbnail graphic to represent the map (based on the current map extent at the time of creation).

    b. Data Frame Properties (In the Table of Contents, right-click **Layers** > Properties, select the General Tab):

        i. ***Description*** – Detailed description of content, purpose, data sources…
        ii. ***Credits*** – Persons and/or organizations contributing to the map/service

c. For each Feature Layer in the map (Right-click the Feature Layer > Properties, select the General Tab):

    i. ***Description*** – Detailed description of content, purpose, data sources…
    ii. ***Credits*** – Persons and/or organizations contributing to the map/service

Many of these blocks of text are identical and can be copied and transferred from one location to another. Attention should be paid to thorough, accurate language that is clear and unambiguous. Spelling is also important because these text fields form the basis of searches and indexing services.

GIS Web Service Maintenance and Management

After the preliminary work of preparing documentation is complete, a plan must be developed that clearly identifies requirements, including specific rolls and person(s) responsible for maintaining the currency and content of the data and service. Some services may be a single snapshot of data, others will evolve over time, and others may even provide real-time information.

The essential components of the management plan include:

What requirements and rolls need to be established to maintain the accuracy and currency of the data

Who will be responsible for the accuracy and currency of the service? A specific person is preferred, if not, a Section Head should be designated and notified

When will the service be updated? Are the data periodic (daily, weekly, monthly, annual…)?

How will the service be updated? Is this a manual or automated process and who is responsible for it?

What level of security needs to be in place? Is this open to the public or restricted to specific users? Who will manage access authority?

Additional Information

If you have any questions about GIS web services, metadata, or how to create and use GIS Services or metadata, contact the IT GIS Manger.