A new approach for Metadata with ArcGIS 10 (part 1)

For the first time in a decade, metadata has a new look and feel with ArcGIS 10. While it may take some getting used to, these changes provide new opportunities for creating and managing metadata. While adapting to the new environment, it may help to understand the goals for metadata with this release.

To start with, both the FGDC and ISO metadata editors provided with ArcGIS 9.3.1 were written using Visual Basic 6. Several metadata utilities provided with ArcGIS Desktop and developer samples were also written using Visual Basic 6. Since ArcGIS 10 doesn't support Visual Basic 6, the stage was set to build a new metadata solution.

Support for metadata standards

One goal for ArcGIS 10 is to support creating complete metadata that complies with the following standards.

- The Federal Geographic Data Committee's (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM).
- ISO 19139, Geographic Information – Metadata – Implementation Specification. This standard provides instruction for implementing ISO 19115, a metadata content standard for describing data, and ISO 19119, a metadata content standard for describing services
- The North American Profile of ISO 19115:2003 (NAP). This has been adopted in Canada and by the U.S., though the FGDC CSDGM remains the defacto U.S. standard at this time.
- INSPIRE Metadata Implementing Rules, for Europe.

Satisfying this requirement is difficult when the standards themselves are often in flux. New profiles of these standards are being created and several ISO metadata standards are entering phases of review and revision, including ISO 19115 and ISO 19119. With the review of ISO 19110 Feature Cataloguing Methodology, support for documenting feature attributes will likely be added to a future revision of ISO 19139. And, in an increasingly global society, there is a need to create metadata that satisfies multiple standards and profiles so information can be shared among different communities.

The solution is to create one new metadata editor that lets you author metadata content appropriately for all metadata standards. With one environment for working with metadata, all ArcGIS users can have the same metadata experience, and that experience will remain constant despite ongoing changes to the standards themselves. Whether you author FGDC metadata today or North American Profile metadata tomorrow, you work with metadata the same way in ArcGIS 10.

Updated technology

You might miss the ArcGIS 9.3.1 FGDC metadata editor because you're an FGDC CSDGM expert and know it like the back of your hand. But, let's face it, it's not a very good application—as witnessed by the continuing frustrations of new metadata users.

Others might miss the ArcGIS 9.3.1 ISO metadata editor because it's easier to use and has a nice way to help you create valid metadata. But, because of its design limitations, an enormous number of new pages would be required to create ISO 19139-compliant metadata and there's nothing easy about that.

Our goal with ArcGIS 10 was to build an easy-to-use metadata editor based on the best qualities of the old editors but with modern Web-style forms for editing content. This includes future updates to ArcGIS 10

features such as reusing contact information and validating metadata content in a similar manner to the 9.3.1 ISO metadata editor.

The resulting ArcGIS metadata editor is based on the .NET 3.5 Framework, which uses W3C-compliant XSLT stylesheets for metadata display. This is an improvement on the ArcGIS 9.3.1 metadata environment, which was based on version 3.0 of the Microsoft MSXML parser, using its decade-old XML technology for managing metadata content and its proprietary XSL stylesheet technology for viewing metadata. However, the .NET Framework prevents ArcGIS 10 from supporting the old, non-standard XSL stylesheets that were used in previous ArcGIS releases. Also, the new forms for editing metadata require changing how some information is stored in the metadata because of how they interact with XML documents.

More blog post on this new approach for metadata coming soon… Next up we'll cover the new XML format and talk about Metadata styles.

A new approach for Metadata with ArcGIS 10 (part 2)

http://blogs.esri.com/esri/arcgis/2011/01/06/a-new-approach-for-metadata-with-arcgis-10-part-2/
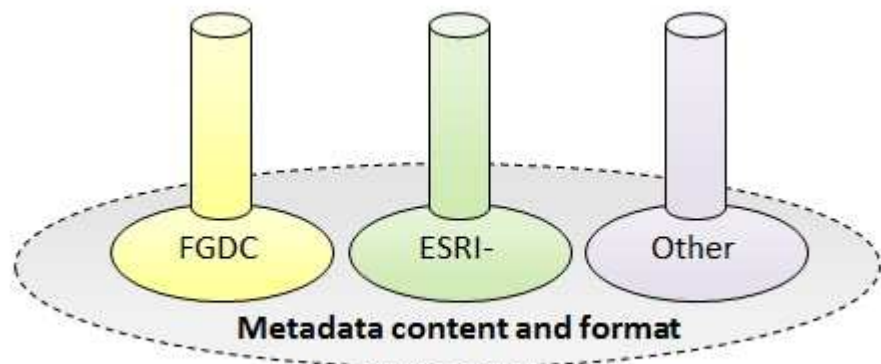
A new XML format

ArcGIS provides access to an item's metadata as an XML document. Within that document ArcGIS 9.3.1 included editors and utilities that managed metadata in the following formats:

- The FGDC metadata editor and FGDC utilities managed content in the native FGDC CSDGM metadata XML elements—the FGDC XML format.
- The ISO metadata editor and ISO utilities managed content in an Esri-defined set of XML elements based on drafts of the ISO 19115 metadata standard—the ESRI-ISO metadata format.

Supporting other standards in 9.3.1 involved adding other element sets to the metadata XML document managed by other custom editors and utilities.

With the ArcGIS 9.3.1 model, each standard was supported by a separate stovepipe, where the editor and all associated utilities comprised a stovepipe. All stovepipes connect to the same XML document underneath. The

The ArcGIS 9.3.1 stovepipe model for managing metadata

item's metadata contains information associated with all stovepipes and some ArcGIS-internal content. If you work entirely within one stovepipe, everything seems fine. However, different metadata standards include similar content. Because stovepipes aren't integrated, supporting multiple standards involves copying and pasting content into another editor, the underlying metadata contains duplicate data, and any usability improvements are specific to one stovepipe. Because an item's underlying metadata is a mix of different content, one of the utilities associated with a stovepipe must export a suitable standards-compliant XML document from ArcGIS.

In the stovepipe environment, it's difficult for ArcGIS software to use information in the metadata. Even something simple like getting an item's descriptive title is hard because there are many places to look for it—one for each stovepipe. There is no way to know where to look first, or to teach ArcGIS how to support third-party stovepipes.

With existing Visual Basic 6 metadata editors and utilities retiring, metadata standards changing, metadata display stylesheets that won't work, and changes required for the underlying XML format, it was the perfect opportunity to improve the way metadata was managed with ArcGIS 10.

Our goal for ArcGIS 10 was to build a unified approach to managing metadata with one new ArcGIS metadata editor that manages information stored in a new ArcGIS metadata XML format.

The ArcGIS metadata XML format borrows a few of the XML elements included in the FGDC XML format. It also borrows many XML elements included in the ESRI-ISO XML format; in some respects you can think of the ArcGIS format as version 2 of the ESRI-ISO format.

The ArcGIS 10 metadata XML format
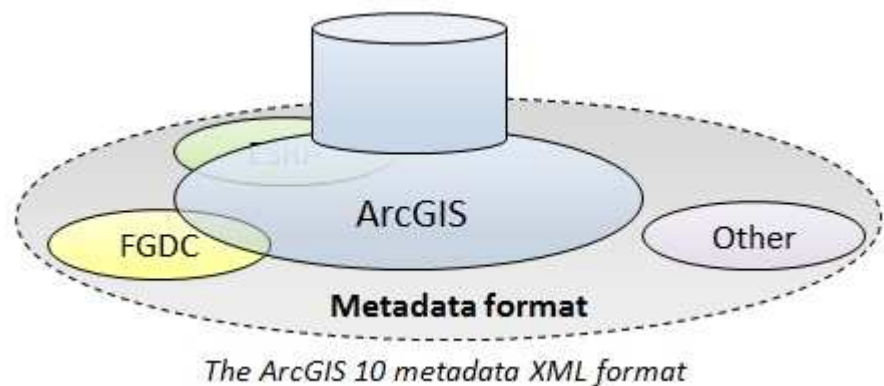
ArcGIS metadata includes all XML elements used to store ArcGIS-internal content such as thumbnails, enclosures, and detailed properties of ArcGIS items. And, it includes many new XML elements that store metadata standard and profile content that was not previously supported by ArcGIS.

From a content perspective, ArcGIS metadata includes all FGDC metadata content, all ISO 19139 metadata content, all North American Profile content, and all INSPIRE metadata content. ArcGIS metadata can be expanded to include other metadata content as well. No matter which metadata standard you need to comply with, you enter your content with one editor. Because there is just one editor, everyone will be able to validate content in the same manner, and reuse the same contacts.

ArcGIS 10 metadata includes content for all standards
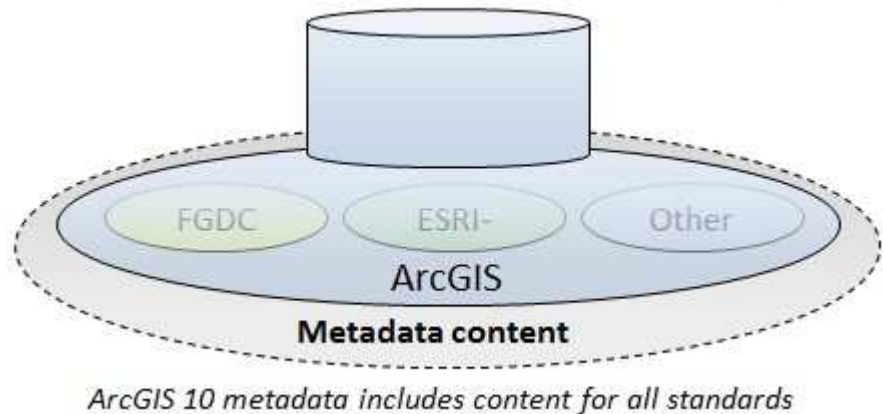
Metadata styles

Metadata styles are an important new concept in ArcGIS 10. A metadata style lets you configure ArcGIS to manage metadata content appropriately for a specific metadata standard.

Choosing a metadata style is like applying a filter to ArcGIS metadata. When you put a filter on a camera lens, the filter changes the amount and type of light that passes through the lens. When you change the

metadata style, the ArcGIS metadata editor and the underlying XML format remain the same, but the new filter changes your metadata experience. For example, changing the metadata style can alter how metadata is viewed, the editor may include different pages to edit different content, some pages may work a bit differently to tailor content for a standard, and different validation rules may be used to evaluate the content.

Like filters, metadata styles change how you interact with ArcGIS metadata
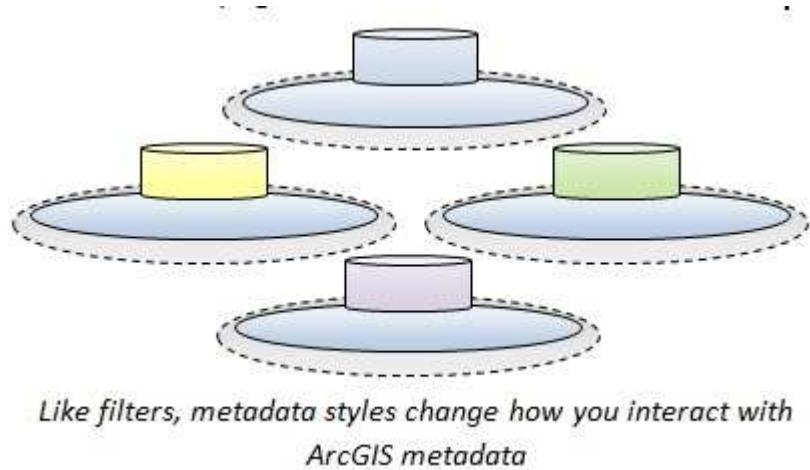
Sometimes you need to use metadata content outside of ArcGIS in an XML format that is compliant with a specific metadata standard. The metadata style identifies the appropriate tool to extract the appropriate content from ArcGIS metadata and format it correctly for its associated metadata standard.

In ArcGIS 9.3.1, switching from one stovepipe to another to create metadata that is compliant with another metadata standard involved individually changing the editor, stylesheet, and synchronizers used in ArcGIS to maintain metadata content; copying the content you already typed into the new metadata editor; then, selecting the appropriate exporter to generate a new standards-compliant XML document.

In ArcGIS 10, if you need to create metadata that is appropriate for multiple standards you simply change the metadata style. Choose one metadata style, enter and validate your content, then export it to the standards-compliant XML format associated with this style. Change the metadata style, check the validation rules and adjust your content if needed, then export it to the other standard's XML format. The same underlying ArcGIS metadata content is used to support multiple standards by applying different styles, or filters, to it.

In our next post we'll take about item descriptions, geoprocessing and how this all works to together in the ArcGIS system.

A new approach for Metadata with ArcGIS 10 (part 3)

http://blogs.esri.com/esri/arcgis/2011/01/12/a-new-approach-for-metadata-with-arcgis-10-part-3/

Simple item descriptions

As crazy as it seems to the metadata community, some GIS professionals have no interest in or requirement to create standards-compliant metadata. While ArcGIS clearly embraces metadata standards, it must also support people who aren't required to follow them.

Another goal of ArcGIS 10 was to introduce simple, generic descriptions of items; it is this type of simple description on which ArcGIS Online is based. A simple item description is merely a very small subset of ArcGIS metadata, and the metadata style supporting it is essentially a very restrictive filter that only allows a few pieces of information.

ArcGIS metadata supports all standards; one is not preferred over the others. As a result, the Item Description metadata style is the default style in ArcGIS 10. The beauty of the new metadata environment is the simple description someone provides today can easily be turned into standards-compliant metadata later, if requirements change, merely by changing the metadata style.

Integration with ArcGIS software

With a single body of metadata content to draw on, it becomes easier for ArcGIS software to leverage information in an item's metadata. Another goal was to start making this possibility a reality. For example, with ArcGIS 10 when you create a layer, the layer's description will be populated automatically if it has ArcGIS metadata including layer description content.

Similarly, if you change a map's properties in ArcMap, that content is saved in both the map document and in ArcGIS metadata if metadata exists. When you change the same information in the map's metadata using the ArcGIS metadata editor, the changes are also saved in the map document. When a map is packaged, information in ArcGIS metadata (if it exists) will provide the descriptive information needed to build the package, and that same information will become the map's description if it is shared with ArcGIS Online.

Focus on geoprocessing

ArcGIS software has increasingly focused on making typical GIS tasks available as geoprocessing tools. In ArcGIS 9.3.1 some metadata tasks were available both as geoprocessing tools and as buttons on the ArcCatalog Metadata toolbar, while others were available only as buttons or as geoprocessing tools. An important goal for ArcGIS 10 was to make all metadata tasks available as geoprocessing tools because a Metadata toolbar is not provided in the Catalog window to support metadata tasks. Several new tools were added to the Metadata toolset in the Conversion toolbox to support importing, exporting, and synchronizing metadata.

Because the ISO 19139 metadata standard is an implementation specification that provides a set of XML schemas in XSD format for validating metadata, new geoprocessing tools were also added to validate metadata using XML schemas. This basic form of validation is required to satisfy metadata standard requirements. Future updates to the ArcGIS metadata editor will
include more integrated validation for metadata content.

Conclusion

ArcGIS 10 provides one way for everyone to manage their metadata. Because there is just one metadata environment to build, we can focus on improving usability and everyone will benefit. There is a better framework for a global environment where users must support multiple
metadata standards. And, with one set of metadata content to build on, metadata can become more integrated with ArcGIS software.

As we continue to improve metadata support in ArcGIS, we think you'll start to agree that change can be good.

Post provided by Aleta (Esri Metadata Team) on January 3, 2011, in Uncategorized*, by rpe2*

Comments:

From curtvprice (January 24, 2011 at 10:02 pm), *with responses from avienneau (January 25, 2011 at 12:28 am)*:

I just had some back and forth with tech support on this, Avienneau. Chime in if I am misunderstanding something.

1. CSDGM2-format ("FGDC Metadata") created in 9.3.1 can be stored viewed in 10.x. The FGDC metadata is stored "parallel" with the ArcGIS metadata. You need to turn on the FGDC stylesheet (ArcMap/ArcCatalog Options / Metadata tab) to see it. This stylesheet was released as a patch to 10.0 final and is included in ArcGIS 10 SP 1 and later.

> *Yes and no. It isn't actually necessary to use the FGDC CSDGM Metadata style to see any 9.3.1 FGDC metadata that is present. Any metadata style provided with ArcGIS 10 except for Item Description will show this content under the FGDC Metadata heading.*

> *It is important to recognize that the patch that provided FGDC support for ArcGIS 10 did so by providing a new metadata STYLE. Metadata styles are a new concept in ArcGIS 10. One property of a metadata style governs the display of metadata using a STYLESHEET. Metadata styles and metadata stylesheets are not synonymous. The patch, which is also included in SP1, does not actually provide a new stylesheet for viewing metadata. It provides a new metadata style that configures ArcGIS 10 to handle metadata content in a manner that is appropriate for the FGDC CSDGM standard.*

2. A "legacy" FGDC metadata editor is available for editing existing 9.3.1 metadata. It does not support "refresh" from the dataset, if you want to populate FGDC metadata you need to use ArcGIS 9.3.1. FGDC metadata may be imported ("upgraded") to ArcGIS metadata, but information will be lost – as the new ISO 19139 standard does not support some FGDC elements and the importer is targeted to ISO 19139.

http://blogs.esri.com/Dev/blogs/arcgisdesktop/archive/2010/06/25/FGDC-Metadata-Editor-for-ArcGIS-10.aspx.

> *Yes. The FGDC metadata editor add-in lets you edit content stored in FGDC XML elements, which are visible under the FGDC Metadata heading. This content will not be automatically updated when the data changes. It also can't be exported or validated using the buttons in the Description tab or on the Metadata toolbar in ArcCatalog.*

3. FGDC metadata may be imported ("upgraded") to ArcGIS metadata, but information will be lost – as the new ISO 19139 standard does not support some FGDC elements and the importer is targeted to ISO 19139.

> *No. Our intent is for ArcGIS metadata to include all FGDC metadata content. If you upgrade FGDC metadata to ArcGIS metadata, in general, information should not be lost in the process. Sure, there are some fixes we need make, and there is room for discussing semantics about things that are similar but not identical, but in general there should be no significant loss of information.*

4. A translator is provided to go the other way – export FGDC metadata from an ArcGIS metadata record. If FGDC metadata exists (either from editing in 9.3.1 or using the Arc 10 9.3.1-editor addin, most of them are included in the "translated" output.

> *Yes and no. I refer you to this graphic from part 2:*
> http://downloads2.esri.com/blogs/images/dev_22115.jpg. *The ArcGIS metadata editor in the Description tab edits the big blue stovepipe's ArcGIS metadata XML elements; this includes any 9.3.1*

FGDC metadata content that was upgraded to version 10. The FGDC metadata editor add-in edits content in the FGDC XML elements associated with the little yellow stovepipe's footprint in this diagram. The attribute descriptions that are shared between the two is the content where these two footprints overlap.

The Export button on the Description tab takes content from the big blue stovepipe and uses a translator (provided by the patch) to create an FGDC XML file from it. The translator doesn't at all interact with the yellow footprint content edited by the FGDC metadata editor add-in except for attribute descriptions, which are shared between the two.

Major changes for Metadata in ArcGIS 10

From John Bocchino, GISP, NJDEP, GIS Specialist

For the past 10 years, the NJ DEP and NJ OGIS have been actively training GIS professionals to create FGDC-compliant metadata using ESRI's ArcCatalog. With the release of ArcGIS 10, all of us familiar with creating metadata within this environment will notice dramatic changes with the way metadata is viewed, imported, edited and exported. Why?

Understanding the goals for the dramatic change by ESRI will help ease some of the confusion involved with knowing that what you have been used to for many years has now been modified with new tools, processes and procedures.

One of the main reasons for the change was due to the changing status of metadata standards. The FGDC standard has been used globally by many in GIS for years. The newer International Standard (ISO), which is largely based on FGDC, will eventually replace it when the North American Profile is finished and fully implemented. Additionally, there are those who, based on various organizational needs and factors, choose not to follow any metadata standard at this time, but are willing to share their data through an easier metadata environment. The goal of ESRI was to reach out and address the metadata needs of all users by creating one environment that generates metadata which satisfies multiple standards and profiles.

In ArcGIS 9.3 and earlier versions, many metadata utilities were programmed using Visual Basic 6, including the FGDC and ISO editors. Visual Basic 6 is NOT supported in ArcGIS 10, so a change in the way metadata is imported, edited, exported and viewed was needed. The solution was to create one new metadata editor that lets you author metadata content appropriately for all metadata standards. With one environment for working with metadata, all ArcGIS users can have the same metadata experience, and that experience will remain constant despite ongoing changes to the standards themselves. Whether you author FGDC metadata today or ISO North American Profile metadata tomorrow, you work with metadata the same way in ArcGIS 10.

A complete 3 part review of this new approach can be found on the ESRI ArcGIS Resource Center/ArcGIS Desktop Blog site (first part of this document)

What to do if you have already loaded ArcGIS 10?

If you've already loaded ArcGIS 10 (please make sure you have installed Service Pack 2), you may have just found out that there is no more tab for "METADATA" next to CONTENTS and PREVIEW. It now says DESCRIPTION. There's also no immediate way to edit metadata using the FGDC editor the way you were used to in ArcGIS 9.3.1 and earlier versions. ESRI does have a way for you to view and edit FGDC-

compliant metadata in ArcGIS 10, however you have to do a couple of things first. Here is a basic outline of what NJDEP has found out that needs to be done:

1. Verify that you have installed ESRI Service Pack 2. Doing so installs the FGDC stylesheet needed to view the detailed FGDC formatted metadata previously created.

2. Load an "add-in" to get the FGDC editor we are used to in 9.3.1:
The add-in for FGDC Metadata editor:
http://blogs.esri.com/Dev/blogs/arcgisdesktop/archive/2010/06/25/FGDC-Metadata-Editor-for-ArcGIS-10.aspx

3. You must customize and load certain tools onto your toolbar to get some of the familiar functionality back. Right Click on a menu and click "customize". Go to "Commands" and then to "Conversion tools". Drag and drop onto the menu tools for:

   · Upgrade Metadata
   · Metadata Importer
   · USGS Metadata Translator

Completing the above gives the user most of the functionality you once had in 9.3.1. One major change though is that the "add-in" editor can no longer "sync" or capture information from the data. Changes, such as object counts and attribute additions, will have to be done manually.

How to VIEW FGDC-Compliant Metadata

In the description tab, there will now be a "FGDC" section below the ITEM DESCRIPTION and ARCGIS METADATA section. If you click here, you will have the capability to "view" metadata in the familiar FGDC format.

How to IMPORT older FGDC-Compliant Templates or Metadata Records

My suggestion is if you have to edit or create metadata using "older, existing FGDC compliant" metadata, please use the ONLY the "Metadata Importer" tool. I have found it, at this time, to be more consistent than the "Import" icon/tool found on the "Description" tab. Using "metadata importer", browse and select the template or metadata record that will be used to create the new record in 10.

How to EDIT using the FGDC 9.3.1 editor

Click on the "FGDC" button in the toolbar to use the "add in" FGDC editor which many were familiar with in 9.3.1 and earlier versions. Rumors have it that this "add-in" may only be a temporary fix in ArcGIS 10. If you make edits, please understand that after saving, you may need to refresh to see any changes. You may also use the inherent "edit" function within ArcGIS. I have found the interface a little cumbersome since it is new. I also have found inconsistent results in editing with loading older FGDC-compliant metadata. At this time, I do not know what may be causing missing elements. Some have suggest syntax errors involving "&" and/or "<>" symbols.

 **Note: The Environmental Protection Agency (EPA) is completing beta-testing on their EME metadata tool to be ArcGIS 10 compliant. It can be loaded and utilized within ArcCatalog. This is good news and could provide a much easier way to create metadata. More details on this tool will be made available shortly.

How to EXPORT metadata into FGDC-Compliant formats (html, xml, txt)

To follow the FGDC standard and to have the capability to export into FGDC xml, txt and html, please use the USGS Metadata Translator tool which you loaded onto the tool menu.

Please understand that the above procedures were NJDEP's first draft of "beta-testing" of ArcGIS 10 to re-create FGDC-compliant metadata using similar functionality most of us were used to. Users should also realize that simple importing and exporting of files are now "geo-processing" tools. This may take more time to import/export individually, but it does give the ability for batch importing/exporting through scripts. The changes ESRI has incorporated in ArcGIS 10 concerning metadata standards and functionality will prove beneficial to all eventually.