SERVING METADATA AND OGC SPECIFICATIONS BASED GEOSPATIAL DATA SHARING USING ArcIMS

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PART I – Introduction to Metadata and Data Sharing Ideas

The document that describes a publisher of data and information that describes data is called metadata. Sometimes to get the actual data one has to call or download it if a link is provided in the metadata document. Nevertheless, it is a lot quicker to review the metadata first and then decide which data to acquire. Often the metadata document and the data itself are on separate systems, similar to a library where the card catalog (metadata) is separate from the books (data). When we talk about sharing data what we need to first create a system where users can create metadata and then search that metadata.

Let's first assume that the original data itself will reside with the data owner, since that makes it easier to be updated. However, the metadata document can be in many different locations across an enterprise. There are several different strategies.

First there is the decentralized approach to publishing metadata. Here each publisher keeps the metadata in the same location as the data. In order to search, one might have to search each individual server every time. The disadvantage is that the server might not be down at that minute and the searcher will not know that that data exists. The decentralized approach might have an central application that lists all the servers online at that moment and performs a basic keyword search. However, since the actual metadata is on the publishers' servers they then have to drill down to a second level to see the metadata.

Second is a more centralized approach where metadata is harvested or pulled by a central server from the publishers' servers. The metadata is stored on the central server and thus the publisher server can be offline and the metadata can still be searched. Furthermore, since there is a central location, metadata can be forced to pass quality checks before it is harvested. Also, with all the metadata in one location we can write tools on the server that make it easier to work with the metadata and that through an economy of scale will benefit all users, searchers, and publishers. I think we can suggest that from here on only a centralized approach will be considered.

The ESRI metadata server takes the second centralized approach and allows metadata to be published to it (pushed) from an ArcSDE database or harvested automatically (pulled) from other ESRI or non-ESRI metadata servers. The methods for pulling metadata include the legacy protocol, Z.39, as well as the never CS-W. If you use a central ESRI Metadataserver as your enterprise metadata storage, then it can pull data from other metadata servers in the background.

The Geospatial One Stop Metadata Server is like the ESRI metadata server, except that it adds even more tools and community benefits. The Federal Government also went with the centralized metadata approach with GOS, but made it free. The trade off is that your metadata is publicly searchable, so it is not totally free! However, since the stadium has been built so to speak, all you need to do is sit in your seat to enjoy the game. There are community channels that you can configure for your data sharing community, tools such as Google that can be used to search quickly through metadata, and buy and sell forums for data exchange, and interactive maps that show links to the actual data that you can acquire. Also, not only the harvesting protocols or z.39 and CS_W are supported but GOS can also harvest data from a simple virtual folder on a web server! A community could be up and running with the GOS metadata server very quickly and use that as its central repository for searches.

Larger communities or communities that do not want to make their metadata publicly searchable might chose to invest in their own version of something like GOS that has similar bells and whistles but requires significant technical expertise to set up. A large corporation might have thousands of expected users of its metadata system and might have some data that might not wish to advertise to the general public. Thus it might make sense to use the ESRI portal toolkit to set up a metadata portal system.

Thus, let's look at a case study of someone designing a metadata system for that would let the counties in a particular state see each others metadata (and links to the data). The county needs to asses the following:

- how many users will use the metadata (just the GIS users or 1000s)?
- if they are using existing metadata servers what harvesting protocols are supported ?
- is it OK to make the metadata publicly searchable? (Perhaps through a portal site like the Geospatial One-Stop, GOS)
- how much technical experience do they have to build a more customized solution (like the portal toolkit)?
- What timeframe is there to get it up and running?

Case 1)
Lets say that some counties had some existing metadata servers that used the Z.39 protocol, some other counties just had web servers where one could place the metadata documents in a folder, and some counties had no web servers. Assume the counties were wary of putting any information out to be publicly searchable, but they were also wary of tackling a difficult technical solution.

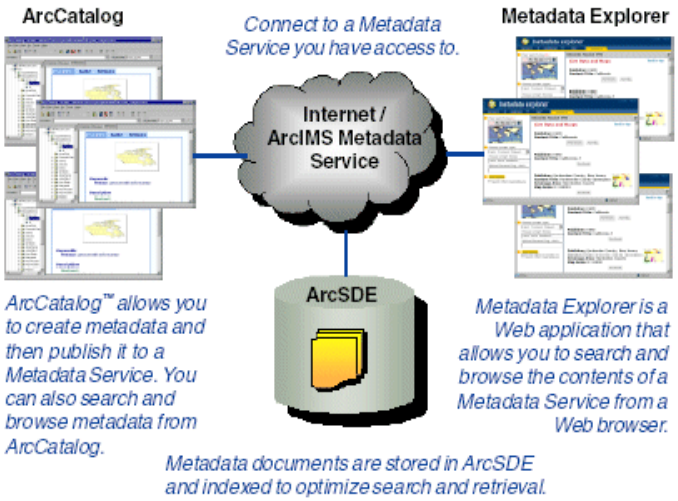
Here they would use a single ESRI metadata server that could harvest the metadata from any of the CS-W or Z.39 enabled metadatada servers. Any other metadata would have to be manually published by each county to the server. Users could use the out of the box ESRI metadata explorer thin web client to browse and search the metadata.

Case 2)
Let's say that although only 30 people will need to use the metadata and its OK for it to be publicly viewable. There is no technical expertise available to build a custom solution and the application needs to working in a week.

Use GOS and configure GOS to harvest the metadata from the Z.39 servers, the folders in the web serves, as well as the many other ways that GOS can harvest metadata. Create a new channel just for that states' counties on GOS where they can have their own forums and post requests and responses to data searches.

PART II - Setting up Metadata server and the Metadata Explorer Application

This section shows how to create the databases needed to store your metadata, and how to configure a browser based thin client that can browse the metadata using a map or placenames (gazetteer).



Section 1 – Required Software Installs

1. Install Java SDK - When you install the Java files before installing ArcIMS you needed to install the Java SDK version if you want Metadata server to work. More generally, you need the java sdk not the JRE so you can create jsp apps, such as the metadataexplorer app. You should have a java install folder like C:\j2sdk1.4.2 for example.

2. When you install ArcIMS 9.1, during the setup options make sure to check off the following:

    1. Metadataserver Server
    2. Gazetteer data (optional)
    3. Metadataexplorer app
    4. Samples – includes an advanced metadataexplorer app..

3. SQL Server – do an upgrade/remove/ or add components to SQL server, or do an advanced/custom install on a fresh install of SQL Server. Choose to install “Full Text Search” and check off that box.

Section 2 – Create an ArcIMS metadata service called Gazetteer (optional)

Do this section only if you want the ESRI Gazetteer data service loaded. You will load gazetteer data into SDE/SQL 2000. The process is also outlined in 90 -92 of the Creating and Using Metadata Services.pdf document.

1. Copy Gazetteer SDE export files to the local computer – This was done already in Section step 2 when you checked off the Gazetteer data box.

2. Create an empty ‘gazetteer’ database and a ‘gazetteer’ login user in SQL Server. - See the Appendix #1 Quick Database Setup for ArcSDE data Loading for simple instructions on how to do this.

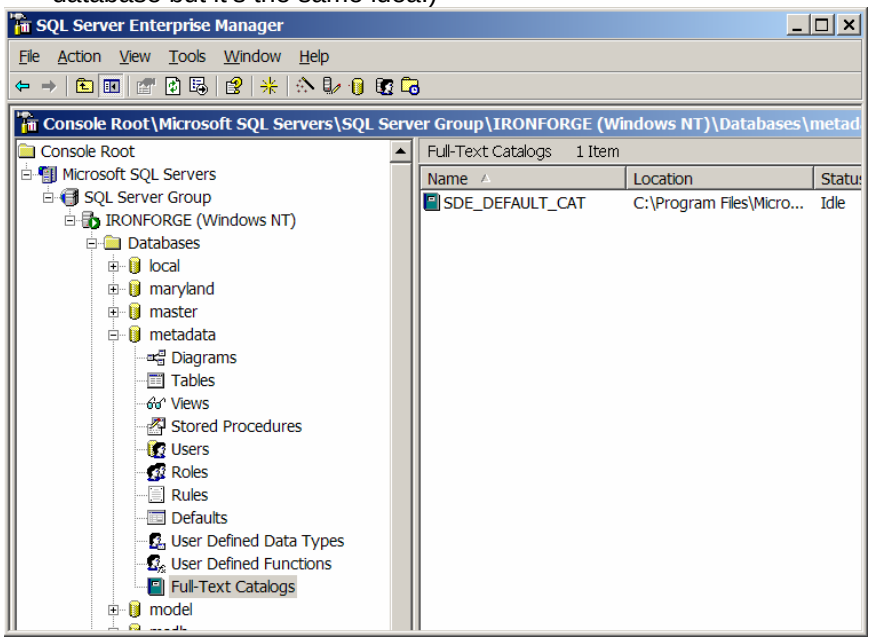
3. Import the Gazetteer export files into ArcSDE - In the C:\Program Files\ArcGIS\ArcIMS\Metadata\Data\Gazetteer\Data_Install_Instructions.htm follow the instructions for importing into the new gazetteer database. All you really need to do is just run the gazetteerimport.bat file for SDE and SQL 2000.

GazetteerImport <machine> <instance> <database> <user> <pass>

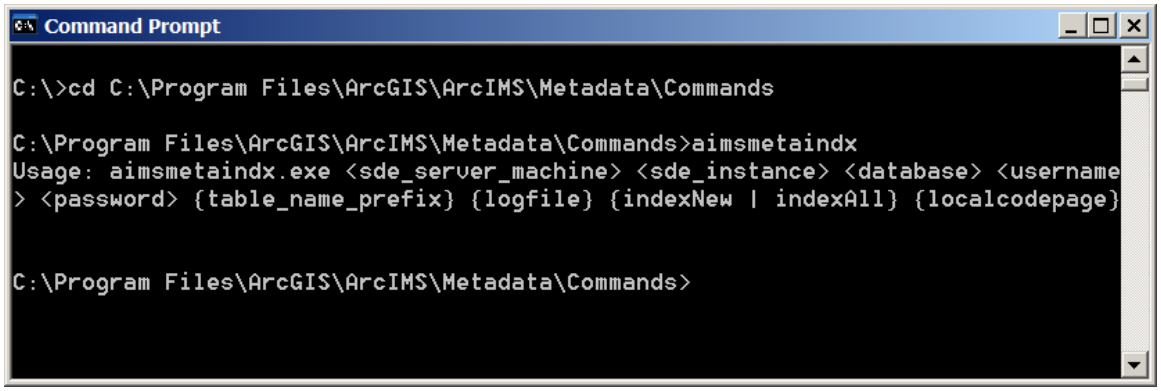
(e.g., GazetteerImport 5151 [machinename] gazetteer gazetteer gazetteer)

Note that the import works correctly even though an error message is initially shown. Your gazetteer data is now in ArcSDE in a database called gazetteer.

4. Create the Full text catalog for full text searching for the gazetteer database.
   a. In enterprise manager expand the gazetteer database and then right click on it, choose new, and click full text catalog.
   b. Call the Catalog “SDE_DEFAULT_CAT” and click OK. (This pic is for the metadata database but it’s the same idea.)



5. Index the Gazetteer data – The gazetteer needs to be index so it can be searched.
   a. At a command prompt change to the C:\Program Files\ArcGIS\ArcIMS\Metadata\Commands folder.
   b. Type aimsmetaindx to see the usage:



c. For example most likely you will type something like this if your machine name is 'mycomputer', your database and user are gazetteer, and you set it up with SQL server.

   aimsmetaindx mycomputer 5151 gazetteer gazetteer gazetteer gazetteer gazetteer

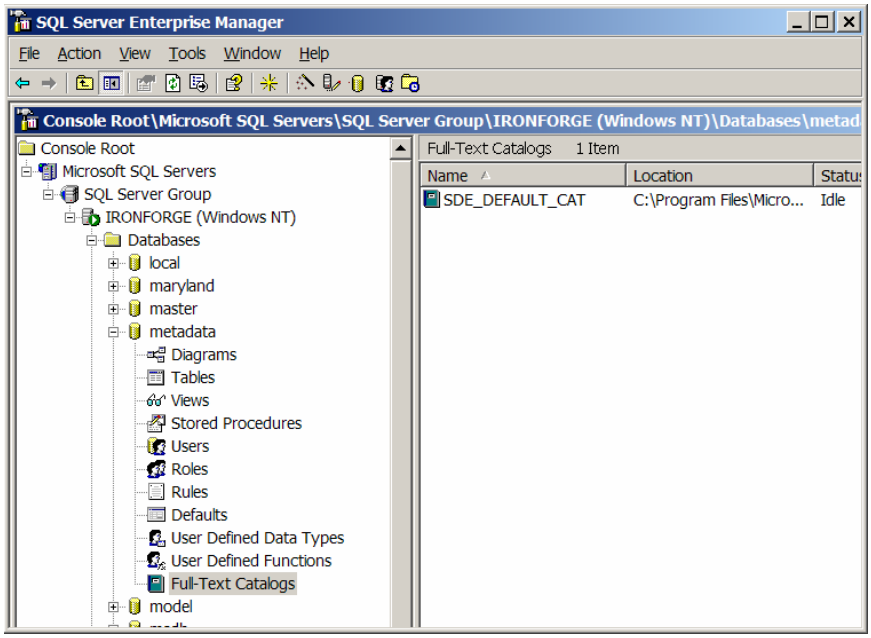
d. The indexing can take several hours. You can tell when it is done because there is a background service called mssearch that runs when the indexing is being done and stops when it is over. (Also, if you open the metadataexplorer and can search on some things that begin with A and then Z you should see that it finished too.)

6. Create a Gazetteer mapservice in ArcIMS administrator.
   a. In c:\arcims\axl\metadata edit the gazetteer.axl file to point to the gazetteer database in ArcSDE. Just edit the SDE connection strings. (The name field can be anything.)
   b. Go to ArcIMS and create a new metadata mapservice called 'Gazetteer'.

Section 3 – Create an ArcIMS metadata service called 'metadata'

1. Set up a database and user like in step 2 but this time call the database metadata with user metadata.

2. Create the Full text catalog for full text searching for the metadata database.
   c. In enterprise manager expand the metadata database and then right click on it, choose new, and click full text catalog.
   d. Call the Catalog "SDE_DEFAULT_CAT" and click OK.



7. Create a Metadata mapservice in ArcIMS administrator.
   a. In c:\arcims\axl\metadata edit the metadataserver.axl file to point to the metadata database in ArcSDE. Just edit the SDE connection strings. (The name field can be anything.)

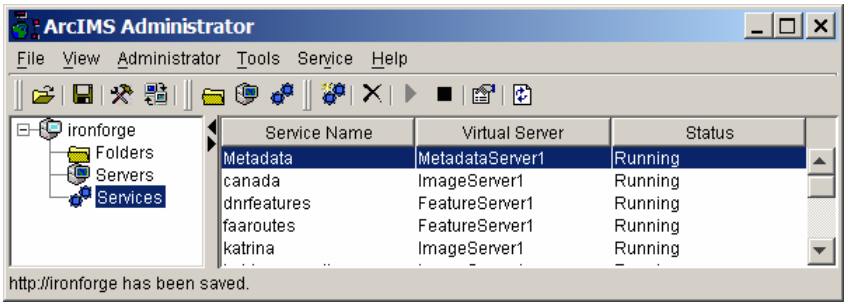
```
<WORKSPACES>
        <SDEWORKSPACE name="mymetadata" server="ironforge" instance="port:5151"
        database="metadata" user="metadata" password="metadata" />
</WORKSPACES>
```

   b. Note that a line further down in the file looks like this:

```
<METADATA_CONTENT validate="true" index_words="automatic" />
```

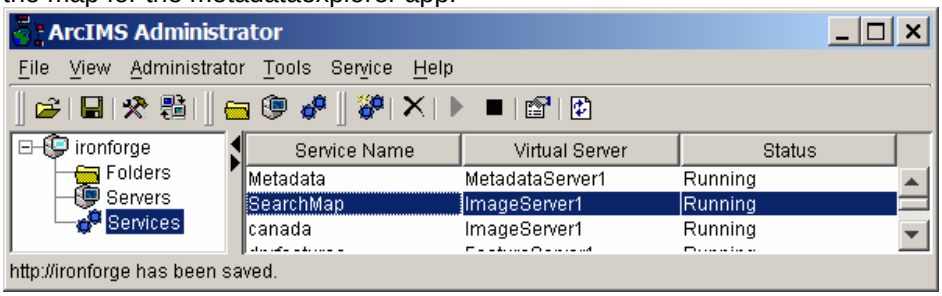
      This means that new content added to the metadata server will be validated so it conforms to a metadata standard, and that it will be automatically indexed so you don't need to runs aimsmetaindx.

   c. Go to ArcIMS and create a new metadata mapservice called 'Metadata' (case sensitive).



Section 4 – Create an ArcIMS Image Service called SearchMap

1. Go to ArcIMS administrator and make a new ArcIMS image service called 'SearchMap' (case sensitive) that points to c:\arcims\axl\metadata\searchmap.axl. This is the image service used in the map for the metadataexplorer app.



Section 5 – Configure ArcIMS to Restrict access to Services with an ACL File

Once you have a metadata server, if you want to allow publishing you need to set publishing permissions and access permission to all of the services, metadata and other that are running in ArcIMS through the use of an Access Control List.

1. Create an access control list (ACL) file - Make a new file called aimsacl.xml and place it in C:\arcims\acl. See Appendix #2 for an example of an acl file that you could use as a starting place. Note that in the services section you need to list all the services, including image services that you want to have people access. You can also put a '?' there to signify al services. Note: Service names in acl files are case sensitive and must match names in ArcIMS services.
2. Force ArcIMS to use your acl file. – In Servletexec - C:\Program Files\New Atlanta\ServletExec ISAPI\Servlets or Tomcat - C:\tomcat4129\webapps\servlet\WEB-INF\classes edit the following lines in the 'esrimap_prop' file (and remove the # in front):
    i. Authenticate=True
    ii. AuthMethods=Digest
    iii. Aclfilename =C:/arcims/acl/aimsacl.xml (use forward slashes)
3. Also see Appendix #3 for a more detailed description about the acl list. Note that the last step in that Appendix (setting IIS permissions) should already have been done when you set up ArcIMS.
4. Restart Tomcat to force ArcIMS to use the new acl file.

Section 6 – Configure the ESRI Metadata Explorer Application

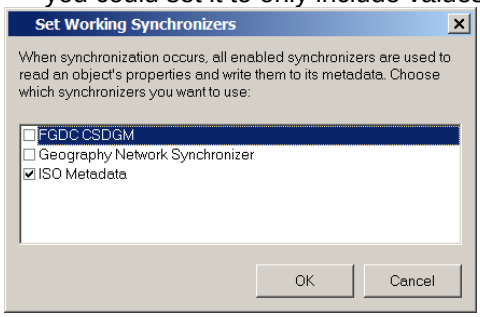
1. The metadataexplorer jsp app is installed already because you checked off that option in the ArcIMS 9.1 install. To view it enter http://host/metadataexplorer. You get might get some errors if you had not configured the searchmap yet. You won't see the gazetteer search box unless you set that to true in step 2 below.

2. To get the gazetteer search box to appear on the metadataexplorer go to C:\Tomcat4129\webapps\metadataexplorer\WEB-INF\classes\aimsmeta.properties and edit:
   a. search_gazetteer=true – At this point you should be able to use the gazetteer search box on the metadataexplorer web page. If you don't want a gazetteer put this to false, which is the default.
   b. meta_service_name=Metadata (case sensitive)
   c. search_service_name=SearchMap (case sensitive) – At this point you should see the map in the metadataexplorer.
3. Restart Tomcat to force ArcIMS to use the modified aimsmeta.properties file.

Part III - Publishing Metadata

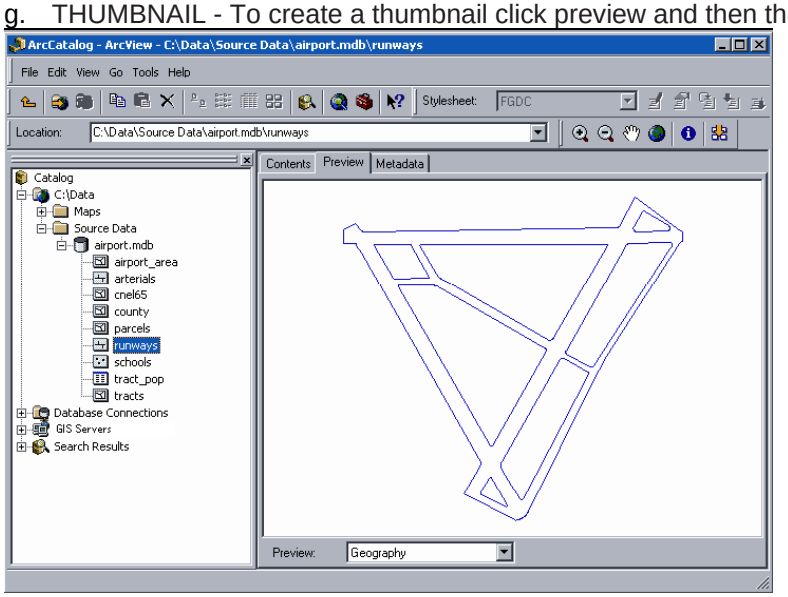
A. Basic Metadata

1. Choose a metadata editor
    a. Click the Tools menu and click Options.
    b. Click the Metadata tab.
    c. Click the Metadata Editor dropdown arrow and click the ISO editor since this one will be the one that is more standard. Choose the ISO default stylesheet and the ISO metadata wizard.
2. Set metadata synchronization options. Metada can be edited in an ISO or FGDC editor. When you publish data it synchronizes the edits made from the various editors, which might have the effect of keeping data entered in one editor where you did not intend to. Thus, we will turn off synchronization for all editors except the FGDC one.
    a. Go to tools, custom and add the following command to the metadata toolbar – 'metadata synchronizers' from the metadata menu. When you click the tool you get this dialog so you could set it to only include values entered from the ISO editor.

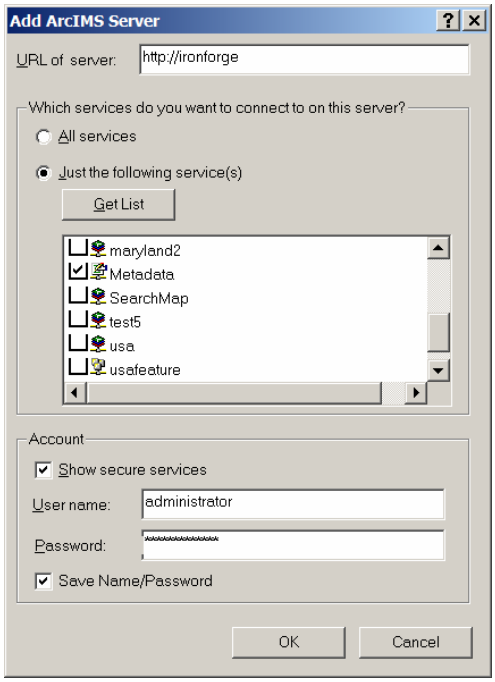


3. Create some metadata for the data of your choice.
    a. In ArcCatalog select the data and choose the metadata tab.
    b. Click the edit metadata button on the metadata toolbar.
4. We will use the ISO editor to edit the metadata and add the required fields:
    a. TITLE - To add a title, click the title page and type in a title.
    b. PUBLISHER - For the publisher do the following:
        i. Click the Point of contact overview page in the table of contents, click yes in response to the second question to add a new point of contact, and then click next.
        ii. To add the publisher, click the last Point of contact page in the table of contents; it will be empty. Load a contact into the page from the contacts database, or type the publisher's name into the organization name text box.
        iii. To define the contact as the publisher, click the Function in relation to the dataset dropdown list and click publisher.
    c. SPATIAL CONTEXT - To add the spatial extent do the following: If the Geographic bounding box page appears in the table of contents, click that page and type in an appropriate spatial extent in decimal degrees. If the page doesn't appear, the spatial context is OK already.
    d. THEME - To define the item's theme, click the Themes or categories page in the table of contents and check all the categories that apply for this item. If the item falls into more than one theme category, click the plus sign again and type in another code.

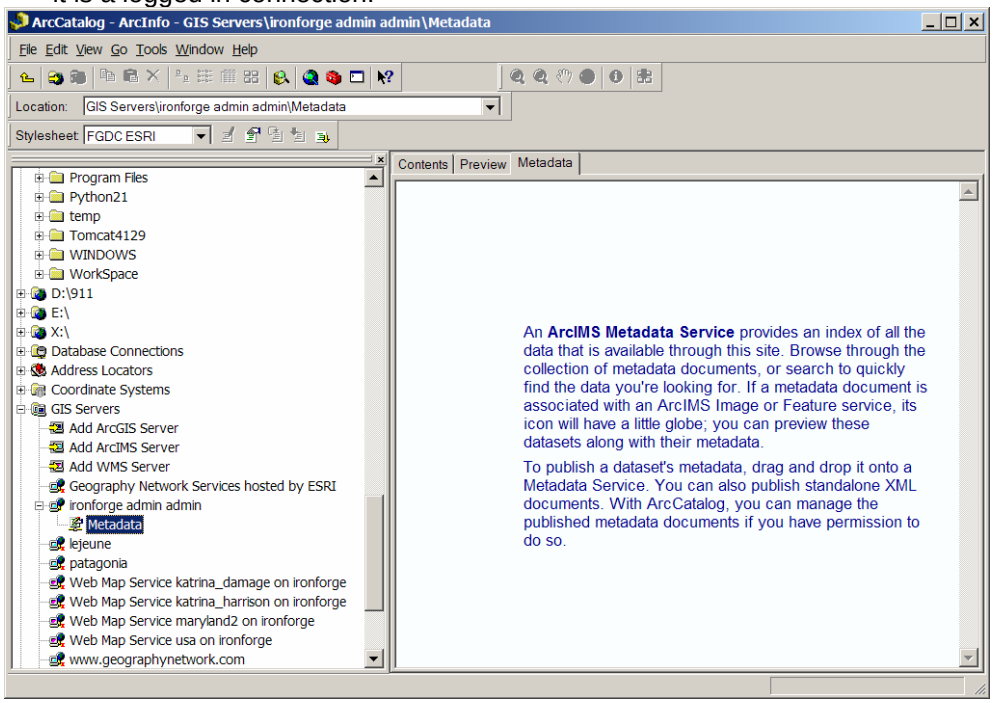
e. CONTENT - Define the item's content type by clicking the On-line delivery options 1 page in the table of contents and click the appropriate content type from the resource description dropdown list. Note – even if the data can't be downloaded you still need to set the on-line delivery option.
f. Click Save.
g. THUMBNAIL - To create a thumbnail click preview and then the thumbnail button:



5. Now we need to publish the metadata into an ArcIMS metadata service.
   a. In ArcCatalog, make a new internet connection to the metadata service and most importantly, use the admin/admin u/p to connect. The metadata icon should have a hand with a pen on a notepad signifying you can publish metadata.



b. Click ok and name that connection something like '(servername) admin admin' to indicate it is a logged in connection.



c. Now drag your feature classes with metadata to the metadata connection server in ArcCatalog.

d. (Note that in order to publish you need author or admin rights to the metadata server, so the GIS Server data connection needs to use those params. Note that if you connect with

author you won't be able to delete a metadata document though unless you connect as admin.)

e. Also, note that if you want the metadata to be searchable by words like OGC, WMS, etc. than put those words in the text of the abstract.

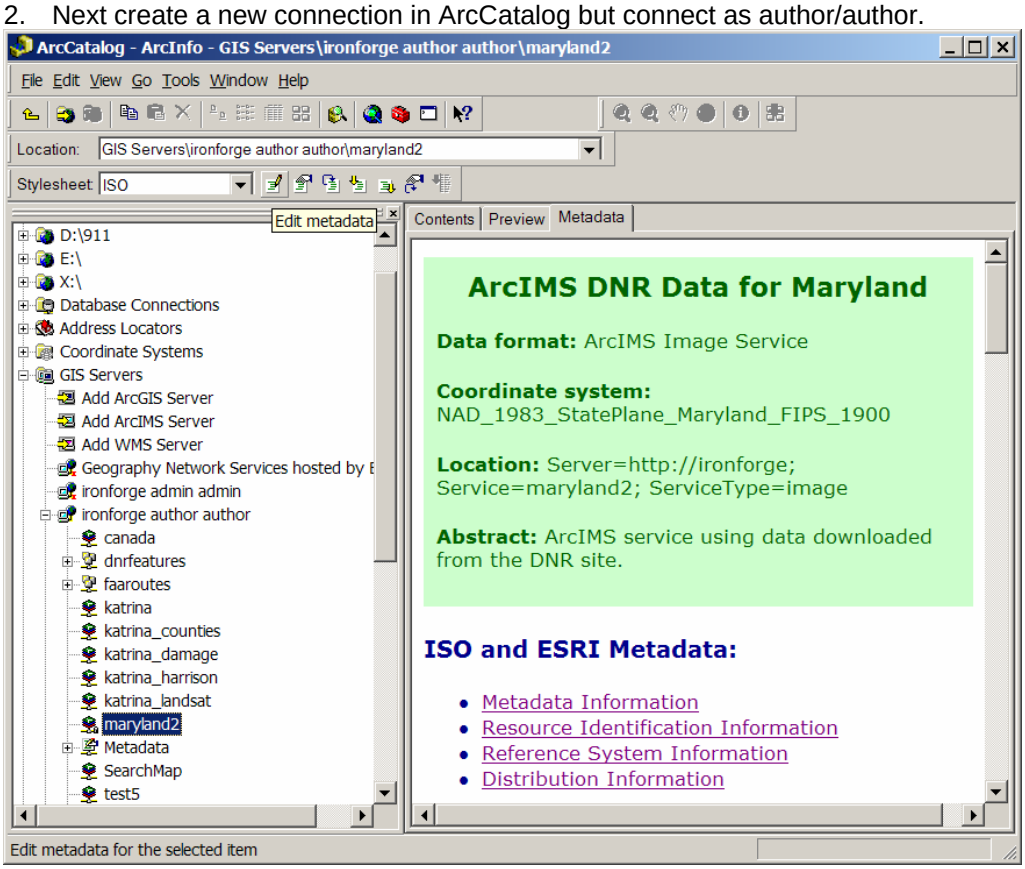
III - B. Publishing Metadata for an ArcIMS or WMS to Metadata Server

A WMS service does not support metadata itself. Thus, we create metadata for the underlying ArcIMS image service but provide the link to the WMS service.

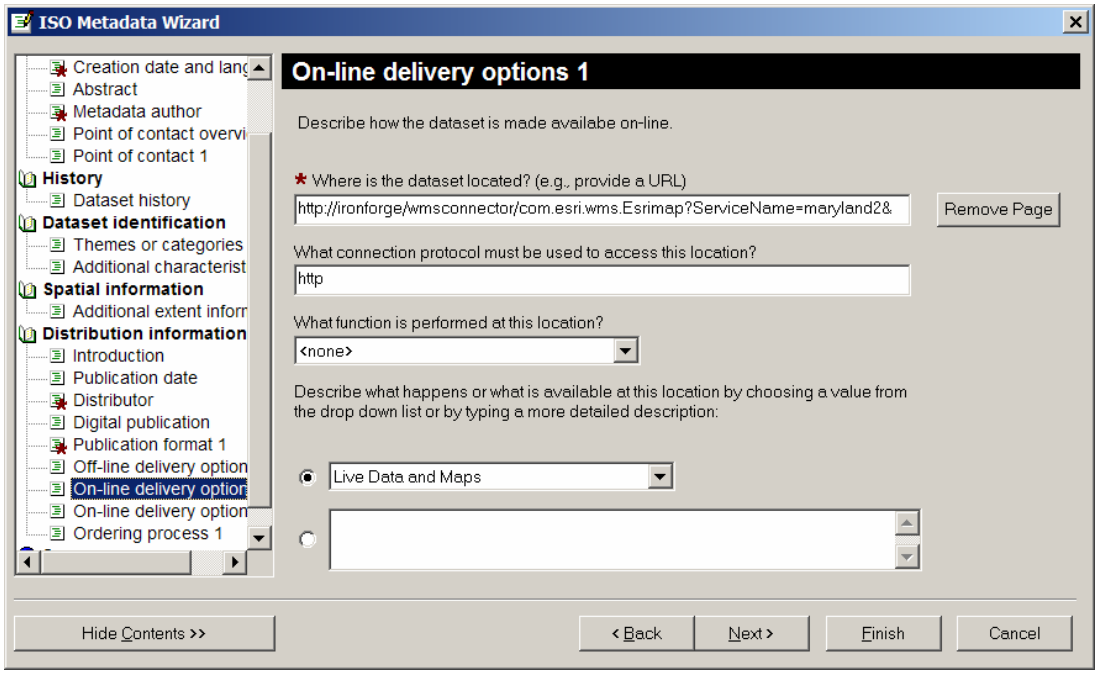
1. First edit your acl file and add the name of the ArcIMS services for which you want to edit metadata to the author metadata entry:

   <USER name="author" password="author" services="Metadata,maryland2" roles="metadata_service_author" active="1" />

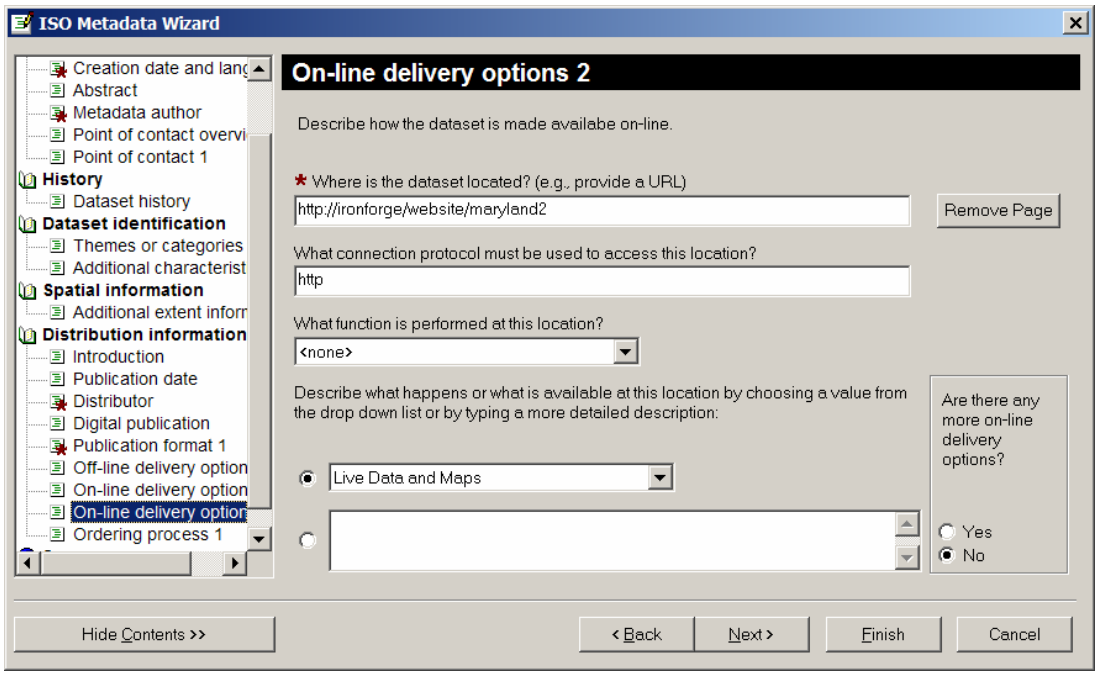
2. Next create a new connection in ArcCatalog but connect as author/author.



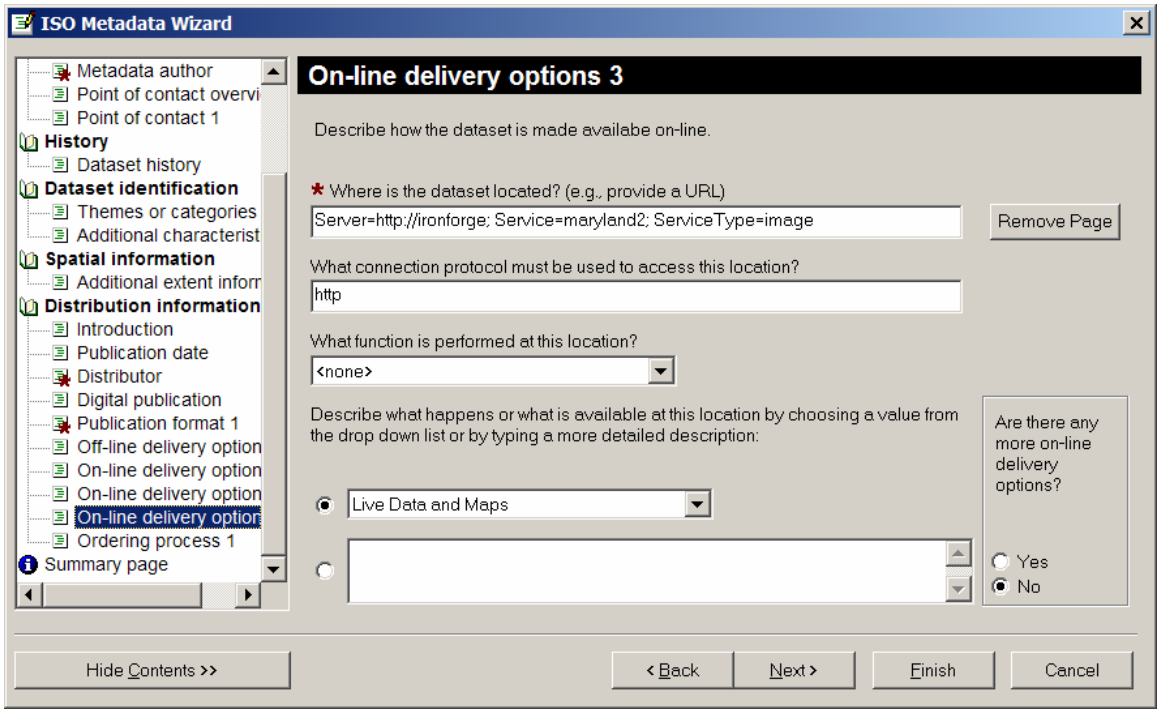
3. Edit the metadata for the ArcIMS services under the new connection that you added to your acl file. Follow the same ISO basic metadata editing instructions as above, but for on-line delivery options enter the following:
   a. For a WMS - For the URL enter the URL for the WMS service, for example: http://ironforge/wmsconnector/com.esri.wms.Esrimap?ServiceName=maryland2& or for the ArcIMS service. Also enter the connection protocol as http.



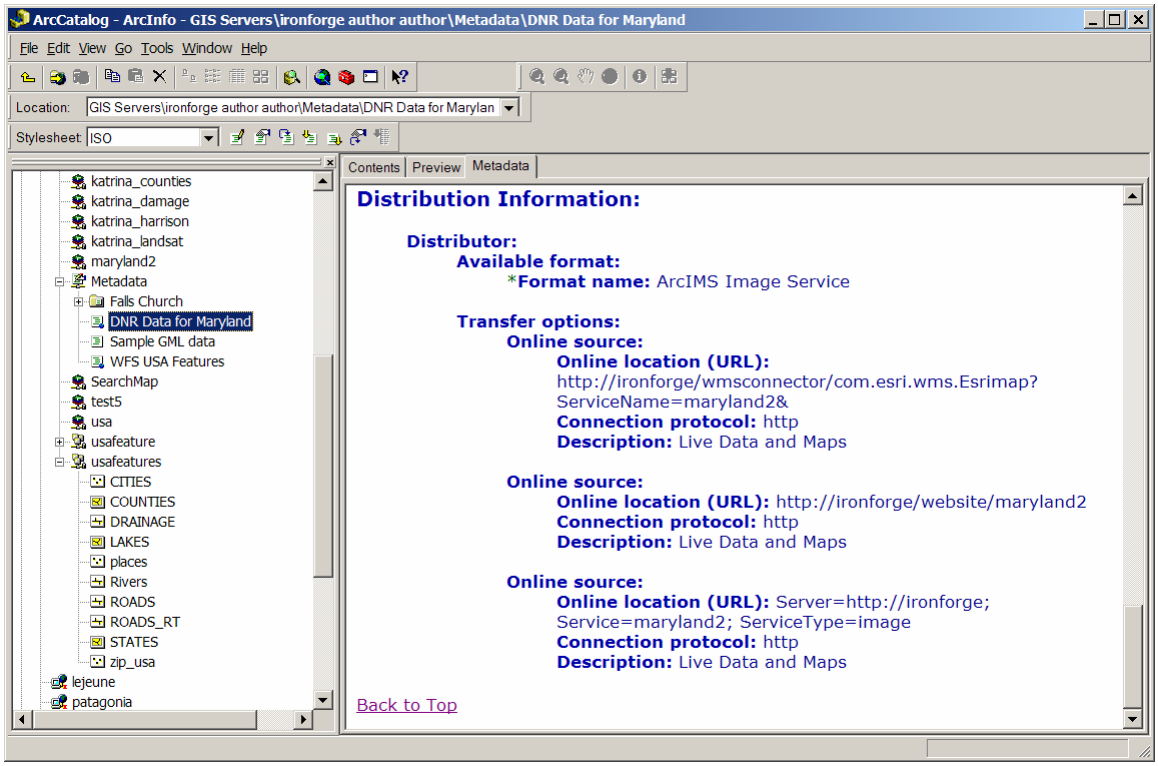
d. Click Yes for more on line delivery options if you want to enter the ArcIMS URL as well and then click next and fill out that screen. Enter the URL to the ArcIMS service as http://ironforge/website/maryland2 for example and http as the protocol.



e. If you want click Yes for more delivery options and enter the URL resource as a server name and mapservice name.

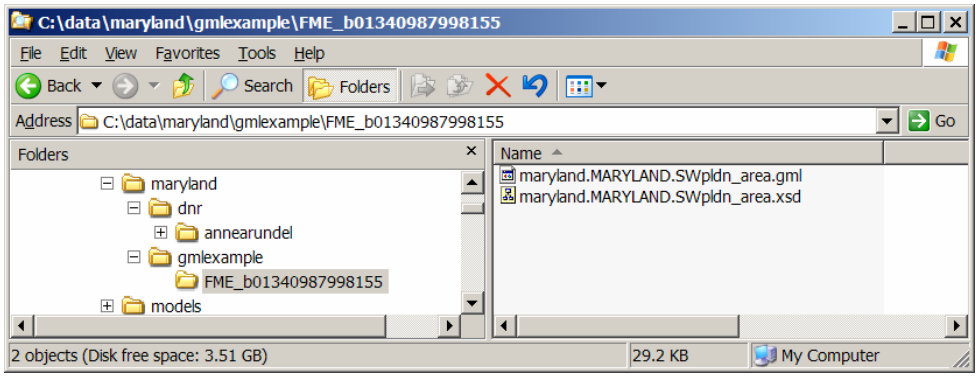


4. Then drag the item to the metadataconnection that has the pencil icon in order to publish it to the metadata server. When it is published you can also hit the preview tab in ArcCatalog to view it. Notice the three urls for dual delivery options further down in the metadata: WMS, ArcIMS URL, and ArcIMS mapservice connection.

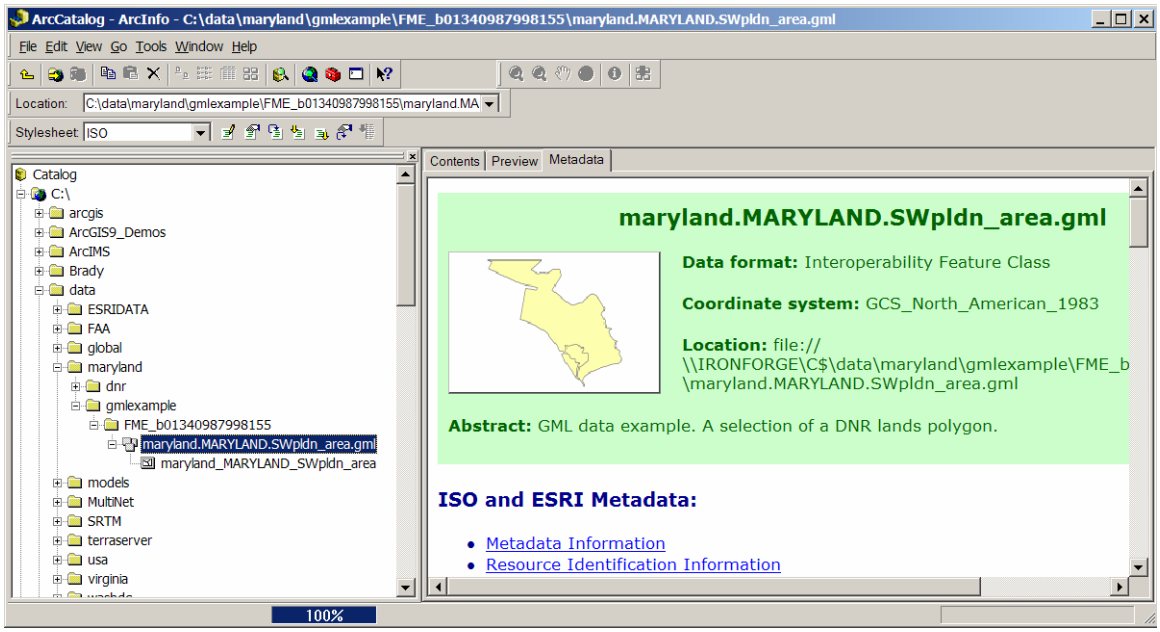


III - C - Publishing GML Metadata to Metadata Server

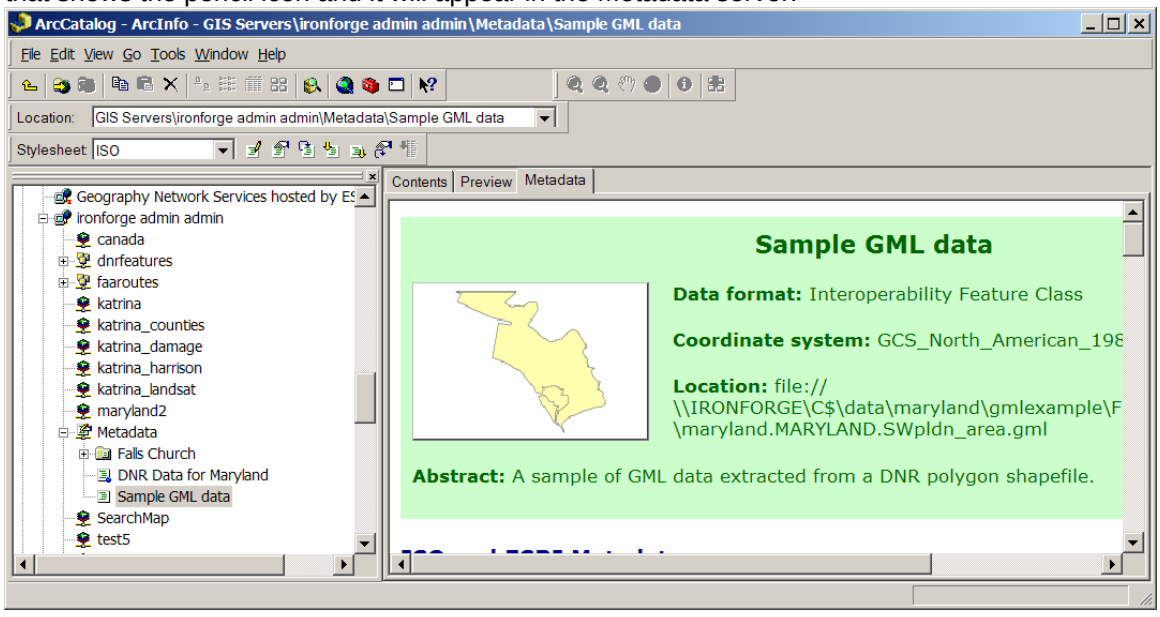
If we have some GML data such as the following we can create metadata for it and publish it in metadata server. This GML data was actually created by using the FME Data Delivery Extension for ArcIMS and downloaded to a local folder. Notice it is only two files and no metadata exists yet.



In ArcCatalog, I cannot preview the GML data, create new metadata, or create the thumbnail unless I turn on the data interoperability extension (DIE). Hopefully this will be able to be done in 9.2 without the extension. I turn the extension on and then create the metadata and thumbnail.



To publish just drag the GML dataset layer (the one highlighted above) to the metadata server connection that shows the pencil icon and it will appear in the Metadata server.



III - D – Publishing Metadata for a WFS

Basically the strategy for publishing metadata for a WFS is the same as for a WMS. The WFS service itself does not support metadata, but the underlying ArcIMS Feature Service does. Thus you create the metadata for the ArcIMS Feature service and then add the additional URL that points to the WFS at the on-line delivery options metadata screen.

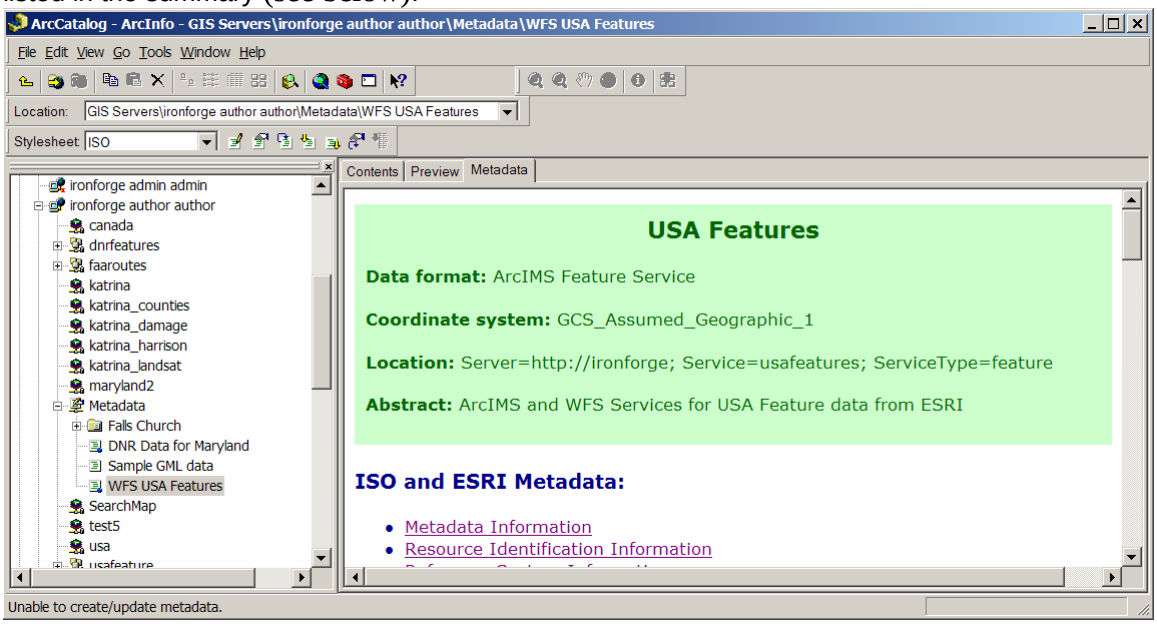
In summary:
1. Create the ArcIMS Feature Service
2. Enable it as a WFS Service
3. Make sure you have the Feature Service in your acl file for authoring permissions.
4. Get the URL for the WFS Service
5. Go to ArcCatalog and create Metadata for the ArcIMS Feature service and add both the ArcIMS online delivery option and the WFS online delivery option. For the ArcIMS delivery options you could include either a URL to a website that uses the feature service or you could use the servername and service name, such as:

Server=http://ironforge; Service=usafeatures; ServiceType=feature

For ArcIMS the above would be preferable than a URL to a site since a full website URL is limited to the java applet viewer. For the WFS URL you would use something like this:

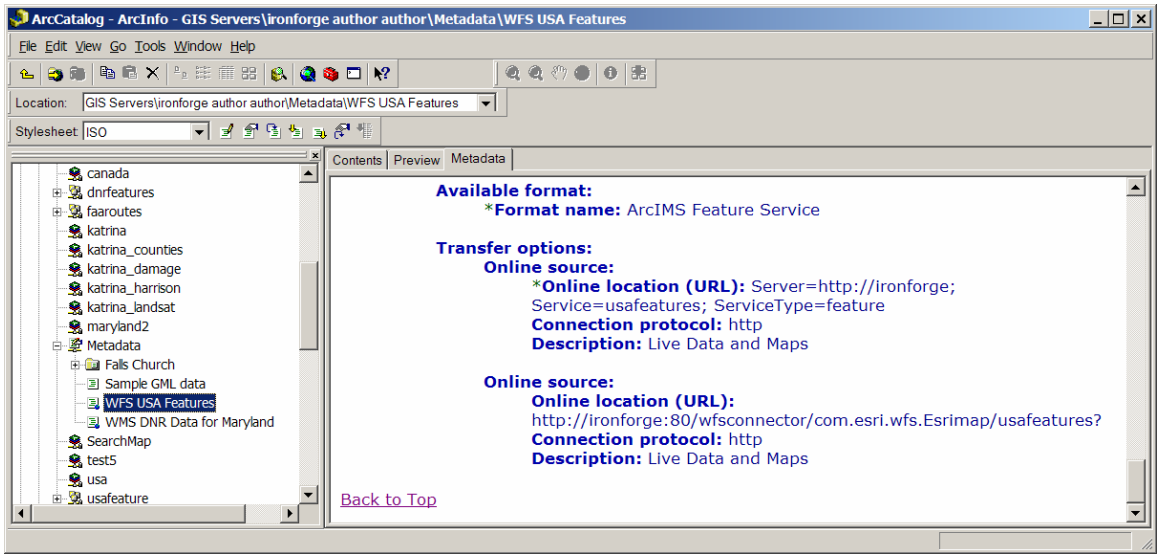
http://ironforge:80/wfsconnector/com.esri.wfs.Esrimap/usafeatures?

Note that the first online delivery option you list is the one that will appear in the short summary at the top of the metadata. For example, both URLs above are in the distribution information but only the first one is listed in the summary (see below).



6. In the abstract or title include any words that you want to use if the user searched for this service, for example, OGC or WFS.

7. Make sure the connection the metadata server uses has a publish hand icon and then drag the ArcIMS feature service there to publish it. Here is the published service showing the URL resources in the metadata.



8. Also, note that if you want the metadata to be searchable by words like OGC, WFS, etc. than put those words in the text of the abstract.

IV – Introduction to OGC Web Map Service (WMS) and Web Feature Service (WFS)

The Open Geospatial Consortium (OGC) has been developing open standards for interfacing with spatial data in a manner that is independent of any vendor's specific format. ESRI has implemented a solution that incorporates ESRI's legacy and future data structures as well as the OGC communities open standard interfaces such as OGC's Web Map Server (WMS) and Web Feature Server (WFS). These two web mapping interfaces have become the most popular OPEN standards based mapping interfaces and have been through a development cycle that continues to evolve. In fact, WMS is in the process of becoming an International Organization of Standards (ISO) standard (ISO19128). See http://www.isotc211.org

Now what is WMS and what is WFS and how are they different?

WMS is simply a protocol for passing back a simple image (e.g. JPG, GIF, BMP) from a server to a client. In this case the image is packaged in such a manner that it complies with OGC's WMS specification. Since WMS is an open specification/standard anyone can incorporate this into their organization/enterprise and thus make data/map services available to anyone that can view the WMS using a client that supports the OGC open standard interface. A note of caution. While the WMS specification is now mature it exists on the web in many versions. Prior to the ISO adoption of the specification it existed in released versions such as 1.0.0, 1.1.0, 1.1.1 etc. There have been slight changes between versions so if one client is built to read 1.0 but not the others then achieving interoperability may be an issue. ESRI ArcIMS WMS connector currently supports all the versions prior to the ISO19128 spec with has only just been published. We will be supporting this in the future but already the ISO19128 standard needs revisions.

ArcIMS WMS's connector is deployed when you install and configure ArcIMS (see below for details). Essentially the WMS is linked to the standard ArcIMS image services. The Image services you have running will be visible the WMS connector and the WMS administrator has control over which ArcIMS image service he/she wants to make available as a WMS.

WFS is simply a protocol for streaming feature data between a server and a client. The format of the data stream is also using an Open Geospatial Consortium standard specification called Geography Macro Language (GML). Similar to the OGC WMS, the OGC's GML is also in the process of becoming an ISO standard. However, unlike WMS, GML is being designed to range from the simple to the complex in terms of describing geometries. To keep things easy and more importantly, interoperable, it has been agreed by the OGC and ISO community that a GML version for simple features, such as describing simple points, lines, and polygons (GML-SF) should be created. Thus, the WFS specification is still a moving target and will be refined as GML-SF becomes more stable. However, ESRI does provide a WFS solution using GML v2.1.2 and is similar to the WMS connector as far as installing and configuring.

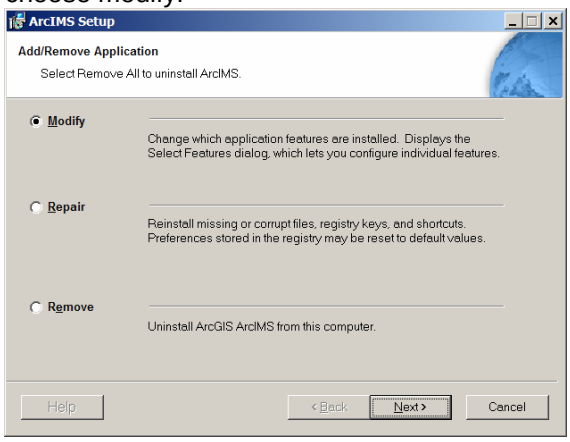
Again, WFS streams vector data, in the form of GML, from the server to the client. Thus the actual GML data is stored and managed locally by the client. Currently ESRI's Desktop solution for GML and subsequent WFS is the Data Interoperability Extension which at 9.1 is available for ArcGIS Desktop. See section VI for installing and configuring the ArcIMS WFS connector.

V - Installing and Configuring WMS Services

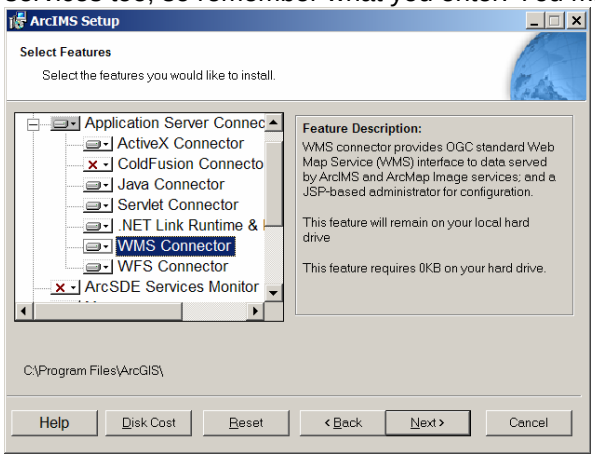
Installing WMS for ArcIMS

Go to http://machinename/wmsconnector and if you get a page you are fine and have installed the WMS connector for ArcIMS. If not do the following:

To install the WMS servlet for use with ArcIMS you need to rerun the ArcIMS setup.exe off the CD and choose modify:



Under application server connections make sure that WMS is enabled and click through the rest of the wizard and follow the prompts. I think you have to enter a username and password for logging into the services too, so remember what you enter. You might as well install WFS too at this time.



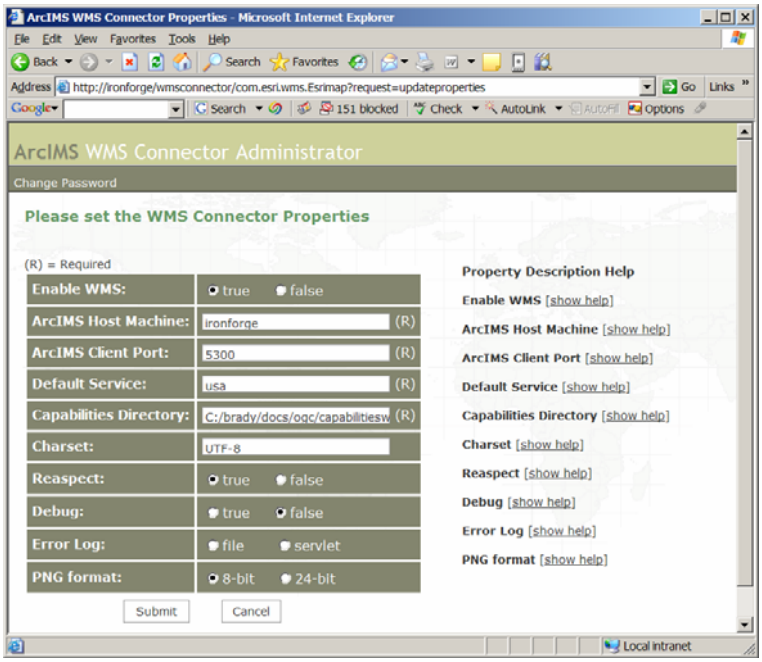
Restart Tomcat and or your web server.

Creating WMS Services

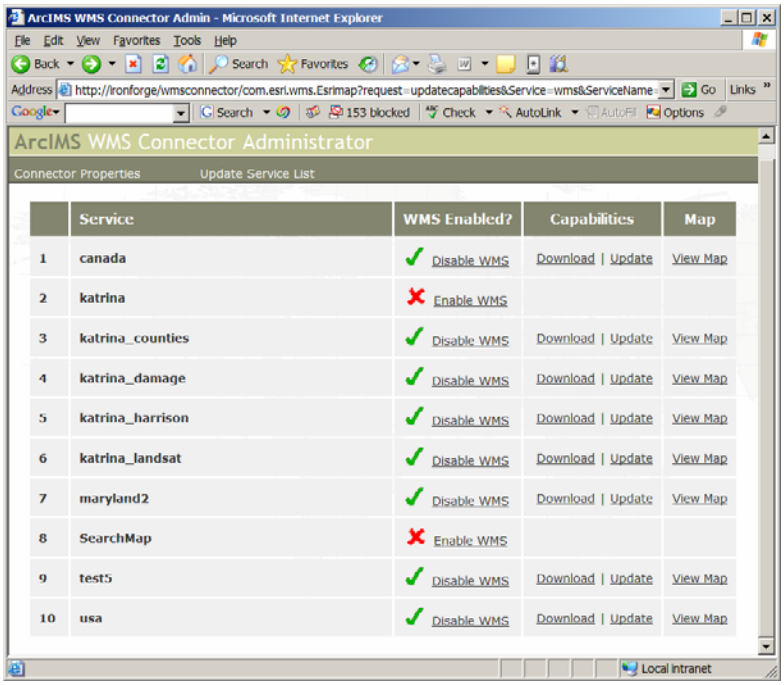
All ArcIMS Image Services and ArcMap Image Services can be served as a WMS service as well. In general, you first make the ArcIMS service and then go to http://machinename/wmsconnector to enable it as WMS. If that URL doesn't work then you need to go back and rerun the ArcIMS add remove program and install the WMS connector (see above). Then you simply enable or disable individual ArcIMS service to expose them as WMS services. It is very easy.

Go to http://machinename/wmsconnector and click connector properties. You then need to create a folder that will store some configuration settings used by WMS. Got to windows explorer and make a folder called capabilitieswms. I made mine here: C:/brady/docs/ogc/capabilitieswms but it can be anywhere.

On the connector properties page for the WMS connector, type in your machine name, default WMS service name, and the directory path to the capabilities folder. Everything else is fine.



Then you can go to the main page and enable or disable individual services as WMS:



Connecting to WMS Services in ArcCatalog

First you need to know the URL of a WMS service to connect to it. You can get the URL if you know the URL for the capabilities page for the WMS service. The URL looks like the following, and just substitute in your machine name for ironforge and the name of the ArcIMS service for maryland2. Leave the & at the end.

For example:

http://ironforge/wmsconnector/com.esri.wms.Esrimap?ServiceName=maryland2&

Then click on ADD WMS SERVICE in ArcCatalog and type in that URL to create the connection. You should be able to preview the IMS service if you hit the preview tab. Note that WMS services do not support metadata since that is not part of the OGC spec yet.

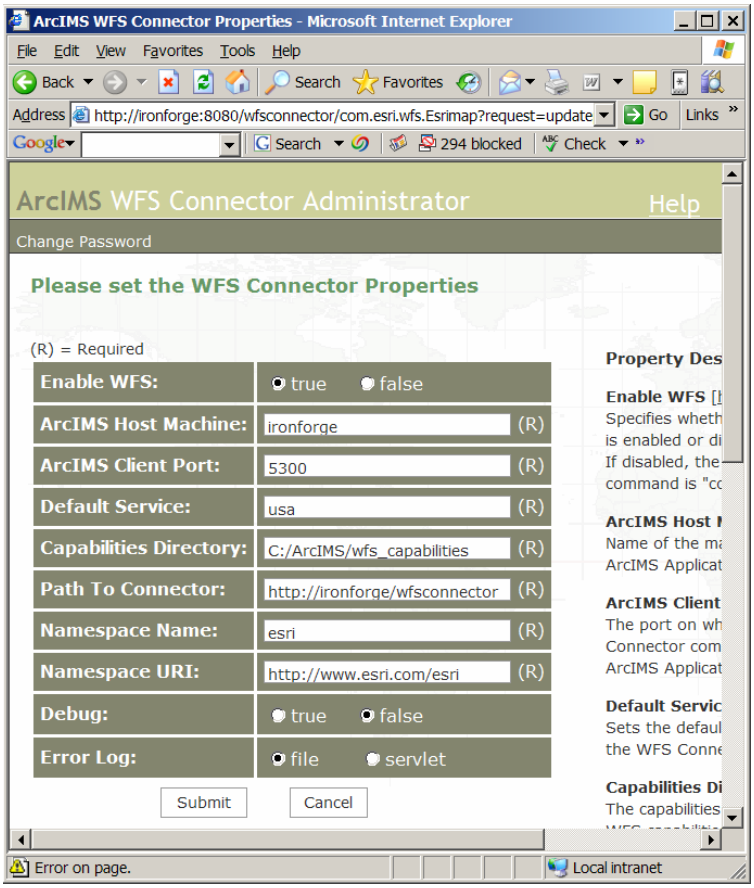
VI - Installing and Configuring a WFS Service

Installing WFS for ArcIMS

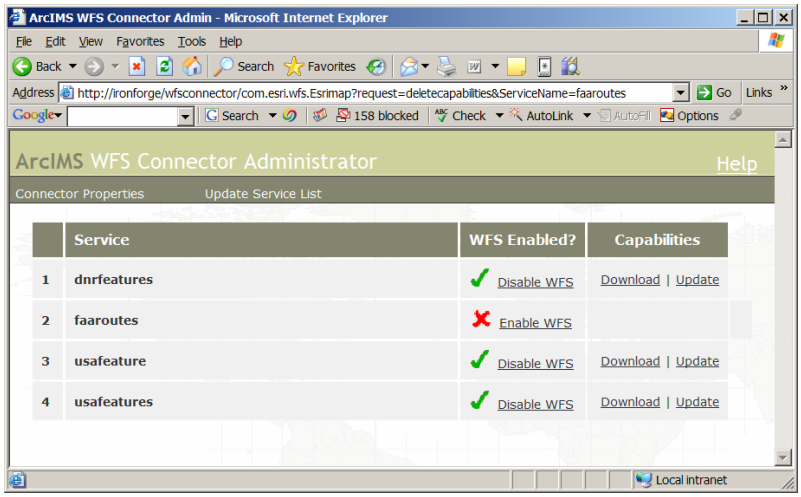
To install a WFS follow the same steps for a WMS but check off the WFS option.

Creating WFS Services

First you have to create ArcIMS Feature services in ArcIMS administrator. Then, just like we did for WMS, you have to create a folder location for the WFS capabilities file. Then go to the url http://machinenames/wfsconnector and configure the capabilities folder, hostname, and default service, and the path to the connector.

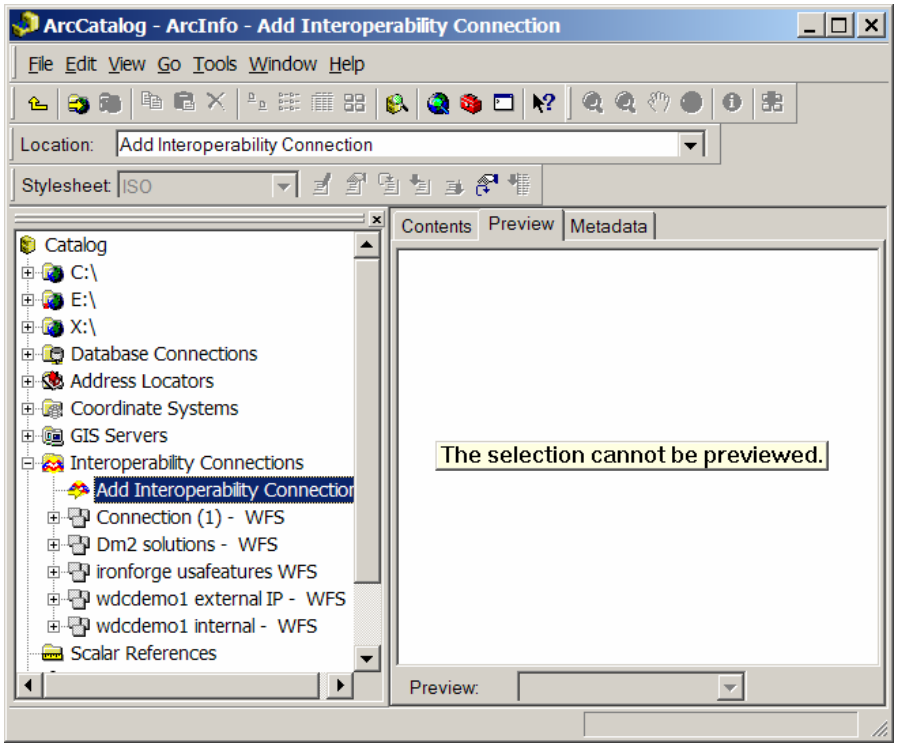


You can then turn on individual services and expose them as WFS services.



Connecting to WFS Services in ArcCatalog

In ArcCatalog you need to click on Add Interoperability Connection …

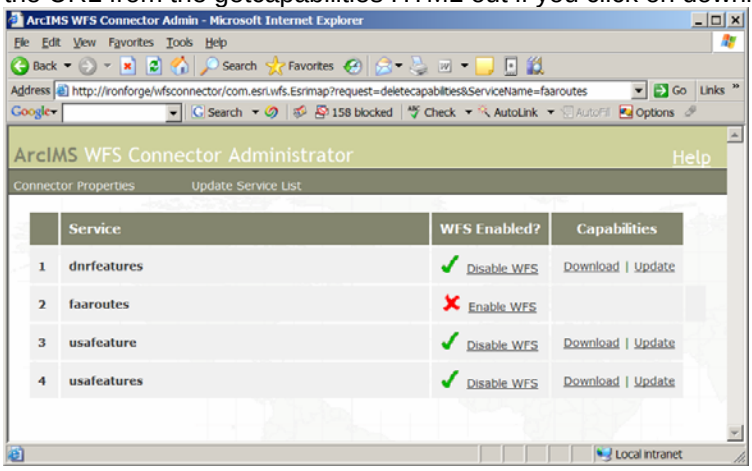


and type in the WFS URL which is like this

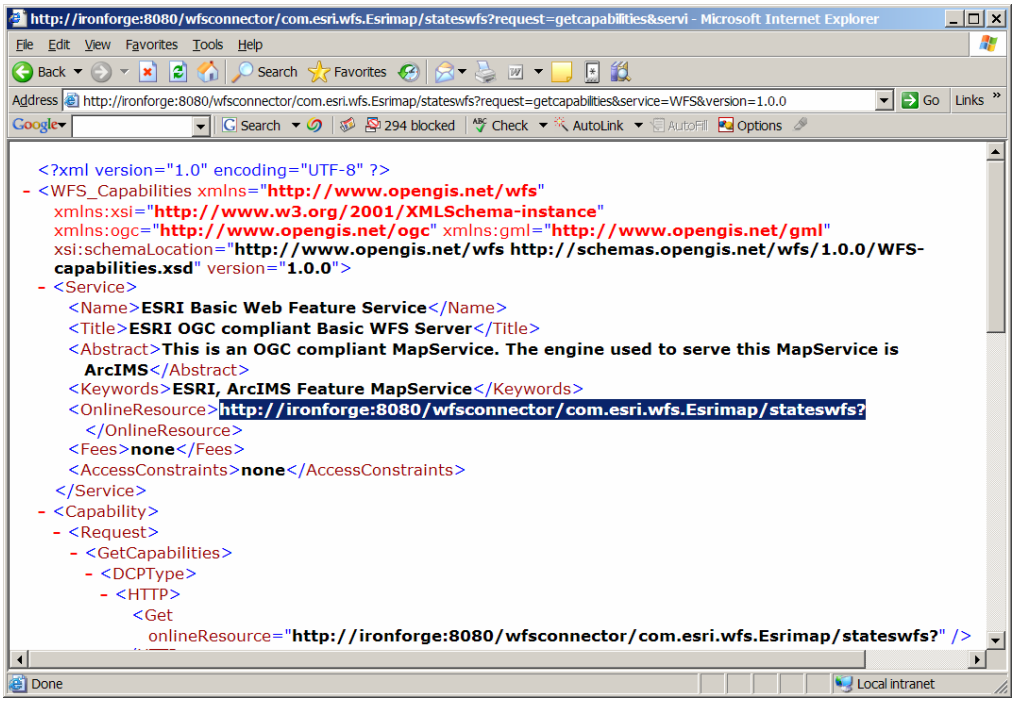
For example:

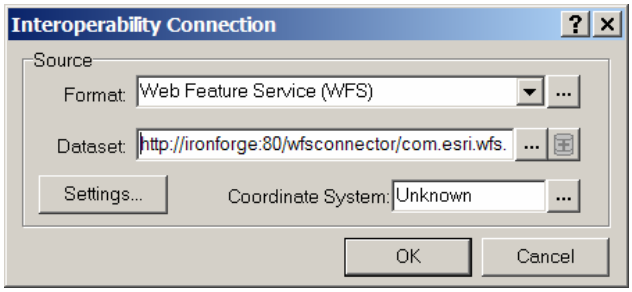
http://ironforge:80/wfsconnector/com.esri.wfs.Esrimap/usafeatures?

Where the server name is first and the end has the WFS name appended. You can also copy and paste the URL from the getcapabilities HTML out if you click on download on this screen …

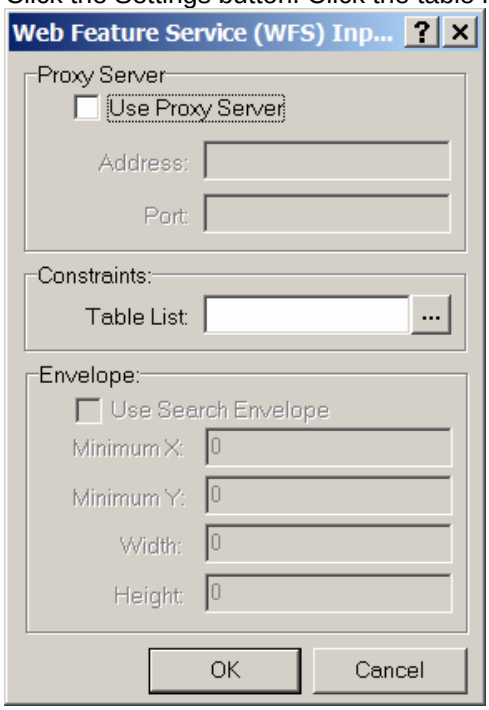


And get this URL …

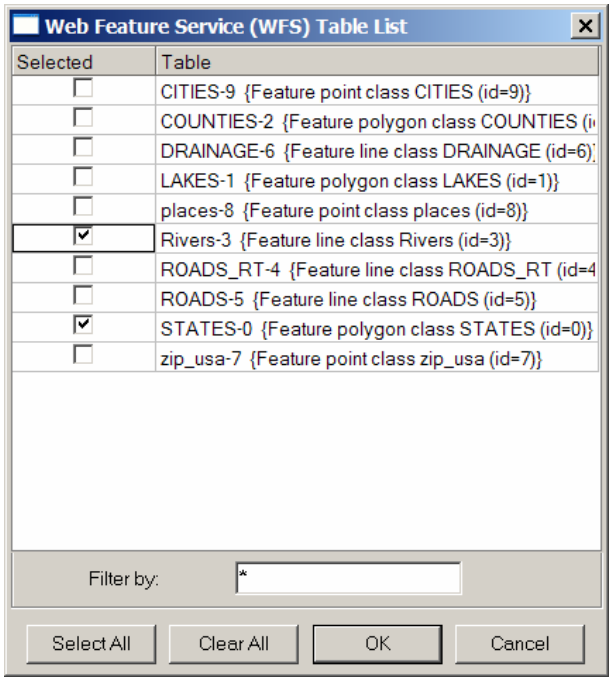




Click the Settings button. Click the table list button…

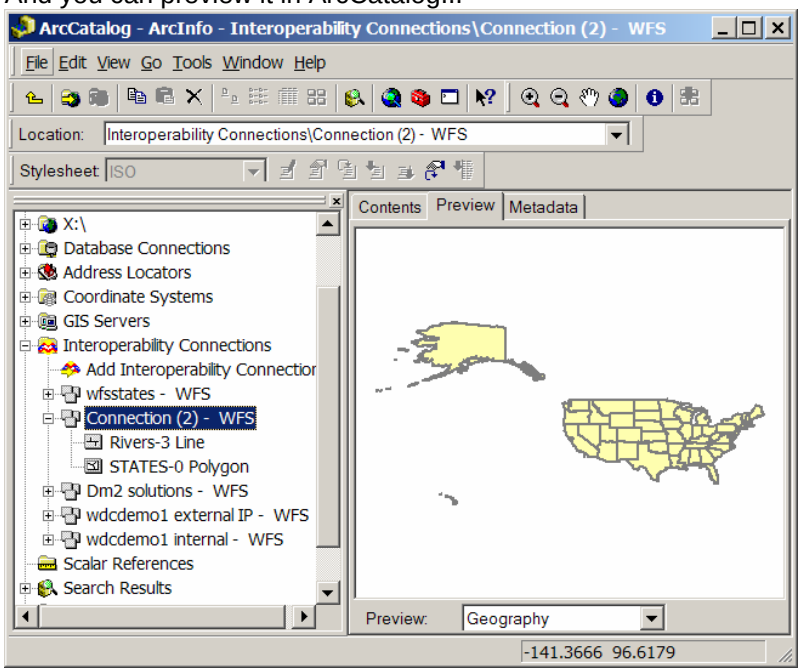


Which brings up this dialog...



Check off the layers in the WFS that you want to include.

And you can preview it in ArcCatalog...



APPENDIX A

Quick Database Setup for ArcSDE Data Loading

The following steps are done in SQL 2000 Enterprise manager. [Demo] database and [Demo] login could be replaced with the name of your new database and login (suggest keeping them and the login password all the same for ease of use.)

1. Create [Demo] database:
    a. Under Databases, create a new database called [Demo].
2. Create [Demo] login:
    a. Under Security/Logins, create a new login called [Demo], with a password of [Demo]. Use SQL authentication. Choose the default database of [Demo]
    b. Under the database access tab for the [Demo] login, give database access to **both** the [Demo] and sde databases for the [Demo] login
3. Adjust sde login database access:
    a. Under the database access tab for the sde login, give database access to the [Demo] database for the sde login
4. Give [Demo] Database permissions:
    a. Right click on [Demo] database, go to properties, and under the permissions tab give the [Demo] logins ‘create table, ‘create SP’ and give the sde login no permissions
5. Give sde Database permissions:
    Right click on sde database, go to properties, and under the permissions tab give the [demo] login the ‘create table’ and ‘create SP’

APPENDIX B

Example of an ACL file called aims.acl

```
<?xml version="1.0"?>

<!-- This file illustrates how you can set up your ACL file to restrict access to your
services.
      Some of the points to keep in mind:
      Make sure that you name the file and store it on disk as you specified with the
aclFileName property in the Esrimap_prop file.
      Usernames and passwords are case sensitive.
      Service names specified in the ACL file should match the case of the names in
Administrator.
      Only those services listed in the ACL file will be available to a client, even
if you have other services running in Administrator.
      Please refer to ArcIMS Help for further explanation of restricting services
with ArcIMS and setting up your ACL file.
-->

<AIMSACL>


<!-- The following sample explains the use of attribute "roles" to manage a metadata
service.
The roles attribute can be set as follows:

roles="metadata_browser" - enables browsing capability (default if not specified)
roles="metadata_publisher" - enables publishing to the service
roles="metadata_service_author" - enables creating metadata for services
roles="metadata_administrator" - enables administration of database, i.e. ability
to reset the metadata tables in the database.

Each roles encompases the permissions of the lesser role. For example, a
metadata_publisher
can also browse and a metadata_service_author can also publish and browse. Users
access this
functionality through ArcCatalog by simply specifying their ACL login in the
connection
dialog. -->

<USER name="*" services="*" />
<USER name="*" services="Metadata" roles="metadata_browser" active="1" />
<USER name="publish" password="publish" services="Metadata" roles="metadata_publisher"
active="1" />
<USER name="author" password="author" services="Metadata"
roles="metadata_service_author" active="1" />
<USER name="administrator" password="administrator" services="Metadata"
roles="metadata_administrator" active="1" />


</AIMSACL>
```

APPENDIX C

Enabling authentication with a file-based ACL

The following steps illustrate how to set up the restricted services using an XML file for the ACL.

Step 1: Author your map file and design your Web site.
Step 2: Edit properties in the Esrimap_prop file.
Step 3: Create the XML file to store the Access Control List(ACL).
Step 4: If you're using Microsoft Windows 2000 and Internet Information Server 5.0 (IIS), you need to configure IIS for authentication.
Step 5: Stop and start the servlet engine. If the servlet engine is native to the Web server, stop and start the Web server.

Step 1: Author your map file and design your Web site.

Create your configuration file (AXL) and then design the look of the Web site with Designer. Note: Designer is not able to access restricted services; thus, you should design your Web site before restricting access to a service .

Step 2: Edit properties in the Esrimap_prop file.

Locate the Esrimap_prop file installed with your servlet engine and edit it with a text editor. ArcIMS installs a backup copy of all the files that comprise the Servlet Connector in \Connectors\Servlet on Windows or /Middleware/Servlet_Connector on UNIX. Don't edit the Esrimap_prop file at this location because it will have no impact on the operation of the Servlet Connector.

Set the properties as shown below. You can set many of these properties by simply removing the comment character (#) before them in the Esrimap_prop file. The properties are case sensitive but the values assigned to the properties are not case sensitive. These properties are described in more detail in the ArcIMS Servlet Connector property file.

Note: If you set the properties for both XML file-based and JDBC-based ACL, the JDBC settings will be used.

enable=True
Enables the ArcIMS Servlet Connector.

authenticate=True
Enables authentication within the Servlet Connector.

authMethods=Basic
Two authentication methods: Basic and Digest. Digest is more secure, but not all browsers support it.

authenticateWithSessions=True
Allows client requests to be processed more efficiently by the Servlet Connector.

sessionTimeout=120
In most cases, 120 seconds is adequate.

aclFileName=<full pathname to the ACL file>/aimsacl.xml
Typically you'll place the ACL file in the same location as the Esrimap_prop file. Slashes in the pathname must be forward slashes (/).

realm=ArcIMS Network
The realm name displays in the dialog box when the client is prompted for a username and password.

Step 3: Create the XML file to store the Access Control List (ACL).

Create an XML file using a text editor. This file identifies which users will have access to which services.

Things to keep in mind:

Make sure that you name the file and store it on disk as you specified with aclFileName property in the Esrimap_prop file.
Usernames and passwords are case sensitive.
Service names specified in the ACL file should match the case of the names in Administrator.
Only those services listed in the ACL file will be available to a client, even if you have other services running in Administrator.

The following sample ACL file has one restricted and two non-restricted services.

```
<?xml version="1.0"?>
<AIMSACL>
<USER name="*" services="SanFrancisco, World" />
<USER name="private" password="pass.word" services="SecretData" />
</AIMSACL>
```

The following sample ACL file shows how to further restrict service access to particular machines and also adds a user who can access all services.

```
<?xml version="1.0"?>
<AIMSACL>
<USER name="*" services="SanFrancisco, World" />
<USER name="private" password="pass.word"
services="SecretData" trustedclients="198.102.62.1,198.102.62.22"/>
<USER name="superuser" password="all.access" services="*" />
</AIMSACL>
```

For a description of all attributes, see the ACL attribute reference.

Step 4: If you're using Microsoft Windows 2000 and Internet Information Server (IIS), you need to configure IIS for authentication.

1. On the taskbar, click Start | Settings | Control Panel | Administrative Tools | Internet Services Manager.
2. In the left panel, double-click the machine name to expand the tree.
3. Double-click Default Web Site.
4. If you're running ServletExec or JRun as your servlet engine, double-click Scripts.
   If you're running Tomcat, double-click Jakarta.
5. In the right panel, right-click ServletExec_ISAPI.dll, jrun.dll or isapi_redirect.dll (for ServletExec, JRun, and Tomcat respectively) and click Properties.
6. Click the File Security tab.
7. Click Edit for Anonymous access and authentication control.
8. Uncheck Integrated Windows authentication and click OK.

Step 5: Stop and start the servlet engine. If the servlet engine is native to the Web server, stop and start the Web server.

Stopping and restarting the servlet engine (or Web server) allows your edits to the Esrimap_prop file to take effect—enabling authentication through the ACL.

Appendix D:

Relevant Docs and Resources

ESRI-Supported Open Geospatial Consortium, Inc., and ISO Standards
http://www.esri.com/library/whitepapers/pdfs/supported-ogc-iso-standards.pdf

On the Data Delivery Extension for ArcIMS:
http://www.esri.com/library/whitepapers/pdfs/arcims_dde.pdf

ArcGIS Enterprise Security: Delivery Secure Solutions
http://www.esri.com/library/whitepapers/pdfs/arcgis-security.pdf

Security and ArcIMS
http://www.esri.com/library/whitepapers/pdfs/securityarcims.pdf

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