



MAY 22, 2017

# CREATION OF AN ARCGIS SERVER

## TOPIC 2: CREATING A LOCAL GEOSPATIAL CLOUD

VINCENT A. DINOTO, JR.  
JEFFERSON COMMUNITY AND TECHNICAL COLLEGE  
Vince.dinoto@kctcs.edu

## Contents

Table of Figures .....	2
Introduction.....	4
Basic Information.....	4
Installing Server .....	4
Assessment.....	5
Getting Started with Server Installation.....	5
Locate the install files .....	6
Installation.....	6
Web Adapter .....	10
Checking to make sure the installation is working.....	12
Services .....	12
Creating a Connection to the Server .....	13
Creating a Simple Map Service.....	14
Assignment: Creating a Map Service.....	16
Configuring a Map Service .....	17
Diagram of Production Network.....	23
Connecting A Storage Array.....	23
Potential Issues with Connection to Storage Array.....	25
Fixing the Data Store.....	25
Connecting a Relational Database.....	26
Quiz.....	28

## Table of Figures

Figure 1: Login .....	7
Figure 2: Configuration File .....	7
Figure 3: Authorization File.....	8
Figure 4: Authorization Information.....	8
Figure 5: Setup Wizard .....	9
Figure 6: Server Login .....	9
Figure 7: Logon to Server Manager.....	9
Figure 8: Successful Connection to Server Manager.....	10
Figure 9: IIS Components .....	10
Figure 10: Cross-domain Policy Files.....	11
Figure 11: Port 80 .....	11
Figure 12: URL of the Server .....	11
Figure 13: ArcGIS for Server .....	11
Figure 14: Final Screen.....	11
Figure 15: REST Service .....	12
Figure 16: Add ArcGIS Server .....	13
Figure 17: Open GIS Servers.....	13
Figure 18: Connecting to an ArcGIS Server.....	13
Figure 19: Connection information.....	14
Figure 20: Example Map .....	14
Figure 21: Creating a Service.....	15
Figure 22: Publishing a Service .....	15
Figure 23: Service Location.....	15
Figure 24: Service Editor .....	16
Figure 25: Map Issues.....	16
Figure 26: Editing a service .....	17
Figure 27: Parameters .....	18
Figure 28: Capabilities .....	18
Figure 29: Mapping Service.....	19
Figure 30: KML .....	19

Figure 31: Pooling.....	20
Figure 32: Processes .....	20
Figure 33: Caching.....	21
Figure 34: Item Description .....	22
Figure 35: Sharing.....	22
Figure 36: Production Network .....	23
Figure 37: Data Store .....	24
Figure 38: Setting on File Sharing .....	24
Figure 39: Registering Folder .....	25
Figure 40: Data Store .....	26
Figure 41: Registering Folder .....	26
Figure 42: Process to Register Database.....	28
Figure 43: Register Database .....	28
Figure 44: Data Store - Database .....	28

## Introduction

It is assumed that a Microsoft Windows Server either as a virtual or physical machine, virtual machines are preferred. The server used for this demonstration is a Microsoft Windows Server 2016, the server software has been installed and configured, and Internet Explorer Enhanced Security is turned off. A potentially useful video: <https://youtu.be/LAeZKN8QbK8>.

A relational database has been installed and configured. The relational database will be a single common site, but installing of the relational database and the server software are beyond the scope of this class. Esri SDE has been properly configured on the relational database server. This course will use a Microsoft SQL Server; other relational databases can be utilized including SQL Express or open source databases.

A mass storage location is available for the student to connect to, it is suggested this not be part of the production network or the students normal storage drive, it could be another server which the learners has appropriate permissions to access.

Esri ArcGIS Server software must be located on a shared space that the learner has appropriate access right to use for the installation. The learner will need to have a unique ArcGIS Server license code once the installation is completed for authorization.

The instructor should have administrative rights to all the servers and the learner should have administrative rights to their own server.

## Basic Information

- ArcGIS Server is a commercial product of Esri. The copy used in this class can only be used for an education purpose and may not be used for any production purposes. Since this would violate license agreement.
- Different versions of the ArcGIS Server software have slightly different installation processes. Therefore, it is always good to consult the software manufacture's website for any modifications of the installation process for the specific version.
  - The images will be Microsoft Server 2016 and Esri ArcGIS Server 10.5.1, older versions of Esri ArcGIS maybe used but must be in the 10.x family and should be 10.3 or higher.
  - Not every screen image will be presented if the screen is simple a next or continue, but will be noted in the written text.

## Installing Server

- The computer (server) that the installation will be done on must be dedicated to a single user. There are numerous ways in which this can be accomplished:
  - a dedicated physical box,
  - a box with a dual boot

- a virtual machine

It is recommend that a virtual machine be used, since if errors occur to the operating system it is simpler to reinstall. It is assumed that the user can log onto the server and will have full administrative rights to the server. The server must be a Microsoft Windows Server either version 2016 or 2012 Release 2 (R2).

- The learner will need to have an authorization code for the geospatial software once the installation has been completed and this should be obtained directly from the instructor.

### Assessment

- During the installation process the learner should provide screen images at key places during the installation process, also when connections to storage devices are made. Each place that a screen image is required will be noted, with a camera icon. Place all images in a single folder and zip them (compress) and submit to the instructor using the following naming methodology:



images\_module #\_initials

images\_M2\_VAD

- The learner will take a short assessment (quiz) about the installation process, so good notes taken during the installation process will be very useful.

### Getting Started with Server Installation

- The server will need to have **Internet Information Services (IIS)** turned on;
  - This can be turned on through Server Manager Dashboard. ArcGIS Server 10.3 and higher versions usually will assist in this process.
- The server should have **.NET Framework 3.5 Features** turned on.
  - This can be turned on through Server Manager Dashboard. Even if a higher version of .NET is running, this still needs to be turned on. ArcGIS Server 10.5.1 normally fixes this problem.
- **Microsoft Enhanced Security** should be turned off.
  - This can be turned on through Server Manager Dashboard.
- First the learner must login to the server, this can be done via a remote connection or by sitting at the actual server console. In general, technicians do not directly access servicers but use a remote connection, such as a VPN or a remote desktop connection. It is assumed that the Microsoft Server software has been previously installed and this is not part of the class requirements (in the production world many times the IT staff will install the operating systems but will not install the production software).
- The learner must have full administrative rights to the server. Instructor note, insure that proper credentials are provided to the learner.

- The learner must have ArcGIS Server software and an authentication code. It is suggested that a single storage location be established for the software and the network drive mapped to the users server. The software can be copied to the local computer drive if needed. The authentication code comes from Esri and should be obtained from the instructor.
- The learner may decide to install Esri ArcMap Desktop on the Microsoft Server as well, but this is optional and will not be discussed in this module. The learner must have access to a fully functional copy of Esri ArcMap Desktop with full administrative rights. Esri ArcMap Desktop must be able to connect to the Esri ArcGIS Server, it is preferred that the desktop version be the same version as that of the server being installed, but not required.

#### Locate the install files

- It is critically important to know when the desktop computer is being used and when the server. It is ideal that the server machine images fill the entire screen but this is not always possible because of video resolution of the server.
  - Locate the Esri ArcGIS Server installation files. There are different ways this can be accomplished which includes saving them on the server desktop or accessing them from another computer. Mapping the location of the installation files to the server. Connecting to the domain should have done prior to receiving the server by the IT staff.
- Run the installation program for Esri ArcGIS Server. Esri ArcMap Desktop can be installed before or after the server software is installed. The desktop software can be on the server or on a desktop machine that can access the server.

#### Installation

- Run (execute) the installation file. Default settings are used unless noted otherwise.
- The user must accept the license agreement.
- An issue that arises in older software versions is missing of the proper form of .Net Framework. This can be added later or the installation process can be stopped and the error fixed. This was not an issue in this version of the installation.
- Creating an account and password. It is critical important that the username and password for the ArcGIS server, be recorded for future use, this should not be the domain

login. There are set password criteria that must be met for proper login. If the password information is lost, the user may not be able to access the server and may need to reload the software. The instructor will not have permission to access the server and create a new login account, see Figure 1.

- Export server configuration file is not required and the default is **not** to export it. Exporting the configuration can save time if a new installation is required. To export the configuration file, the installation program will prompt for a location for the configuration file to be saved. The storage location should be a secure location and probably not on the server that the installation is being done on but at another location. Copies can be made of the configuration file once it is exported, which is recommended. The configuration file is in xml format, see Figure 2.

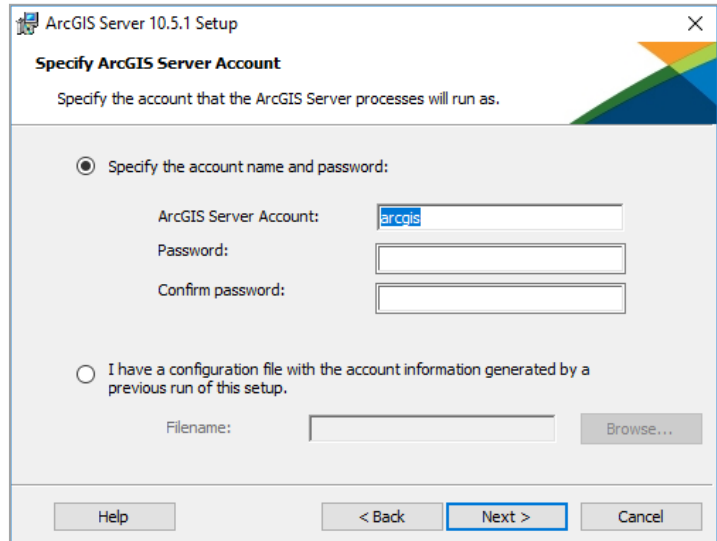


Figure 1: Login

To export the configuration file, the installation program will prompt for a location for the configuration file to be saved. The storage location should be a secure location and probably not on the server

that the installation is being done on but at another location. Copies can be made of the configuration file once it is exported, which is recommended. The configuration file is in xml format, see Figure 2.

- The ArcGIS Server software should begin to install, the time for the installation will vary with the speed of the connection to the software, the speed of the server and the speed of the remote connection.

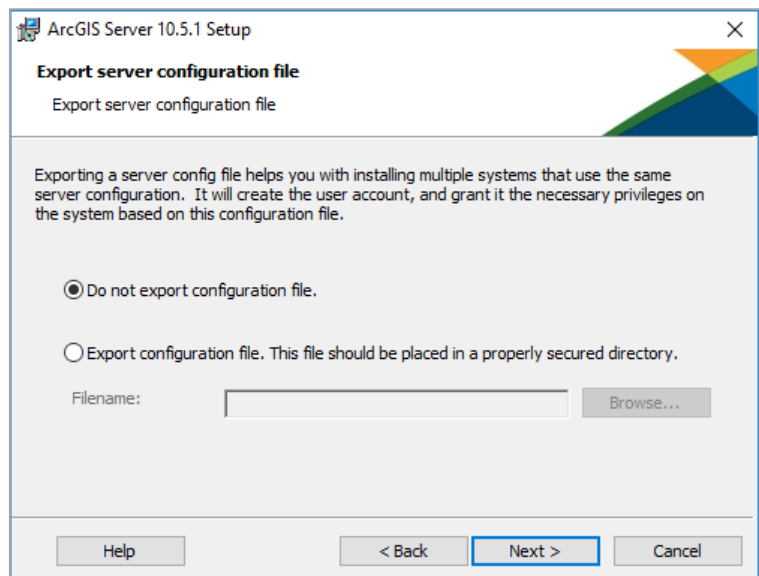


Figure 2: Configuration File

- Once the software has successfully been installed, an authorization code/file is required. The authorization information should be obtained from the course instructor. The instructor must obtain this code from Esri directly or from their college manager of the Esri license. Authorization codes can only be provided to those formally enrolled in a course and those instructors working with the GeoTech Center.
- Instructor note: the authorization file can be received as a download or an email attachment. It is important when creating the code to put in the note section what the



purpose for the license, this will make it easier in the future to know why the license was generated and where it is located. Generally the name of the server and/or the IP address should be included. The file should be in the download folder. If the file was attached to an email the file should be saved prior to browsing. Make sure that copies of the authorization file are saved before forwarding to the student.

- The next step will be to authorize the ArcGIS Server software, in general this is done through the Internet; select Internet and press Browse, see Figure 3.
- A screen will show the authorization information and just select next.
- Since the author planned on using this server for education purposes, his selections are slightly different from those that the learner will make, Figure 4.

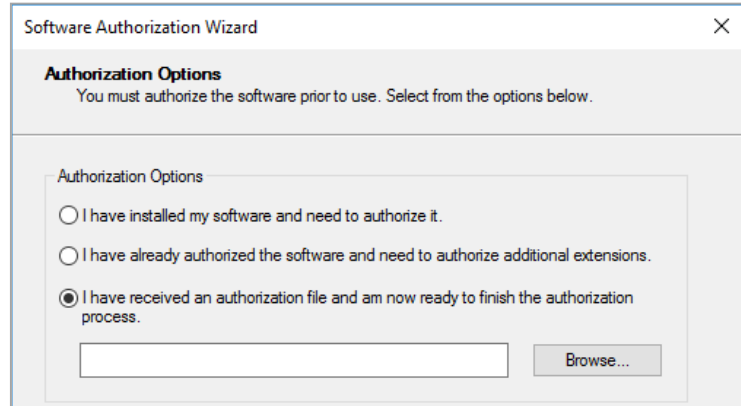


Figure 3: Authorization File

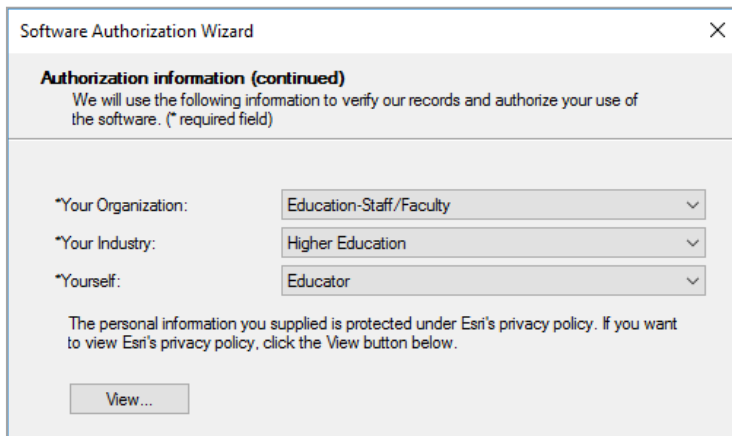



Figure 4: Authorization Information

- In the first box selection Education – student 
- In the third box select student
- The next will window shows the authorization number. Select next.
- The following window will display the extensions being authorized. Select next.

- Instructor Note: The extensions being authorized will vary depending on the license agreement with Esri.
- Finally a list of other extensions will be display ignore these and continue.
- The installation software will then use the Internet connection to authorize the server, this will complete the installation process.
- Ignore a certificate error.

- The server manager software will then open to continue the set-up process. A set-up wizard will begin to walk the user through setting up the site correctly. Select create a New Site, since the server is on a single computer license, ArcGIS Server will not be joining an existing site, see Figure 5.

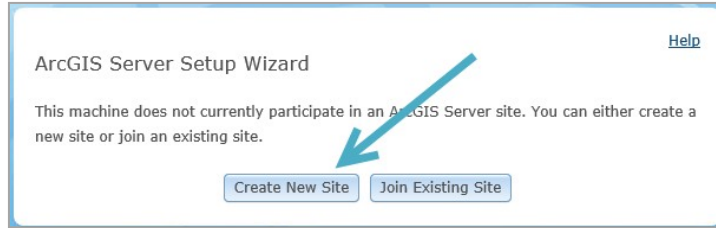


Figure 5: Setup Wizard

- Use the username and password created at the beginning of the server installation process, see Figure 6.
- The defaults will be used when possible, by using the defaults it is much easier to troubleshoot problems that may arise. After several screens of selecting next, the prompt will be to select finish, which will take several minutes to complete the set-up of the site.

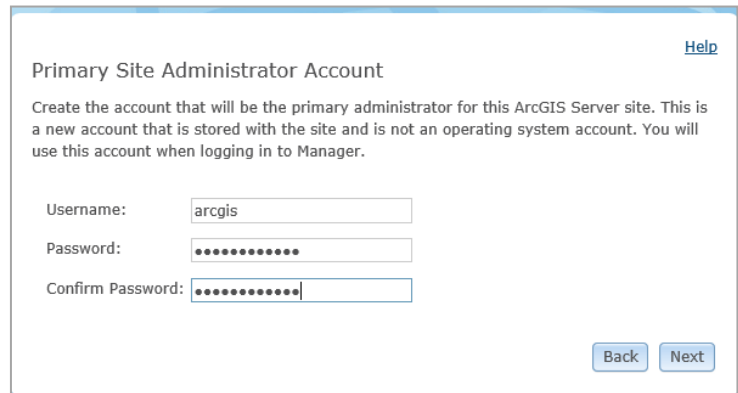


Figure 6: Server Login

- The next step is to logon to Server Manager now that the configuration has been completed. Note that the Server Manager runs in the default web browser, in this example Microsoft Internet Explorer was used, see Figure 7.
- Note the URL in the browser is named localhost instead of the qualified pathway, this will occur when the user is on the actual server either directly or through a virtual connection (the general method). Localhost is a name that works only with the actual machine name, typically the machine name might be the IP address.

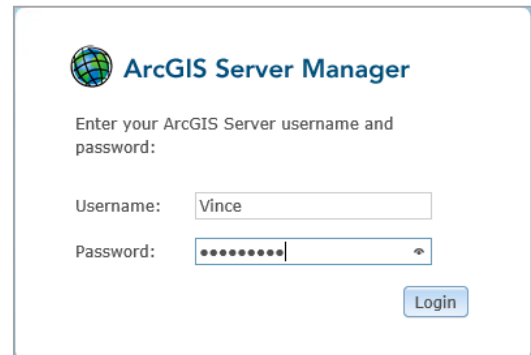


Figure 7: Logon to Server Manager

- The username and password were created during installation process. If the installation process is successful a screen like Figure 8, should appear.



•The ArcGIS Server Manager will be explored in more depth in another parts of this module. It is very important to keep straight the ArcGIS Server Manager and the Windows Server Manager they have very different functions. Exit ArcGIS Server Manager before continuing. The server is

now set-up and operational, but can only be used internally, within the organizational firewall, through port 6080.



Figure 8: Successful Connection to Server Manager

### Web Adapter

- The web adapter component must be installed to make the server functional in an internet environment. This process will require another complete installation, which was not done as part of the previous installation. The ArcGIS Server uses port 6080, which is fine for working internally within an organization, but in general port 6080 is blocked by most organizational firewalls, so information could not be transmitted to external users. If the server is to be available to the public and have read/write capacities by selected users, then it should use port 80 to communicate on the internet, this is the common port for Internet Information Services.
- Even with the web adapter installed, the server will not be visible to the outside world. This is because the IP address most likely will be in private address space as opposed to public address space. Making the server invisible to those outside of the firewall of the organization, because the student server is not a public facing machine. This is an institutional/instructor decision how the IP addresses will be assigned and was done prior to set-up the ArcGIS software. In the production environment, the web adapter is required if the server will be public facing and to simulate the actual enterprise workspace the web adapter will be installed.
- When installing the Web Adaptor several screens will appear and the default settings will be used.
- The first screen that requires the installer to provide input is usually the error page as it relates to Internet Information Service (IIS), see Figure 9. Instructor note, the assumption is that the Microsoft Server will be running IIS and not a different protocol. Depending on how the Microsoft Server was initial installed it maybe that the IIS components were not installed during the basic set-up of the server. These parameters can be modified during the installation of the Web Adaptor or by stopping the installation and using the Microsoft Windows Server Manager. In previous versions, this was required to be done

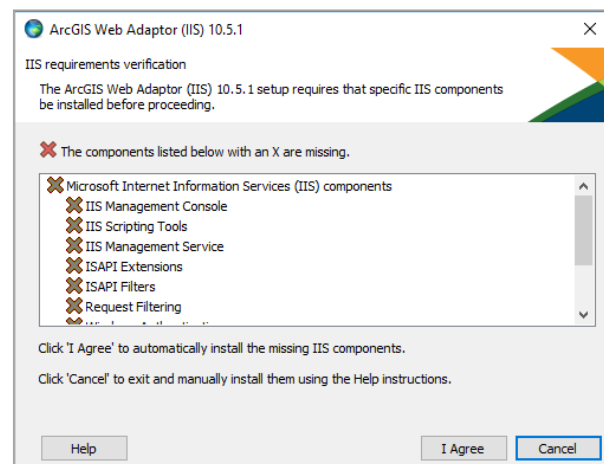


Figure 9: IIS Components

manually before continuing the installation of the Web Adapter. The process will take a few minutes to complete.

- The user must agree to the License Agreement. The user may have to change the selection for the Cross-domain Policy Files depending on version, see Figure 10. For Cross domain Policy Files to be installed use the pull down next to the 'X', change the selection to install on hard drive.
- Use the default Web Site (http) port 80, see Figure 11. This prompt may not occur in some versions.

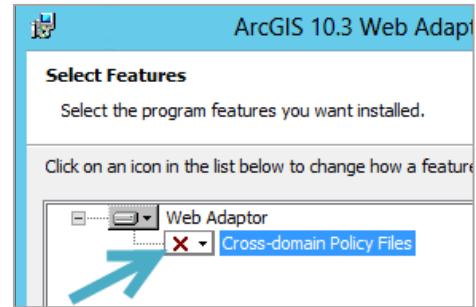


Figure 10: Cross-domain Policy Files

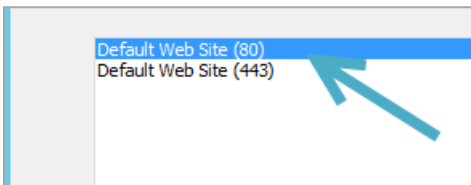


Figure 11: Port 80

- The next prompt will be for a name for the web adaptor and it is suggested that the default is used.
- The web adaptor must be configured before it can be used. Select ArcGIS for Server, see Figure 12.



Figure 12: ArcGIS for Server

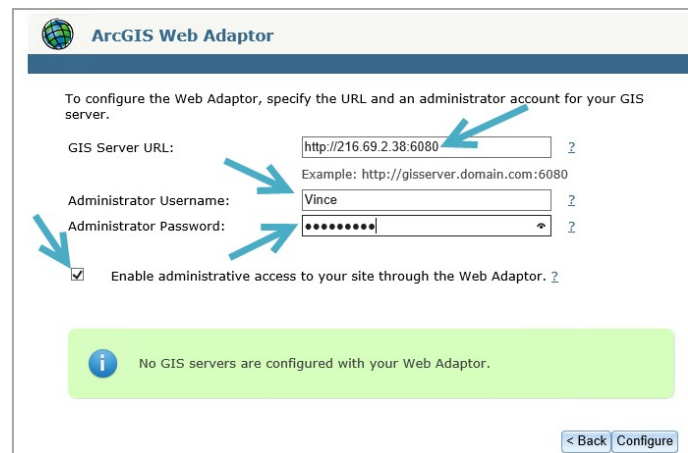


Figure 13: URL of the Server

- See Figure 13, the URL of the computer, was the IP address followed with a colon and 6080. The IP address must be inputted, the address can be determined by using the command prompt and typing ipconfig.
- The administrative account information was entered, the same as was used when set-up the server.
- The check box, Enable administrative access, was checked to allow more accessibility of the ArcGIS Server.
- The process was successfully completed, see Figure 14. Manually exit the configuration program once the process has completed.

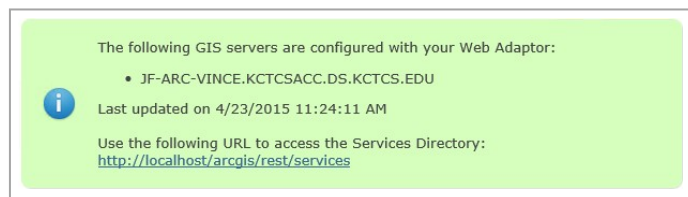


Figure 14: Final Screen

- One web adapter can be used for multiple servers and need not to be installed with each server set-up, if they are in an enterprise configuration.



### Checking to make sure the installation is working

- Open a web browser, goto <http://IP address of the server/arcgis>, note input the IP address of the local server that was configured.
- A default service was installed with the ArcGIS Server installation Click on the SampleWorldCities and it will open the details about the service. A map should be displayed.
- The time for the total installation will vary from computer to computer and from network to network. The installation process took approximately one hour for this example using version 10.5.1. Consulting the help information provided by Esri is always a good first line troubleshooting if a problem arises. Each version of software has some unique features that were not in previous versions. The installation process has been simplified over the last several versions.



Figure 15: REST Service

### Services

There are multiple types of geoprocessing services that can be created, only two types of services will be discussed initially. A video that might be useful is: <https://youtu.be/1hSf-vtyOIY>

- A **Map Service** is a one directional stream of information, from the server to the user, no modifications can be made to the content and may not be edited by the user even with administrative permission in ArcMap Desktop. The owner of the map service can modify the content, by using the original geospatial files and re-publish the service. The purpose of such a service is to display specific information, which still allows for geoprocessing functions to be done, just not creating permanent changes.
  - The service can be utilized in both web and desktop applications.
  - This service is an Esri service and is compatible with all of their software, but may not be compatible with other software packages.
  - The service cannot be edited.

- Service data may be in a file folder on the server, a storage array, a file geodatabase or a relational database. Generally, it is not in a relational database for reasons that will be noted in the Feature Class Service.
- **Feature Class Service** are editable services, with appropriate permissions.
  - The data must be contained within a relational database. A relational database is different from a typical geodatabase, since it allows for multiple user connections and does time stamping of information when modifications are made.
  - The relational database can be physically located on the server or on another server. In an enterprise configuration, the relational database would normally be on another computer server. The relational database would **not** have a public IP address, thus it would be within the organizational firewall.

### Creating a Connection to the Server

- This operation can be done in ArcMap or ArcCatalog, this example will use ArcCatalog.
  1. Open ArcCatalog
  2. Open GIS Servers see Figure 16.

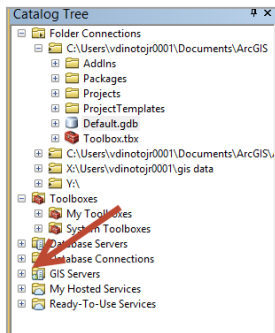


Figure 16: Open GIS Servers

3. Click on the plus and then click on Adding ArcGIS Server see Figure 17.

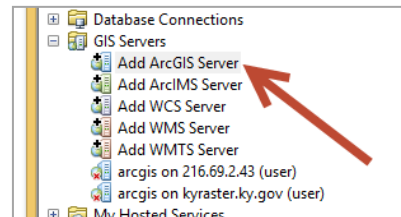


Figure 17: Add ArcGIS Server

- The next step will be to select the type of connection, see Figure 18. The three types of connections are as a user, a publisher or an administrator. To connect as a publisher or an administrator will require an account on the server. A user cannot publish information

to the server, but can only view information and no credentials are required. Connect as a publisher, for this part of the module. Use the username and password that was set-up during the installation process of the ArcGIS Server. Click next to move to the next window. An administrator account allows for more control of the server than does the publisher account.

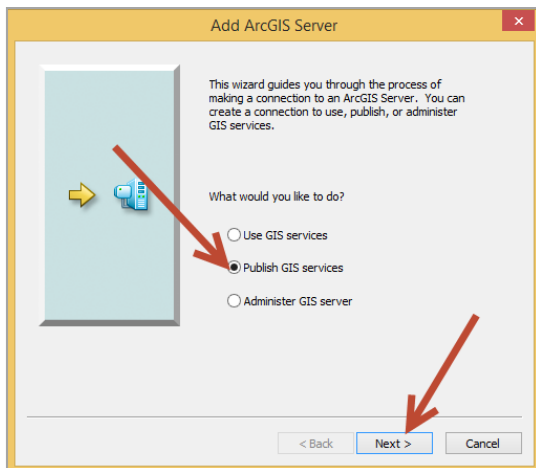


Figure 18: Connecting to an ArcGIS Server

- To connect to the server the information in Figure 19 is required.
  - The server URL in this example is 216.69.2.43 and the folder is arcgis the default name. Generally, following the hint below the top box would be done, but in this instance, since the web adapter has been installed, the 6080 was omitted. The user should put the information about their server instead of that of the author.
  - Input the user name and password that was created when the installation was done on the server.

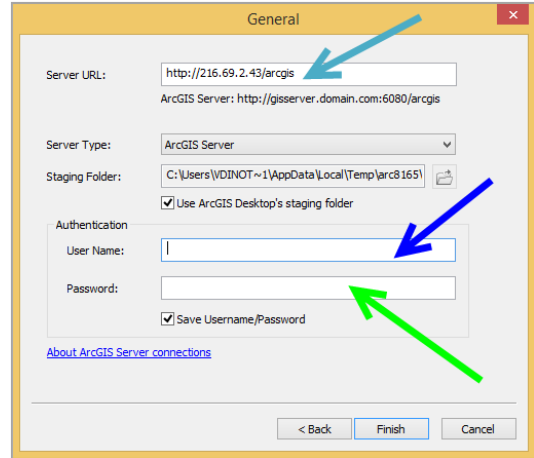


Figure 19: Connection information

- In ArcCatalog or ArcMap the server should now be visible and connections to it are similar to a geodatabase or a folder. No services are available since none have been created, other than the default service that was previously discussed. If problems arise, in the connection process go back to the screen in Figure 18, select User Connection, and connect to the server address shown in Figure 19, the user will not be prompted for a User Name or Password. If that connection is made successfully, next try to connect to the server that was created as a user which will not request a login. If both these connections can be made the issue may be in the User Name and Password.

### Creating a Simple Map Service

- Open ArcMap Desktop, create a map of three layers, all in a single geodatabase, and saved in a storage area (the user will decide on the content to be mapped). A portion of an example is displayed in Figure 20.
  - Create custom zoom levels when the data will be visible and when it will not.
  - Create custom zoom levels for labels.
  - These zoom features will be part of the service that will be created.
- Once the map has been created, the map must be shared, by using the File Tab, Select Share, and then select Service, see Figure 21.

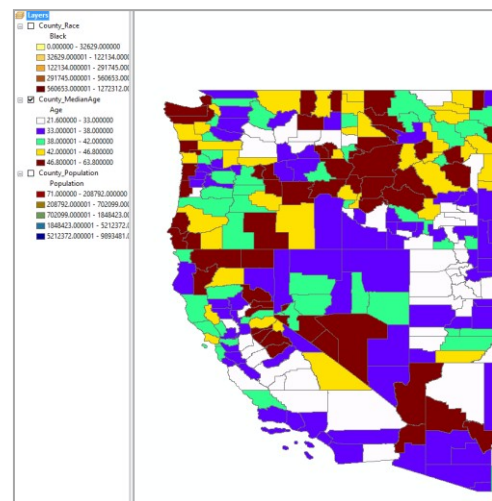


Figure 20: Example Map

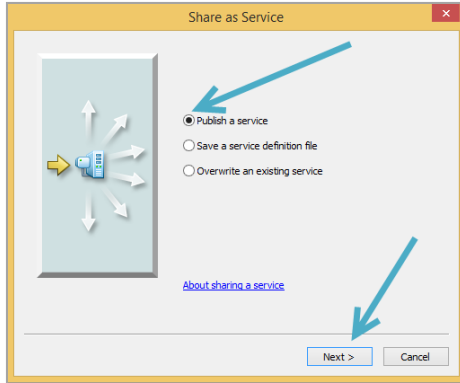


Figure 21: Creating a Service

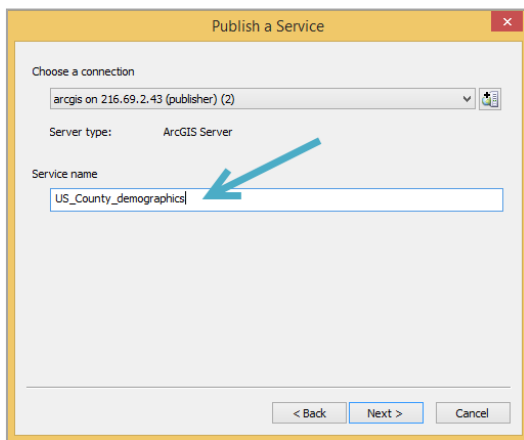


Figure 22: Publishing a Service

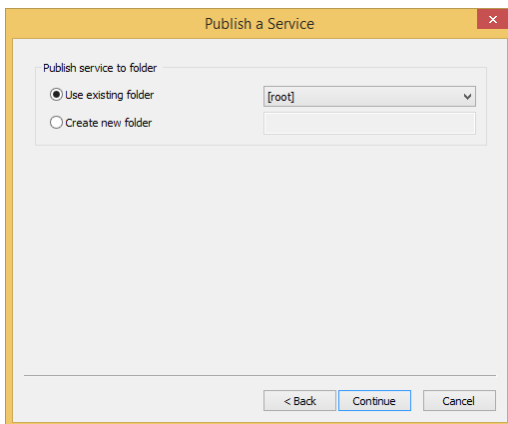


Figure 23: Service Location

- The next component is to publish a service. The ArcGIS Service connection made previously in ArcCatalog may have also established the connection in the ArcMap Desktop, if not follow the previously discussed method, see Figure 19.
- These windows are same as was seen when a connection to the server was made in ArcCatalog.
- In Figure 22 a name for the service was added, no spaces can be used in the naming.

- In Figure 23 the storage location will be requested, shown is the default location. It will take a few minutes for the next two windows to open at the same time. The window across the bottom of the screen will show errors and problems with the service that is being created. The floating window will have items down the left side and on the upper right corner. The items on the left side are parameters that can be modified which will be covered in this section and in more detail in the next section.

- The first step will be to **Analyze** the map to see if there are problems. Generally, there will be issues that will be noted, some may be critical and others only reminders. There are three types of responses that will be displayed after the map is analyzed, see Figure 24.

- Errors must be corrected before the service can be created. To correct the errors click on the message and the appropriate window will open that allows for correction of the issue(s).

- Warnings have three types, high, medium and low; these do not need to be fixed to create a service, but can be potentially problematic in the usage of the service.

- Messages provide information and can have three different levels.



Severity	Status	Code	Description
High	Unresolved	24011	Layer's data source is not registered with the server and data will be copied to the server
Medium	Unresolved	10045	Map is being published with data copied to the server using data frame full extent
Low	Unresolved	24059	Missing Tags in Item Description
Low	Unresolved	24058	Missing Summary in Item Description
Low	Unresolved	30003	Layer draws at all scale ranges

Figure 24: Map Issues

- The next button is **Preview**, which allows the user to view the map to see what the service will look like prior to creating the service.
- The final button is the **Publish** button which will create the Map Service. Do not attempt to publish the map until Errors have corrected.
- Analysis messages, will vary from service to service, but some of the more common warnings are shown in Figure 24 and explained in points 1 – 4.

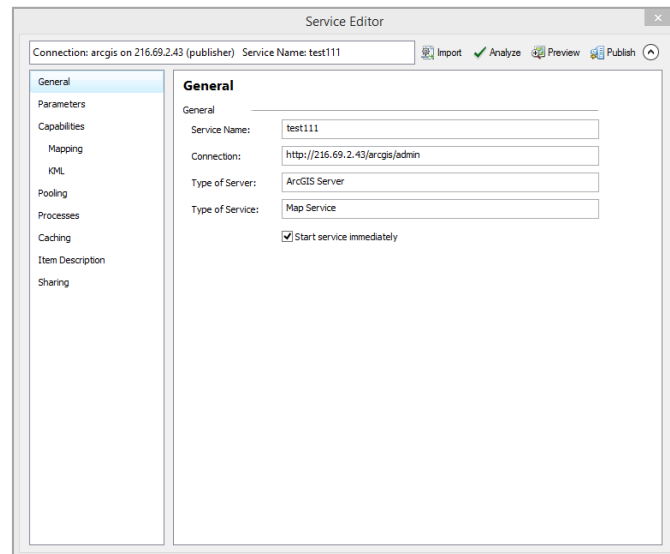


Figure 25: Service Editor

1. This warning occurs when the data store has not properly been registered on the ArcGIS Server, if this warning is not corrected then two copies of the data would exist, one in the storage location and the other on the ArcGIS Server. As much as possible data should not be saved on the ArcGIS Server. Registering of file sharing can be tricky and will be covered in depth in another section of this lesson.
  2. This warning is related to the first because large amounts of data will be moved. When the first warning is fixed this warning will disappear.
  3. The next two warnings are because of missing metadata, correct this by double clicking on the warning.
  4. The caching of the map is being done at all scale ranges, which uses more storage space; this will be discussed in another section of this module.
- Creating a service is done by pressing the publish button.
  - Start a new map and go to the ArcGIS Server in ArcCatalog to load this service as a base layer, explore the results.

### Assignment: Creating a Map Service

Use ArcMap to create a service. ArcMap can be located on the server or another computer that has access to the ArcGIS Server. The results must have the following:

1. Create a map that has at least three layers, these layers should all be located in the common storage area. Do not place any online layers on the map. It is suggested that files be stored in a geodatabase.
2. Once the map has been created and saved publish the map on the server. Prior to publishing make sure the project file has been saved.
3. Create a connection to the server and set the publishing rights, this will need to only be done once per server.
4. Once the map service has been created it should be loaded into a blank copy of ArcMap to ensure that it is functioning properly, remember these layers are non-editable.
5. Provide the instructor with a screen image of the map and the web address to the map service.



### Configuring a Map Service

- In the creation of a simple map service, none of the parameters in the map creation process were modified, all the defaults were selected. In this section some of the parameters that can be modified will be explored in the Service Editor Window.
- It is critical to put only layers that use a similar zoom level into a single service. Web mapping operations can use multiple services within a single map. The following video may assist in the process. <https://youtu.be/fsHBhYrFNjE>
- See Figure 26, under the General tab the following information is derived from the information provided in the ArcMap Service Window, these are editable boxes. Generally, this information would be edited in the previous dialogue boxes.

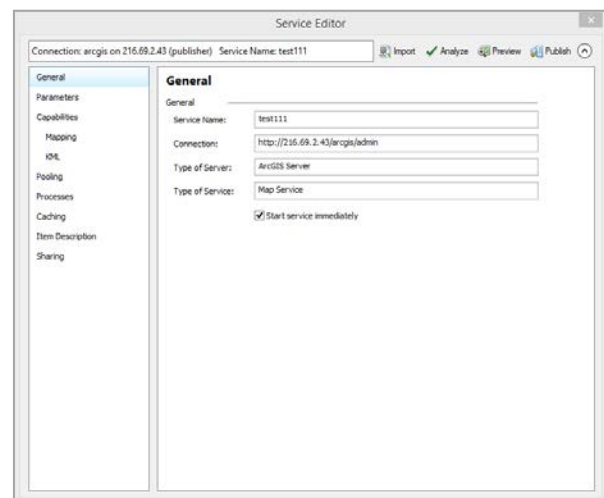


Figure 26: Editing a service

- In the Parameters section, see Figure 27, there are several different areas that can be controlled. In general, the default parameters are used for these areas. Anti-Aliasing is a process of blending edges together to give an appearance of a smoother border, the same can be done with fonts to make a smooth blend with the background. Not using the anti-aliasing process will speed the drawing operations.

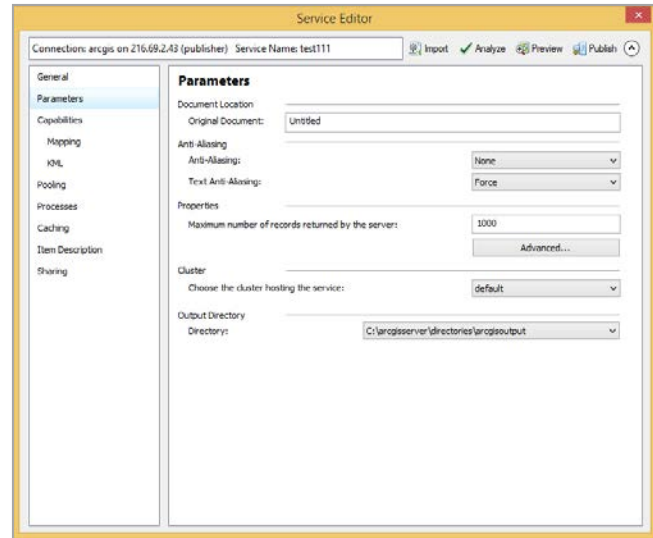


Figure 27: Parameters

- The Capabilities will be covered over multiple slides, since there are several sub-areas, the number of sub-areas will vary depend on the number of boxes checked on the first screen, Figure 28. The default is the Mapping and KML (Google). The Mapping service is always created. A Feature Access service can only be created when connected to a relational database. For each type of service selected a sub-area will be created that has parameters that can be individually configured. Each service will be created on the server and can be consumed by the appropriate types of operations. Services should not be created that will not be used, since they

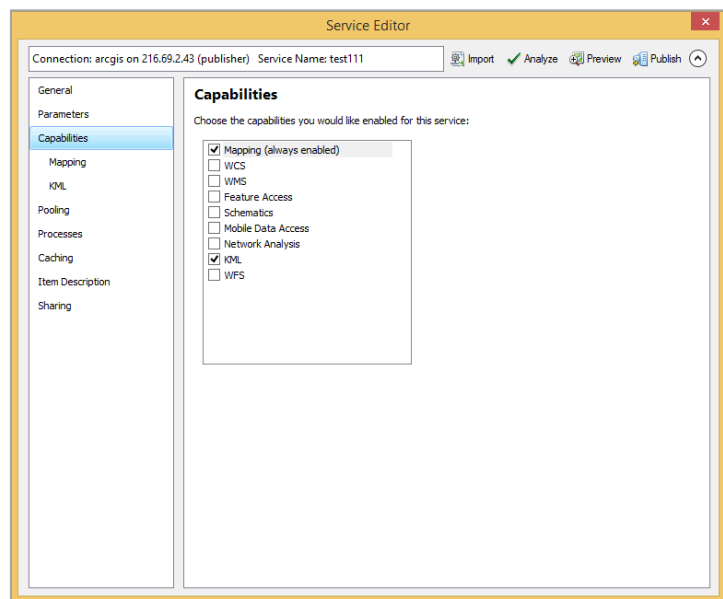


Figure 28: Capabilities

can be created later when needed. The more services running on the ArcGIS Server the slower the total operation. Thus when a service is no longer needed it should be turned off or removed. This must be done through the ArcGIS Server Manager.

- In Figure 29, the first two lines shows the locations for saved information. The REST service is generally the process that will be used in mapping.
- There are three operations that have been checked (default)
  - **Data** allows access to the attributes.

- **Map** allows a map to be drawn in other applications.
- **Query** as the name indicated allows the consumer to query the data set.
- A feature mapping service cannot be used unless the data is in a relational database that has been connected to the server appropriately. This data example does not have the information stored in a relational database. It may be possible to check this option, but the layer will not function properly without the relational database.

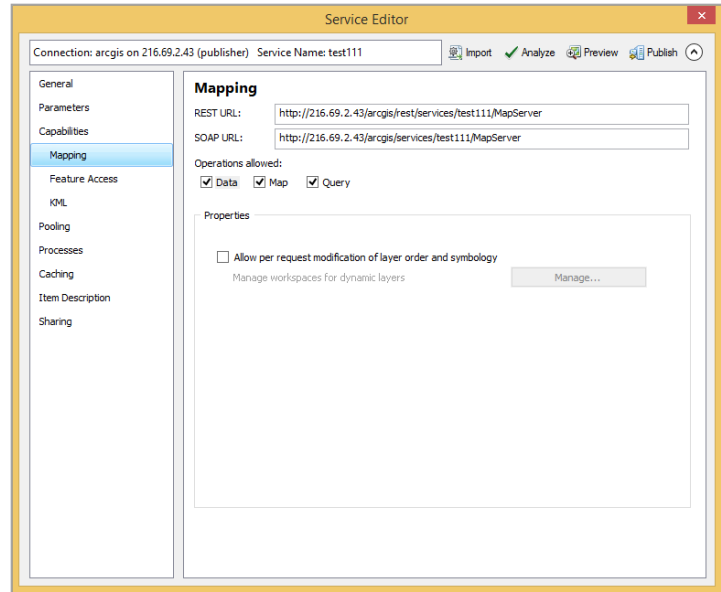


Figure 29: Mapping Service

- The REST and SOAP storage is are for a feature service is similar to the map service.
- The operations allowed are different than those for the map service, editing of the data can be done from either a web interface or directly in ArcMap therefore, much more dynamic control of data is available, but not for the general public to have access. General consumers should always connect to the map service not the feature service.
- The KML service is used on Google Earth, see Figure 30.
- Service that can be used on Google Earth can be created as a layer, but used only locally. This area will be covered in a future section, but this is the location to set-up the service stream. Without this being set-up it cannot be used with a Google Earth.

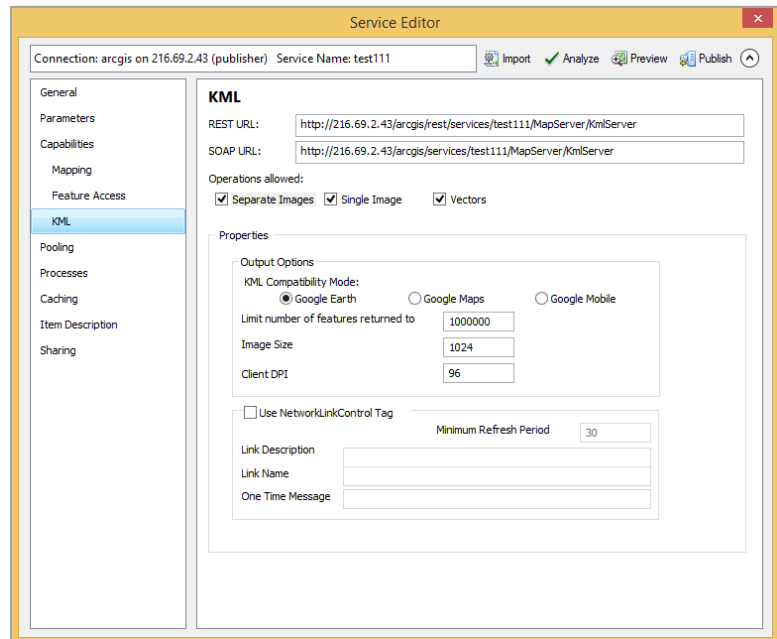


Figure 30: KML

- Pooling involves how many instances of a service is being run at the same time. The defaults are shown in Figure 31, it is suggested to start with the defaults and these values can be increased in the future.
- The more instances running the slower the server may perform, but fewer instances can reduce the number of concurrent connections.
- For high demand service increase the maximum number of instances, for low demand services or services that are still being designed reduce this value. The server itself always uses one instance.

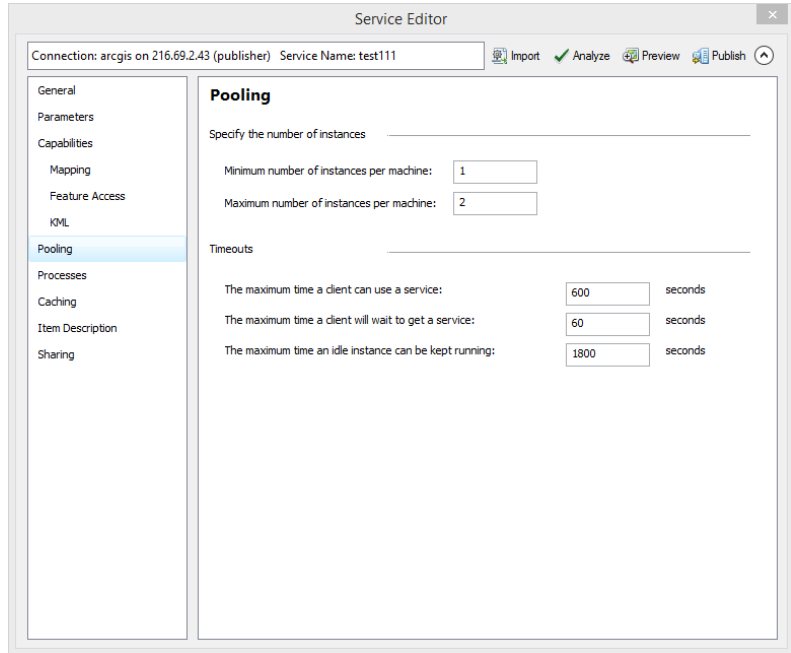


Figure 31: Pooling

- High isolation means that each user will have a separate instance. In low operation users may share instances.
- Basically the other parameters are how often should configuration be recycle, once a day is the default, and after major operational times is usually a good setting. Remember the services that are created may be utilized in web mapping operations and thus realizing an understand of the clientele is important. For example 12 AM Eastern is only 9 PM Pacific time and might not be a good time to recycle, see Figure 32.

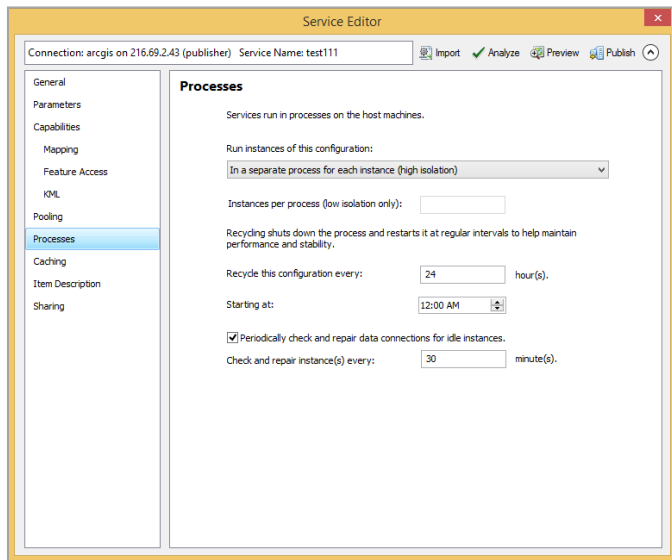


Figure 32: Processes

- Caching is probably one of the most important configurations and many times is poorly configured and has tremendous negative results on processing speed, see Figure 33.

- Using the dynamical data button, will create the map on demand, which is a slower process but requires less storage.
- If the radio button for caching is selected a cache will be created.

- The designer needs to have a clear understanding of the purpose of the service.
- During the map creation process zoom levels should be set, for when the data is visible and when it will no longer be visible. For our example, the map is visible when we look at the entire country, but not the world, maybe a zoom level of 5 is appropriate. The data is no longer visible when zoomed in at the county level, a zoom of level 10.

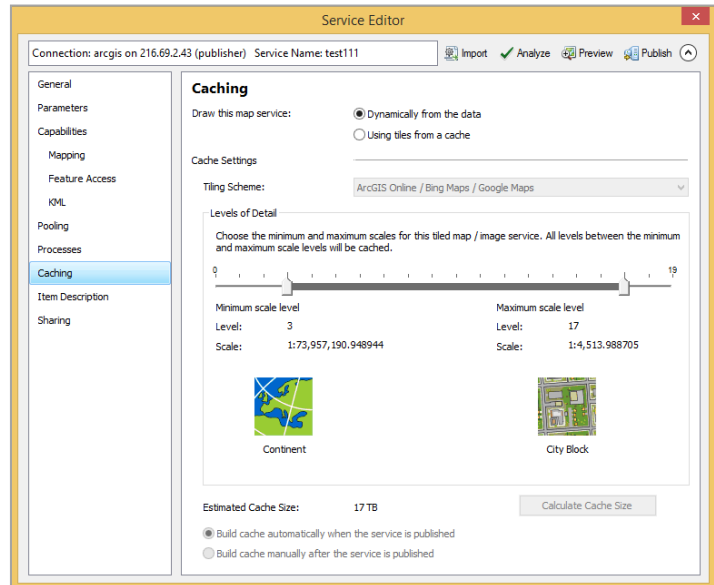


Figure 33: Caching

- The cache should mirror the zoom level of the map. There is no reason to generate the map at levels in which data will not be visible.
- The higher the zoom level the bigger the cache created. Layers rarely used should not be created in the cache.

- The Item Description is the service metadata, see Figure 34.
- Metadata should be as complete as possible so that the user can fully understand the data and make the best possible use of it.
- Warnings will be created when running **Analyze** before publishing the service. If the metadata is created prior to publishing it should appear in this window.

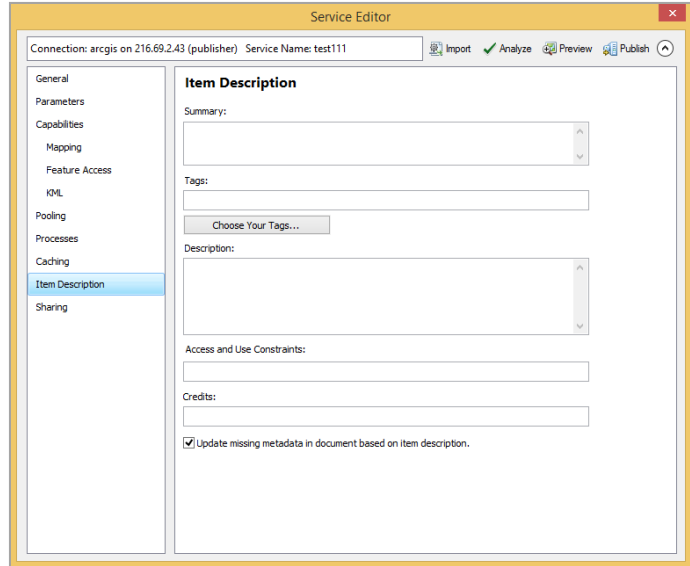


Figure 34: Item Description

- Sharing will give the user the ability to use ArcGIS Online see Figure 35. An AGO account is required for this window to be visible. The designer must log into with the Esri account.

- The results of being connected is displayed in Figure 35, (the image is showing the authors account), the users site will look different.
- Content can be accessible directly with ArcGIS Online, while remaining on the server.
- Creating a map in ArcGIS Online will be covered during this course in another section.
- Once these parameters have been set a map can then be published or republish.

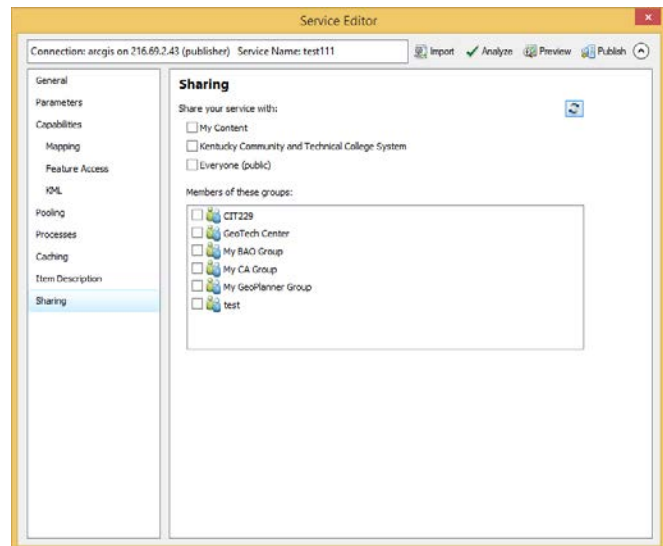


Figure 35: Sharing

- Once the map is published these parameters are set but can be modified by going to the ArcGIS Server Manger program, on the server. Most of these parameters can be controlled under the Services tab. This includes creating other types of services:
  - For example, while testing the map only a map service was made, but after testing phase Google Earth KML service was needed, this can be done in the ArcGIS Server Manager.

## Diagram of Production Network

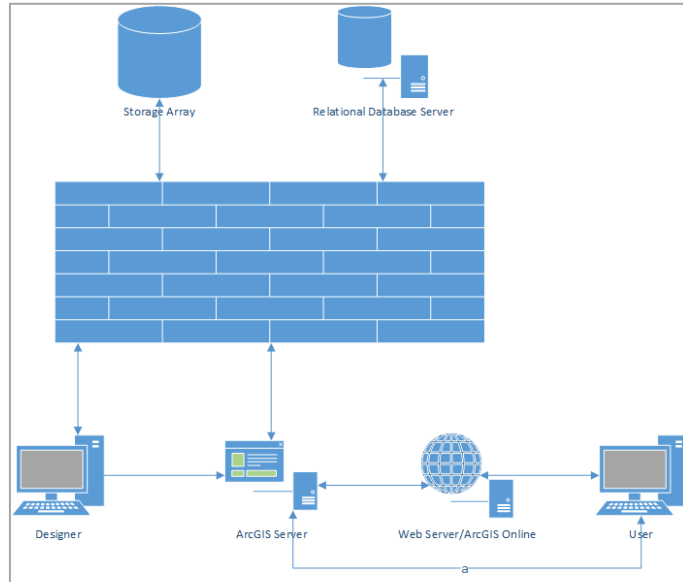


Figure 36: Production Network

In this section a complete look at a simplified production network will be covered, which will be useful in many parts of this course, the direction of the arrows are critically important to understand the data flow, see Figure 36.

- The Designer using ArcMap creates a map that they wish to share as a service on an ArcGIS Server.
- Storage of data should not slow the ArcGIS Server so data needs to be stored on another computer or in a data storage array.
- A connection pathway must be established between the ArcGIS Server and Storage Array using the Data Store.
- A similar pathway must be established between the ArcGIS Server and a relational database. A relational database is used for making editable services (feature services) and should not be used for static services.
- The services then can be consumed directly by other users in ArcMap or ArcGIS Pro or as a web application.
- The storage array and the relational database are placed behind the firewall of the organization to protect the data.

## Connecting a Storage Array

- When a map is created on the desktop and shared as a service on an ArcGIS Server than the data is copied to the Server unless there is a connection made between the storage location and the Server. Useful video <https://youtu.be/lueCCNeKWp0>
- In production environments the data is not placed on the ArcGIS Server, this is to maximize efficiency.
  - Permissions will need to be created between the storage computer and the server.
    - Create a local account on the storage computer/server with the same name and password as that on the ArcGIS Server.
    - Create a share on the data storage computer for the file folder that contains the data giving the newly created local account read/write permissions.



- This handshaking of accounts will hopefully solve potential connection issues.
- The data storage location in general, in the production environment, is a storage array specifically designed for data warehousing. For the class this location could be the local computer or a storage array depending on the learning environment.
- In this example, the connection will be to a large storage array, but the procedure is the same for any drive.
- This connection can also be done from either the server or a desktop machine .
- Multiple different storage connections can be made from the ArcGIS Server.
- The biggest issues generally is getting the permissions correctly configured.
- First logon to the ArcGIS Server Manager (Manager).

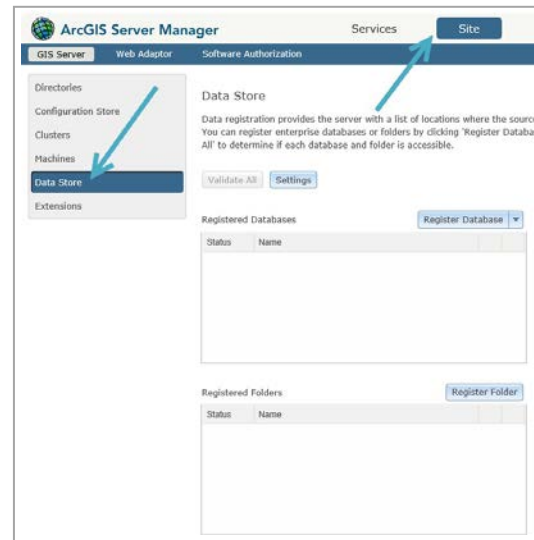


Figure 37: Data Store

- Enter credentials that were established during the installation process to login.
- Select the Site Tab on the top, see Figure 37.
- Select Data Store
- Click Register Folder

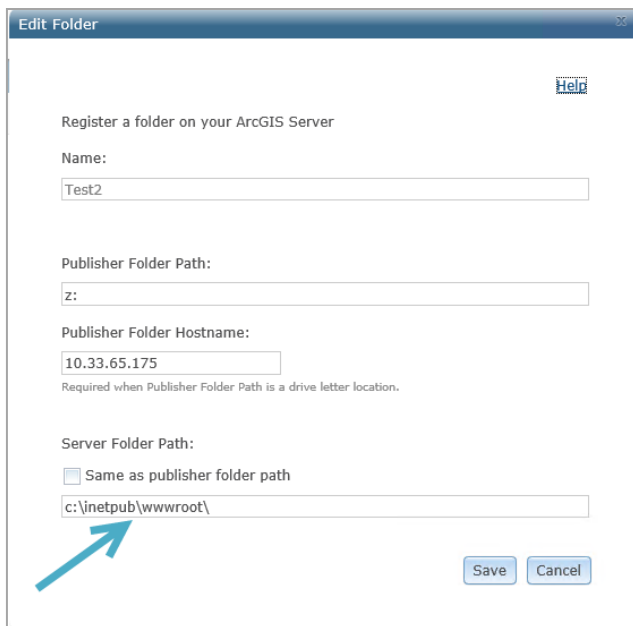


Figure 38: Setting on File Sharing

- Select a name, see Figure 38
- The network drive should have been mapped previously, enter the path or the complete server destination.
- Next enter the hostname in this example the server is designated with an IP address.
- The server folder is the location of internet operation folder, this is a typical default location.
- Click save and the connection will be tested.

- Click validate to make sure the connection functions, see Figure 39.

- Connecting to a Database will be covered later in this module.

### Potential Issues with Connection to Storage Array

- There are numerous potential issues with the connection to a storage array. Some of the methodology discussed previously for the connection to the storage array may have potential issues due to security issues. Some of the issues include:

- Is the ArcGIS Server a user on the storage array?
- Is the drive mapping done on the desktop machine the same as the mapping on the server machine?
- How will I know if I have a problem?
  - Did a warning appear that data was to be moved to the server when analyzing the data to create a service from within ArcMap? If this occurs then the data store is not working properly.
  - On the local server the validation works fine, when ArcMap is located on the server in this case there most likely are no issues.



Figure 39: Registering Folder

### Fixing the Data Store

- Create a local account on the data storage machine that matched the ArcGIS Server account, use this account as part of the share to the folder in which the data is stored and making sure the account has read/write permission to the folder on the data storage machine, generally this will fix the issue. To solve this problem may require administrative rights to the data storage machine.
- Connect to the ArcGIS Server from the desktop machine to register the storage location. Do this through ArcCatalog. It was suggested in conversations with Esri that a connection be made as the Administrator and not as a Publisher.
  - Register the data source from the desktop machine. This is done by right clicking on the Server Connection and going to Server Properties.
- Changing the connection information to a local domain account which has a password does not expire do this in Configure ArcGIS Server Account (a program). Use the UMC path, instead of a mapped drive letter in the establishment of the data store.

- Click the Add Button, see Figure 40.

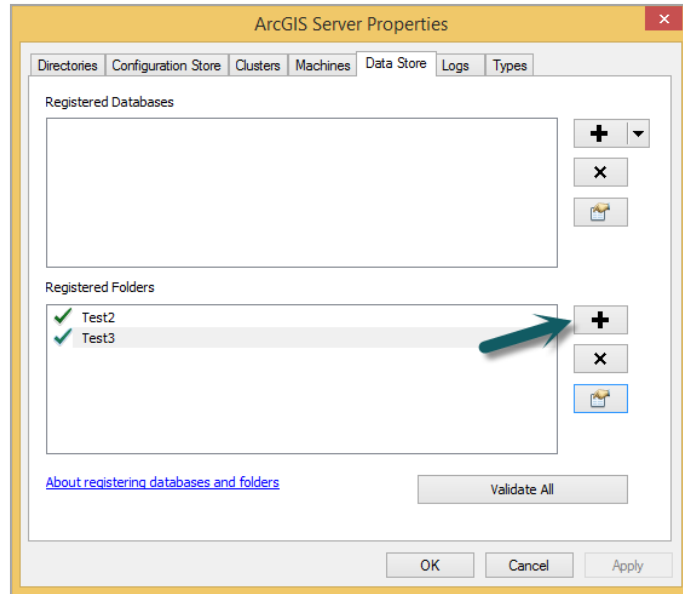


Figure 40: Data Store

- Provide a name for the folder, see Figure 41.
  - Provide the mapped path to the folder.
  - Provide the actual path to the data, using machine name or IP address.
  - Once these have been completed click OK, the folder name should now appear in the window displayed in Figure 40 and the location can be validated.
  - This is also possible to be done through the ArcGIS Server Manager, but it seems to be more effective on the desktop computer.

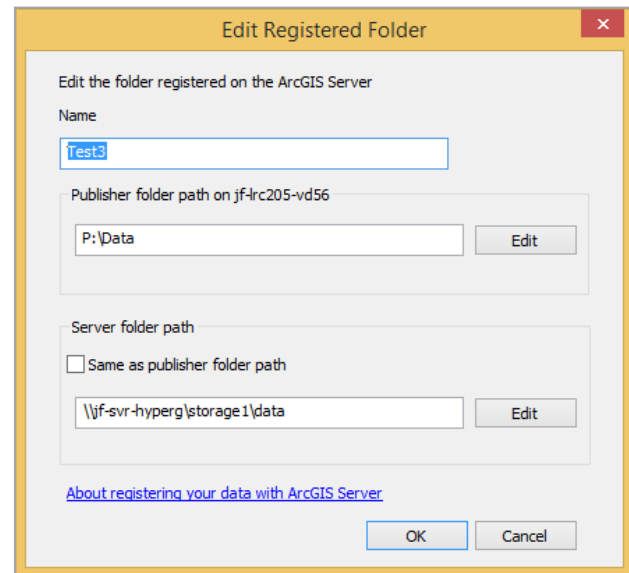


Figure 41: Registering Folder

- One solution that will help (but not total fix the problem) will be to make the mapped drive the same letter on all machines, but this is not always possible.

### Connecting a Relational Database

- Connecting a relational database is similar to connection to a storage array and done in the same location.

- A pathway to the relational database should be provided by the instructor.
- This connection can be accomplished on the desktop machine or via ArcGIS Server Manager.
- Native Client must be installed on the server (download from the Internet).
  - The version must be the correct for the version of SQL being used.
  - Select either 32 or 64-bit depending on the database server. In general it will be the 64-bit version.
  - This installation will require rebooting the server.
- If the ArcGIS Server and the Desktop are both version 10.3 or higher then SDE has been integrated into the software. In the past SDE had to be set-up properly.
- Go to the Server Properties as done for Storage Array see Figure 42.

Select the pull down and select Register Database, which will require the providing of a name and then click Add, see Figure 44.

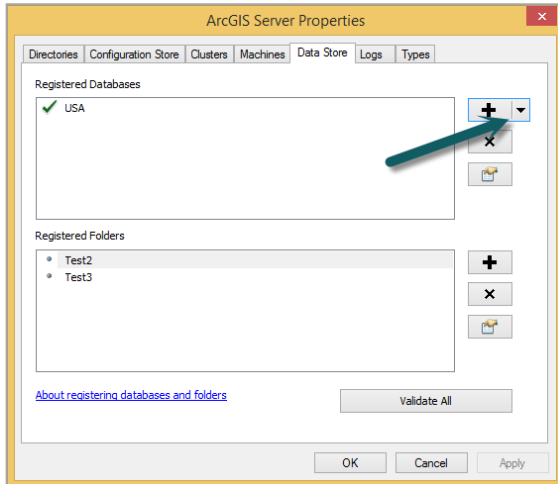


Figure 42: Data Store - Database

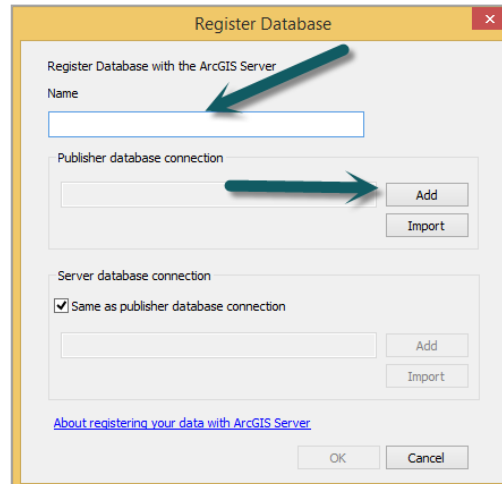


Figure 44: Register Database

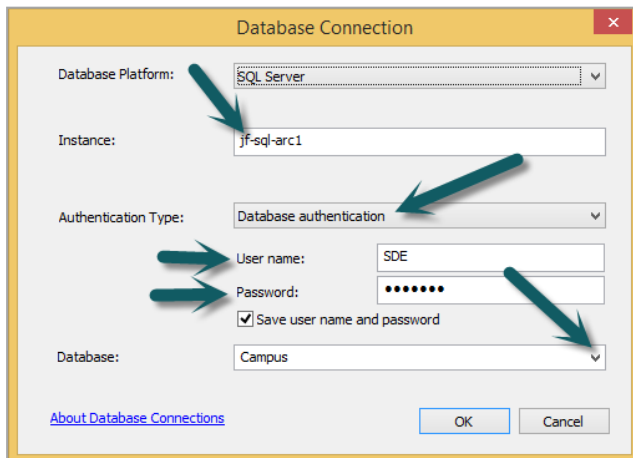


Figure 43: Process to Register Database

- See Figure 43, type in the name of the server.
- Select Database authentication.
- Provide the Username and Password.
- Use the pull down and select the proper database.
- Click ok on a couple of screens to finish the action. The database should register in a few minutes.

## Quiz

- The quiz will be based on the loading of the server software, the creation of services and the connections in the data stores as well as server parameters.  
[http://216.69.2.80/Learning\\_Modules/GIS/GIS260/Storyline/Quiz 2 - Storyline output/story.html](http://216.69.2.80/Learning_Modules/GIS/GIS260/Storyline/Quiz 2 - Storyline output/story.html)



JCTC\_CIT 229\_Module 1\_Topic 2\_Creation\_of\_an\_ArcGIS\_Server by Vincent A. DiNoto, Jr. is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

This workforce product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The U.S. Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This is an equal opportunity program. Assistive technologies are available upon request and include Voice/TTY (771 or 800-947-6644).