ArcGIS Server: publishing geospatial data to the web using the EEA infrastructure

*IMPORTANT: Map Services should be published using the EEA Map Services Tick Sheet for guidance. Contact Sebastien Petit (Sebastien.Petit@eea.europa.eu) to receive the tick sheet if you don't have it. Each time a Map Service is published a filled tick sheet should be emailed to him.

Introduction

ArcGIS server is used to host advanced geospatial web services (examples include the Natura 2000 viewer, Corine Land Cover) as well as more data heavy map services and datasets.

Partners operating outside of the agency can publish remotely to the servers if they have a desktop version of ArcMap (version 10.1 or higher).

To keep this guide simple we will focus on the publication of map-services. Feature services and Image tiling services can also be produced in the same way. For extended information about ArcGIS Server please visit http://server.arcgis.com/en/server/ or contact someone at IDM3.

IMPORTANT: when to use ArcGIS Server to publish geospatial data

You can always use ArcGIS Server to publish your data to the web. ArcGIS server provides a powerful, developer orientated platform to host advanced geospatial applications. But in case your dataset is small and you need to quickly share it, it might be worth doing so in ArcGIS Online.

ArcGIS online is a great place to host and share web maps, feature services and small datasets. To quickly upload and share small datasets please refer to the ArcGIS Online: <u>publishing geospatial data</u> to the web using the EEA infrastructure document.

To be able to upload to the EEA, first you need to be given access rights. To gain access rights you should email your EEA project manager and CC Sebastien Petit (Sebastien.Petit@eea.europa.eu) stating your Eionet account, EEADMZ1 or EEA account username.

ArcGIS Server Publishing map-services

Publishing map-services is simple in the latest version of Arc Map. The EEA has a number of guidelines to follow. From experience we learned that we should scale down to what we support.

Guideline 1: Data Types

The EEA requires that you prepare your data initially into File Geodatabase format for vector data, or TIFF data for raster data. To convert a shapefile (vector) into a File Geodatabase feature class is a simple

matter. First in ArcMap or Arc Catalog, use the catalog tree to navigate to your workspace. Then right click > new > file geodatabase.

		LUCA	sources101 S Copy Paste Delete Rename Refresh
-	Folder		New 🕨
Ū	File Geodatabase		Item Description
Ũ	Personal Geodata	databas	e "
	Database Connec	aatabas	-
	ArcGIS Server Cor	rnie geo	uatabase.
\diamond	Layer	1	old
0	Group Layer	Q	Ic2check.mxd
	Python Toolbox		Lucas_2001_2009.mxd Lucas 2001 2009 copy.m
	Shapefile		ript
		es	
-	Turn Feature Class	oolb	
8	Toolbox		oolboxes
	dBASE Table	e Serv	
	LAS Dataset	· · · ·	nnections
8	Address Locator	ers ArcG	IS Server
	Composite Address Locator		/IS Server
x	XML Document		Server S Server

You should rename the file Geodatabase, and then you can export your shapefile to the file geodatabase by right-clicking on the shapefile in your map document table of contents > Data > Export Data > Locate your file geodatabase and export.

□ Luca • □ ↓ Luca •		Open Attribute Table Joins and Relates Zoom To Layer Zoom To Make Visible Visible Scale Range Use Symbol Levels Selection Label Features Edit Features Convert Labels to Annotation	• •	
	%0	Convert Features to Graphics Convert Symbology to Representation Data	▶ €	Repair Data Source
	 <!--</th--><th>Save As Layer File Create Layer Package Properties</th><th></th><th>Exprt Data Exp Export Data Ma Save this layer's data as a shapefile</th>	Save As Layer File Create Layer Package Properties		Exprt Data Exp Export Data Ma Save this layer's data as a shapefile

To convert raster data from other formats to TIFF, the idea is the same. Right click on the data layer in the table of contents, export. You can then select the export folder and change the format to TIFF. It is important that you follow this data rule as it is enforced to keep the EEA services running optimally. All other formats will be systematically removed by our GIS administrator.

Guideline 2: Map Document:

We also require the data to be saved in an '.mxd' map document that structures and represents the data properly. It is best if you structure your folders so that the project folder (root) has subfolders – **data** – for the source data, **map** – for the mxd map document and **doc** – containing any readme information



Map documents can have many structures but we advise you to follow these guidelines.

- 1) Re-project your content into Web Mercator (WGS_1984_Web_Mercator_Auxiliary_Sphere) projection. Most API's Google, ArcGIS, Bing use this projection. The map may look wrong if you do not do this. It will improve the performance drastically.
- 2) Give your layers clear names. The web services need to be understood easily.
- 3) Group what belongs together. For example if you need to layout on different scales make sure those layers are grouped together.



- 4) Scale dependencies should always be the last grouping. Make it possible to show the layer at all scales by including always a layer that is visible in the display and extra layers that are by default turned off (whenever the scale is outside the layer's visible scale range).
- 5) Groups turned off should show something when turned on. Meaning that some or all of the underlaying layers should be turned on.
- 6) Make field names readable by giving aliases. For example you may want to create an alias for a field called 'c_code' to 'Country Code' to make it more easily understandable



In ArcMap right click on the layer and use properties. Go to the Fields tab and type an alias for every field to make it readable.

7) Turn off those fields not relevant to the map service.

IMPORTANT: if your web services needs to be queried and return the geometry, the SHAPE field should not be unchecked from the list.

8) For code lists use "domains" to give proper naming.

Database Properties				
General Domains				
Domain Name	Description	^		
LandCoverCode	Land Cover Codes			
		-		
		-		
		1_		
Domain Properties:				
Field Type	Text			
Domain Type	Coded Values			
Split policy	Default Value			
Merge policy	Default Value	_		
		-		
		-		
Coded Values:				
Code	Description	•		
111	CONTINIOUS URBAN FABRIC			
112	DISCONTINUOUS URBAN FABRIC	1		
121	INDUSTRIAL OR COMMERCIAL UNTS			
122	ROAD AND RAILNETWORKS AND ASSOCIATED L			
123	PORT AREAS	T		
•	1			
	OK Cancel	Apply		

In ArcCatalog right click on the database and select properties. Add the domains as lookup tables. (Make sure you use the same field type)

- 9) Remove any base map or background information not part of the map content. Map services are merged together into a web map at a later stage. A base map is added from ArcGIS online.
- 10) If you have tables with data in them that you want to include, also drag them into the mxd.

Guideline 3: Metadata

Once your map is tested and functional you are ready to write metadata.

In order to achieve environmental protection goals, in the long-term and broad-scale, huge amount of data is needed to be retrieved, stored and analysed.

Metadata contains information needed to understand, manage and effectively use this data.

So it is very important to write the metadata of the map you are going to publish.

In order to reuse your map, users will need, at least, to know who created the map, when it was created and the purpose.

1) Please check that your MXD data frame has an appropriate name and it's not set to the default value, "Layers". Also the description of the map will be shown in the Rest ArcGIS Services.

Like in the picture below, right click in the data frame, located as the heading of the Table Of Contents in ArcMap.

Feature Cache	Annot	ation Groups	Extent Indicators	Frame	Size a	and Position
General	Data Fr	ame (Coordinate System	Illumina	tion	Grids
Name:	Natur	a 2000 Sites	Query			
Description:						
Natura 2000 is the key instrument to protect biodiversity in the European Union. It is an ecological network of protected areas, set up to ensure the survival of Europe's most valuable species and habitats. Natura 2000 is based on the 1979 Birds Directive and the						
Credits:						
© EEA, Cop	enhagen, 2	2010				
Units					_	
Map:	Meters					
Display:	Meters				ī.	
100000000000000000000000000000000000000		ArcMan On	tions > Data View tab	for		
Reference Sc Rotation:					-	
Rotation:	0				_	
		and and 1 albed	Facine			
Label Engine:	St ayer transp	-	ends	publishing	~	
Label Engine:	St ayer transp	arency in leg		publishing	~	
Label Engine:	St ayer transp	arency in leg	ends	publishing	✓	Apply
Label Engine: Simulate la Allow assig	St ayer transp	arency in leg	ends ic IDs for map service			Apply
Label Engine: Simulate la Allow assig	St Stere	arency in legi inique numer	ends ic IDs for map service			
Label Engine:	Station: abel Engine:	arency in leg unique numer 0 Stand	ends ic IDs for map service OK ard Label Engine			
Label Engine:	Station: abel Engine:	arency in leg unique numer 0 : Stand ayer transpare	ends ic IDs for map service OK ard Label Engine	Cance	······································	

Feature Cache	Annotation Grou	ups Extent Indicators	s Frame	Size and Position
General	Data Frame	Coordinate System	Illuminat	ion Grids
Name: Description:	Natura 2000 Si	tes Query		
Natura 2000 i European Uni up to ensure	on. It is an ecologic the survival of Euro	nt to protect biodiversit al network of protected ope's most valuable spe- on the 1979 Birds Directi	d areas, set cies and	~
Credits:				
© EEA, Coper	nhagen, 2010			
Units				
Map:	leters		~	
Display:	leters		~	7
	onal options for dis	Options > Data View to playing coordinates in th		
Reference Sca	e: <ivone></ivone>			~
Rotation:	0			
Label Engine:	Standard La	abel Engine		~
	er transparency in ment of unique nu	legends meric IDs for map servic	ce publishing	

The Name corresponds to the Map Name, the Description to Description.

> C	Dio.discomap.eea.europa.eu/arcgis/rest/services/ProtectedSites/Natura2000Query_WM/MapServer	副 ☆ 🖸	
ArcGIS RE	EST Services Directory	Login Get Token	
Home > s	ervices > ProtectedSites > Natura2000Query_WM (MapServer)	Help API Reference	

ProtectedSites/Natura2000Query_WM (MapServer)

View In: ArcGIS JavaScript ArcGIS.com Map Google Earth ArcMap ArcGIS Explorer

View Footprint In: ArcGIS.com Map

Service Description: Shows the Natura 2000 protected sites based on sitecode and species name. Data source: http://www.eea.europa.eu/data-and-maps/data/natura-6.

Map Name: Natura 2000 Sites Query

Legend

All Layers and Tables

Layers:

- Natura 2000 Higlighted site (0)
 Scale above 1/100K (1)

- Scale above 1/100K (1)
 Natura 2000 Sites by SpeciesName (2)
 Scale under 1/1M (3)
 Scale between 1/100K and 1/1M (4)
 Scale above 1/100K (5)

Tables:

- CONTAINSHABITAT (6)
- · CONTAINSPECIES (7)
- HABITATTYPE (8) <u>Natura2000Sites</u> (9)
- <u>SPECIES</u> (10)

Description: Natura 2000 is the key instrument to protect biodiversity in the European Union. It is an ecological network of protected areas, set up to ensure the survival of Europe's most valuable species and habitats. Natura 2000 is based on the 1979 Birds Directive and the 1992 Habitats Directive. The green infrastructure it provides safeguards numerous ecosystem services and ensures that Europe's natural systems remain healthy and resilient.

2) Please check that each of the datasets included in your map already contains comprehensive metadata.

To find out if a particular layer has metadata, you can search the source layer in ArcCatalog, right click the layer and display the item information. In Europe, geographic stored data layers should be documented with INSPIRE compliant metadata, although there are other formats (ARCGIS, ISO19139 standard, American FGDC).



 Create metadata for your ArcGIS map service by filling the appropriate fields of the MXD metadata. If you fill in the metadata fields for your map project (mxd) these then will be published within your map service.

There are several formats to store metadata. For map services, none of them are required (they have been designed for data sources), but to harmonize metadata procedures, it will be helpful to use the most common metadata fields and use the INSPIRE version inside ArcCatalog by going into "Customize"->"ArcCatalog Options". Select "Metadata" and in the Metadata Style select "INSPIRE Metadata Directive".

cCatalog	Options						X
General	File Types	Contents Co	onnections	Metadata	Tables	Raster	CAD
Metad	lata Style						
		nes how metad ich pages appe					
INSF	PIRE Metada	ta Directive				•	
	lata Update:						
		properties such utomatically in			of featur	es	
V A	utomatically	update when r	netadata is	viewed.			
		Notification					
FGDC	-formatted n	ge format for n netadata in the be upgraded b	display as	read-only in	formation		
V Sł	now metadat	a upgrade pro	npt.				
About	t managing F	GDC metadata					
				ж	Cancel		Apply

Then right click the MXD file in the ArcCatalog window within ArcMap and select Item Description.

Once the window pops up, please click Edit to proceed (notice you have options to export and import metadata for similar services, which can be helpful too if you have similar services).

There are many fields and not all are mandatory. The minimum we ask is for you to fill in the "Item Description", which include Title, Tags, Summary, Description and Credits, "Topic & Keywords" and "Metadata Contacts".

Overview ^		
Item Description	Item Description	
Topics & Keywords	Title My Cool Map	
Citation		
Citation Contacts		
Contacts Manager		
Locales	Thumbnail	
letadata		
Details	X Delete 📑 Update	
Contacts	Tags	
Maintenance	Cool, EEA, Metadata, Map	<u>^</u>
Constraints		
esource		M
Details		Liif
Extents	Summary (Purpose) What's the purpose of this service?	^
Points of Contact		
Maintenance		
Constraints		X
Spatial Reference	Description (Abstract)	
Spatial Data Representa	B I U A* A* 🗄 🎼 🖉 🚍 🚍 🖷 🗺 🗺 🏷 🝽	÷
Content	Here goes the extended details	^
Quality		
Lineage		<u></u>
Distribution	Credits	
Fields	The Map Map at EEA	^
References		
Geographica Liston		M



When clicking in any of the fields it might be of aid to notice that there is a description or a small text at the bottom of the editing window to help you filling in the information.

Guideline 4: Publishing

The agency wants to roll out its publishing plan in a series of gradual steps so that we can safeguard our data, services and servers. To do this initially the EEA requires users to publish everything to the test environment. Datasets will then be moved by our administrators into our production environment.

Registering an ArcGIS server using the EEA's infrastructure

You will need an EIONET account with publishing privileges to gain access to this.

- 1) In ArcCatalog go under "GIS Servers" and press "Add ArcGIS Server"
 - 规 Connection to sdeproject_sa
- 🗉 🚮 GIS Servers
 - Add ArcGIS Server
 - Add ArcIMS Server
 - Add WCS Server
 - Add WMS Server
 - Add WMTS Server arcgis on cow.eea.dmz1 (admin)
 - arcgis on cow.eea.dmz1 (publisher)
 - arcgis on discomap.eea.europa.eu
 - arcgis on stage.discomap.eea.europa
- 2) Select Publish GIS Services and press Next

Add ArcGIS Server	
	This wizard guides you through the process of making a connection to an ArcGIS Server. You can create a connection to use, publish, or administer GIS services.
	What would you like to do? Use GIS services Publish GIS services Administer GIS server
	< Back Next > Cancel

3) Type the server Url – this will be to the test environment such as http://test.discomap.eea.europa.eu/arcgis

General	×
Server <u>U</u> RL:	http://stage.discomap.eea.europa.eu/arcgis
	ArcGIS Server: http://myserver:6080/arcgis Spatial Data Server: http://myserver:8080/arcgis
Server Type:	ArcGIS Server
Staging Folder:	C:\Users\bliki\AppData\Local\Temp\arcEEE3\Staging
	✓ Use ArcGIS Desktop's staging <u>f</u> older
Authentication	
User <u>N</u> ame:	Bliki
Pass <u>w</u> ord:	•••••
	✓ Save Username/Password
About ArcGIS Serve	r connections
About Spatial Data S	Server connections
	< Back Finish Cancel

Make sure that 'User ArcGIS Desktops Staging Folder' is selected. Enter your Eionet credentials and Press Finish. At this moment, you should have EEA server registered to your ArcCatalog.

4) Double click to see if you can access the content of the new ArcGIS Server added. You should see something like this.



Publish your map to EEA's infrastructure.

Open the map you created and follow the following steps.

1) In ArcMap go to "File" > "Share As" -> "Services"

Share as Service	×
	Publish a service Save a service definition file Overwrite an existing service
	Next > Cancel

2) Select "Publish as a Service" and press "Next"

Publis	sh a Service			×
Ch	oose a connection			
	arcgis on cow.eea.d	mz1 (publisher)		
	Server type:	ArcGIS Server		
Ser	rvice name			
	CLC2006_WM			
			< <u>B</u> ack Next >	Cancel

3) Select the server to publish the content towards (the test server you just added), create a service name and press "Next". Make the service name easily understandable.

4) Select the agreed folder you can publish under and press "Next".

vice Editor	:8234_85 (publisher) Service	Names CLC2006 UM		. An aluma	/ Description	🐖 Publish 🗕
onnection: arcgis on eeap	(8234_85 (publisher) Service	Name: CEC2006_WM	Red Imbou	 Analyze 	+ Preview	Sel Publish _
General	General					
Parameters	General					
Capabilities	Service Name:	test/CLC2006_WM				
Mapping	Connection:	http://eeapc8234:85/arcgis/admin	1			-
KML		ArcGIS Server				_
Pooling	Type of Server:	ArcG15 Server				
Processes	Type of Service:	Map Service				
Eaching		☑ Start service immediately				
tem Description						
õharing						

TIP: You might want to import the settings of other similar service already published. Click the Import button at the top of the window (see image above). This will affect capabilities, item description and other properties of the service. Be sure to change relevant properties or description before clicking the publish button!

- 5) Go to Capabilities and check "WMS" and "WFS" if applicable.
- 6) Check the "Item Description" and check if all content is filled.
- 7) Press the "Analyse" button. It will list you a number of issues if you have issues. Most of the time a "Data source is not registered" would be shown. This is normal as we expect you to upload the data to the server. (In large data cases, please contact the EEA)
- 8) Press the Publish button and your service will be packaged and uploaded to the EEA's infrastructure.

Your map has now been published and can be used inside ArcGIS online. Check your service using the published URL for example <u>http://test.discomap.eea.europa.eu/arcgis/rest/services</u>.

Follow EEA on Facebook or Twitter or through Discomap for updates.