

What is a GIS Service?

Paul Trevillion gives an overview of GIS services, how to create them, and how to use them.

http://video.esri.com/watch/633/what-is-a-gis-service_question

Video Transcription

00:01 OK, so welcome back, and I see many of the same faces here, so I'm going to pick up where we left off in the last talk...

00:05 ...which was to introduce the architecture of the GIS server and how it works within an organization...

00:11 ...to go specifically then to a GIS service.

00:13 What is it? [To] present this I'll talk about the server scenario very briefly again and then talk about the workflow...

00:21 ...and actually demonstrate how to make a GIS service and then some other examples of using them.

00:27 So recall this slide before, then, where we've got our architecture now for internal users using ArcGIS [for] Server.

00:34 The desktop users, desktop professionals, as well as those right from the decision makers down to the customer service representatives...

00:42 ...for example, in some organizations, all of them having access to mapping information, to maps, and to the ability...

00:49 ...to do editing and so on. That's internally and then beyond as well to public and other interested users and also...

00:58 ...extending the reach to your other divisions or regional offices, all through our GIS server.

01:06 I just threw another little cloud there just to kind of symbolize the idea that you know, the GIS server is producing services...

01:13 ...and it's making use of web technology, HTTP. You've certainly seen that for many years now; what does it mean?

01:21 What's its significance? It's really kind of the little channel that allows you to extend beyond the walls of your building in a...

01:31 ...with confidence that you're still protecting your internal network. This is the reason why web services are so great...

01:38 ...is that, you know... Can you reach your GIS data from outside your building? Normally not. It's a local area network thing.

01:46 It involves communication on a number of different channels in your network, and to protect all those channels safely has always...

01:55 ...never been considered to be fully possible, and so there's always...

01:59 It's rare that you would see anyone's local area network opened up beyond the building walls.

02:04 However, HTTP is good, because it provides this little channel which can be monitored...

02:08 ...which can be, you know, a very narrow channel in which communication can occur outside the wall.

02:17 [I] mentioned this workflow again and that we authored a number of different resources...

02:21 ...these are maps, analytical models, globes.

02:25 We can create those, create the contents of our geodatabase, and all of these things can then be published.

02:31 The actual act of publishing is as simple as going to the desktop software and choosing a menu item here called Publish to ArcGIS Server.

02:40 I'll show you that in a moment. It follows with a dialog which just has a couple more choices to make and then it's done.

02:47 What happens, though, is that it creates these services and there's a corresponding service for each of those resources below...

02:53 ...geodata service for the geodatabase, a map service for our map, an image service from our imagery, a geoprocessing service...

03:03 ...or an analysis service from our models.

03:07 And as I said before, it could be used for a variety of clients.

03:14 Let's just show you what I mean by that. I'm going to bring up ArcGIS [for] Desktop. Oops. Not even the right application.

03:23 I should have brought this up before. Let's just close that.

03:35 ArcMap is what I wanted. And I'm going to load into it a map.

03:50 Come on, ArcMap. Here we go. Yeah, I've got some data from my own local area in New York, quite some comprehensive data.

03:58 It's actually...this data is provided freely from the City of New York...many layers, and actually our office...

04:04 ...is just down here in the tip of Manhattan. So it helps produce a nice map, I'm happy with this, but I'd like to share it out with others...

04:12 ...and in order to do that I need to publish it. I can go into ArcGIS [for] Desktop into the Catalog interface here...

04:20 ...I can find this map document that I've created here...it's got a long name to it...right-click on it, and here's...

04:27 ...that menu item published to ArcGIS [for] Server.

04:34 It brings up a dialog, and I can mostly accept all the defaults here; I will just change the name to something simpler.

04:40 It's going to publish to my own server, I'm just publishing it to my local server running on this same machine here...

04:45 ...it's just a laptop, but I could be publishing it; I could be making an administrative connection to some other server...

04:51 ...some other machine in my organization to do this. All right? So I'll publish it by that name on this server.

04:58 Oh! It already exists. OK, let's give it a different name.

05:04 The next panel is a choice of capabilities. Now, mapping is at the top and I actually can't turn that off.

05:11 But that's a good thing, that's my whole point here, is to create a map service. Some additional capabilities though...

05:16 ...are feature access. If I was interested in creating an application where I could edit that data, feature access...

05:24 ...would be a capability I'd need to turn on.

05:26 Mobile data access. So these are additional capabilities that I can provide from this same map service, right?

05:33 I'm going to accept the defaults again and click Next. It gives me a little summary, and I click Finish, and it publishes.

05:43 It pops up with my administrative connection to the server here, and if I scroll down a bit I can see that there's my...

05:50 ...one I had created earlier and this new one here, NYC Basemap 2, as well as some other services that I've organized into folders.

05:59 The folders are handy, not just for organizational purposes and collecting things nicely together, but I can actually...

06:05 ...set different access permissions on the services in a particular folder.

06:10 So the top one there could have completely different access permissions than the one in the Portland folder here.

06:17 Okay. So that's just the simple workflow of publishing a resource to make a service.

06:26 We'll come back to the demo in a moment, but let me just tell you what I did under the hood here.

06:34 If we were to look at the GIS server, we're really talking about two main components, right?

06:41 When you install ArcGIS [for] Server, you're setting up a web server and a GIS server.

06:47 Now, web server can be any of the commercial web servers that are used.

06:50 You have Microsoft operating system, it's the IIS web server, you could use other free ones...

06:56 ...like Apache. There's other ones, IBM's WebSphere, there's BEA WebLogic, there's all sorts of...

07:02 ...commercial web servers out there that are perfectly compatible with this system. But it does involve a web server.

07:11 The other part is really the GIS part, the GIS server, and it's made up of a number of components as well...

07:16 ...which I won't go into the details of. But just, you know, there are some components that you'll learn about.

07:21 When I published that map, what I did was I instantiated a server object.

07:27 Now, that's some pretty fancy terminology, so I don't need really to go into any more detail about it.

07:32 But I...essentially I created something running in the server that has the name NYC Basemap 2. All right?

07:41 So it exists; this does the maps. Ultimately that's the part that's going to make a map when I zoom to upper Manhattan or over to Brooklyn.

07:49 That thing's going to go to work and fetch the data, render it in such a way according to the symbology that I set in my map...

07:57 ...and deliver to whoever is requesting it, a map of Brooklyn or Bronx or whatever.

08:02 That's the part that does the work. However, how to access it comes up above, by what we call GIS server web service endpoints.

08:13 So the active publishing, when I just did that right-click and went through that dialog, created the server object, and it also...

08:19 ...enabled an access to it through an HTTP URL.

08:26 And the format of that URL, actually there are several of them. They're in these open standards of communication...

08:33 ...very commonly used standards in the web world. You don't again really need to know the details of this...

08:38 ...but there's something called SOAP protocol, there's REST, which I guess you could also say is a protocol...

08:43 ...and there are other standards like...as defined by the Open Geospatial Consortium.

08:48 You may have heard of WMS and WCS and so on.

08:51 All of these protocols, by which you can access that service, are provided by the act of publishing.

09:01 And by default, the SOAP and the REST are provided. Now, if I were using my ArcGIS [for] Desktop...let's just carry this a bit further.

09:08 Oh, just to mention, there are some other things I can load into my web server, and if you've heard of tiled map services or caching...

09:14 ...that can be hosted on the web server as well, as well as my web applications, you know...

09:18 ...these actual functional applications that my end users are using, [of] course that's...those sit on a web server...

09:23 ...they can sit in the same one.

09:26 I guess the key to understanding here [is] that there are web applications and web services...

09:30 ...that this web server component is taking care of.

09:33 And as I said, then, any number of applications can connect to this. If I were using the desktop software...

09:38 ...under the hood it's actually connecting to that SOAP endpoint. If I'm using JavaScript or Silverlight or Flex, under the hood...

09:45 ...it's connecting to a REST endpoint.

09:49 Now, the REST has really opened up the capabilities for our web application development.

09:56 It's really simplified the whole process of creating focused applications. REST is our friend.

10:04 And so let me take a closer look at what I mean by that. Again, I'll bring up my browser, and let's just go to a page here...

10:17 ...a web page that is coming from my server. And it's a standard page. I could look at the same kind of page from ArcGIS Online.

10:27 I'd see a lot more services listed there, but the same look and feel and the same links are in the ArcGIS Online...

10:33 ...or anybody else's ArcGIS [for] Server instance. They look the same. And these...in most cases, the public...

10:43 ...you can go to these sites as well. It's probably not much use to the public, but as a developer...

10:47 ...this is very important information that I can get from here.

10:50 I see my two services; there's the one I just created. I can click on it, and then drill in it to get a little bit more information about it.

10:59 Did I click on it? Let's try that again.

11:07 I was expecting that to come up a little faster...it's usually very immediate...but there's usually...

11:14 We've been having some problems with the network connections in here. All right, well, let's try something else, then.

11:28 All right. Well, that's not behaving very nicely right now. I assure you that it normally works. But what I could do then...

11:33 ...if I clicked on that link, it would give me information about the individual layers of my map service...

11:40 ...and a lot of other metadata-type information about it.

11:43 The fact that it's presented in this hyperlink is kind of reflective of the whole idea of REST...

11:48 ...in that everything that we use with REST... Here we go, finally. It's showing some layers.

11:54 Is that...there are a whole bunch of other links here as well. ...means that I can access information through hyperlinks...

11:59 ... through URLs, HTTP something something something. All right?

12:06 Pretty well all the information; not only information about the layers but also the operations that I'd like to perform...

12:11 ...on this map service. I'm going to scroll right down to the bottom here. There's something called Operations, Export Map...

12:20 ...Identify, Find, Generate KML. These are operations that are also supported by REST.

12:26 And Export Map would be a common one that's used then to draw a map.

12:31 The point is that my request to draw a map is in the form of a URL. My request to query a map, like Identify or Find...

12:40 ...is also in the form of a URL. This is what makes it very easy for your web programmers to build applications.

12:48 I'm going to back up to the previous page that I showed you here, and I'm going to bring up...No, sorry, let's go back to that one.

12:58 I'm going to click on another link here that just gives me a quick view of the...of a very simple web application showing my service.

13:08 All right, so there was my New York City map, and it's now showing in a browser as a web page. It's a very simple application.

13:16 If I right-click on it...this is the nice thing about JavaScript, is that I can see the code, and much of this code is actually superfluous.

13:25 I've probably got about maybe three dozen, four dozen lines of code here, and really the

substantial part of it that's important...

13:33 ...is only about maybe 12 or 20 lines here, so again, it doesn't take very long to learn how to make an application...

13:41 ...that's showing your maps. All right, so...

13:47 Oh, let me go back to this one second, let me go right to the viewing of the code source for this.

13:56 You notice there are some URLs in this code, HTTP something. There are some other ones up here.

14:04 A lot of use of other resources through URLs. What's the one I really wanted to look at...Oh, this is a really important one here.

14:13 Let me see if I can just zoom in a bit on this. Where's my plus sign?

14:23 I'm creating a layer in my map. It's using some code from the API. That's a bit too technical, perhaps, but...

14:31 ...here's the interesting part. What am I feeding this object that I'm creating? I'm feeding it a URL to this map service.

14:42 You will find that if I wanted to query a layer, I could construct the object that does the query, again just by pointing it to a service.

14:50 If I wanted to...what else do I want to do? If I wanted to do geocoding, if I wanted to be able to...

14:57 ...give my user a box to type in their address and have the service resolve that address into a location on the map...

15:03 ...I would point it to an object that has a URL as its argument, as its input value. It makes it very convenient and easy to program.

15:18 How are we doing on time? About time? OK.

15:22 So I hope that gives you an idea of how GIS services are made and how they're used, in a little, slightly more technical manner...

15:29 ...than we showed before. Again, I invite some questions for just maybe two or three minutes here.

15:34 Sure, go ahead, sir. Yeah, right, right in front.

15:37 [Audience question] The workflow is really nice. Is the Flex API, is the workflow the same or?

15:43 Yeah, the question is, Is the Flex API a similar workflow? Absolutely. The great thing about this REST endpoint is that...

15:49 ...it's the same service that would be used by a Flex application or a Silverlight application. And the same basic structure...

15:56 ...of how to get to these resources is through these URLs. REST defines how the service is accessed.

16:04 Those different APIs allow for the simple programming of access to them, and it's the APIs that take care of..

16:15 ...writing this kind of request to the server to get the map or to query the map.

16:22 Ultimately underlying though are very similar object models, same functionality from API to API.

16:28 Good question. Any other questions? Yes, go ahead.

16:33 [Audience question] Do I have to have an enterprise server to do this...

16:37 Do I need to have an enterprise license of ArcGIS [for] Server to do this? No. Mapping is enabled with the standard license...

16:44 ...I believe even with the ArcGIS 10.1...I shouldn't speculate, I know it, I've heard it.

16:49 Even with the basic license in the upcoming release, it's going to have some simplified mapping capability with it...

16:54 ...but for now, ArcGIS 10, you need the standard or the advanced license, but mapping is possible with standard license, yeah.

17:05 OK, well, thank you very much for your attention, and enjoy the rest of the conference...

17:09 ...and I'm standing by if you do have any other questions.

17:14 [Inaudible]

17:15 OK, and just one last note (thank you), we'd really appreciate your feedback on this session...

17:19 ...as all of them, and the URL for that is www.esri.com/sessionevals, that's e-v-a-l-s is the last part of that. Thank you very much.