Working with Image Services and ArcGIS for Server

This session will focus on publishing and using image services on ArcGIS for Server. It will provides details on how and best practices of publish images services directly from any raster dataset as well as publishing Mosaic Datasets using the Image Extension for ArcGIS for Server. The session will also highlight different methods to access such images services in different applications including Desktop, GeoProcessing Tools, ArcGIS Web Mapping APIs, and using OGC Standards.

http://video.esri.com/watch/61/working-with-image-services-and-arcgis-for-server

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Video Transcription

00:01 Good afternoon. My name is Melanie, and with me today is Hong and Wenxue.

00:06 And we're going to present to you working with image services in ArcGIS Server.

00:12 So briefly, it's kind of a crash course. We're going to tell you the basics about what image services are...

00:19 ...how you work with them, the data that you can serve, how you serve them...

00:23 ...and some really simple applications in using them...

00:26 ...and get into a few things that are a little bit more advanced using Web applications and...

00:30 ...we're going to show you some code and a few other things.

00:34 So very briefly, what is imagery in ArcGIS? It's been a theme that's been going on in this conference.

00:40 And the one thing that I just want to make sure that's clear to everyone, that when we're talking about imagery...

00:44 ...we're not just talking about aerial photography or satellite imagery.

00:48 We're talking about all of our raster data that we support, digital elevation models; you know...

00:54 ...scanned maps, the surfaces that come out of the Geostatistical Analyst or the Spatial Analyst.

01:01 So all this raster data, it's all considered imagery in ArcGIS.

01:08 So there's a couple of ways in which you can serve that imagery; there's two main ways.

01:12 One, which we're going to focus on today, that's the image service.

01:15 It's really just serving that imagery, that raster data, making it available by a server to client

applications.

01:22 The other way is publishing it as a map service; that's putting your imagery into a map document in ArcMap...

01:29 ...saving that, and publishing that as a map service.

01:33 And then of course there's other ways. The globe service, putting data in a globe document, saving it.

01:37 There's mobile services, geodata services, and...and several others.

01:42 So there's a couple differences between the image service and the map service.

01:45 Course, with the image service, you're serving imagery directly.

01:48 With the map service, you're serving the map document containing that imagery.

01:53 When you serve it out as an image service directly, you're really serving it out as, in a way, a raster dataset...

02:00 ...because your users have access to changing the compression, changing the rendering.

02:05 If you serve up an image service with multiple bands, they can change the band combination.

02:09 Whereas if you serve it up as a map service, essentially you're putting that imagery into the map document...

02:15 ...you're setting the properties, and then you're publishing it...

02:17 ...so your users don't have the ability to make modifications to that layer.

02:23 The other thing with an image service is you can save that layer, that image service layer, and use it as...

02:29 ...a data source in things like geoprocessing or just save it as a layer so you've got that connection.

02:36 The benefit to a map service over an image service is that you can build a cache.

02:40 A lot of people are talking about building a cache. This is the...the way that you could do it if that's necessary for you.

02:49 The other thing that a cache brings you is, at this point, it is the absolute fastest way for you to distribute your imagery...

02:57 ...if you plan on using it as a basemap.

03:00 If you plan on serving out imagery because you want people to access it and use the pixel data that's there...

03:06 ...and a number of other things that we're going to talk about today, then the image service is where you need to...to look.

03:12 So what can you do with an image service? There's mainly three things.

03:16 You can use it as an image, you can do visual analysis, you can use it as that basemap.

03:20 You can also use it as raster data. It's...it is raster data.

03:25 So you can do pixel analysis; you can use it in geoprocessing; you can use it in any analysis operation, band algebra, et cetera.

03:34 And the thing that's new, because we have a new data format...

03:38 Hopefully you've been learning about it this week, called the mosaic dataset.

03:41 ...is you can actually serve up an image service that's now accessible as a catalog.

03:46 Because essentially a mosaic dataset is a large collection of data that we manage in a way like a catalog.

03:53 So you have that same capability when you serve it up as an image service. 00:03:58

04:02 So how can you access an image service? It's really very basic.

04:04 You're going to access it just like you would a raster dataset in...in our desktop application...

04:09 ...but first you're going to connect to ArcGIS Server.

04:11 We also have the ability to access it in Explorer.

04:16 And I'm going to get into all of this as we go through the presentation.

04:19 You know, there's our Web APIs, the main sort of open sources using REST.

04:24 We also have the WMS, the WCS, you can access it in Google Earth.

04:30 So image services source data. I briefly mentioned this.

04:34 There's two main sources. One is the raster dataset; it's a single file.

04:40 The other one is called the mosaic dataset...

04:42 ...and this is this new data model that allows you to serve out these large collections of imagery.

04:48 When you serve the mosaic dataset, this is where you need to have the Image extension.

04:54 You can serve an image service without the Image extension; you just need the standard ArcGIS Server license.

05:02 And for that, you can serve up your raster datasets.

05:05 But if you need to serve the mosaic dataset, you have to purchase the additional Image extension.

05:09 The other thing that you can do is you can serve up layer files that reference either a mosaic dataset or a raster dataset.

05:16 And some of the reasons that you might do this, particularly with rasters, is if you want to control the rendering.

05:22 So you've got a multiband data source, but you want to define the bands that the user sees.

05:27 Or you've got 16-bit data and you want a specific stretch to be applied to it, you can specify all of this in the layer...

05:35 ...just like you do normal layer properties in ArcMap, and publish that layer as an image service.

05:42 So what's the mosaic dataset? I hope that you've been to other...some of our other sessions like the What's New.

05:49 This is something that we're really excited about at 10 because it brings a lot of power to every user.

05:54 This is a new data model that we have in Desktop, and it's used to catalog and process large collections of imagery.

06:04 It's stored as a table or as a catalog, but you can access and view it either way, as a...as an image or as that catalog.

06:13 And the nice thing about being able to access it as an image is you can then use it in geoprocessing like it's a single raster source.

06:22 The other thing is it has indirect pixel management.

06:27 If you're familiar at all with ArcGIS Image Server, there was something that we created in ArcMap called the image service definition.

06:33 This is modeled a lot from what we learned from that.

06:37 And it also had the indirect pixel management, where the images remain wherever you want them stored.

06:46 The mosaic dataset itself is stored within the geodatabase...

06:50 ...but this is really just a container with pointers out to where the source images are.

06:55 So we're not moving all of your data into the geodatabase, into this mosaic dataset.

07:01 In a way, it's a lot like an unmanaged raster catalog.

07:05 For those of you familiar with ArcGIS Image Server, there was a limitation in the size; it was a 2 gigabyte limit.

07:12 We have no limitation really for the mosaic dataset; it's really limited by your hardware.

07:17 You know, SDE, you can have a mosaic dataset inside SDE, and that's limited by the hardware.

07:26 Same with the...the file geodatabase. The personal geodatabase is the only one that does have a limit.

07:30 But when I'm talking about the limit, I'm not talking about the...the total size of image files that you have.

07:38 So we saw... a lot of people say, I have 2 terabytes of imagery.

07:42 But what I'm talking about is the size of the mosaic dataset, which is the container that just holds the pointers.

07:48 So you can point to far more than 2 terabytes of imagery 'cause we're just storing some vector files and...

07:54 ...and things that are a lot smaller than the image source files themselves.

07:58 The other thing the mosaic dataset brings is the dynamic mosaicking and the on-the-fly processing.

08:04 So dynamic mosaicking, because again, these are large collections.

08:08 There's always imagery that's overlapping; it's not always usually just joined right up at the edge.

08:09 ...how...how you want to display it in your application, such as the format, the band IDs, interpolation, et cetera.

08:14 There has to be a way for you to set up rules to determine which image is going to get displayed on top.

08:21 So we do a number of different things. We...we have a footprint that outlines the image, every image...

08:29 ...and you can actually modify that footprint if you don't want everything in that image to display.

08:34 And some of the reasons why you might modify that footprint is if the image inside the image extents is rotated...

08:43 ...and you have that lovely, often black, boundary or white boundary.

08:46 You want that removed, you can crop that footprint or redefine that footprint using some of our editing tools that do that automatically...

08:54 ...or manually editing it. You're not physically modifying the files on disk.

08:59 You're just modifying the pixels that you're going to allow to be part of this mosaicked image.

09:05 The other reason you might is if you've got a lot of scanned maps that have map marginalia.

09:09 You don't really want those getting in the way of the map next to it, so you can essentially crop that by cropping the footprint.

09:17 You could also define queries.

09:19 So if you have imagery of a certain date that you always want to be displayed on top...

09:28 ...you can set up the mosaic dataset to display it that way.

09:31 And then we have a couple of, in a way, sort of defaults with...they're mosaicking rules.

09:35 And they help determine how this imagery gets displayed on top.

09:39 So in this example, I've got a couple of mosaic methods or rules listed here, and there's a few more in the software.

09:47 The first one that's here that we're using is by attribute, and my attribute in this case is the most cloud cover.

09:57 So you can see that the image that has the most cloud cover is displayed on top of this collection.

10:04 The next one is closest to center, so it takes the image that's closest to the center of that area of display and puts that on top.

10:12 So you can kind of see how these things...they are dynamic and...and you can get, hopefully, to the image that you want to see.

10:21 And then we have a few others, closest to nadir, seamline, et cetera.

10:25 When there's a case when the images are actually exactly the same, which is really fairly rare...

10:34 ...we do have this mosaic operators that resolve the overlap.

10:38 So first just means the first one in the...in the catalog list will be the one that gets...that wins out and gets to go on top.

10:47 We also have this on-the-fly processing.

10:51 So this means that the imagery that you put inside this mosaic dataset, we aren't modifying its source pixels...

10:58 ...we aren't writing anything else out, but we are doing processing on the fly.

11:03 So when you zoom in to your area of interest or even see the whole mosaic dataset...

11:10 ...the pixels that are used to create what you see, they're what is getting processed.

11:15 And there's a...a number of different processing that we can do.

11:18 We have image enhancements, we can combine bands with these processes.

11:22 Something that's new at 10 is color correction.

11:25 We could always do it in our raster catalogs, but now we've added it to this capability of...

11:29 ...of the mosaic dataset and also then being able to serve out that on-the-fly, color-corrected image service.

11:37 We have pan sharpening, shaded relief, hillshade; there's a number of them.

11:43 The thing that's kind of key, too, is there's two levels in which you can apply these functions.

11:49 So you can apply...you can do processing on the fly on the whole mosaic dataset.

11:55 So if you have all your elevation data inside a mosaic dataset, you can put...

12:00 ...you can define the processing to take place on the whole thing to create one hillshade.

12:05 Alternatively, if you've got maybe a mosaic dataset that's built up and it has some scanned orthophotos in there...

12:15 ...that are already perfect and they've got some satellite imagery, maybe it's 16 bit and it needs to be stretched...

12:23 ...and it needs a specific band combination to be applied.

12:26 You can apply functions on that dataset that get applied only to it when it is used...

12:34 ...and doesn't affect the other imagery that might be in there.

12:38 So it gives you a lot of power and control to really be able to...to create different kinds of products.

12:44 So building a mosaic dataset is really pretty simple.

12:46 You store it in a geodatabase. The nice thing is it's a fully integrated data model at 10.

12:56 And in this case, I'm referring to ArcGIS Image Server.

12:58 When we had image service definitions, you had to do automation using something called IS commands.

13:04 But with this mosaic dataset, you just can use the geoprocessing environment, so models and Pythons.

13:09 There are two main tools that you're going to use.

13:11 One is the Create Mosaic Dataset tool. This just creates the empty container that's going to contain all the imagery.

13:18 And the next tool is the Add Raster Data To Mosaic Dataset tool. It's two simple steps.

13:26 Create the container, add the imagery to it.

13:29 And then, optionally, there's a whole lot of other things that you can do with it.

13:32 And you know, next you can go and modify your footprints if you need to.

13:35 You can edit the properties, like set up those mosaic methods if you want to restrict them to something...

13:39 ...and you can insert some functions.

13:42 And all this editing that you can do interactively, when you're not just relying on the

geoprocessing environment...

13:49 ...you do inside ArcMap.

13:52 Publishing a service is just as simple it is...it is to publish any other service within ArcGIS Server.

13:59 There's two main publishing environments. You can publish using ArcCatalog, and you can publish using Server Manager.

14:04 When you're publishing a new service, there are some things that are unique, some different capabilities and parameters.

14:10 So just briefly, I want to mention this Image extension. I mentioned it a little bit before.

14:14 We used to have something, and we still do; it's called ArcGIS Image Server.

14:18 It was a third-party kind of application that we purchased and we brought into the software stack.

14:24 But we never fully integrated it. We have done that by creating this mosaic dataset...

14:30 ...and then adding a lot of neat capabilities that we wanted into the server environment.

14:35 It used to be something that was a completely separate install...

14:38 ...separately configured, and then had to be configured with [ArcGIS] Server.

14:41 Now it's just a license file.

14:43 All you need is a license to register with [ArcGIS] Server so that you can publish these mosaic datasets.

14:52 And this Image extension, it gives you...

14:54 ...the capabilities of doing a lot of the stuff that you can do with the mosaic dataset inside [ArcGIS] Desktop...

14:58 ...so you can take advantage of the dynamic mosaicking...

15:01 ...and access everything within the catalog, which we're going to talk about a little bit.

15:06 So some of the capabilities that I talked about that are different when you serve up an image service.

15:12 We have a...one that we've always had, which is the image. It's...allows the image to be displayed.

15:19 And then we have four more that are basically specific mostly to just mosaic datasets.

15:23 Metadata. This determines how much metadata people are going to be able to access...

15:28 ...'cause maybe you don't want them seeing that much information about your data...

15:31 ...or maybe you want them seeing everything.

15:33 Catalog allows users to access the...the table of the mosaic dataset.

15:40 Download is another one that we got a lot of requests for in the past and have been able to implement.

15:46 You can turn it off if you want, but Download allows users to access that image service with the mosaic dataset on the back end...

15:54 ...and download source datasets out of it.

15:58 And the other one is Pixels. This one's really divine...designed for the developer framework.

16:03 We have a lot of developers that have wanted access to the actual pixel blocks of each individual raster.

16:10 And some of the developing applications that people might want to use is to develop a stereo application if they're going to do that.

16:20 So I'm just going to talk about some of the parameters.

16:23 Some of the parameters for Image apply not to all the different data types.

16:28 So we've got the raster dataset or layers, and there's three things here that apply to that.

16:33 And the mosaic dataset is pretty much what the rest of the properties are all for that we're going to talk about.

16:39 One is a maximum image size request. We've set the maximum default to be basically fairly high.

16:48 Some people may want to limit it. If you need to...

16:51 There are some people who might want to increase it, and one of the times this might come up...

16:55 ...is if your users are plotting really large plots that are using imagery coming from an image service.

17:03 They may be requesting a massive amount of pixels at one time, so this could impact them.

17:12 You can also set a default resampling method, things like nearest neighbor or cubic convolution.

17:16 We also have something called a transmission compression setting. We have had this for a while.

17:25 Basically, if you're serving up an image service and you know that your users are going to have a very slow connection...

17:33 ...or there's a chance they might have a really slow connection, you can set a fairly high compression...

17:39 ...on the image that gets transferred.

17:42 So you could set a JPEG compression on an image at, you know, 75 percent quality...

17:47 ...to really make that package smaller that's going to get transmitted to them.

17:54 And they can zoom, and they can pan, and then if the quality setting isn't ideal for them, they actually have the ability...

18:01 ...on the client side of the application to turn this compression off if they're willing to wait for the image to get to them.

18:08 So then we have a couple that just apply to the mosaic dataset.

18:11 There's a maximum number of rasters per mosaic. Again, if you've got lots of...

18:17 ...lots of rasters that are being accessed and opened up in order to create that dynamically mosaicked image...

18:23 ...you could put a...you could make the server work really, really hard.

18:27 So we've set a couple of defaults that...that we feel are good.

18:34 You may want to reduce it or increase it depending on the kind of data that you're increasing.

18:38 You can also modify the mosaic methods.

18:41 Another parameter that we have is Download. I mentioned it a little bit before.

18:45 This allows users, when there's a mosaic dataset being served by the image service, to actually access the source images...

18:52 ...and download them to their desktop or somewhere.

18:57 The thing with Download, in Server, is if you're going to use this, it's really important that you set up a virtual directory...

19:06 ...because, by default, Server will take the source data, move it to a temporary location, and then move it to the client...

19:15 ...which is a big movement for raster data. Not so much for vectors, but these can be pretty huge files.

19:21 You want to set up a virtual directory so that they skip that middle part...

19:25 ...and they just go straight from the source location to the client application.

19:30 Setting up a virtual directory, you define it obviously in the properties...

19:33 ...but it's really something that you do within the operating system.

19:36 Same with this Define Your MIME. This is part of your IIS properties.

19:41 You need to do this too because if you have a source dataset that has an extension that isn't

already defined here...

19:48 ...it won't get transmitted.

19:49 So I think TIFFs are already specified with the extense...extension .tif...

19:56 ...but if your source datasets also have a TIFF world file with a .tfw extension, this isn't going to get transmitted to them.

20:04 So you need to define it in here so that it doesn't sort of get erased from the transmission.

20:11 So we have some other capabilities beyond just Image. We have the open source standards...

20:18 ...the Open Geospatial standards, the WCS, which is the Web Coverage Service.

20:24 We've had both this and the next one, the map service, before.

20:28 These...the Web Coverage Service serves up the actual pixel information.

20:32 So if you are designing an image service that's going to be ingested by maybe an application...

20:37 ...you're not sure what its capabilities are but you know it supports these open standards...

20:43 ...or if it can't connect straight to ArcGIS Server and they're doing processing...

20:48 ...I would recommend using this WCS capability to get that imagery to them.

20:53 And we've improved it a little bit at 10; we've added the capabilities to do queries for the different datasets...

21:00 ...also to utilize time, which is new at 10, and we also have the ability to limit when you're exporting.

21:08 And then the other one is the map service. This is really used for rendered images; it's used a lot for basemaps.

21:16 Hong is going to give you a demo now on publishing image services.

21:21 Okay. First, I'm going to publish two datasets. One is the raster dataset, one is a mosaic dataset.

21:30 In the map, here is the raster dataset in TIFF format. It is Portland DEM data.

21:37 And the second one is the mosaic dataset, which has been compiled, created using Portland Landsat data and Portland QuickBird data.

21:47 I publish to ArcGIS Server. I add services, give a name, and specify it is image service and specify the source.

22:00 First I publish the DEM. And you see that during publishing I can specify some parameters to define the properties for my service.

22:09 For example, this is DEM. I want to be able to compress it, and also I want to make sure the compression is lossless.

22:19 So I remove the JPEG compression from...from the list and then publish.

22:31 We find out that today's network is kind of slow right now. It's trying to find my machine's name.

22:38 Hasn't gone to the publishing part yet. Not yet it's published.

22:46 For this Portland mosaic dataset, I add another service called DEM and image. Image service and specify the source.

23:04 In this case, this is the mosaic dataset. Add. And mosaic dataset has a set of default parameters.

23:14 In this case, when I add to ArcGIS Server, it...the default parameters will be populated automatic...automatically.

23:23 So here you can change some of the default parameters.

23:27 In this case, for example, I want to change the allowed method in the...remove some of...some of those method.

23:31 And let's select further. Only select the...this particular QuickBird data.

23:35 Some of those doesn't actually apply, so I remove those.

23:39 And also, I want to, for example, I want to limit the levels...metadata levels that client can access.

23:45 It should be quick; only select one from...from the two selections.

23:51 Enable WMS...WMS capability and publish.

23:54 Did I click the wrong button?

23:58 So in this case, users can see some of the basic information of the raster...

24:04 ...but cannot see all the function change that has....has been applied to that particular raster.

24:12 And again, it will take some time to find the server...to find my server and add to...

24:26 It's running? Yeah? Okay.

24:28 So let's check the service. This the DEM service that I published, and look at the property page.

24:36 And you see that the compression, default compression is the LZ77 that I specified, and the JPEG is...is removed from the list.

24:48 And for the image service, and we...let's open the table of the image service. You see all the rasters behind the scenes.

25:02 And the...let's look at...from the raster viewer and we can see the properties of this particular raster, and this is the...I...

25:12 This is the metadata information, the thumbnail. And let's check the metadata information.

25:19 In here, I only see the basic information of that particular raster and all the raster functions...

25:25 ...function chains have been blocked from the client side.

25:31 And back to Melanie.

25:33 Thanks, Hong. One thing I...I want to mention; I'm not sure if I really made it clear.

25:38 All of these capabilities, especially when you're using a mosaic dataset, the mosaic dataset is special...

25:43 ...'cause it allows the person who creates it to set up all these different defaults.

25:48 So if there's a maximum number of rasters or a certain compression method that is used or not used...

25:55 ...they can set it up and control how they want users to be able to access and work with it.

25:59 But your server administrator may want to turn some of this off or reduce some of the things that happen...

26:05 ...because there's such a load that's potentially maybe taking place on the server.

26:09 The one thing that they can't do is they can't exceed the limits that the person who created the mosaic dataset set.

26:16 So if they said that the maximum number of...of rasters is 20, the server admin can't go in there and type in "50."

26:23 If they type in 50, it just bounces back to 20. What the server admin can do is make it 10 or something smaller than 20.

26:31 So I just want to move on now to image services in...in our desktop and mobile applications.

26:36 We can use it in pretty much all of our applications except for [Arc]Scene. So we can use ArcMap, [Arc]Globe...

26:40 ...ArcCatalog, [ArcGIS] Explorer, Google Earth, and...and other OGC standards.

26:46 So briefly, just we can use image services by connecting to ArcGIS Server in ArcMap; behaves like any other sort of raster dataset.

26:53 It gives the same capabilities depending on the kind of data that you're serving.

26:57 If you're serving a raster dataset, it behaves like a raster dataset; if you're serving a mosaic dataset...

27:02 ...then you have all the access to the mosaic dataset that you would have if you were directly connecting to it.

27:09 You can serve it up in ArcGlobe. Nice thing about ArcGlobe and...and with image services...

27:14 ...you can use it as draped imagery or, depending on the kind of data it is, such as elevation...

27:19 ...you can actually serve it as a...an elevation service...or surface.

27:26 In [Arc]Catalog, this is mainly where you are going to make your connections.

27:30 You could save some layer files, but you're really going to be able to manage your server here and your image services.

27:36 The other key thing with image services, and I...

27:38 ...I've already stated this, but you can use image services in your geoprocessing tools.

27:43 And I've had a couple of people come down and talk to me about this 'cause maybe they weren't getting it to work for them.

27:47 So there's a key thing that you need to be able to do.

27:52 Even at 9.3 we had this. There's a Make Image Server Layer tool.

27:59 In order to use an image service in a geoprocessing tool, it needs to be a layer.

28:04 So if you add it into ArcMap and then you open up the tool, you can then point to that layer and it'll process with the tool.

28:11 But if you haven't added it to ArcMap, or if you're going to use it in modeling and scripting...

28:18 ...you need to first use the Make Image Server Layer tool to create that layer.

28:23 That way we know the...what the connection is to that service and maybe some of the properties...

28:29 ...that need to be set on that service like a mosaic method option, before it's ingested by the tool.

28:36 The other thing you might want to do when using this tool is to define an extent...

28:40 ...because if you're connected to an image service of the entire world and you're doing a process in your...

28:45 ...county or your area of interest, you only want to process the data in your area of interest.

28:50 So it's recommended that you define an extent, or else you're processing the entire image.

28:58 You can also use an image service in ArcGIS Explorer. In previous versions, like 900 and 1200...

29:05 ...first you had to create a layer file that pointed to the image service and then add that layer file into [ArcGIS] Explorer.

29:11 At 1500, which is coming out in a month or two, you can actually make a direct connection to that image service.

29:22 Mobile applications, they're becoming...

29:25 ...well, they've been around for a long time, but they seem to be really becoming more popular right now.

29:31 You can make direct connections to image services there.

29:35 But of course, the thing that you have to remember is mobile devices need to be live...

29:39 ...and there's lots of situations where your mobile device isn't going to have that live connection.

29:44 So you can connect to your image service and then you can export the image from that image service.

29:47 Export the chunk that you need and save it onto your mobile device.

29:51 Alternatively, you can use a map service; you can put your imagery into the map document...

29:57 ...you know, publish that, connect to your map service, and then create a local cache from that map service onto your device.

30:07 So next we're going to move back to Hong, who's going to give you a demo on using image services in desktop applications.

30:15 Oh, that's yours?

30:20 Okay. I'm going to show an example of using ArcMap client to work with image service.

30:27 For example, I...I'm given a task to do landscape planning for this area in...in Portland close to a...close to Portland downtown.

30:38 And I have street data, I have buildings, but I don't...I don't have imagery.

30:44 So I want to find a most recent imagery for my study area.

30:48 And I just create...create the service that...in the first demo, right?

30:53 So we add this image service to my map, and I want to search imagery from this image service.

31:02 Image service is a part of selections in 10, so let's do search by location and search from this image service...

31:11 ...and overlay with the bound...study boundary; which is the green box that I defined as a feature class; and search.

31:19 And now, you see that there are nine images...nine rasters are...are found.

31:24 I want to do a search, narrow down some search...some images, so I...I'll do a search by attribute.

31:35 Because I know that in the level of my study, I don't need Landsat data, which is a little too coarse for my study.

31:42 So I want to search from my image service and I want to search QuickBird data...

31:49 ...sensor is QuickBird, and I also want to narrow down to be multi...multispectral data. Let's find.

32:05 Now there are two rasters I identified.

32:08 Let's look at the table and these QuickBird images and the acquisition date, one is 2006, one is 2005.

32:20 And obviously, I should choose 2006.

32:23 Let's check further, and it is a QuickBird image and has a higher resolution, so it is the one that I need.

32:57 You've been giving a lot of demos this morning; maybe your computer's tired.

33:07 Yeah, it just...take time to just find one from two. Okay.

33:12 So, let's...let's zoom in to this. Zoom to...zoom to this raster...raster that I selected.

33:23 And it's a little bigger than what I really need, so I want to zoom in to the area, and I can further download the image.

33:39 So I open the Download folder and see all the files that are associated that particular raster are listed.

33:51 So I can download those files, and further, I only want that smaller portion, so I clip.

33:56 It will work...create TIFF file and also associate the...TFW files, so now I download.

34:03 Let me show the Download folder right now is empty. And this download is pretty quick because I only clip a small portion.

34:17 It shouldn't be...that slow. Okay, yeah. It's done.

34:23 See, all the files are downloaded from the server to my client machine.

34:28 So I can...I added a TIFF file into the map, remove the image service because I don't need it anymore...

34:38 ...and turn on the images that I downloaded.

34:41 It's black because it doesn't have statistics, so let's, using the Image Analysis Window...

34:48 ...and make this be better by turning on the DRA.

34:52 So now I have my study area that has street, buildings, and also the imagery that I need.

34:58 I can take off, I can go...go to the field and work offline.

35:05 So back to Melanie.

35:06 Thanks, Hong.

35:08 So if you've seen a mosaic dataset, you can see how it...it works very similarly when it's

published out as an image service.

35:16 So next we're going to move on to using image services in Web applications.

35:20 Nothing new here...well, of course there is. But we've been doing this since about 9.3.

35:26 We support our image services through SOAP, REST, WMS and WCS capabilities as well as KML...

35:34 ...and having this allows you to make mashups. One example of mashups is this ArcGIS Online with My Maps.

35:44 You can also access these and build Web applications using JavaScript, Flex, and Silverlight.

35:49 We're going to talk about each of these eventually.

35:54 When you serve up an image service and you access it in a Web application...

35:58 ...you have basically a lot of the same capabilities that you would if you were accessing it through our desktop applications.

36:05 Using support...or using REST and SOAP, we basically support a lot of the other...

36:11 ...a lot of capabilities that make these modifications and these calls to these image services.

36:15 And you can change layer properties like you could in [ArcGIS] Desktop, like the band combinations.

36:20 You can change that transmission compression method, change the resampling and the mosaic methods.

36:26 As well as you can have geoprocessing services that use image services so that you can create your results.

36:33 So briefly, creating a mashup, for example, you can use that My Map application.

36:39 And I don't know if the rest of you have seen much about this; I know it was shown at the plenary.

36:43 I'm kind of excited 'cause I get to maybe make some maps now and...and send it home to my family, of places that I like...

36:49 ...and they can just connect in.

36:51 But you can publish your image services and...

36:55 ...and then use the My Map application to mash it up with other image services that are out there...

37:02 ...add some data and then share it to people that you work with or, in my case, to my family...

37:08 ...or...or share to the world and don't have any restrictions on who gets access to it.

37:12 And basically the way that you make connections to your image services there is through your

REST address.

37:20 So we're going to talk a little bit about REST. REST is really just an HTTP endpoint.

37:25 And it has a number of different operations that can be specified in...in addition to just the address.

37:32 The main one is Export Image. This is the command, essentially, or the operator that allows you to...

37:40 ...specify and then constrain information about the image that you want to receive from the image service.

37:45 And we're going to talk about that a bit later.

37:47 Another one is Query.

37:48 This one only applies when you publish a mosaic dataset, obviously, 'cause it has that...that catalog of items that you can query.

37:55 The other one is Download. Again, it only applies to the mosaic dataset, and Hong showed that to you.

38:01 You can do this through Web applications.

38:04 And then we have another one called Identify, and Wenxue is going to demo this a little bit later...

38:09 ...but you can actually identify the pixel values in the items that are there.

38:15 And we didn't have that one at 9.3 or 9.3.1, and we think it's a powerful new addition.

38:24 So with the Export Image, again, you can...you can connect to your...

38:29 ...your image service using your Web app and get the entire image...

38:33 ...or you can maybe define a boundary or you can define a limit in the number of rows and columns that you receive.

38:38 You can define a different spatial reference; you can define a compression, et cetera.

38:43 Some of the things that we added at 10 is the mosaic rule 'cause now we're serving up these mosaic datasets...

38:49 ...so the mosaic method really matters.

38:52 And you can specify, you know, if you know that your image service has a...a field of Date and you want to specify all of the...

39:03 ...you know, you want to receive all of the images in your area of interest from 2010...

39:08 ...you can use the mosaic rule to define that information.

39:13 We also have something called the rendering rule. This is also new.

39:17 This allows you to define rendering on an image service that doesn't get done on the client application...

39:24 ...but instead gets done on the server.

39:26 We haven't opened up all of our functions to this capability, but some of the...

39:30 ...the basic, more requested ones we have opened up.

39:35 So things like creating a hillshade on an elevation model.

39:39 You can have an elevation service of the world, and using this rendering rule...

39:44 ...you can ask to receive that image back with a hillshade result.

39:51 So your client machine or application that you're building doesn’t have to know how to create a hillshade...

39:56 ...or a shaded relief or a slope because the server's going to do that work for you.

40:01 You're just going to get that result back.

40:03 The other thing that we've added, again, it's a big theme for 10, is time.

40:08 So you can either identify a single instant in time, or you can specify a start and an end time.

40:17 Another one that we've modified...it's not new; you've always been able to request an image format.

40:22 But we added something called JPEG PNG.

40:25 Basically, by specifying JPEG PNG, you allow the server to decide what format is best and...and will be exported.

40:34 And the reason is, JPEG supports transparency...or sorry.

40:40 PNG supports transparency, but JPEG is smaller and faster and, very often, a better quality.

40:47 So where you need transparency, where your image doesn't cover the entire area of extent...

40:54 ...you want to be able to provide that transparent image.

40:57 But, you know, as you zoom and pan around, some of the images obviously don't...

41:01 ...they do cover your entire area of extent, so you don't need to worry about transparency.

41:06 That's when you can, you know, generate that image and transmit it faster and...and make sure that it's smaller...

41:10 ...and that it's a nicer quality.

41:15 So I'm just...got here an example of what a REST endpoint address looks like.

41:21 It's made up of a number of different components.

41:24 So first, starts with http; the second part is your server address.

41:29 I have an address here of sampleserver.argisonline.com.

41:33 This is actually open to everyone.

41:35 We use this so that we can publish some samples that people can actually access and...

41:41 ...and Wenxue will be showing you that.

41:43 It's...next it's followed by the...the information that states that it's a REST service, followed by the name of the service.

41:52 So in my case here, it's...the name is MODIS and it's in a subfolder called World.

41:58 And then it's followed by the image server Export Image operation.

42:04 So if I just type in that information, it'll give me the image that you see right here on the screen.

42:09 If I want to further confine that, I can enter the following information like a bounding box.

42:15 I can change the spatial reference, I can ask for the JPEG format.

42:19 And because I'm specifying JPEG, I can specify compression method.

42:24 I can define a pixel type, nearest neighbor, resampling, and so on, to get the final image that you see in the bottom corner.

42:32 So next, I'm actually going to demo this image services directory.

42:35 It's how you can access, how we can access a list of these REST services.

42:47 So if you have ArcGIS and [ArcGIS] Server installed on your computer, you basically can go up to your My Programs...

42:54 ...over to ArcGIS, over to your server and open something up called the ArcGIS Services Directory.

43:00 And this will give you a list of everything on your server.

43:03 If you don't have one but you want to connect to a different service, somebody else's service...

43:07 ...you really just have to type in the address of the server...

43:11 ...followed by this part that defines that it's REST service information that you want to receive.

43:19 So here I've connected to sample-server-3, and I've got a list of folders such as Hydrography.

43:25 This doesn't have an image service in it, but it does tell me that there's a map service in here and a feature service.

43:32 I can go to one called Portland. This one does have an image service.

43:36 I can connect to it or click on it and get some more information about it.

43:41 I can actually go to some of these top links and view it right away in ArcMap 'cause I have ArcMap loaded on my machine.

43:47 I also have Google Earth loaded up on my machine, so that link appears there, and I can view it now using KML.

43:53 If I needed to pass the KML address to somebody, I just have to right-click on this and save this to my machine...

43:59 ...and it basically creates a .kmz file, which is a zipped KML file.

44:08 So here I can get some metadata information about this service, things like the extent...

44:13 ...the pixel type, other information that I might want to use.

44:18 Here are the operators that are allowed with this particular service. There's the supported interfaces, both REST and SOAP.

44:29 The other thing that I can do is go up and take a look at the REST API.

44:33 And this is pretty important because if I am going to be working with REST, I want to understand...

44:38 ...how to specify some of these commands.

44:39 So if we go to the Export Image section, we can learn about the different parameters.

44:45 So what is the bounding box, and how do I...how do I specify it, et cetera.

44:54 So it's pretty straightforward.

45:01 So next we're going to move on to the Web applications. So the first one is JavaScript.

45:05 I like JavaScript 'cause I think it's pretty simple, and you can go into the samples on Resources Center...

45:12 ...and then open up a text editor and copy and paste and...and work with these samples yourself.

45:17 You don't need anything extra installed on your machine; doesn't require any extra downloads by your clients.

45:23 It's really light, and...and it basically is executed in HTML pages.

45:29 And I'm going to move to Wenxue who's going to give you a...a demo of using a JavaScript application.

45:38 Thank you, Melanie.

45:40 This demo we're going to use ArcGIS JavaScript API to consume image service.

45:46 As you can see here, I have a Landsat image service, this is...which is published from a mosaic dataset.

45:53 I can include the image service in my Web application.

45:57 I can zoom in, zoom out, pan the image, and mash up with ArcGIS Online map service.

46:06 Now let's see what we can do with the image service.

46:09 We can change the visualization, change the screen display. See the format? 00:46:17

46:28 I can also change the interpolation, such as bilinear, cubic, et cetera.

46:34 I can also choose which band and in which order I want to display such as maybe I want a band 4,3,2 composition...

46:44 ...false color, or maybe a vegetation composition.

46:50 I can also turn on the compression quality if the returned image is a JPEG. I'll make it better.

47:00 I can also turn on the transparency as well.

47:05 Now let me move to an elevation service.

47:09 As you can see here, by default, ArcGIS Server will stretch the floating point elevation data to display a nice picture on your screen.

47:20 One of the new feature that we added at ArcGIS 10 is called a raster function.

47:27 It's something that we can define on the client side and pass down to the server and ask the server to process it...

47:33 ...such as hillshade, slope, or adding a color map. Here's shaded relief.

47:49 I can change some of the parameters such as altitude, et cetera.

47:55 Now let's see the coding behind the scenes.

48:19 Okay. First...okay.

48:39 To include the image service in the application, we simply define image service layer and pass down the URL...

48:46 ...of the image service and add it to my map.

48:51 So image service layer provide a set of different methods that you can call to set the display and the...

49:10 Now I would like to show you how can we set to use a different raster function.

49:17 I simply define raster function and give the name of the raster function...it is this one.

49:25 ...such as hillshade, shaded relief, et cetera.

49:30 When I pass down the required parameters here, such as altitude, color map...

49:37 ...and simply call the image service layer to set the rendering rule to use the function I just defined...

49:43 ...Image Server will get the raster function, process it on the server side, then send back a processed image.

49:50 With so many different visualization features, a list of different visualization method...

49:57 ...we can display the same service differently.

49:59 There is no need to get a true color Landsat, a false color Landsat.

50:04 You only need one Landsat because you can visualize them on demand based on the requirement of the application.

50:11 Back to Melanie.

50:12 Thanks, Wenxue. So one of the things that Wenxue showed is he went a little bit beyond using just a REST call.

50:23 He's actually taking advantage of this class called ArcGIS image service layer.

50:27 It uses the REST address, and instead of using Export Image and specifying different parameters there, he can use this class...

50:36 ...which basically asks for the same type of information and makes that export image request back to the server for you.

50:45 And it does a lot of the same things; you can specify the mosaicking rule and the rendering rule...

50:49 ...you can change the spatial extent, the bounding box, et cetera, and time.

50:54 So next we're going to move on to discuss Flex.

50:57 We actually, in ArcGIS, we have a new viewer for Flex; it's currently out in beta. It's an out-of-the-box viewing application.

51:04 But basically, Flex is obviously a richer environment than the JavaScript and provides a nice kind of user experience.

51:12 It requires a Flex development environment, specifically Adobe Flash Builder 4...

51:18 ...and it does require that there be an Adobe plug-in on the client-side application in order to view it.

51:24 So we're just going to go back to Wenxue, and he's going to give you a demo of basically utilizing time...

51:29 ...and the other thing that I had mentioned was using that Identify to get the pixel value.

51:35 He's going to show you an example of...of using that, using this Flex application.

51:43 Okay. What you see here is a simple Web application built on top of ArcGIS Flex Viewer which is using ArcGIS Flex API.

51:54 Now I have a temperature series, which is a time series for December from 1950 to 2099...

52:02 ...with the last 90 years projected using a model.

52:06 I can use the time slider control to animate through different years and to see the temperature change.

52:15 I can also identify the point and get a list of values from a different year and visualize it on chart...

52:26 ...and see the temperature change across different years.

52:31 Behind the scenes for Identify... Let me get this.

52:40 I simply define image service Identify task, give the URL of the service, which is the REST address...

52:48 ...and provide the required parameters; in this case, it's the identify location, then execute the image service Identify task.

52:59 So Image Server will run the identify and get a list of values from each underlying raster...

53:06 ...because the service is from a time series data; it's a mosaic dataset.

53:12 It's going to retrieve the values as well as the attribute associated with this raster.

53:18 In this case, I used the value at this point, and I used the year attribute and I combined it to my [inaudible] to visualize it.

53:32 And this is the REST request where I placed the Identify button. So it take the geometry.

53:39 Optionally, you can provide the mosaic method and the pixel size.

53:43 It's going to return the value of the mosaic...

53:46 ...as well as the values from each underlying rasters and the associated catalog attributes.

53:55 Now I would like to take you to ArcGIS Resource Center.

54:03 You can see here, under ArcGIS Products, there is a new Web section.

54:10 This is the centralized location for Web developers to download the new API, which is currently available for you...

54:17 ...Web API 2.0 for JavaScript, Flex, Silverlight; and you can also get code snippets within the code galleries...

54:26 ...watch some demo videos; and check all the blogs, forums, et cetera.

54:34 Now let's take a look of Flex section. We can go to the samples.

54:41 There is a new section called Time-aware layers. You can see the time behavior of ArcGIS 10.

54:48 ArcGIS 10 is time aware; so that's the map service and the image service.

54:55 Under this, I have a time-aware e-mail service. We can check the code behind the scenes; it's

very simple here.

55:03 You just add a time slider control, create the intervals, and you can start animating.

55:12 There is also a new section called Image Service.

55:17 Right here you can see how can you add the image service in your application.

55:21 Check out the time behavior area, raster functions, et cetera.

55:26 And again, these samples are available in Flex; it's also available in JavaScript and Silverlight.

55:33 Thank you. Back to you, Melanie.

55:34 Thanks, Wenxue. So next we're just going to move on in to Silverlight.

55:40 Silverlight is a cross-platform and cross blow...browser...or environment. It supports, again, rich, interactive applications.

55:51 You also need a developer environment for this to do the Microsoft Silverlight Web APF.

55:57 There's two choices here. There's the Visual Studio 2010 or something called Expression Blend 4.

56:02 And it also requires a plug-in, a Silverlight plug-in, on your client application in order to execute it.

56:10 So we're going to go back to Wenxue, who's going to give you another demo...

56:13 ...and really show you the power of that mosaic dataset...

56:16 ...and do something very similar to what Hong was able to do in [ArcGIS] Desktop.

56:21 Okay. As you can see here, we are going to use Silverlight API to consume our mosaic datasets...

56:27 ...to consume image service published from a mosaic dataset.

56:31 I get Portland aerial photograph from different years.

56:36 We can do query, download, and we can change the mosaic method on the fly. 00:56:42

56:48 It's going to run the query, return the footprint of each individual raster in the mosaic dataset, as well as the associated metadata.

56:57 I can do an attribute query as well, such as name, such as the year in 2005.

57:10 I can click image and further explore the metadata information; that is, the resolution, the acquisition date, spatial extent.

57:18 The spatial reference, right here, is WKID. I can get a thumbnail as well.

57:24 I can also retrieve the associated identifiers, and if this is the one that I want to use, I can download it from Image Server.

57:35 You can cancel here. Let's see. I have a query.

57:40 I got the image for 2005, and I'd like to show only the imagery in 2005.

57:46 I can use a different mosaic method. I want to lock to my selection, which is Lock Selected Rasters.

57:54 I'm going to apply this mosaic method.

57:57 You can see here, the REST rasters are gone; now I can continue to work with my 2005 collection.

58:09 Let me show you a different mosaic method. I'm going to zoom in to a particular neighborhood.

58:18 Because I got a collection from different years, I can mosaic them based on attribute.

58:26 I'd like to see the image in 2001, 2003, and 2005 to check out the neighborhood development.

58:46 And then, again, you can do similar things just like time series data; hook up with a time slider as well.

58:56 Now let's see what's behind the scenes.

59:10 To query the image service, we can use a similar way just like we query a map service.

59:18 We simply define a query task.

59:20 If it's a spatial query, we pass down the spatial geometry.

59:24 If it's an attribute query, we can provide the WHERE clause. Then we run the ident...sorry.

59:30 We run the query task and the...we get the returned footprint of each individual raster...

59:37 ...then we can visualize it in a...in a graphics layer.

59:41 And then we get the attributes, we can hook up with my data grid.

59:48 To change the mosaic method on the fly, I can define a mosaics rule; I can choose a different mosaic method...

1:00:03 ...maybe mosaic to the center of the wheel, maybe mosaic by attribute or lock to a particular selection...

1:00:11 ...then provide the required parameters such as mosaic by attribute, provide the base field and the base value...

1:00:19 ...then set the image service layer's mosaic rule to use my newly defined mosaic method.

1:00:27 And, again, you can get these samples from ArcGIS Resource Center. Go to the Silverlight section and explore it. Back to you.

1:00:37 Thank you. So we're just going to wrap up.

1:00:39 So today we saw an overview of image services, basically what they are; what kind of data that you can publish with them...

1:00:47 ...how you can publish them; and using different applications, how you can make use of those image services.

1:00:56 There are a lot of sessions left that are related to raster stuff.

1:00:59 If you want something a bit more advanced, we have something called Working with Sensor Data.

1:01:05 It's not really advanced on the image service but is specific to the mosaic dataset.

1:01:10 If...and it...it's specifically about working with sort of satellite data or data that needs to be orthorectified.

1:01:19 We have another session, but if you haven't learned about mosaic datasets yet...

1:01:23 ...you're going to want to go to the What's New to see what's new with imagery in ArcGIS.

1:01:30 I just want to remind everyone to please fill out the evaluation forms that should be on their desk...

1:01:34 ...or if they're not, I think they're on this table that's over here.

1:01:40 And questions. Yes?

1:01:44 [Inaudible audience question]

1:02:07 Yeah. Yes. The question is, I've got a huge collection of imagery I put into a mosaic dataset...

1:02:13 ...publish it a...as an image service, and I want to display only one of them.

1:02:18 Yes, you can make an attribute query if you know which one you are looking at...

1:02:23 ...then lock to the selection if you don't want to display the rest.

1:02:26 Or you can use mosaic by attribute to show this one first and still keep the display of the other rasters. Thank you.

1:02:38 Sure.

1:02:39 [Audience question] I had a question about the tolerance for having a variety of rasters in...

1:02:45 ...sort of in a variety in the sense of projections and datums from the field. 01:02:52

1:02:56 And I'm curious about the tolerance for having disparate types of projections and datums.

1:03:02 What do you mean by "tolerance"?

1:03:03 [Audience question] What's the tolerance in the sense of what's the capacity of [ArcGIS] Server's field of [inaudible]?

1:03:11 Well, you can create a mosaic dataset and serve it as an image service that contains data that is disparate...

1:03:17 ...so it doesn't overlap at all. And it does have different datums and different projections.

1:03:23 Hong looks like she wants to answer this question.

1:03:25 [Audience question]...I'm thinking of if to create a mosaic dataset.

1:03:27 So are you...

1:03:28 [Audience question] That implies that you are able to handle or...or there is a requirement...

1:03:34 ...coming into the mosaic dataset in terms of what the parameters are or are tolerated...

1:03:43 ...from a standpoint of being different projections, different datums.

1:03:47 Mosaic dataset allows you to add data at different projections. There's no problem.

1:03:53 And then...and be able to project on fly.

1:03:57 In terms of...are you saying that tolerance means the accuracy?

1:04:02 [Audience question] No. I don't mean that. I mean...

1:04:04 Just can you do it?

1:04:05 Yeah. There is no problem.

1:04:07 [Audience question] But...but...but...but the fact is that, for example, just in terms of loading different datasets into a viewer...

1:04:15 ...I won't be notified about problems about transformation...

1:04:19 Oh, okay.

1:04:20 [Audience question] If they're not the same...

1:04:21 Mosaic dataset is designed just for this in a lot of cases.

1:04:25 So you mean that, you know, sometimes you are...

1:04:28 ...there is a message telling you that the datum transformation, datum is now differ...is different.

1:04:34 Yeah. So when you create a mosaic data...dataset, actually you can also define datums that will be using in the mosaic dataset.

1:04:44 For example, mosaic dataset allows you to define a projection, which can be different from the source data.

1:04:50 If your mosaic dataset has like a WGCS datum and then your source data is, say, NAD84 or something like that...

1:05:01 ...during adding data in the Add Raster To Data...Mosaic Dataset GP tool, you can specify an

environment setting...

1:05:11 ...where you can specify which datum transform...transform...transformation will be used to add those data.

1:05:17 So mosaic dataset carry those datum transformations and use where...and whenever it's necessary, it will use on the fly.

1:05:26 [Audience question] It...this invites further discussion, I'll [inaudible].

1:05:33 I think there's...yes.

1:05:35 [Audience question] When you're doing a time series request on imagery, is it...

1:05:39 ...is the API making repeat...repeated requests out to the server to get each individual frame...

1:05:44 ...or is it making one request and returning back a multiframe image, like [inaudible] or something like that?

1:05:50 Each time the time is changing, it's...

1:05:52 [Audience question] It's making a call...

1:05:53 ...a new request...

1:05:54 [Audience question]...return?

1:05:55 ...yeah.

1:05:56 [Inaudible audience question]

1:06:03 Well, it takes a certain amount of time to retrieve an image each time...

1:06:06 ...so it could impact the server if you have a lot of people constantly making multitimed requests for an image.

1:06:16 So, yes, it can have an impact on your server.

1:06:21 You know, actually, if you see that each display, the screen resolution is 1024 by 786, you don't actually request a huge image.

1:06:33 You request smaller image each time.

1:06:37 You have to be able to do both.

1:06:39 Yeah, usually the response time is...is pretty short.

1:06:43 If you make the request return format to be a JPEG is really like half a second for you to request or maybe less than that.

1:06:52 I heard somebody say, But you have to have the overviews. Not necessarily.

1:06:56 You need to have pyramids on your data, or we always recommend it when working with

raster data.

1:07:01 There is overview generation when you're looking at the whole image, but when you're looking at time...

1:07:08 ...you're usually getting that source data or the pyramids that are generated for that source data...

1:07:12 ...so it's...it's a different...slightly different setup. Sure.

1:07:17 [Audience question] If you create an image service from a mosaic dataset...

1:07:20 ...can you bring in the boundary and footprints as well? 'Cause I notice [inaudible].

1:07:28 You don't get the boundary, but...well, you get the extent, but not the boundary, you get the footprints. Yeah.

1:07:34 [Audience question] Is that the setting that Hong may have selected, because when she created the service...

1:07:40 ...it didn't come through when you added that to ArcMap...

1:07:43 It's just a default.

1:07:45 [Audience question] You mean a default [inaudible]?

1:07:47 No, no, no. It's a default that it's there. Yeah, if you're...

1:07:51 [Audience question] I haven't seen that before...

1:07:53 She didn't have it turned on. So, yeah, to see it in ArcMap, you go on to the display properties of the...the layer...

1:08:00 We'll set up...

1:08:01 ...and turn the footprint on. Bill...they'll set something up to show it to you.

1:08:03 They'll set up, show you, so that you can answer the next question.

1:08:06 Okay. Yes?

1:08:07 [Audience question] So this different image set is...typical what we have is one image set per year? Yeah.

1:08:13 [Audience question] Would it be better to create for temporal data, have one mosaic dataset for all data...

1:08:19 ...so you're all into one mosaic dataset?

1:08:21 We actually just wrote a help topic on that, and I'll try and find it.

1:08:25 I'm...I'm giving people advice on how to put these different types of datasets together, and in that specific case...

1:08:32 ...he's talking about having multiple years of the same sort of data.

1:08:37 So basically, we recommend that you build a mosaic dataset that has similar characteristics...

1:08:44 ...so it has all data of the same bit depth or data of the same time; set that up the way that you want it...

1:08:51 ...set up all three if you have three years, for example...

1:08:55 ...and then put them together in a...in a third, fourth...sorry...mosaic dataset.

1:08:59 So you manage them separately, but you now can access them as one.

1:09:03 And then set up the time on that one so that users can access the...the different time.

1:09:11 [Audience question] So you can have a dataset that represents secondary...

1:09:15 Yeah. And it doesn't really slow anything down. You can put it all in one, but it just becomes more complex to manage.

1:09:20 So just to try and make it simpler for people to manage, we recommend you just try and keep the same stuff together.

1:09:27 Yeah. Yes?

1:09:29 [Audience question] Is there any reason the 9.3.1...the upgrade to version 10, you have to launch [inaudible]?

1:09:37 Yeah, I didn't talk about migration, and I should have mentioned that.

1:09:40 Migrating your image service definitions into the mosaic dataset is really pretty simple.

1:09:45 You create that mosaic dataset with the Create Mosaic Dataset tool, and the same tool that you use to add all the raster data to...

1:09:53 ...you just point to that image service definition file.

1:09:58 It...all of the rasters and all of their...their processes will get ported into the new mosaic dataset.

1:10:07 The only thing that doesn't get ported over is any processes that you've defined on the image service definition level.

1:10:13 Because of those differences in properties and processing, you just need to redefine those.

1:10:18 But anything on the...on the rasters, that gets ported over.

1:10:22 And then you can pretty much zip up that ISDef folder and stick it on a storage disk somewhere.

1:10:27 The only thing that you need to save is if you created service overviews or derived images, those are source datasets now...

1:10:34 ...and they've also been moved into the mosaic dataset.

1:10:36 So just don't delete those or you'll...you'll mess up your mosaic dataset.

1:10:40 Make sure to move them too. Yes, red hat.

1:10:44 [Audience question] Two-part question. First question, do you [inaudible]?

1:10:55 Yes. Yes.

1:10:56 [Inaudible audience question]

1:11:01 Whatever you selected that you're going to download.

1:11:03 [Audience question] Okay. And then the second part of that is, you adjust it later or you get some modified [inaudible]...

1:11:11 ...dataset container that has all the...the [inaudible], scale and stuff.

1:11:17 No, when you're downloading, you're downloading the source datasets.

1:11:20 [Audience question] Okay. So that what is happening to create that dataset is that [inaudible]?

1:11:24 Yeah. If you wanted...if you wanted the imagery as it appears, you need to use Export Image...

1:11:31 ...but that only gives you the...the mosaicked image that you see.

1:11:35 Okay. I have...excuse me. Oh, yeah.

1:11:38 I have ArcMap right here and then back to the original question right here.

1:11:42 And yes, we can also display the footprint from the image service.

1:11:48 You have an option here in ArcMap.

1:11:50 If you are using a [unintelligible] Web API, you just make a query request to return the geometry.

1:11:56 And for requesting of downloading and save the processed image, if you want to save the processed image...

1:12:03 ...such as this Landsat, if there is...it is pan sharpened, I can just right-click, go Data and Export Data.

1:12:11 If you want to download the source raster when it is unprocessed, not pan sharpened in each band...

1:12:17 ...and if you use the DEM is also going to retain it for you. So just make a selection, then go to Data and Download.

1:12:25 Here it's grayed out because I don't have a selection.

1:12:27 And if you want just a portion of the image...

1:12:30 ...you can define the imagery just like Hong showed to you and clip it to that extent. Thank you.

1:12:38 Any more questions? Yep.

1:12:41 [Audience question] Could you go down that row, select the rasters so I can see some of the options...

1:12:46 ...for other raster types besides it download too?

1:12:52 Can you select a raster, Wenxue, and do the download? Well, download only gives you what...

1:12:59 [Audience participation]

1:13:00 Well, unless you're clipping.

1:13:05 [Audience question] So it really only gives you this sort of... Yeah.

1:13:07 There's another...I think...

1:13:08 [Inaudible audience question]

1:13:10 So if, say...

1:13:13 [Audience question] That's great.

1:13:16 What your question is?

1:13:18 [Audience participation] Actually, that...that answers my question.

1:13:20 It does. Oh, that's fine.

1:13:21 [Audience participation] ...that you can only get the source data, but unless you were clipping...

1:13:24 If you're clipping, then you get it as a...

1:13:26 Right, right. There's another way that you can, say, if you want to...where's the selection?

1:13:34 [Inaudible background conversations]

1:13:36 Is there a selection? Oh, here. If you...you can also add your data to ArcMap, have a...a layer name.

1:13:49 So say if you want to add a data that are processed and...and export the processed data...

1:13:58 ...you can add to ArcMap and then use data export.

1:14:03 Yeah, this is a great solution for the question that you had.

1:14:07 You can use that lock raster, add just those selected rasters then to your display, and then you can do something with it.

1:14:13 [Audience participation]

1:14:14 Yeah, exactly. Any more questions? Oh, my gosh. We had no hands a minute ago. Yes.

1:14:24 [Audience question] Is there a limitation for the input data of the mosaic? I mean, as far as file size.

1:14:32 It's usually [inaudible] large, like, [inaudible].

1:14:36 That's really nothing.

1:14:38 [Audience question] Really? Okay.

1:14:39 No, we don't have a limit on the file size.

1:14:41 And we...I mean, the thing that's important to remember is, again, you're...you're not moving any data over.

1:14:46 So as long as ArcGIS can read that file, we can put it in the mosaic dataset and use it.

1:14:50 Now there may be issues; maybe you have something that's oh, super highly compressed and...and it's slow to read.

1:14:57 That's not very ideal in any situation. But yeah, if it's...if we can read it, we can use it in a mosaic dataset.

1:15:05 [Audience question] I've got a separate question. And according to the download, you...you referred to I...IIS?

1:15:13 Yes.

1:15:14 [Audience question] Can I use Apache Web server to...I mean, it's going to be [inaudible] using Apache Web Server.

1:15:22 Yes. The question is whether I can use Apache server for my Web server, and yes.

1:15:29 And usually when you do...when you use Apache, people who usually use ArcGIS Server Java edition...

1:15:36 ...and by default, I think that there is no limitation on the...on the format that can be transmitted.

1:15:42 And if there is a limit, you can do similar things just like IIS, define the MIME type so it can be transmitted. Yes.

1:15:49 [Audience question] So in [ArcGIS] Server, it's going to be fully supported [unintelligible]?

1:15:56 Yes. For ArcGIS Server will have two platforms for .NET and for Java. They have the same functionalities.

1:16:03 [Audience question] Okay. That was it.

1:16:04 Thanks. Yes?

1:16:07 [Inaudible audience question]

1:16:16 TIFF with JPEG compression tiled, yep.

1:16:19 [Audience question] [Inaudible] Is there any change at all?

1:16:28 No, it's the same recommendations that we had before. Yes. There were a bunch of hands. Any more questions?

1:16:36 Hold on. Oh.

1:16:37 [Audience question] Is there any [inaudible] centers running .NET, so you have one mosaic dataset [inaudible] basemap...

1:16:46 ...someone creates a map service or a map document with that imagery, someone kind of builds...

1:16:51 If you nest services within services, yes. There's limitations. I mean, you really don't want to do that too much...

1:16:57 ...because you're relying on multiple servers and...and multiple different kinds of requests happening just to make your one request.

1:17:05 Do we have any recommendations? I don't know. We pretend...you know, don't go past three different levels...

1:17:13 ...and then it will probably just...it could grind to a halt, but, you know, it's...

1:17:19 Alternatively, you can actually put an image service into a mosaic dataset as a layer and then serve that up.

1:17:25 Because maybe you...you have data in a small area...

1:17:28 ...but you want to use an image service of the world to cover area that you have missing.

1:17:32 So we do make recommendations like that, but you don't want an image service pointing to multiple image services generally. Yes?

1:17:42 [Audience question] [Inaudible] I've got a mosaic dataset that's got all kinds of projections and then [inaudible]?

1:17:59 It absolutely should. And it does basically the same thing. It...it doesn't go through all those different transformations.

1:18:06 Just like with ArcGIS Image Server. Basically, the final transformation is what the source data goes straight to.

1:18:13 So, yeah. If your data is in a State Plane and your image service is in a UTM and your output is something else...

1:18:23 ...it's not going to go through UTM one datum to another datum and then into whatever the final thing is.

1:18:31 It's just going to go straight from here to there.

1:18:34 [Inaudible audience question]

1:18:36 It's true for elevation data. It's true for all of our...our supported data. Any more questions? Yes.

1:18:44 [Inaudible audience question]

1:18:50 Yep. We call them overviews. You...you know, we support pyramids a lot better too, so it might...

1:18:57 ...and we will really utilize any pyramids that you have built.

1:19:00 [Inaudible audience question]

1:19:07 Different technology is all I can say. Yeah, you can still use the pyramids or... But you know what?

1:19:13 You've already built all your service overviews, so you don't have to re-create everything that you've already done...

1:19:18 ...but if you're going to build anything new from now on, use the pyramids that you may already have had created.

1:19:26 [Inaudible audience question]

1:19:36 No, it's just like working with raster data. We don't try and do anything automatically for you.

1:19:40 But when you add that data, there's...in the Add tool, to add the data into the mosaic dataset...

1:19:46 ...there are some check boxes in there so that you can create the pyramids at the same time.

1:19:50 You can generate statistics, you can create thumbnails.

1:19:53 'Cause we know that people are going to have that same sort of an issue; they...they need the pyramids.

1:19:58 So no, you don't have to do it in a separate operation, but you still need to do it. Yes.

1:20:06 [Inaudible audience question]

1:20:14 We don't have that capability yet. It didn't quite make it into 10.

1:20:18 Yeah, so he wanted to be able to basically create his service overviews on multiple server instances.

1:20:25 Yeah, that was a great tool; it saved a lot of time. That is definitely coming and...

1:20:30 ...and I'm not sure what release, but we're hoping the next release. Yeah. Yes?

1:20:36 [Inaudible audience question]

1:20:41 No. We still read the old original .rrd files.

1:20:48 We now create something in 10 because we...we use something called GDAL now to read all of our data...

1:20:55 ...it's a .ovr file. It just has a different name; .ovr's are actually TIFF files.

1:21:01 The nice things about the pyramids now is we can compress them.

1:21:04 So we used to recommend that if you're going to create pyramids and generate statistics...

1:21:09 ...you save like an extra 10 percent of space 'cause that's going to get taken up.

1:21:14 By being able to compress your pyramids now, it's down to like 2 or 3 percent...

1:21:18 ...if you...if you add like a JPEG compression or something like that onto your...your overview generation.

1:21:24 But yeah, don't re-create the pyramids. We still read what was there.

1:21:31 Any more questions?

1:21:34 Alright, thank you very much.

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