

The ArcGIS System - Putting It All Together

Canserina Kurnia and Carl Byers give an overview of the ArcGIS system and how it provides a new way to share and access geographic information and functionalities from anywhere, anytime, and using any device. Note: Due to technical difficulties the slides are not viewable between 00:40:04 - 00:52:34 and 00:65:24 - 00:66:41.

<http://video.esri.com/watch/632/the-arcgis-system-putting-it-all-together>

Video Transcription

00:01 This is a technical workshop called The ArcGIS System—Putting It All Together.

00:06 I think that may sound...that's a little ambitious.

00:09 How many people went to the Plenary Session yesterday morning? Pretty much everybody.

00:14 And you probably had the sense then that there's a lot of emerging technology, especially with how GIS, in particular ArcGIS...

00:23 ... is used through the, quote, unquote, cloud, how it's being made available to the public to a really, really broad base of users.

00:33 And what we're going to focus on here in this workshop is how that system actually gets built.

00:39 We're going to have some fairly detailed examples of that system.

00:44 We're going to use a hypothetical disaster involving a derailed train car in Louisville, Kentucky, as our example.

00:51 But what we're going to do is we're going to look at this in a lot of the different environments in which we actually use GIS.

00:57 So we'll be looking at this in ArcGIS Desktop. We're going to be looking at this from Server.

01:03 We're going to be looking at this from the perspective of maybe one of the free...

01:10 ...several of the free viewers that come with our software, for instance, ArcGIS Explorer Online.

01:18 We're also going to look at Windows Mobile. And all these are different technologies.

01:24 And we're going to look at how these would relate to our hypothetical disaster scenario.

01:29 And from this, what we'd like you to take away is a sense of how this system actually works together.

01:36 We don't get to give you the...it's too big to talk about in an hour and 15 minutes.

01:42 It might take three days to bring in all the nuances that go with this.

01:46 This is, the subject keeps getting larger every minute that we keep talking about it. That seems to be my experience.

01:54 Perhaps that's your experience too. Everyone's you're...you're agreeing with me, okay.

01:59 Has everybody...seen ArcGIS Online now? Okay. And ArcGIS.com?

02:07 And everybody's perfectly crystal clear on what the difference is between those?

02:13 So if you type in...go to your Internet browser and you type in ArcGIS Online, it automatically defaults to ArcGIS.com...

02:20 ...and then opens up ArcGIS.com. And I work for the company, and I was going, you know, this is confusing.

02:27 So here's one thing we can just sort of start with.

02:29 ArcGIS Online, which we'll talk about in a little detail later on, is a repository...

02:34 ...where you can publish, share, collaborate...data, maps, services, all this other stuff.

02:40 And ArcGIS Online is the portal, if you will, the repository, and you can access that through ArcMap, for instance...

02:49 ...our desktop application in which case you go to ArcGIS Online to add data.

02:54 When you want to use ArcGIS Online through the Internet, you go through ArcGIS.com...

03:00 ...which is essentially the viewer, or the enabler, that gets you there.

03:05 So if everything else I do today doesn't make any sense whatsoever, I like to feel like I've done something constructive so far.

03:13 Okay, are we ready to begin? Yes.

03:15 Okay. Do you want to introduce yourself, Rina?

03:18 Yes, thank you for coming. Welcome. Is The ArcGIS System—Putting It All Together technical workshop

03:25 My name is Canserina Kurnia. I am a full-time instructor and a technical lead with the training services in Redlands, California.

03:33 And I am also helping a lot with industry manager with their demos.

03:37 I like...my passion is to introduce the latest technology from Esri.

03:43 And joining me today--Carl--Carl, want to introduce yourself, please?

03:47 Yeah, my name is Carl Byers; I'm also an instructor with Esri. I work out of the Olympia, Washington, regional office.

03:53 And primarily, my focus in GIS is on cartography and analysis.

04:00 So if you ask me questions related to cartography and analysis, we will have a substantive digression in that direction.

04:07 So please go ahead.

04:08 Alright, thank you. Before I start, let me ask you, How many of you are GIS managers? Few of you.

04:16 How many of you consider yourself as the GIS analyst? Couple of you.

04:23 How many of you actually have the GIS data that you need to be accessed from the field, using mobile devices? A couple, yeah.

04:34 How many of you actually want your GIS resources to be able to be accessed via web applications? Alright. Okay.

04:44 So we're going to try in here is to combine this, all the needs together through support by one system.

04:53 So the technical workshop is not only about the products and functionalities. 00:05:00

05:05 ...the concept about ArcGIS as a complete system. And how that actually we make it enabled.

05:13 The same vision and concept that Jack delivered yesterday in the Plenary Session...

05:19 ...one map, accessible by everyone, from anywhere, anytime, on any device, okay?

05:29 So the first part in here in the agenda is going to emphasize again about the system...

05:36 ...the importance to have all the resources in one system.

05:40 Then how about GIS? Is ArcGIS system enabled already?

05:46 And then after that, Carl will dive into the products and technology that make all the systems working together...

06:06 ...best products and analysis.

06:07 Is that, it's actually...oh, okay, you want to switch to mine? And let's take a look; alright, let me try here, maybe I haven't...

06:15 ...I haven't shared it properly. Sorry about that. Okay, alright.

06:21 So let's take a look at why a system, take a look at the system here. If you take a look at this picture of a city here...

06:30 ...does anybody know where is this? San Francisco? Well, you can think about that. I will give you the answer later on.

06:41 But if you see this city, this can be a city anywhere in the world. I can see the potential [that] GIS can be implemented.

06:49 It can be in the park/recreation, in the electric/gas, public works, tourism. A GIS can be implemented everywhere.

06:59 More and more, organizations realize the value of GIS.

07:05 They want to use it; they want to see their information on the map, okay?

07:11 Now, traditionally, every single group or department, they built their own GIS.

07:18 They use it, it's successful, but in their own group.

07:22 Another department then built the same thing, and it's successful. In also their own group, right?

07:29 So there is not much collaboration or sharing between the departments, okay?

07:34 And all this, the technology, GIS technology, and spatially, did not really also make it easy to share between departments.

07:46 But nowadays, GIS and its related technologies really provide a new way how to share and collaborate your GIS resources.

08:00 So all these departments, they're probably facing the same problem with the GIS.

08:05 Through the sharing, they probably can solve this problem together and make it more efficient.

08:12 So let's take a look [at] GIS if it's a system.

08:15 GIS is really good for collecting data from many different resources, integrate them and analyze them...

08:24 ...and turn it into actionable intelligence, into a knowledge that really supports the decision maker.

08:33 And then GIS also will become the common operating picture for all these people that actually have to work together...

08:44 ...to share, to collaborate, to communicate. So then it becomes and it results in coordinated action.

08:53 This is [how] we make it possible if we have GIS as a system.

08:59 So I summarize why to have the GIS as a system, it provides access from anywhere, anytime, on any device.

09:11 If you [are] working only in one unit in your GIS department locally on the desktop, once you want to share it...

09:20 ...it will be harder to share compared with if you have those resources in the system.

09:28 So system supports many missions and workflows...

09:32 ...integrating information, improving efficiency by sharing, meaning we reduce the possibility of redundancy in the data.

09:43 We also provide real-time information.

09:45 If I'm in the system, if Carl, for example, does editing to the data, I can see it [in] real time, the changes.

09:53 So it leads into better decision, quicker decision, and effective communication as well.

10:01 Now to illustrate that, let me show you the diagram of the GIS, ArcGIS. 00:10:08

10:12 ArcGIS is not only easier, more powerful but is also everywhere.

10:19 I can use ArcGIS in my desktop application, but I can take the technology of ArcGIS into a mobile application in the field.

10:30 And I also can use its components in the web, okay?

10:36 So regardless which level I am [at], desktop, mobile, or web, I can still do the same GIS functionality.

10:45 I can collect data, I can discover, I can create, I can manage, visualize, analyze...

10:53 ...and the most important now is collaborate between all of these levels.

10:58 I can start from local system, going to the enterprise, and more and more now, people [are] going to the cloud...

11:06 ...so have all the infrastructure in the cloud, okay?

11:14 ArcGIS addresses many common workflows as well.

11:17 I may start with my GIS group, and as my GIS group, if I have all my data into one system...

11:25 ...one geodatabase, for example, I can use that for many different purposes. I can use it for asset management.

11:35 I can use it for my cartographic group to create really nice maps; I can use it for modeling and analysis.

11:43 And with the other group, I can use one system for design and planning, for the field collection...

11:53 ...and for showing the collaboration and transparency, and also to support situational awareness.

12:00 If there is a situation [that] happens, like train accident, maybe then by one system, all the agencies can use the same data.

12:12 So to illustrate this, I'm going to give a demo [of] ArcGIS as a complete system.

12:18 The story behind it is there is an accident in Louisville, Kentucky.

12:23 A train that [is] carrying hazardous material has been derailed and [is] releasing dangerous gas.

12:33 As the manager of City of Louisville, I have to act quickly, collect the data, and analyze the impact.

12:44 I need not only to work with my GIS group to do the analysis, but I also have to work with many different groups.

12:52 With the public officials, police, and fire department; I have to brief them about the situation.

12:59 Also, I have to work with those people in the Emergency Operations Center, where all agencies work together to handle the situation.

13:10 I also have to work with the field crew.

13:13 This field crew is the one that I dispatched to the field to do the damage assessment.

13:18 Last, but the very important one, I also have to brief the public about the situation.

13:26 So where should I start first? I will start from the desktop. Desktop is always a good start for me.

13:34 It's always good application for me to get started.

13:38 Here, in my desktop, I collect the data. This is where the accident is located.

13:48 And using a model, a spatial analysis model, I calculate where the impact will be.

13:56 So there is something called ALOHA plume model that calculates what is the chemical content, the wind direction...

14:04 ...and creates where is the area that gets impacted. And I create what is called hot zone around it, okay?

14:14 I also collected some critical infrastructure like hospital in here.

14:22 Then I also used the data from ArcGIS Online so I can put the basemap underneath that.

14:29 So I can get the idea about like, oh, what are the major highways going into the impacted area?

14:37 And there is a big river in here that [is] also going to the area, okay?

14:41 So ArcGIS Desktop is really a good way for me to get started collecting the data and analyze the situation.

14:50 But now, I need to go and brief...to the briefing room to brief the police and fire departments.

14:59 To do that, I uploaded all my data into the system.

15:04 In Carl's presentation, I'm going to give you a demo how to actually publish it into the system.

15:11 So basically, I publish this into ArcGIS Server, okay?

15:16 From there, then I go to the briefing room, and I actually access the same information but using another tool.

15:25 This is what is called ArcGIS Explorer Online. This is available from the ArcGIS.com.

15:34 From the Presentation tool, I access the same information in here. So I can see in here all the layers that I have.

15:43 I can zoom in and zoom out on the map as well.

15:48 Now the nice thing about ArcGIS Explorer Online, I can build presentations.

15:53 So basically, I can see all the...I can create slides for the briefing.

16:01 So I'm going to play this presentation.

16:05 So it really starts with, alright, this is the area, this is the city limit of Louisville, Kentucky.

16:11 And this is the train location, and this is the picture of the train accident.

16:19 And next, I show them as well what's the model that I've been running and where the impacted area [is].

16:28 Not only that; I also access services that show the demography of the area.

16:37 And because the accident happened in the morning, the daytime population is more meaningful.

16:43 I also link into a graphic about how many people got affected and what is the age group.

16:51 I point out to the police and fire department there are many children and elderly in the area.

17:02 So we have to plan the evacuation accordingly.

17:10 Next, I also show them critical infrastructures, like hospitals, in the area.

17:17 By zooming in, I also can give them, in more detail, information of each of the hospitals.

17:26 And again, this is the real map that I also have in my desktop.

17:33 Next, I also show them all the major roads that need to be blocked, entering the area. Also the potential location for the shelter.

17:49 I also reach more than the data that I have; I access the services from the National Weather Service...

17:58 ...that's showing the current precipitation in the area.

18:04 And also the wind direction, because these can change the affected area.

18:12 I also show them where the staging is located now so all the agencies can work together here.

18:24 And where are other resources available, for example, the dump truck and the food supply to the staging location.

18:37 I also show them where I dispatch my field crew to do the damage assessment.

18:43 Some of the area has already been completed, but some others [are] still in progress.

18:51 Next, I show them live application in here, live data, where is my crew at the moment, and

also which area that has been surveyed.

19:04 So I show them that the red one is actually damaged, and then the yellow one is the moderately damaged...

19:11 ...and the gray one has not been surveyed yet. Not yet, okay?

19:18 So by doing this, then I really showed them...they're not GIS users...but they can see my data, they can see my analysis...

19:28 ...and then what happened on the field.

19:31 So when they go out from the briefing room, instead of [my] giving them the paper map...

19:37 ...I ask them to access all the information from the mobile device such as iPad, iPhone, mobile phone, that they have.

19:45 So they can actually monitor what happened on the field from the mobile device. So that's the briefing room.

19:56 Now I have to work with those people that work in the Emergency Operations Center.

20:02 For them, I created a web application. This web application is based on the Flex Viewer.

20:09 Probably some of you [are] familiar with this already. Again, it's accessing the same map from the same system, okay?

20:17 From here, I can change the basemap, I can also go to the bookmark and zoom in to the damage assessment area.

20:29 So in here, maybe I'm going to change it to the arrow in here and enable the same damage assessment area.

20:40 So from here, they also can track the progress of the field crew, yeah.

20:47 Now, talking about the field crew, what did I have for them?

20:50 Well, I can have the mobile application based on the iPhone or Android or based on the ArcGIS Mobile.

21:02 So now, I'm going to let Carl handle the ArcGIS Mobile application and make the changes like he is in the field.

21:11 Anyway, what I...just to recapitulate what I said, we looked at this in a number of different platforms.

21:16 Now I'm looking at a different software product; this is called ArcGIS Mobile, and this is on a completely independent device...

21:24 ...but it's still, once again, capturing the same content from the same service.

21:29 And so, for instance, if I go to Tasks in my mobile device here, I can go to Identify, and perhaps I'll pick this structure right here.

21:42 And I've selected it, and I discover at this point that this is actually unsurveyed, and maybe my field crew does a brief investigation...

21:50 ...and we discover that, well, now that we surveyed it, that we have to actually change this.

21:56 In this case, we're going to change it to this structure has been destroyed. Then I can finish this.

22:02 And then notice that when I go back to my map, that I've actually changed...

22:06 ...remember that was the gray, unsurveyed color when I began.

22:10 And Carl, can we quickly switch to my laptop and see if my viewer changed as well.

22:16 Okay, so now you're looking at Firefox Internet browser...

22:20 ...and notice that her display in the upper left has changed to reflect my changes on my mobile device.

22:26 Can I show them into my iPad first, please?

22:29 Okay, sorry, I turn on my iPad in here...can you switch to iPad. Let's see if it's picking it up as well.

22:39 So let me just go in here, and then sometimes in here I have to do a little bit; because this is using wireless...

22:50 ...it normally takes longer, but did you see that?

22:53 Yeah.

22:54 The quality; I don't like the quality, but you see that it's also changed on that.

22:58 So my manager can be in Starbuck coffee shop, but it can still monitor what happened on the field.

23:06 And I'm in the operations center; I can see my viewer in the browser and see the change.

23:12 And Carl is on the field; he's doing the editing. What about doing another editing there?

23:20 A little more? Yeah.

23:22 Perhaps we have, looking at this block further, and we realize that we have to block off--one of these areas is still hazardous...

23:30 ...and we need to block it off from any access from field crews or from the public.

23:36 So maybe I can go in; I can collect some features, I'm going to do some redlining here.

23:42 And I'll use my default values when I actually do this. I'm going to collect geometry in the map interface.

23:48 I have the alternative, perhaps, of using a GPS device if I want, so I'll collect using the map.

23:54 And let me just, I'll use this parking lot right here as an example. And I'm just simply going to come in and...

24:02 ...and I'll accept that, and I'll edit the attributes. And in this example, I'm going to make this, how about inaccessible.

24:10 Then I'll go OK, and I'll finish my feature, and I'll view this in the map now.

24:17 So I've actually now created a new feature using a mobile, remote device, that going through an ArcGIS Server...

24:25 ...and now this is actually showing up in, this is actually now going to be available in...

24:31 ...I'm going to switch this back to Rina's computer; this is now available in the Flex Viewer...

24:36 ...which is using Internet browser to access this information.

24:39 So, in summary, in my demo, I showed you that if I manage my ArcGIS resources as one system...

24:48 ...this gives me a new way how do I share the information, not only with the GIS users but also non-GIS users.

24:56 In the situation like the train accident like this, it's so many agencies working together; they need the same information...

25:04 ...regardless they are GIS user or not.

25:06 So using that so many variety different of tools, browser, mobile device...

25:12 ...and also like ArcGIS Explorer Online, it can like give the message...

25:18 The most important is the message itself and then the importing of the data to solve the situation.

25:25 So I hope I give the clear picture from the demo about the importance to have GIS as a system.

25:33 So, let me continue a bit in here that I work with many users and many organizations, and all of them...

25:44 ...even though they probably have different business purposes, but each of them has the same pattern.

25:55 So we saw that the pattern that they deal with is about these five patterns.

26:01 First, every organization has to manage an asset, manage something. Either they manage people, equipment, building, parcel.

26:13 They manage something. And GIS has been really good in helping the asset management.

26:19 ArcGIS Desktop, Mobile, is all good in store, manage, and maintain the accurate asset records.

26:28 Then we turn all this data to transform that into actionable intelligence. We do planning and

analysis.

26:39 We know the power of GIS in planning and analysis. But then we also support field mobility here...

26:47 ...get information into and out of the field.

26:51 The technology's ready; there's many varieties that you can choose for doing GIS on the field.

26:59 Now we have to share, disseminate the knowledge, to all that need it. We call it operational awareness.

27:07 We have the technology for that. You can decide to create web applications, if you like, and other types of applications.

27:16 And the last one here, the last pattern, is newer, but it's become more and more trendy, is citizen engagement...

27:26 ...where we give the information to the public but also ask the input from the public. Okay?

27:34 Crowdsourcing mapping or volunteered geographic information. And all those [unintelligible] has become important now.

27:43 Alright, so that's the first part of this presentation about all the system, putting it together, but now let's understand the details.

27:52 What are the products and technology that enable all this to become a system, one system?

28:00 And Carl will take that from here. Okay, thank you, Rina.

28:14 So I think almost every year we go through this exercise [inaudible]. Excuse me.

28:29 This theme of putting it all together, we've done this almost every year.

28:34 There'll be some workshop, some track that actually looks at this.

28:38 And I've actually looked at some of the presentations that have been done in past years, and one of the things that they often do...

28:43 ...when they say, well, let's put the whole system together, is they show you all the software.

28:48 And they show you all the software products.

28:51 And a couple years ago, someone had the bright idea of actually alphabetizing all those products...

28:56 ...and I'm going to show you this really as a point as to what I'm going to try to actually avoid here.

29:05 Oops, look like I lost my link there.

29:07 I'll go ahead, I'm not going to bring up the website; we have a link to it later.

29:11 We have 77 different products that...distinct, identifiable products...

29:16 ...and I don't think we're going to really understand what a complete ArcGIS system is by going through those products one by one.

29:25 Rather, what I'd like to do is to talk about this not in terms of a stack of applications or something like that...

29:31 ...but clusters of applications, which together build something like the system that we're envisioning in this slide.

29:39 And I want to go through it more or less in this order, starting with data.

29:43 I'm going to talk about this in terms of a data-driven system.

29:46 I'm going to talk about our desktop GIS. I'm going to talk about server, ArcGIS Server as a technology.

29:54 And then the last part we'll touch on here is the mobile portion of that.

30:02 So GIS is a data-driven system. We don't make this stuff up; it actually comes...

30:09 We're actually talking about real data stored in, I guess, real databases at this point.

30:14 The geodatabase, which is in essence a specialized type of relational database management system...

30:21 ...leverages that database technology and applies it to spatial data.

30:27 So the geodatabase is our default storage mechanism.

30:32 The geodatabase is intended to work with all the other existing relational database management systems that are out there.

30:39 So it can live in or on, if you choose, with Oracle, with SQL Server, with Postgres. You know, your choice.

30:47 It's also scalable. We have geodatabase versions that live on your desktop computer.

30:52 The file geodatabase is, in fact, the default storage mechanism for data on the desktop.

30:59 The scalability includes both the size of the database and the number of people who are working with it, the number of editors.

31:05 Anybody here from the City of New York?

31:08 City of New York really has all of their parcels--they have two million parcels.

31:12 They have all that in one feature class, and they have about 10 editors that simultaneously maintain that single feature class.

31:20 So the idea here is that primarily that it's scalable; it's a high-performance system.

31:26 There's a few little detailed bullets here. Maybe you can't read this, I think, and I'm not going to go through all these.

31:33 In addition to storing feature classes, that is, tables that contain geometry, we also have stand-alone tables.

31:39 We also have specialized technologies for symbolizing our data that can be stored on the database.

31:45 We can store annotation; that is, the text information that we put in our map, as feature classes in the geodatabase...

31:52 ...plus we can do all these other things that involve very specialized behaviors like build topological rules.

31:58 So we can have a rule that says one parcel must not overlap another parcel, for instance.

32:05 Again, so these are all database-driven systems.

32:08 Now, when we start talking about ArcGIS Desktop, again we see the same type of scalability that we saw in the database...

32:15 ...and we're going to see this again when we look at ArcGIS Server.

32:18 So there's really three levels of functionality in ArcGIS Desktop, and those are going to include...

32:25 ...at the beginning level, ArcView, then go to ArcEditor, then to ArcInfo.

32:30 Now if you're a manager and you're installing the software, deploying the software...

32:35 ...the installation for the desktop is the same everywhere in the system.

32:39 And everyone does exactly the same install unless you choose to customize it, and then the functionality is controlled through licensing.

32:46 Most large organizations use some constellation of licenses where maybe they have a number of ArcView users...

32:53 ...perhaps a few more ArcEditor users, and maybe several ArcInfo users.

32:58 The differences between those levels of functionality are fairly distinct.

33:02 ArcView really is about using the data, making maps, manipulating the maps, extracting information from the maps.

33:09 But there's a real distinct divide between using the map and actually producing maps, and at the ArcEditor level...

33:16 ...you get much more comprehensive editing tools, you have the ability to create something called relationship classes...

33:22 ...which are the permanent associations stored on the database that associate records in one table with records in another table.

33:28 You get more mapping tools, more editing tools, more geoprocessing tools.

33:32 At the ArcInfo level, you get the complete set of geoprocessing and analysis tools.

33:38 You also get all the advanced cartography tools.

33:41 And in fact, if you're involved in finished production cartography, you probably will need at least one ArcInfo license.

33:48 So that's generically the way it's set...

33:49 I'm going to apologize on behalf of Esri. We have this way of coming up with a good name for something...

33:56 ...and instead of retiring it when its time comes, we just reuse it.

34:00 So now ArcView is a level of functionality as opposed to a stand-alone product that some of you remember perhaps from years ago.

34:08 You remember that exactly, right? Okay.

34:13 How do you go about familiarizing yourself with all that functionality? This is actually kind of...

34:18 Again, this is not the way to go, I suppose. Let me open up...

34:22 Here's...we have a functionality matrix; doesn't that sound useful? You should be nodding to yourself, "Yeah, that's great, Byers."

34:31 It's 44 pages long, and we'll just scroll down so you can get a sense of what it looks like. And we have pages and pages of this.

34:39 This tool's available at this level of licensing, this level of license.

34:43 This is not a good way to...I'm not sure who's going to use this.

34:47 It used to be a poster, and you could print it out and put it up on your wall. I don't think people are doing that anymore.

34:53 We have other ways, actually, of exposing the functionality. Okay, I have to do this, though.

34:58 Rina and I are both trainers; we train people how to use GIS, so I'm going to say, oh, you can take a course from us.

35:06 We have, at any given time, about 50 instructor-led classes and about twice as many other types of offerings...

35:12 ...some of them delivered...some of them very short, some of them long; many delivered through Internet.

35:17 There's other sort of tutorial products that are available.

35:20 We have a lot of training available. The training is something that continuously evolves.

35:24 Now, when you're trying to embrace all this functionality, when you're sitting at your desktop...

35:30 ...I will just say a couple things about the software.

35:33 For instance, in terms of the help, our help files have been progressively upgraded and have evolved...

35:43 ...from a merely hierarchical structure to the help blockiness to something which I think the web people would call "semantic."

35:50 So the ideas are linked together in a logical and perhaps intuitive way, and so when you actually go into our help files...

35:58 ...and look at something under Geoprocessing, under Commonly used tools, there's Proximity Analysis...

36:06 ...where you might've found a buffer, but you'll also find a lot of other links in here related to other applications.

36:13 "Network Analyst can also be used to compute origin-destination matrices."

36:17 Okay. Help files are a comprehensive document to help you explore all that functionality.

36:24 The classes we teach are more commonly related to workflows, what's a really good way to link all these things together.

36:30 And then, finally, in ArcMap itself, one of the things that's relatively...

36:38 ...or is new in Arc[GIS] 10 is the search technology inside the software.

36:43 And if I type in something like buffer and search for tools, I'll actually get a...the search tools are actually very fast...

36:55 ...but what they do is they, again, they expose relevant content to what the tools are, how they fit into a workflow...

37:03 ...how they relate to other tools, and how to find them.

37:06 And they actually also are linked to--if I can get my mouse to cooperate--I can even...they even...

37:14 ...we simply even have metadata for our tools.

37:17 And so here I just opened the item description for buffer, and it comes with some nice graphics...

37:23 ...but it also comes with very extensive document-- I'm not going to read all this and I hope you don't either.

37:29 A lot of information that goes with it.

37:31 So the key point I want to make about ArcGIS Desktop as such, it's a very mature, complex, large product.

37:41 It's perhaps the largest single application or stack of software that you can actually install on the Windows operating system.

37:49 And it's very well documented, very well supported.

37:55 So a few other things to say about the desktop and we'll have another demo here.

37:59 At the highest level, we can talk about the Desktop applications in terms of what they do.

38:03 ArcMap is where we do our cartography, our analysis, our editing.

38:08 ArcCatalog is a stand-alone application for data management purposes.

38:12 I think all of us here have data management tasks, many of which don't require the presence of a map in order to actually do this.

38:18 We have two 3D visualization environments--ArcGlobe for relatively small-scale visualization...

38:25 ...and ArcScene for large-scale visualization; 2D and 3D visualization.

38:33 Recently, starting at ArcGIS 10, we've moved toward--the evolution of the software's been toward a single operating environment...

38:40 ...and so now, for instance, there's the Catalog window in ArcMap which will allow you to accomplish most of the things...

38:46 ...normally you would do in ArcCatalog actually in the ArcMap interface.

38:50 I don't think you can go in and delete the map document you're working in, though.

38:57 Also, in addition to the core desktop software, we have extensions.

39:01 And the extensions can be grouped fairly logically according, you know...

39:07 ...as the analyst series, productivity tools, and specialized software.

39:10 The analyst series are going to be things like Spatial Analyst, Geostatistical Analyst, Network Analyst.

39:18 Productivity tools and specialized software, those are things that are going to affect, be related to your particular workflow.

39:27 We have tools for facilities management.

39:31 We have specialized solutions for aeronautical and nautical disciplines, those sorts of things.

39:39 Production mapping. So we've got a lot of extensions.

39:42 The t[r]end in the software has been for more functionality to move to the core from the extensions...

39:47 ...and also for functionality to move down to the ArcView level.

39:50 That's just generally the way it's evolved now for the last seven or eight years.

39:55 What I'd like to have happen now is Rina to show us a little bit of her desktop...

39:59 ...and she's going to look at some more of the functionality that I've been talking about.

40:05 Thank you, Carl. [Interference] Yes. Thank you. Okay. Alright, thank you, Carl.

40:18 So Carl already gave you some demo of the ArcGIS Desktop.

40:22 Let me ask you, How many of you [are] actually using ArcGIS Desktop already? A few of you? Thank you.

40:29 How many of you [are] using ArcGIS Desktop 10? A few of you, okay.

40:35 The one that I show you in here is ArcGIS Desktop 10, so this is ArcMap.

40:42 And from ArcMap now, I can actually access the ArcCatalog nicely from here, so I don't have to open as a separate application.

40:51 And again, I also can go and do the search in here.

40:56 So one thing about this as well is I continue with my story about the train accident in Louisville, Kentucky.

41:06 So as the GIS manager, I also want to create what is called vulnerability map, hazard vulnerability map.

41:15 So what I collect in here is, I collect...because this city is near the river, so there is a flood hazard, potential flood hazard.

41:30 There are several hazmat facilities, so I collected the information and I buffered them.

41:39 Then I also buffered the railroad because it's a lot of this chemical content is actually carried by the train.

41:50 And also by truck, so I also buffered the hazmat roads from there. And using the...

41:59 Not only that. I also have the map of vulnerable populations where there are...the elderly and children are mostly concentrated.

42:09 And also the density map of critical infrastructure. So it's got a lot of critical infrastructure in here.

42:17 Now, using the power of GIS, then I create a model in here, which is the...it's called...I name it Vulnerable Assessment...

42:30 ...which is, this is the input of the hazard, and I use a tool that's called Risk Weighted Overlay.

42:37 That created a hazard map, and then I incorporate as well the critical infrastructures' location and demographics.

42:45 I use Map Algebra tool from the Spatial Analyst extension...

42:49 ...then I got the result of these combined hazard variables to create the vulnerability map.

43:00 So this is the result in here.

43:09 So let me see that in here. This is the combination and then the green is the low risk and the red is the higher risk of the hazard, okay?

43:22 So by using this information, when the train accident happened like this, so I can, like, take a look and overlay which area...

43:31 ...how many percent of the impacted area is actually high risk of the hazard vulnerability.

43:42 So with that in mind, I also share the information with other agencies how we have to handle this situation.

43:49 So in summary, Desktop, ArcGIS Desktop, is really a good way for me to do analysis...

43:54 ...and create a new understanding about the area where I working for. Back to you, Carl.

44:03 Thank you. So we've seen several things now.

44:26 We've seen the desktop, we've seen the mobile service, we've seen the Flex application through the Internet browser.

44:34 The part that makes all this work and the part that...how all these things are connected is through the web.

44:39 And the web part is enabled, if you will, by using ArcGIS Server.

44:44 I should also say something, I think when I introduced myself, I said I did mostly analysis and cartography.

44:49 I usually don't work with Server; I don't work with, you know, big complex databases, that sort of thing.

44:54 But I have to say that in terms of what I...in terms of, say, installing Server, getting a data service up and running...

45:01 ...getting a map service up and running, you don't have to be a programmer or developer to actually do that.

45:06 It's actually, it is, you know, commercial off-the-shelf software.

45:10 If you accept all the defaults in the installation process, you'll end up with something working in about 10 or 12 minutes.

45:16 It really, it's become a whole lot easier.

45:20 Now, in fact, we're actually seeing, what we're seeing in this slide is the Desktop...

45:26 ...which Rina was using to author, for instance, a map.

45:28 ArcGIS Server, well, this is where all the services are housed and where they're enabled...

45:33 ...and then we've already seen examples of mobile, web, and desktop clients actually using all this content.

45:41 So by putting this stuff on the server, we not only enable the complexity of this complete system...

45:48 ...we actually end up getting a higher-performance system.

45:51 We're actually able to do things instantaneously involving any number of participants, any number of technologies.

46:00 So when we talk about the dissemination, collaboration, sharing, maybe even crowdsourcing information...

46:05 ...maybe that contaminant plume we'll have people reporting to us on their iPhones...

46:10 ..."Yep, I can't breathe," "Yep, I can't..."

46:12 Well, we can actually crowdsource information for these types of events.

46:15 So Server is the core part of this.

46:19 Now, there are different types of services out there, and we should spend just a couple minutes talking about these.

46:26 What we've looked at so far are all versions of map services.

46:29 So when I have a map service, I can have a map service just for visualization...

46:33 ...but I can also have a feature service that allows me to perform edits...

46:36 ...or maybe I can have a mobile service that allows me to support multiple mobile devices using that service.

46:42 I can have a globe service. In other words, I can publish something in the 3D environment.

46:48 I can have geocoding services. We're all familiar with geocoding.

46:52 You type in an address and a map opens up and it shows you the real-world location of the address you typed in.

46:57 You can embed geocoding services in any of your other services, or you can have a stand-alone geocoding service.

47:03 ArcMap, the regular desktop application that you're using, has embedded geocoding functionality as well.

47:09 If you go to the Find window, you can type in your address, and you can find your way home; hopefully you don't need to do that.

47:16 You can have data services.

47:18 You can have geoprocessing services.

47:20 These are services that use analysis tools or perhaps a whole series of analysis tools to generate some sort of result.

47:27 I think the examples we saw yesterday involved drive times, for instance.

47:33 You can have image services. How many of you have a lot of imagery? Like gigabytes, terabytes. Anybody in terabytes?

47:41 Yeah. And it's everywhere now. How do you... You need tools for managing that as a resource.

47:47 You need tools for managing that in such a way that the people who need access to it can get it.

47:52 There is...Image Server is an...

47:55 There's an Image extension to ArcGIS Server that will actually allow you to do all your image enhancement.

48:03 That'd be your panchromatic sharpening, your orthorectification, your mosaicking, your color balancing.

48:08 You can do all that stuff on the fly, and it's actually a very fast-performing system.

48:13 You can store all your imagery in its native format, so again, Server will support you doing that as well.

48:20 Like the other things we've looked at, it's scalable in terms of basic, standard, and advanced in this case.

48:25 The basic Server configuration is for a data service. It's for a data service.

48:32 Standard allows you access to some simple web editing and basic geoprocessing tools...

48:39 ...and then the advanced level, you've got access to all the geoprocessing tools in the server environment...

48:44 ...and you also can support a mobile system. It's not just a...

48:48 When you're actually using just one mobile device, you can actually support that with a desktop...

48:55 ...but generally speaking, when mobile systems are deployed, it uses multiple systems there.

49:03 How does this happen? Anybody familiar with any of the acronyms up there? Any favorite? Any personal favorites?

49:11 Www works for me. The way all this works is ArcGIS Server and ArcGIS in general conform to any number of industry standards...

49:22 ...which are unfortunately all characterized by acronyms.

49:26 In addition to supporting the general standards, in terms of our Server functionality...

49:30 ...we also support something called REST.

49:35 And REST is a--Representational State--it is a...

49:43 What the server does is it preconfigures certain types of output and makes them available at endpoints...

49:49 ...attached to your server--attached to your service.

49:52 And then other, these open APIs that we refer to, Flex--those are application program interfaces...

49:59 ...Flex, Silverlight, and JavaScript, they can go and make a request from the server.

50:03 And what they're looking for has been preconfigured through the REST technology...

50:07 ...so they're actually very...they perform very, very quickly.

50:10 They don't have to go deep into the machinations of the service, of the data service behind it...

50:15 ...to actually get everything it needs to fulfill the request.

50:19 So that technology is very important. In fact, I would go so far as to say--and please correct me if I'm wrong, Rina...

50:26 ...that most of the web maps that I see deployed, most of the web apps, applications, that I see deployed...

50:33 ...are relatively targeted in what they do, and virtually all of them are being created now with these open APIs.

50:41 That's my basic perception, and I'm not wrong, am I? No, see, I got that one right too.

50:49 So what we should do now is have Rina actually show us a little bit of the process of actually using ArcGIS Server.

50:57 And I'll switch you there. Thank you, Carl.

51:01 So I've been uploaded most of my data about the accident into the system, but this one is not yet, the hazard vulnerability map.

51:14 So I'm going to show you how do I publish it to ArcGIS Server.

51:18 I can easily do that from my ArcGIS Desktop.

51:22 In ArcCatalog, in here, there's a link that I can add GIS server, ArcGIS Server or WMS server or WCS. I use ArcGIS Server.

51:34 So in here, if I want to publish this service, then I have to manage the GIS services.

51:40 I click, and I put the URL into where the server is located and the host name.

51:47 I make already that connection, so this is my connection into the server here.

51:56 I can always show you the server properties in here, so where is this host, the host of this service...

52:07 ...and then the directories that is [unintelligible] and everything in here.

52:12 And I believe I opened the properties in here.

52:14 You see this is basically my server URL, trainingcloud.arcgis.com/arcgisservices.

52:21 So this is the one that enables it as a system. I have ArcGIS that [is] not local in my machine.

52:28 It's actually somewhere that people can access it from many different locations, many different devices.

52:35 So it's outside my firewall, okay?

52:39 Now, actually, the machine that I am working [on] at the moment is the trainingcloud.arcgis.com.

52:48 This one here, I remote desktop into this training.cloud.arcgis.com.

52:53 This server is in the cloud, in Amazon EC2 cloud, okay? So I can easily work with ArcMap in the cloud.

53:04 And I'm now going to publish this as a service.

53:09 So the name of my map service...the name of my map document is For Publishing.

53:16 I can have a better name there if I like to. So if I...

53:19 What I'm doing in here is right-click on that, Publish to ArcGIS Server.

53:26 And I have a folder in here named Demos, and I think in here I'm going to put the risk map, for example.

53:40 And then I go to Next. This is the capabilities.

53:43 If I would like to access this map service from the ArcGIS Mobile, I have to enable mobile data access.

53:53 ArcGIS Mobile is not iPad/iPhone, okay? So Carl will talk about that.

54:01 If I want to enable editing on the web, so other users can actually add/delete the feature, I enable feature access.

54:11 Again, this is only enabled in--starting in ArcGIS 10.

54:16 But at the moment, I just leave it like this.

54:18 Also, there is the capability to integrate with KML.

54:23 I click Next, Finish. So then it will take my data, then publish to ArcGIS Server.

54:32 So if I go into my demos in here, this is my risk map as a map service. Okay?

54:40 Now, since this is in the cloud, I can directly go now into my browser, and I'm going to open ArcGIS.com.

54:53 This is ArcGIS.com, and I open the segment My Map, okay? This is the built-in viewer in ArcGIS.com.

55:01 So what I can do in here is, I'm going to zoom in to Louisville, Kentucky. Here you go.

55:14 And I'm going to access the map service that I just created.

55:19 So I go to Add, Add Layer, Search for Layer. Okay, let me just make it so you guys can see it better in here.

55:33 So what I need in here is I have to access a GIS server, which is my trainingcloud.arcgis.com, and that's enough.

55:50 So it will then find all the layers that are available in there. I just need to find my risk in here.

56:00 I don't like the...what is it? The resolution here. Let me try again. Is it this one here? Maybe this one, huh? Oh, yeah, this one.

56:16 So I can just click in here if I like to and see the map and add to this, add to the map. So here you go.

56:31 And I can continue in here, save it, save as My Map. For example, this is the Louisville Risk Map and put the tag. Whoops.

56:53 I'm going to put the tag my name so I can find it easily, but maybe this is also Louisville, and put the description in here.

57:09 So when I save my map, what happens behind the scene is it remembers all the layers that I added into this map...

57:17 ...and then saved it into My Content in ArcGIS.com.

57:21 So by doing that, then I can easily access it from web applications for the mobile devices and all of them.

57:31 So now I go to My Content. Just real quick I'm going to show you what...the description about this.

57:45 So this is the risk map; I open the description.

57:55 So this is the two layers I use. One is from trainingcloud, and the other one is the basemap, okay? Okay.

58:03 So let's go back to you, Carl.

58:17 So unless I'm mistaken, I'm not actually even keeping count of the number of different venues we've exposed content in this afternoon.

58:25 We just saw taking a map, publishing it to a service and consuming that service through ArcGIS.com...

58:35 ...and that's one of the free viewers that we provide. So that was...

58:41 I want to add one more piece to our discussion. We're talking about this whole system.

58:46 I started with data, we talked about the desktop, we talked about Server.

58:49 And there's one more large piece to this system, and this is Mobile.

58:53 And I know from the show of hands we saw a little while ago, many of you are not here for mobile services per se...

59:00 ...but I think we're all certainly quite aware that the growth of the consumption, at least, of our Internet...

59:08 ...of our GIS services is through the Internet and also through mobile devices.

59:12 So a key thing here is, first of all, this is usually server based. It's usually server based.

59:18 There are a few alternatives to this. You can, on a limited extent, run mobile applications from your desktop.

59:25 You can do that with a single device, like another laptop, or there's another piece of software, one of our products.

59:32 It's called ArcPad.

59:33 Are there any ArcPad users here? Okay, we've got, we're up to two. Do I see three? Do I see...not yet. Okay.

59:42 ArcPad is considered more of an ad hoc mobile implementation, primarily for...

59:48 ...especially for use for extended periods of time actually in the field.

59:55 And it essentially takes your GIS with you in your mobile device.

1:00:00 The mobile, the regular mobile implementation, you get to specify, control what that looks like.

1:00:06 It usually is a somewhat thinner client, actually, than ArcPad.

1:00:10 But anyway, ArcGIS Mobile for Windows, which you might do on your Windows-driven device...

1:00:17 ...and maybe that would be my ruggedized laptop example...

1:00:21 ...and I can use that for interaction with the server, I can use it for data collection...

1:00:24 ...I can use it for data correction, fields checking.

1:00:27 I can get workflows, work orders actually delivered to me through that service.

1:00:32 ArcPad, again, an ad hoc implementation.

1:00:34 And then probably the thing that has everyone moving in one direction or another is the fact that...

1:00:41 ...these mobile services can be consumed on the device that many of you probably have in your pocket.

1:00:48 How many of you have a--how many have a smartphone? Everybody. Is there...is anyone--

1:00:54 I'm afraid to ask if anyone doesn't.

1:00:57 How many of you have an iPhone? And anybody have a Windows Phone? Okay, we've got a couple.

1:01:05 And then Android I guess for the rest of you? Okay.

1:01:08 So we're all there. We're all walking around with a potential GIS in our pocket, and that's a key thing.

1:01:14 And it's not just us that's aware of that now; it's the public's actually becoming aware of it.

1:01:19 Maybe we can do one more little mobile demo? Yes. Okay, go ahead, please, Rina.

1:01:27 Alright. So remember this, this map that I have it in my ArcGIS Server, and I access this from ArcGIS.com.

1:01:36 And what I did is I put it in my group, okay, I shared it with my group.

1:01:41 I have my own group for the UC that doesn't [unintelligible] system.

1:01:46 So I shared it there. What I'm going to do is I'm going to access it from my mobile device.

1:01:52 I can access it from my iPhone, but probably it's easier if I see it from my iPad. 01:02:01

1:02:03 How many of you already downloaded Esri apps on iPhone, iPad? Yeah, many of you?

1:02:09 So it looks like this. I can go into here. I already logged in as myself.

1:02:15 And then I can connect to ArcGIS Server from here, okay, if I like to, but then I'm going to just go to my group...

1:02:25 ...and the group that I have in here is the UC 2011 system, and this is the map.

1:02:36 So replacing the current map in here, give the basemap here, and then I can directly see if it's done, the risk assessment map.

1:02:51 Oh, my goodness, I don't like this image. Take a look of that, okay.

1:02:56 So as soon as you publish your resources on ArcGIS Server outside your firewall, it's easy to be accessed from anywhere...

1:03:05 Maybe I should dig a little deeper. How many people have tarred and zipped a coverage? Anybody?

1:03:06 ...from web application or mobile application like this.

1:03:16 Okay, I should have asked, How many people have an iPad? And who's going to buy one later this week?

1:03:23 I keep...I'm tempted to keep bringing more and more technology home with me.

1:03:30 We have one more--oops, [unintelligible]. There we go.

1:03:35 One more subject--well, actually, we'll draw it out just a little bit here--and this has to do with ArcGIS Online.

1:03:43 And again, I'd like a show of hands.

1:03:44 How many people here have taken a shapefile and zipped all those different files together and e-mailed it to somebody?

1:03:54 And has anyone had somebody do that to you, they send one to you?

1:03:58 And has any part of that been missing like the .prj file or the .dbf file? You know what I'm talking about.

1:04:12 We've got...we've got...okay.

1:04:14 Okay, I just wanted to say, I mean, I'll do the good news. Here's the good news; we don't have to do any of that anymore.

1:04:21 We actually have the ideal vehicle, if you will, for sharing our data. And I'm talking about ArcGIS Online.

1:04:28 What I'm going to end up with is...well, we're not just going to share data.

1:04:31 No, we're actually going to share maps, we're going to share applications, all sorts of things.

1:04:37 But at the simplest level to share, I can actually create something called a layer package...

1:04:42 ...which is a layer, all its properties, and the package part means the data goes with it.

1:04:46 I can publish it to ArcGIS Online, and I can share it with the world. It's really easy to do.

1:04:52 The package part of that all of a sudden completes, you know, our ability to effectively and efficiently share everything.

1:04:58 We can share map packages, not just a layer.

1:05:00 We can take the whole map, all the brilliant cartography, you know, all the different data frames...

1:05:06 ...all the data that support all those data frames, put those in part of the map package and share those.

1:05:11 Someone can download it, they can open...or they can open it directly in ArcMap.

1:05:18 Now where we're taking this is to the next level though, where we can also share things in services.

1:05:23 So we can share map services, we can share geocoding services, we can share, you know, applications and that sort of thing.

1:05:29 ArcGIS Online is associated with those free viewers—

1:05:31 [Audience comment] Microphone? Excuse me? [Inaudible audience comment]

1:05:34 I'm doing a really bad job with the microphone. I probably shouldn't repeat everything I just said, though, should I?

1:05:41 No,[inaudible]. Okay.

1:05:43 The key thing here, though, is when I am working with ArcGIS Online, I can include not just my data, not just my maps...

1:05:52 ...but all my services, and there's free viewers to go with this.

1:05:56 That means I can publish a service, a map service [unintelligible], something that's dynamic, and it can be viewed by the public.

1:06:03 So my ability to disseminate my GIS content, my GIS resources is actually enormous here.

1:06:12 I will point out that this system is probably growing even faster than we anticipated.

1:06:17 The figure there, millions of maps a day are going through this, especially through the use of the basemaps.

1:06:24 So this is actually one of the primary things that we're doing.

1:06:27 I think it's probably one of the most exciting things that we're doing now.

1:06:32 Do you want to show something with ArcGIS Online? Yeah, it's real quick here. After this, we're going to wrap it up.

1:06:38 So I show you how to share it into the group, but maybe some of you already know that you can share it with the public.

1:06:45 The map that you author in ArcGIS.com, you can put it in your Facebook, or you can Tweet about it...

1:06:53 ...or you can copy and paste this link here, put it in an e-mail, and then you can send it to somebody. Okay?

1:07:00 Or you can embed it in a website.

1:07:02 This is a simple HTML code that you can put it in your personal website so it can draw the map on that.

1:07:12 Another one that I'm going to show you in here is...by sharing, is make a web application.

1:07:20 I'm not a web developer, but I would like to create a web application.

1:07:24 So here there are many templates that I can choose from.

1:07:29 The one that--where is it?--Bernie show you is the combination with the Twitter as well, okay?

1:07:38 So I can view it first before I even download it, and then when I see, then I can see if I like the style.

1:07:47 If I like to, I can download it, and I can then click this Tweet as well.

1:07:51 One thing that I want you to realize here is every single map has the ID here.

1:08:01 So this is the ID of your map. This is if you want to choose...

1:08:06 ...or if you want to use this map in any other application like in ArcGIS Flex, Silverlight, JavaScript...

1:08:13 ...that ID, that's the one that carries this map into other applications. Okay?

1:08:20 That's one thing that I want to show you. Back to you?

1:08:24 Okay. We just have a couple more topics to touch on. Actually, one more thing, and this...

1:08:32 So along with ArcGIS Online, which is in essence a portal and through the use of ArcGIS.com...

1:08:40 ...becomes essentially a cloud-based GIS, is this whole idea of cloud, cloud computing, cloud sourcing.

1:08:48 Is anybody using cloud services like, you know, Amazon's EC2? Anything like that?

1:08:56 So for instance, you don't want to set up your own ArcGIS Server.

1:08:59 There are, for hire, ArcGIS Servers that are preconfigured, available for you to use, and they're available in the cloud.

1:09:07 And just like Rina published her map to her ArcGIS service, you can actually go to commercial services and do this.

1:09:17 This has actually been very attractive in the private sector; it's also very attractive for things like disaster response planning.

1:09:24 And the graphic that I'm actually looking here, well, you'll pay more if your actual demand on your web service is actually very high...

1:09:32 ...but usually in the time of a disaster, for instance, or immediately after the disaster, that demand is high...

1:09:38 ...then the use actually goes down and the amount you actually pay for that goes down.

1:09:42 And that's part of the notion that goes with EC2, Amazon's product; that's the elastic part of the elastic...

1:09:49 EC2 is Elastic Cloud Compute [sic].

1:09:52 And I think that's pretty much... [Inaudible]

1:09:58 Alright, in summary, I would like to come, go out from this room with the message that ArcGIS is more than just mapping.

1:10:05 It's a complete system that transforms the way that you do business and makes organizations more effective and efficient.

1:10:14 Think about how you enable GIS as a system in your organization and how we at Esri can help you to achieve that.

1:10:23 A few other things in here. This is the link for ArcGIS.com, Resource Center and Esri products.

1:10:29 There are many workshops related to this, all the products that we talked about but if you want to know...

1:10:35 ...the real samples and applications of the GIS, there is a Power of GIS tomorrow, and Carl will be one of the presenters.