Enabling Technologies

On day one of the 2010 GeoDesign Summit, Esri Staff demonstrate the latest advanced in ArcGIS technology and its relation to GeoDesign workflows.

http://video.esri.com/watch/105/enabling-technologies

Video Transcription

00:01 Let me introduce the people who will be making presentations. Bernie Szukalski, who is on the development team...

00:06 [Inaudible] Not sure yet. He doesn't know what he's doing.

00:11 Matthew Baker, Gert van Maren, Nathan Shephard, and Richie Carmichael is hiding in the wings here.

00:18 And this is an unusual event for us; we actually have three guys from the southern hemisphere, two guys from...

00:23 ...two Kiwis and a guy from the Big Island.

00:26 [Inaudible audience question]

00:27 Okay. Can you hear me now? No. Sorry.

00:31 Just...just...Hugh, just...just...just wait to get the microphone...

00:41 How about now? No. How about now? Yes. Alright.

00:49 Okay. We're going to start off with...we're going to show you a little snippet of technology. This is...

00:54 As...as Jack said, this is not the be-all, end-all; this is barely the beginning. Some of this is actually done; you can use it now.

01:00 Some of it's going to be coming shortly with the 9.4 release. So let's start off.

01:06 Can you hear Bernie?

01:08 Hello? Hello. Hello. Hello? Hello? It's good. Okay, we're good.

01:16 Alright. Thanks. Thanks, Hugh. What I'd like to introduce today is something called ArcGIS On...Online.

01:22 And when we do GeoDesign, one of the things we need is a substrate upon which to work.

01:29 And we need some maps, we need some geographic data. We also need other things.

01:33 We need a way to share not only our maps and our information but also tools that we might

use in the GeoDesign process.

01:42 And what I'm going to do here this afternoon is take you for a quick tour of ArcGIS Online...

01:48 ...and we'll begin with ArcGIS Online maps.

01:52 ArcGIS Online is a rich repository of worldwide data, which includes imagery, street maps, and topographic maps.

02:00 Worldwide, it's 15-meter resolution minimum, and as we zoom in to cities throughout the world...

02:07 ...we'll see higher resolution imagery that's available.

02:10 There's about 2,000 of these worldwide, cities and towns throughout the world for which high-resolution imagery is available.

02:17 And here we are looking at London. And there's also other imagery available from leading imagery providers.

02:24 And here we're looking at the Microsoft Bing aerials, which are quite nice as you can see.

02:29 We can zoom in and see quite a lot of detail. An excellent substrate for beginning our design work.

02:35 Microsoft also provides the Bing hybrids which include street names, and which also provide additional context for us.

02:43 So all of these are available through ArcGIS Online.

02:47 Additionally, we have detailed street coverage across Europe and in many other locations.

02:52 And as we zoom in, we can even see building footprints appear that are part of this map set.

02:58 We also have topo maps. As I zoom out, you'll see us cross several scale thresholds here.

03:04 So these topo maps also represent a nice backdrop for doing our GeoDesign.

03:11 Focusing now on the United States, we have one meter or better imagery across the entire United States.

03:17 And the sources for these are from many different federal, state, and local government sources...

03:22 ...such as the City of Salt Lake here, which has provided us imagery.

03:27 Here the City of San Diego has provided us some imagery as well.

03:31 And this imagery is also complemented by data from other providers.

03:37 So very detailed imagery is available throughout the United States.

03:41 We've also just finished up work on a new world street map, and I'm going to focus here on the United States.

03:47 We provide 1 to 10,000 nationwide coverage with buildings at 1 to 5,000 scale in metro areas.

03:56 For selected cities, and this is an ever-growing list of cities, we go down to 1 to 1,000 scale.

04:02 So as I zoom in to Portland, you'll see us cross several scale thresholds; we see the building footprints...

04:08 ...and we see even more detail. So, again, very nice basemaps.

04:13 The world topo map is also something that we've been working on.

04:16 Everybody is familiar with the standard USGS topo maps...

04:20 ...and this topo map is made from many of the same data sources and also other sources.

04:26 So it's been combined...compiled from the best available sources such as the USGS...

04:32 ...as well as Tele Atlas providing landmarks, which have been incorporated into the map.

04:38 And we've also worked with local GIS users to provide additional information like building footprints and lidar data.

04:45 Here I've zoomed in to the Rose Bowl in Pasadena, and you can see the high level of detail and also the terrain which this affords.

04:53 And of course we also have lots of detailed information for the Redlands campus.

04:58 This is where we, of course, are right now, here located in the new building Q, our new landmark, if you will, on campus.

05:12 So this topographic map also presents a nice framework for integrating other types of content.

05:18 And we can do that by separating that topo map into its basemap.

05:22 You can see the cartography here is..is es...especially muted...

05:28 ...because it's meant as a basemap upon which we're going to paint other layers.

05:31 We have the top layer of this...you can think of this as a sandwich, so this is the other slice of bread.

05:36 This is the reference layer, and in between, we can put our meat.

05:39 This is the topic...the...the data that we're really interested in.

05:43 And here I've added some of the demographic information, which we publish through ArcGIS Online...

05:48 ...and again, it's a multiresolution data.

05:50 And I can click on any of these polygons and retrieve specific information...

05:55 ...about in this case, population change for this data source.

05:59 So this is live data with lots more than just graphics. It has lots of information behind it.

06:05 We're also working on a...a geology map. And I'll give you a little preview of what that might look like.

06:11 And again here, if I click on one of these polygons, I get additional information about the geology...

06:15 ...and also includes links to its source and other information.

06:19 So you can see that ArcGIS Online really has quite a lot of rich content which we can begin to use.

06:26 Now the application that I've been presenting this to you in is called ArcGIS Explorer.

06:31 And it's a free, downloadable geobrowser that works with GIS data.

06:36 And I'll use this to highlight some of the other ArcGIS Online capabilities as we go forward.

06:41 So one of your questions might be, as a user, how do I find this content?

06:45 Well, in Esri applications, the content is now built into the application itself.

06:52 So here in Explorer, I can choose from the same basemaps that I showcased earlier from the basemap gallery.

06:59 I can also add directly from ArcGIS Online, or you can open up any Web browser and just enter "Arcgisonline.com"...

07:07 ...and here's where we can begin the search for the content that I'm looking for.

07:11 So this is the...the main gateway page, and I can begin by typing in a keyword. And I'm typing in "demographic".

07:17 I'm looking for demographic data, and here's a list of things that have matched that keyword search.

07:25 And I can look at these; I can click on them; I can get additional information. 00:07:29

07:32 So one of the things I'm interested in is the metadata.

07:35 What's the source, what's the update interval, what's the resolution, and I can look on that here.

07:40 I can also preview the content by clicking the Preview link...

07:44 ...and here I have a little JavaScript application which allows me to preview the data...

07:50 ...so I can make decisions about it and decide if it's something I really want to use.

07:56 Now as we go back to the main list, we see there's a number of different choices here on the page.

08:01 I can search for all content that matches, I can search just for maps, I can search just for layers, or I can search for services.

08:10 These are Web services which I might bring into a Web app.

08:13 Or I can look for tools. And currently there's no tools that match the keyword demographic...

08:18 ...but we'll look at another example in just a moment. So let's go back to all.

08:22 Now I showed you some data that can be added to the map, but ...

08:26 ...there's also complete applications which are also part of ArcGIS Online.

08:30 For example, here's something called Selected Esri Demographic Content.

08:34 And if I click on that, I actually open up a Web application...

08:38 ...which allows me to choose from a variety of different demographic themes and draw them on my map.

08:44 So this is not a layer intended to be brought into an existing map but rather a complete application...

08:51 ...which allows me to do interesting things like click on the feature...

08:54 ...and I'll get a little pie chart which it talks to me, in this case, about the diversity in this particular area.

09:01 So complete applications can also be part of what we can share and discover and use on ArcGIS Online.

09:09 Now let's look for some different data by a different topic.

09:12 I'm going to search by area; I'm going to look for San Diego.

09:17 And we'll do a search on "San Diego". Sorry, little spelling error here.

09:25 And let's search for that keyword, and...

09:27 ...here I have a variety of different content that's available to me, and I have a nice thumbnail preview of all of it.

09:33 Now here's one that looks pretty interesting. This is San Diego housing density.

09:37 So to add this to my map, I just click on it, click OK.

09:43 And what's happened in the background is that we've added this to my current ArcGIS session.

09:49 So here I'm looking at the housing density, and I can zoom in.

09:52 I now have other tools available to me that allow me to do things like adjust the transparency.

09:58 And I also have a nice swipe tool which allows me to...

10:00 ...slice back and forth between layers that I add to my map and the underlying basemaps.

10:06 So let's go back to ArcGIS Online, and let's continue on with our search. Let's look for some

tools.

10:14 And I'm going to type in...well, let's just look for all tools.

10:18 So here's a list of a variety of different tools available.

10:21 What are these? These are geoprocessing services and other service-based tools from other vendors...

10:28 ...that I can load directly into my application.

10:31 For example, let's look for a tool with which I can do some terrain analysis with.

10:36 This is a geoprocessing server powered by ArcGIS Server...

10:41 ...and I can view it here and I can actually download it directly from ArcGIS Online.

10:46 And I've already done that in ArcGIS Explorer and have added it to the application.

10:51 So to use this now, I just digitize a line.

10:55 That line is now being sent to a waiting remote server...

10:59 ...which does the heavy lifting and returns the result to me in this application.

11:03 So in this case, this is a free application, but even though it's free...

11:07 ...it can be extended with GIS capabilities by authoring and publishing geoprocessing services online.

11:15 So let's go back to ArcGIS Online. And let's go back to the home page, and let's do something very interesting.

11:21 Let's create a new Web map online. And I do that by clicking this link.

11:26 And here I'm using the ArcGIS Online content that I've already given you a tour of.

11:30 So we have the streets, we have imagery, we have topography, we have shaded relief, so I can choose the map that I want.

11:38 I can save this map at this point, but I want to do something interesting with it.

11:42 I want to find other layers that I can add onto the map.

11:46 So this is a list of all the service layers available, so I can create a mashup from any of these...

11:51 ...or I can further refine my search by typing in a keyword. And I'm typing in "fire".

11:56 So here's one that looks interesting; it's a California fire history published by J. Bartley.

12:01 And I can add that to my Web map by clicking on this link, and now we're connecting to this service.

12:08 And I've just created a mashup on the fly which shows me all the burn areas throughout the L.A. area.

12:14 And let's zoom in here on the Simi Valley. And let's zoom in to San Fernando, and let's put on my imagery...

12:20 ...and you can see how some of the burn areas encroach on our urban environment.

12:24 So this might be very useful information for me to have.

12:28 Now this service was published by somebody that I don't know.

12:32 Actually, I...I do know them, but it could come from anywhere.

12:35 So people can author and publish services and make them available to me...

12:39 ...and I can mash them up and bring them together without writing any code into my map.

12:44 Now I can go ahead and save my map, and I'm going to give this map a title.

12:50 Let's call this Landslide Areas that we need to worry about, 'cause after a burn here in California, that's...that's a concern.

12:59 And I'm going to give it a couple of tags, and let's go ahead and save my Web map.

13:06 So what's happening is my map has now been saved to my account on ArcGIS Online.

13:12 Let's take a look at my account. Now you can see I've signed in before this session.

13:16 So you sign in with an Esri Global Account; you just need to register to obtain one.

13:21 And when you do, you can look at your content.

13:24 So here's a variety of content that I've added previously and that I work with on a daily basis.

13:29 I've organized this into groups.

13:31 And I've just created this landslide area map that I can now click to look at; thumbnail was automatically generated.

13:39 I can add some metadata about this, and I can also open it and view it.

13:44 And I can even continue on from here. I can add more layers to it and do other work with it.

13:49 Now I have added this map to my list of content, but what I want to do is I want to share it to others.

13:55 So I've authored this; I want to make it available to more people, and I do that by clicking Share. And here are my choices.

14:02 I can make it public so anybody can search for it based on the tags that I entered...

14:07 ...and find it and begin using it and do mashups on top of it themselves, or I can make it private and just publish it through...

14:15 ...specific groups that I'm either a member of or that I've created.

14:18 So here's a group called the GeoDesign Summit, so I'm going to publish it in that group.

14:23 I also might want to make it publicly available and just use that group as an organizational component...

14:29 ...so I'm going to make it publicly available but also organize it within that group.

14:34 Now let's take a look at that group.

14:36 So here's my groups; these are groups that I have asked to become a member of or been invited to join...

14:41 ...or groups that I've created myself.

14:44 And the group that I created and just published this content in is called the GeoDesign Summit.

14:50 So here's the main gateway for that group, and I can go ahead and look at the content that's available there.

14:56 Here's my Landslide Area map, which I just added.

14:59 So other members of this group can also begin to use and work with this landslide map...

15:06 ...and they'll see the...exactly what I've saved. And it's also shared publicly so anybody can find it as well.

15:13 So just as a real quick overview. Arcgisonline.com is the site that you can visit.

15:20 It has lots of ready-to-use maps and applications and tools that you can bring in to your working environment.

15:27 It provides capabilities for you to search and share...

15:29 ...and also to create communities and collaborate as you move forward in the design process. Thank you.

15:36 Thanks, Bernie. So the takeaway idea related to planners is where do I find data? Where do I put data if I have data?

15:47 How do I create something that I can share with other people?

15:50 So Bernie showed you an example of just saving a simple mashup map, but you can also save out layer packages.

15:56 You can put data out there. You can put map documents out there.

15:59 The map documents can include geoprocessing applications, the de...the stuff that you might run on a...on a desktop.

16:05 So you can begin to see that there's an opportunity for a group to collaborate in a space on ArcGIS Online.

16:11 Okay. So what we're going to do is we're going to move from...from ArcGIS Online to consuming services.

16:18 And we're going to show you some of the new stuff that's been added into the 9.4 Desktop package.

16:23 Can you guys do something about the contrast on this?

16:28 It's okay from here. It's o...is that okay? Yeah. Alright. Okay.

16:31 So Matt Baker's going to take us on a little trip here.

16:34 Can you hear me? Alright.

16:37 Alright. For this example, we're going to focus on the City of Detroit.

16:41 Right away I'm looking at a topographic map that Bernie showed us, which came from ArcGIS Online.

16:46 Overlaid with that, I have a number of different layers which have come from the City of Detroit's GIS.

16:51 So my purpose is, I'm looking for key areas for redevelopment within the city of Detroit.

16:55 And I'm going to use a model to focus my area of attention...

16:59 ...and then I'm going to use some of the sketching tools to do a little bit of neighborhood redesign.

17:03 So just to show you what I've got in here. In my table of contents, here are the different layers that I'm looking at.

17:07 And just to show you one of them is housing units and vacant housing use it...vacant housing units per block group.

17:14 To make some more sense out of this data, I'm going to build a model, and I'll show you the model that I already have open here.

17:21 And it's a very simple model that basically takes all the different layers in my table of contents...

17:25 ...and extracts certain block groups that meet a criteria.

17:29 Here are the layers that I had in my table of contents.

17:31 Here are the different tools or operators that are going to extract those block groups.

17:35 And here are the resultant datasets that I get for each of the tools.

17:39 The final piece of the puzzle here would be to take the intersecting areas that meet all of these different criteria...

17:44 ...and those would be the areas that I would use for my redevelopment.

17:47 [Audience question] So Matt's looking for things like vacant lands...

17:51 Blighted areas, low-income areas. You get the idea. So what he's going to do is generate a

subset of these.

17:58 So I'm going to use a tool called Intersect, which allows us to basically take all the inputs and find the intersecting area.

18:04 I'm going to use the tools to simply link all my data to the tool. I'll do this one by one.

18:15 I'll have this add to display when I'm done, and I'll just neaten up my model a little bit.

18:19 So now I'll just run the model. And what it does is for every tool, it's going to run it, find my block groups...

18:25 ...create that resultant dataset, and go through and do these one by one.

18:30 So the red boxes are showing us the operations that are taking place.

18:33 And whenever you have an oval that's got a drop shadow, it means it's created a dataset.

18:37 And I forgot to remind Matt to...to add the result to the display. You got it.

18:49 Alright. There we have it. So there I'll just change the symbology real quick so we can get a better look at this.

18:55 So there are the areas, my key redevelopment areas. Not bad.

18:59 So I'm going to actually do some neighborhood design now. There's my areas.

19:03 I'm going to zoom in a little bit more to an area that I like.

19:06 I like this area because there's schools in place, there's parks nearby...

19:08 ...and they've actually just put a whole new dedicated bike path down an old rail cut.

19:12 So I'm going to zoom in a little bit further and I'm going to start doing some GeoDesign.

19:16 So we're going to start to use our sketching tools by starting an edit session.

19:20 And I have a set of layers loaded in here already.

19:23 When I start an edit session, I'm presented with a list of feature templates that I'm going to use to actually do some drawing.

19:29 As he's doing this, let me...Is Avi here? Avi from EDA, AEcom Design?

19:35 So Avi is the author of this template with these symbologies and markers. Thanks, Avi.

19:39 Good.

19:40 Alright. First thing I'm going to add is a commercial area just to sort of be the anchor for my new neighborhood.

19:47 So I'm just going to drop this in here, and you'll notice as I'm drawing, I'm drawing with the symbol...

19:52 ...but I'm drawing with the attribute of the actual type of data that I've chosen from my

feature templates.

19:58 Next thing I'm going to do is a little bit of street beautification.

20:00 So I've got a couple different line templates here, which I'm going to simply drop in on the map.

20:05 You can see I'm drawing with the symbol, but there's attributes and there's data behind the scenes.

20:09 I'll drop in another one here, so there we go. So I'm starting to focus my neighborhood now.

20:16 So the next thing I want to do is add some moderate-density housing.

20:19 So I'm going to grab it from my template window and again just start sketching. Alright.

20:26 So it would be nice to have a little bit of feedback here as I go, just to get a sense of how much I have as I'm drawing.

20:32 So I'll open up a dynamic charting window here.

20:35 And already you can see that I have the amount of area that I've drawn on my map instantaneously summarized.

20:40 So I have the acres; I have a breakdown of how much area is in the pies. I have the different types of data that I've drawn.

20:47 And as I select another one, or i.e., I'm going to want to put in some high-density along here, right?

20:53 As I add this to the map, the map itself updates and the chart updates.

20:58 So again, I'm going to draw a little bit more area here, some parks, and then one more area of low-density housing...

21:06 ...which I'll kind of put over on the side here. I'll start it here and just kind of wind it around as I...

21:12 So hopefully you're getting the idea, if you've used our product before...

21:14 ...we're really trying to acknowledge that designers are using this now, and we're trying to make this easier.

21:19 You don't have to know about the geodatabase, you don't have to know if you're dealing with points, lines, or polygons.

21:23 You're just putting stuff in.

21:26 So we're going to take a look...another look at the Detroit example tonight at five-thirty...

21:29 ...with Ahmed Abukhater, our community development lead, in one of the back rooms.

21:33 So if you're familiar with the area and you want to take another look at this stuff, we'll be back there. Thank you.

21:37 Okay. So the takeaway for this is, you can build models easily, no programming, and there's a sketching environment...

21:42 ...an editing environment which is a little bit friendlier for designers.

21:48 Yeah. Now he was going to put in that community point of interest...

21:50 There it is. ...but we kind of lost that. Okay. Thanks, Matt.

21:53 Okay, now we're going to switch over to...to Nathan Shephard who's going to show us...

22:02 ...some new visualization capabilities in...in 3D as well as new analytical capabilities in 3D.

22:11 Thanks, Hugh. Am I on yet? Am I on? Good.

22:16 Okay. So we've done some 2D GeoDesign; let's do some 3D GeoDesign.

22:22 So at 9.4, we have a complete system for 3D GIS.

22:25 That's create, maintain, analyze 3D GIS data, and that includes doing GeoDesign.

22:31 Where's that basemap from?

22:32 It's...you're jumping in.

22:34 Sorry about that.

22:39 The first thing you'll notice, if you can wait, is the...is that we're using the same basemap...

22:45 ...the same topo...world topo basemap as our background for this globe.

22:50 And if I zoom in to Philadelphia, which is our study area, we get in close, you can see that we've got building footprints.

22:55 So Philadelphia's one of these cities where we've worked really closely with the city and got some really good data and improved it.

23:01 And Philadelphia, we actually go down to 1 to 200 scale with the display of this topo map.

23:08 So there's four main elements to having a good virtual city.

23:14 And the first element is a great topo map. And we've got that.

23:18 The second element is imagery. And as Bernie showed, there's a whole bunch of freely available data that's really good.

23:25 Here's the i-cubed world imagery service.

23:28 But if you have better data, like four-inch imagery of Philadelphia, you can incorporate that.

23:34 You can see how good, how much detail you can get here for your city.

23:40 The third element is elevation surface. And again, there's a whole bunch of free data available through ArcGIS Online.

23:51 Mostly it's 30-meter or 10-meter depending on where you are, which might be useful in a lot of cases at large...at large distances.

23:59 Once you get close to the ground, you really need high-quality elevation surface as well.

24:04 So for Philadelphia, we have a 1-meter DEM surface...

24:09 ...and you can see that...what appears to be a dead-end railroad is actually going into a tunnel. We can see that.

24:18 The next element is buildings. You'll see them coming in here.

24:26 So in this case, the data was created from OpenFlight by a business partner and then imported in...

24:32 ...into the GIS for display, but it can come from many other sources...CityGML and BIM, IFC, and so on.

24:41 Other data formats are supported.

24:43 And once it's into the GIS, then you can start building your city.

24:46 So here we are at the top of the Rocky Balboa steps at Philadelphia with the skyline...skyline view.

24:52 We can cruise down the Ben Franklin Parkway and see our city. We'll just come in to Logan Circle.

25:08 We can start bringing in other data.

25:09 So these are the four main elements for a virtual city, but you might have other information such as street...

25:15 ...parked cars, street furniture such as lights, and vegetation like these trees.

25:22 Now the important thing about this is that all of this data is GIS data.

25:26 It's stored as point features, and we're just using symbology to display it in 3D like this.

25:31 That means that all of these features can still participate in maintenance programs...

25:34 .....rating...routing trucks out for...for maintenance programs or tree-pruning programs...

25:38 ...and it all works seamlessly with your...your visualization environment.

25:43 So we've had, you know, lots of users ask how they can set up a...

25:46 ...a document like this, what kind of data they need and...and that...

25:49 ...so we're actually going to...providing the content you're seeing here as a free download as a template for people to follow.

25:54 So you can see how to author the buildings, how to author these different layers and get great performance for the data.

26:01 Okay. So let's do some GeoDesign.

26:06 So let's say that the city of Philadelphia wants to do a safety fence program where...

26:13 ...they're going to digitize in some dangerous zones.

26:16 So we come back here to this rail...where this railroad is. We can see that there's some...

26:20 ...some steep slopes, there's the railway track...and then there's some wooded areas here.

26:25 These are areas that maybe you want to protect, especially 'cause it's so close to this...this playing field.

26:33 So just like you saw before, we just start editing.

26:37 I've got multiple data sources.

26:40 It's warning me that I'm editing in WGS84, so there's a...the GIS component there that we care about.

26:45 That kind of stuff. And I get my template. I've got a fairly simple template.

26:50 I'm going to dim...can digitize in steep slopes, areas where vehicles will be traveling through, and...and wooded areas.

26:57 And these are the areas that I want to make sure that we...we can protect using fencing.

27:05 I'm just going to sketch in these, and we'll do some vehicle.

27:17 So you might notice that there's this thing called snapping, which is a GIS term, to make sure that we get some good quality...

27:25 ...make sure these...these features match up to each other.

27:29 Do the same again with this wooded area, snapping.

27:34 Now I've got those polygon features.

27:36 Now, to run a model against this, what I would need is some...some locations where I would be...

27:40 ...want to make sure that people who are here can't get into these danger areas, so I'm just putting them in for later use.

27:46 And now I can actually put in the things I'm trying to design, which is the fences.

27:50 So I'll put in a 6-foot-high wood fence along there, and maybe the chain link 4-inch...4-foot fence along there.

28:01 And we'll stop editing and we'll save our edits.

28:04 And because Globe uses display caches, I'm just going to resynchronize my caches.

28:11 And we can look at the results of what we just digitized in. You can see that these are

our...our zones that we care about.

28:16 And if I turn the zones off, we can see that we've got our...our fences in place.

28:21 And now we could run geoprocessing tools to...to analyze this.

28:26 Just going to quickly switch to another quick scenario inside a city.

28:31 I've just turned on a layer here for the vacant parcels.

28:34 So a really common scenario is a proposed building and you want to analyze the impact it's going to have on a city.

28:39 I'm just going to do a couple of quick analyses of those.

28:44 So we'll go to the location of that...that building, and I'm going to start editing.

28:50 And I have just one template to find for this document, and it's for the buildings, and I'm getting my tool.

28:57 And with a single click, I'm going to import a 3D model.

29:00 In this case, it's going to be a SketchUp file that was sent in as a proposal for a new building to go on this lot.

29:06 So I can select that SketchUp file, and it's going to be brought into the GIS.

29:12 Now in GIS, we care about features for the geometry but also for attributes, so I'm going to put in some things.

29:21 Put in a contact name; the date it was submitted, which is today; and iteration number.

29:26 This is the first model we've got for a proposal from...from Bob for this.

29:31 And I can continue to make edits to that feature. Let's say I want to rotate it to face the correct direction...

29:41 ...and I can move it to its correct location on the lot.

29:45 If we turn the other buildings on, now we can start to get a feel for how this new building is going to appear...

29:51 ...inside our landscape.

29:52 Now...now that I've done all this work, of course, the...the contractors are...

29:58 ...just contacted me and said that he would really like to replace that model with an update.

30:06 So I'm going to replace that model.

30:11 I'm just going to give this a second to count down because it's thinking about something.

30:19 We'll replace that model with an update.

30:26 So they've...they've enhanced the model, the...the design's changed.

30:30 They've got a different type of geometry; they've put textures on the side of it.

30:33 They've done all of that themselves in whatever format they like...

30:36 ...and they've delivered it back to us as a...as a SketchUp model.

30:46 Okay. Now, next we want to analyze the effect that this might have on our city. So I'm going to close this.

30:53 Actually, one key point is those attributes that I entered before haven't changed. So I've been prot...

30:59 ...even though I'll switch out the geometry, I still have the GIS feature, and the...

31:03 ...the geometry is just one part of that GIS feature.

31:07 So, unselect it, and we'll start thinking about some impact it might have.

31:15 So nearby is Logan Circle; we saw that earlier. And over here, we have these...these viewpoints.

31:22 And these are the apartments that currently have a view of Logan Circle and might be impacted by this.

31:29 So how do we know whether they are or not? We run some analysis. So I've created a geoprocessing model to do this.

31:36 I'm just going to bring it up. It has a...it only has a couple of tools in it...

31:40 ...and there's a couple of new tools available at...at 9.4 to do 3D vector analysis.

31:46 Very simple model.

31:48 We're just going to construct some sight lines and then find out which ones of those are intersected by that new building.

31:54 So we'll run the tool. And I've set it up so there's only one...one parameter.

32:05 And that's the output. And it's going to go create lines between this viewpoint here and these locations...

32:14 ...and it's going to identify all of the...all the lines that have...intersect through this building...

32:20 ...and are...that therefore have their view blocked.

32:24 So there's the result. Let me just change the symbology so it's a bit easier to see.

32:31 So all the people who live here are going to have no view after this building is built.

32:36 So we mention that to the...to the developer, saying that they're blocking some views...

32:40 ...and do they have any other designs in mind, and they said, well, we've got one more. We'll send it to you.

32:47 We're going to reduce the height of the building a little bit.

32:48 We're going to bring it down three stories.

32:50 And you can see that that's going to have absolutely no effect.

32:53 So the idea is that you can go through iterations of...of this, and...

32:58 ...and just what GeoDesign's all about, right, is you try things out and then you analyze each...each state.

33:02 We don't need to rerun it because we can see it's not going to affect it.

33:07 But because this is a GIS, we actually know who the apartment owners are. We can contact them.

33:10 That's a...that's a very good point. That's a good reminder.

33:14 This GIS...the attributes here can link us to who owns these apartments...

33:17 ...and we can advise them that this construction's going to go in before it even happens.

33:24 So that's one example of analysis that we might be interested in. Another one is this idea of a skyline.

33:30 And some cities actually have protected skylines, and...and for other cities, it might be just a skyline they want to protect.

33:35 So here we are back at the Rocky Balboa steps, and we can see the skyline of Philadelphia from here.

33:40 And we can see that this proposed building won't change that skyline.

33:43 So if that's part of our approval process, we know that we're okay from here.

33:48 And if I just quickly show you what a skyline is, you can see it's not as simple as you might think.

33:55 It runs over a building, it runs off into the distance, comes back into the foreground and runs over...over the next building.

34:01 The advantage of this new tool at 9.4 is you can identify which buildings participate inside your skyline and you can flag them.

34:09 So, for example, this building here, you can see how the skyline...which part of the building is in the skyline.

34:16 And you could also say that if this building wants to put anything on top of it, a new tower...

34:21 ...then there would be an additional processing or an additional approval step required for them to get approval from us.

34:30 Okay. So that's all I'm going to demo live. I'm going to hand over to Gert now to show you a bit more 3D vector analysis.

34:45 Can you guys hear me? Oh, good.

34:48 Yes. As...as Nathan explained, we have a complete system for 3D GIS...

34:53 ...and an essential part of that system is analysis in 2- or 3D space.

34:57 And I'm going to show you a couple of more advanced analyses.

35:00 This is one we call our volumetric shadow analysis.

35:05 How's the shadow of the proposed building going to affect neighboring buildings?

35:08 We...we've placed a building in our city scene; so here's an example of a building.

35:12 We've placed it. We...we have a look what the visual impact is of that building throughout a...a...a cityscape.

35:19 So we go to another spot here, and we see the building appearing again...

35:24 ...and we can get a feel for how it is going to affect our city.

35:27 But what we can do now, we can actually for a specific time of day...

35:32 ...we can calculate a so-called shadow volume behind this building, which we will see appear now.

35:39 And that volume we can actually use in further analysis.

35:42 So we can use that volume to select...to calculate the affected volume of the neighboring building.

35:49 Now what...what we're doing here is...is something different as to traditional shadow maps you've seen...

35:54 ...which is just a visual cue where the shadow goes.

35:56 Here we actually have...we're creating features in the database...

35:59 ...volumetric features in the database that can be used for further analysis.

36:03 So again, I'm calculating now, for a different time of day, the shadow volume of that building...

36:08 ...and then I'm going to use the shadow volume to select, in 3D...

36:12 ...all the apartments that will be affect...affected for that specific time of day.

36:18 Of course you can do this for any number of times of days and create several shadow volumes...

36:23 ...and get, so, a good feel of what they...the effect of the shadow of that building's going to be.

36:29 So that's one example of...of a 3D analysis. Another one is what...what...what we call a maximum building height analysis.

36:38 Now where this comes from is...is I'm...I'm from New Zealand, and...

36:43 ...they want to know, before they're going to start building, how high can they build according to height restrictions.

36:49 So what we're doing here is, we're going to calculate the maximum height in a certain area that we can build to...

36:55 ...without that new development being seen from a public road.

36:58 So what you see here in green is the area of interest. That's where I want to build.

37:02 And the road with the specific viewpoints are displayed in red.

37:05 Now what you can do now, for each point you can calculate the so-called local horizon...

37:10 ...and then a visibility plane through that horizon.

37:13 And I can do that any number of times, so here I'm...I'm doing it six times.

37:19 And all these visibility planes from that public road, I can use later to intersect in 3D...

37:28 ...so-called...what I call virtue...ver...vertical lines, which are sticks.

37:32 The reason I'm using here these vertical lines is that actually in New Zealand, they go out and place wooden sticks on the property...

37:38 ...and then you have to go drive around and see if you can see these sticks.

37:40 So, I...I thought I'd use sticks here as well. And...and I'm cutting these sticks with my visibility plane, see now.

37:48 And of course, the more times you intersect, the more accurate the analysis becomes.

37:53 But in the end, what we're going to end up with is a...

37:56 ...whole bunch of vertical sticks that can't be seen from, you know, my public road.

38:03 And the next result we can create from these vertical sticks is actually a volume, a volume that can't be seen from the road.

38:12 Because we're in 3D, we want to have a volume.

38:15 So what you'll see here now is we're creating a volume from those vertical sticks, which will appear now.

38:21 So this volume, you can build anything you like in that volume; it won't be seen from the public road.

38:26 And because in New Zealand, they weren't so much interested in...in...as a net result, the volume.

38:31 They wanted to have a height map, you know.

38:33 What's, for each area in that particular property, how high can I build to, maximum height build?

38:40 So what you see here is the end result is a map that you can share and in what areas, for example...

38:45 ...the areas that you can build to 39 meters maximum, and you won't be able to see it from the road.

38:52 So just an example of...of...of two advanced 3D analyses now possible. Thank you.

38:58 Thanks, Gert. So again, the takeaway from this is there're new 3D analytic tools in the product...

39:09 ...that we're really trying to become more sensitive to the problems that designers and planners have in urban environments...

39:15 ...and in trying to use the 3D tools in general.

39:18 What we're going to show you now... You need to switch to your machine.

39:29 There's a little bit of Web editing, and this is based on a little...a little example, a little parable that Jack told us about...

39:35 ...which we have extrapolated into a pothole application in New York City.

39:40 This isn't rocket science, but it...it...it talks about the VGI, CGM stuff that...that Mike talked about earlier.

39:48 And this has been a topic that Jack has really been interested in for a while.

39:51 So the idea is we have a Web-based application; a person could put in a pothole.

39:56 Now, this could be done with a...with a mobile device, could be done using a Web application.

40:00 But what he's done, he's actually entered a new pothole. And this is great. We want citizens to be able to do this.

40:05 But we also want this to go into a database which has ontology, and we also want to have a management function.

40:12 So what Derek's done is he's dropped in a few...a few potholes.

40:17 We can go back at...go back and look at them using a manager's view. This is the whole idea.

40:23 Yes, there is a pothole; yes, I've got a crew out working on it; yes, the repair has been finished...

40:29 ...and I can publish that out on the public service site. Simple idea, but it closes the whole loop.

40:35 Okay?

40:41 So we're going to look at some comments now on...on ARRA projects.

40:45 Everybody knows what those are, right? They're ready-to-dig projects.

40:48 This was something that we were told yesterday might be a cool thing to show, so we're showing it.

40:54 The whole idea here is that there are projects that are available...

40:56 ...and citizens should have the opportunity to comment on whether or not the project is valuable.

41:01 You know, there's $10 million allocated there, but I don't see any...I don't see any dirt turned.

41:05 Or maybe the dirt is turned, or maybe it's a worthwhile project.

41:08 So the whole idea is that we can actually make comments, we can vote on stuff...

41:12 ...we can actually associate pictures or photos about the projects.

41:15 So this is ob...this is a real project in Colorado Springs, and they've done a good job advertising...

41:19 ...what their ambitions are for this.

41:21 So again, this is just a public...public response thing.

41:27 You know, since we're at this conference, and we're thinking about comments going on...

41:31 ...we thought we'd show you a brand-new thing. And I don't think Jack's seen this so hope this doesn't cause any problems, boss.

41:38 We know that some people here are fairly prolific Twitterers, and you may be aware that Twitter is geolocated, is...

41:47 ...provided some geolo-...-location capabilities. And if you type in...are we going to put in the GeoDesign filter?

41:55 Let's see if there's anybody that you're sitting next to that might be tweeting right at the moment.

41:59 [Inaudible audience participation]

42:00 Aah. Yeah, somebody's saying something. Okay.

42:07 One last thing, and this is totally off topic with regards to...to VGI...

42:11 ...but it is germane to...to design and something we all should be thinking about.

42:16 This is an application we collaborated on with the TNC. I don't want to steal Evan's thunder, but I just thought we'd drop this in.

42:24 You guys are all aware that there are IPCC models out there, right?

42:27 May not know how many there are, and you may not know how variable they are...

42:31 ...so this is just a little comparison tool that one of our guys put together so that you can do 3 by 3.

42:36 And one of the reasons to show you this, is this is using a new data structure in 9.4 called mosaic datasets.

42:43 Imagine 16 models, 12 months, seasonal...seasonal averages for a hundred years, and the rasters are dense.

42:53 So this is not just the U.S., it's global.

42:55 And TNC has assembled this data, and we're trying to help them figure out ways to publish this and do analysis on it.

43:01 So if you actually touch on one of those maps, the inset maps, right. You can see we get an exploded view.

43:08 And if he touches on a specific location...you can do this anywhere in the world.

43:14 What we're doing is we're driving dow...diving into the database, and we're finding the results from each of the models.

43:21 The graph's a little hard to read, and we need to work on this.

43:23 But you can see that there is enormous variability in worst case versus best case.

43:29 The yellow line is the mean, so these...

43:31 I think we're looking at precipitation here. Alright?

43:34 So the models are quite different, so you need to be careful about which model you're using and looking at.

43:38 Mike's shaking his head here. We'll talk to you about this later, alright. Okay. Alright.

43:42 So if you're interested in the Web stuff that we've done, please come to the little open house we'll be hosting this evening.

43:49 What we're going to do now is we're going to switch over...was that it?

43:54 We're going to switch over and show you some stuff that we've been doing on a surface table.

43:57 And this is not a plug for Microsoft; we don't have any big emotional investment in this.

44:03 To tell you the...tell you the...the whole story about this...

44:05 ...is Jack asked us if we wanted a surface table, and we said no, and it showed up four weeks later.

44:12 So since it came, we decided we should show this. And I was going to ask, Will and Breece, do you guys recognize this data?

44:20 Yeah. [Inaudible]

44:21 Alright. So we've been working with Scott Murray, who gave us a little subset of your data.

44:25 And the idea here is to take the...we're trivializing the greenprint process.

44:31 But we're thinking about what this might be...how this might be effective in a public environment.

44:37 So what Richie has done is he's...he's put in three different weightings here, and you can go back...

44:43 ...and as you toggle between the different...different results...

44:46 ...look at the slider buttons; they move if he's actually changed them.

44:51 So you can record what each group or each...each interest group's settings were.

44:56 And we've also done a Web-based version of this as well, which we'd be happy to show to you.

45:00 So I'm glad...I'm glad I got to meet you yesterday, and we'd like to show you some stuff later today.

45:06 Okay. So the other thing we've been doing with this is we've been...we've been trying to understand UI on touch devices...

45:14 ...especially on a device like this where you can have lots of simultaneous inputs and...

45:20 It's not like you've got a fat mouse; you have to really think about what the experience is like.

45:24 Does this look familiar to planner/landscape architects? The famous linear summation weighted overlay kind of thing.

45:33 So what Richie's doing is he's setting the parameters for a cross-country mobility analysis.

45:40 He's gone ahead and execute...he's going to execute that, right? That's running? Okay.

45:47 Your display is not quite like our display, but dark green is cheap to travel across.

45:53 The redder, warmer colors are expensive to travel across.

45:57 And these little hockey puck things just show different origins go...all going to the same destination.

46:05 So you can see it's pretty fast.

46:07 The other thing we can do is we can actually turn this more into a pipeline siting or transmission line siting kind of application.

46:15 Again, cross-country mobility or cost surfaces.

46:18 And what we're doing is we're finding the top 3 percent of the solution sets from each origin to each destination.

46:25 So if we're in dark blue, we're still in the one...top 1 percent of the solution set in terms of expense...

46:31 ...cost, however you want to measure that, to get from that origin to that destination. Got it?

46:37 Okay. So one of...so...so one of the cool things about the...about the...the surface table is it also has...it uses...

46:49 ...it takes advantage of these things called domino tags. Richie, could you...okay. Let...

46:54 I'm not going to distract you. You do what you're going to do.

46:58 Can you see that there's a big fire truck there?

47:00 And it's got a little tag on the bottom of it, alright, and he's just going to place that on the table.

47:06 This is not going to be an origin. What this is saying is, Construct me a cross-country mobility model for my fire truck...

47:12 ...and another one for my Mazda 6 hatchback, or Mazda 3, whatever that is.

47:18 And so you may see...if the...if the color was a little bit better, you'd see that...whoops! Let's restart that guy.

47:29 There actually are two guys behind the curtain here.

47:37 Alright. So that's our destination.

47:40 Alright, these are red circles. And what happens is when the cost surface is finished, they will change color.

47:46 So you can see that there's a blue color, and there's a green color now.

47:50 And what Richie's doing is he's touching, with his finger, different origins.

47:54 And if you're really sharp-eyed, you can see from each ...each origin, there are two different paths taken.

48:00 There are two different efficiencies; fire truck can go places where the Mazda 6 can't go.

48:05 And if we bring up the table, we can actually see the cost surfaces for each one of them, so... Got it?

48:11 So this whole idea that you can tag these things to do an...an explicit operation.

48:16 You can i...you can imagine using Monopoly houses or high-rise buildings, some of those sorts of applications.

48:24 Okay, Richie. Okay, so we've shown you how to make cross surfaces.

48:32 Let's show you a little site suitability application that Jack asked us to do.

48:39 So let's get the...get our table of contents turned around here. So we've done some suitability analysis already.

48:48 Wow, Richie. Okay.

48:53 And he's just drawing with his finger what he wants the plan to be. This is kind of...

49:01 This is...this is the...this is the whole idea of doing a design literally sketching. So your yellow trace has been replaced...

49:09 Well, you guys probably aren't using rela...yellow trace; you're not that old.

49:13 But the whole idea that you could do those...those kinds of comparisons quickly by using the interface.

49:19 Richie, were we going to show another one? How about surface profile?

49:22 Profile?

49:23 Yeah. So the surface table, all the applications we've written for it are custom applications.

49:31 They've been done using the Microsoft WPF. Technical stuff.

49:36 But what we want you to know is everything is a Web service that's running here.

49:39 Every operation is a geoprocessing operation running on a server.

49:44 So this should look familiar, because this is the same tool, the same service from the same server...

49:50 ...that Bernie discovered and used when he was doing his ArcGIS Explorer demo.

49:55 So the whole idea that if you create a service and publish it like Boston Solar has done, other people can consume it and use it.

50:04 Okay. If you guys want to come and play around with this later this evening, we're going to be over in Q1 east...

50:10 ...and we'd be happy to show you the stuff that we've been working on.

50:13 I leave anything out?

50:14 [Inaudible]

50:15 Oh! I'm sorry! One more thing. Come on, Thomas.

50:21 So this is Thomas Emge, and this is a...this is an application he wrote three or four years ago...

50:26 ...and what we've done is we've just...we've Web enabled it.

50:28 So what he's got is a...is a BlackBerry device. You can see it...maybe you can see it.

50:35 He's gone out and taken a bunch of photos around Redlands. It's got a GPS in it, so the photos have been geotagged.

50:43 He's put it on the table. It's got a tag, so it's den...a Bluetooth communication downloading the photos...

50:48 Oh, that's nice. ...the photos from the camera onto the table.

50:54 And he's just using this as a light table, and he can get rid of the ones he wants and he can keep the ones he wants.

50:59 And he asked it to be geocoded.

51:01 So it's taking the headers, it's sending those to a Web service...

51:06 ...which is georeferencing those things and correctly placing them on the map.

51:10 And these have orientation.

51:12 And if we executed the next step of this, they could be consumed in their correct position and billboarded...

51:18 ...inside of the 3D applications that Gert and Nathan were showing you just earlier.

51:23 So we'll get some information about the...the pictures.

51:28 We can inc...we can explore them, we can do...we can put them on the table.

51:32 A great idea that Carl suggested to us yesterday was do a...drive a video up the street and use the little...the li...

51:41 ...your fingertip to play back and forth the video.

51:46 Can you bring up the...let's bring up the police thing, just really quick look.

51:49 This has nothing to do with planning, and it's...we're just...we were experimenting with the capabilities of Silverlight.

51:54 And I just wanted to show you this because it's, you know, the technology is changing so quickly.

52:00 This isn't ours, but we're just taking advantage of some stuff that's been done.

52:03 So these are simulated police car locations.

52:07 And this is the cool thing about them is that... Can you open up a couple more, Richie?

52:19 And so we're looking at cameras on the dashboards of cars driving through.

52:23 And you can see that the cars are actually leaving breadcrumb trails behind them.

52:25 So we...we literally can walk back and forth on the street.

52:30 And because we're a GIS company and we...and because we can do 3D simulations, you can put future buildings that have not been constructed and walk up and down the street and see how they're going to be affecting the streetscape that you're involved in.

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