# GeoFlow takes data for a 3-D drive
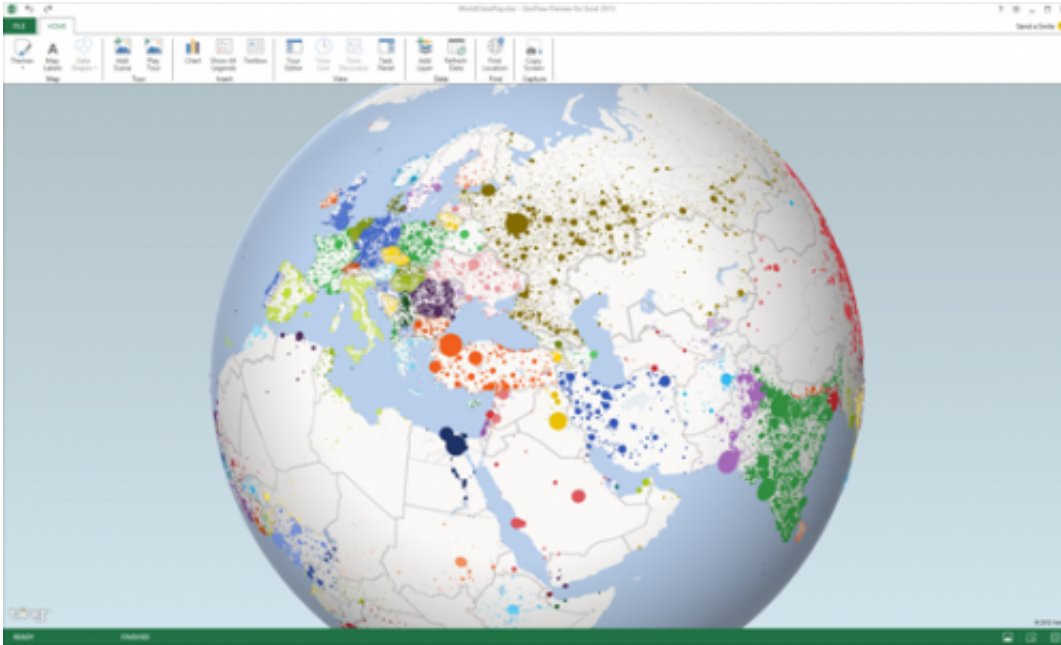
April 12 2013



GeoFlow visualization of global city population.

In November, during the SharePoint Conference 2012, attendees received a Public Preview of project codename "GeoFlow" for Excel, the latest business-intelligence (BI) functionality to be integrated with Microsoft Excel 2013 later this year. As an Excel add-in, GeoFlow provides interactive, 3-D geospatial and temporal data visualizations. It enables information workers to discover and share new insights from data through rich, 3-D data on a globe and fluid, cinematic guided tours—virtual cinematography moving through data.

With <u>dynamic data</u> exploration that turns rows and columns of spatiotemporal data into rich 3-D maps, the term "add-in" really doesn't do justice to the technology behind GeoFlow, a preview of which is available for <u>download</u>. Take a look under the hood, and you'll see stars. That's because the research that led to GeoFlow began with Microsoft Research's WorldWide Telescope (WWT) research project, which visualizes terabytes of imagery and data from the astronomy community. Launched in 2008, the WorldWide Telescope application always was meant to be more than a tool that gives young astronomers an observatory in a PC. It enabled seamless panning and zooming through the universe, connecting them with stories and images from multiple sources over the Internet to deliver an immersive experience.

But even while Curtis Wong, principal researcher at Microsoft Research Redmond, was busy giving talks about WWT, he had further ambitions in mind for the technology.

"With the dramatic growth in geospatial and temporal data," Wong says, "we wanted to explore new tools that could help us understand the large-scale temporal and geospatial trends that affect businesses. The goal always has been to bring dynamic, interactive data visualization to the business world. Yes, we built a gigantic <u>virtual telescope</u>, but to do so, we had to build an engine that could visualize the universe. If we can visualize the universe, we can visualize almost anything else."

The notion behind WWT was the ability to drive a virtual camera into the visualization space, give the user control over space and time, and create 'movies' with narratives that tell a story about the data that could be shared with others to communicate insight.

"This is very different from what has been done before," Wong explains, "partly because most representations of the sky or universe had low-resolution imagery or computer-graphic representations of the sky. In

WWT, we created a 3-D virtual universe where you could zoom into anywhere on a Terapixel view of the night sky and see images of objects from the Hubble, Chandra, and Spitzer space telescopes—or others that are presented in the sky at the correct scale and orientation. Users were also able to explore the 3-D universe—to fly out to see the rings of Saturn in great detail or exit the solar system smoothly as you pull out past the local stars and leave the Milky Way to see the large-scale structure of the universe, with a million galaxies. That visualization of the million galaxies in the Sloan Digital Sky Survey is accurate enough to show the relative size, color, and shape of each of the galaxies. Beyond that, you could drill into any one of them, get detailed information about that galaxy, red shift, or spectrum, and download that data to Excel.
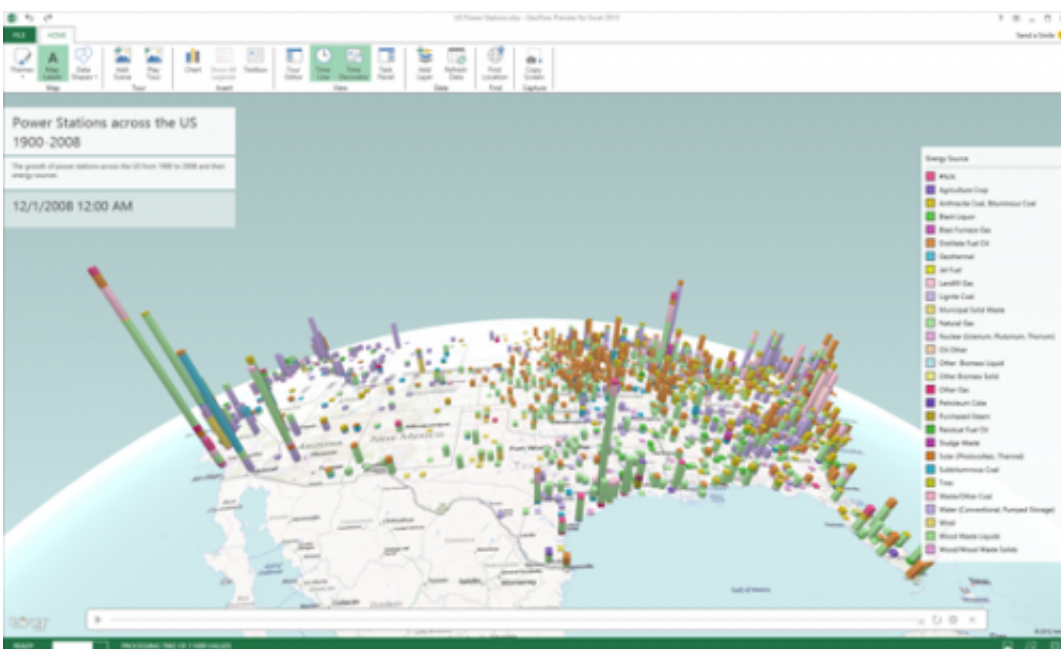


GeoFlow visualization of U.S. power stations.

"WWT enabled people to create guided tours of the universe by driving a virtual camera though the solar system for sharing with others. WWT

has many guided tours done by astronomers, astrophysicists, educators, and even kids. These guided tours are interactive at any time, enabling full exploration 'to stop and look around' anytime you want to pause the tour."

With the telescope successfully launched, Wong began reaching out to product groups at Microsoft and discussing how 3-D geospatial data visualization could enhance their current capabilities. Scott Ruble, principal program manager lead for Microsoft Excel, immediately saw how an engine that could visualize the universe could give Excel the most advanced BI capabilities on the market.

"Microsoft Research did a great job pioneering 3-D visualizations," Ruble says. "The work they did with WorldWide Telescope showed real business applicability. Not only did the project help illustrate the value and real future potential of 3-D visualization, it significantly reduced our risk in productizing the capability."

That took awhile to build a full head of steam.

"We started out with a very small team," Wong recalls. "Then, in June of 2011, we got the green light to go into product development, and from there on, it grew slightly bigger, with a product manager from Office, as well as developers and designers from the Startup Business Group and a lot of hard work. There was work to define functionality more clearly and to ensure that the user experience would be in line with the rest of Office and Excel."

In parallel with the product-development efforts, Wong worked with Jonathan Fay, architect and engineer for WWT, to prototype various data-visualization capabilities using a special, private build of WWT.

"We'd figure out how to do things," Wong recalls, "and then we would

show that to the product-development team and say: 'Here's how specific functionality works. Here's what it's supposed to do.' We showed them what was possible—for example, how to create a tour. That helped the development team design the product specs to understand the range of functionality needed in each feature. But don't think that made their jobs easy, because the process of building a real product is N times more complicated than a research prototype, because of all the edge cases."

"Sometimes research requires a long-term view," Wong says. "WWT was a project that gave the research work a focus on a real problems and access to data and imagery, and it also contributed something valuable to the study of astronomy: a unified visualization of everything, accessible to everyone. But soon after the launch, we set a very deliberate goal: that we needed to guide the work in a way that it would ultimately find a home within one of the product groups."

It also looks as though GeoFlow will be finding homes with happy customers, as well, if feedback from an early user is any indication.

"Thank you for providing us access to the GeoFlow software," the user wrote. "We just completed a demonstration of the technology to a utility, overlaying household energy-consumption projections on top of household information. The spatial presentation of this data was a huge success. We and the customer are looking forward to the formal release of this software!"

  **More information:** [Public preview of project codename "GeoFlow" for Excel delivers 3D data visualization and storytelling](#)

[Dallas Utilities: Electricity seasonal use simulation using project codename "GeoFlow" Preview and Power View](#)