

ENTER DIGITAL REALITY

THE BATTLE BETWEEN APPS AND THE MOBILE WEB MIGHT SOON BE WON – BY A TECHNOLOGY THAT ENABLES EVEN LARGE LIDAR POINT CLOUDS TO BE VISUALISED ON RESOURCE-CHALLENGED SMARTPHONES. **MATT SHEEHAN** EXPLORES HOW IT WORKS AND WHAT IT CAN OFFER

The mobile mapping revolution has brought with it an innovation explosion. But the world of mobile apps has become polarised. In one camp are the very popular native apps. Distributed through the various app stores, these are platform-specific apps built by expert programmers. However, not to be left behind, web apps have evolved. So-called 'responsive design' has become popular, allowing web apps to provide a great user experience regardless of device.

Mobile web versus native has become a particularly heated debate. Arguments in favour of native include the ability to handle big datasets, high performance and deeper device access. Arguments for web apps included ease of development and access.

Enter digital reality. This is a new way to view and ask questions of our world. Call it a digital twin or a representation of the real world in a computer. Digital reality is a recent phenomenon made possible by advances in technology. Digital reality allows you to visualise and ask questions of your data. Any data. Unlike in the world of GIS, data need not be confined to a geodatabase.

Digital reality assembles any data from across your organisation in one view. And not just in 2D, but in 3D with real-time data. Thanks to optimisation in how the data is served and taking advantage of the GPU on the device, performance is amazing. Large LiDAR point cloud datasets, for example, can now be visualised on even resource-challenged smartphones.

So how exactly does digital reality work? First, source data needs organising. A server component discovers, catalogues and generates metadata on existing local data sources. Web services can then be

ANY MOBILE WEB OR NATIVE APP CAN NOW RENDER ONCE IMPOSSIBLY LARGE DATASETS

generated from this source data for use in client applications. As an example, LiDAR data can often be enormous. It is often stored as point clouds in LAS files. Once catalogued, LiDAR data can be made accessible through

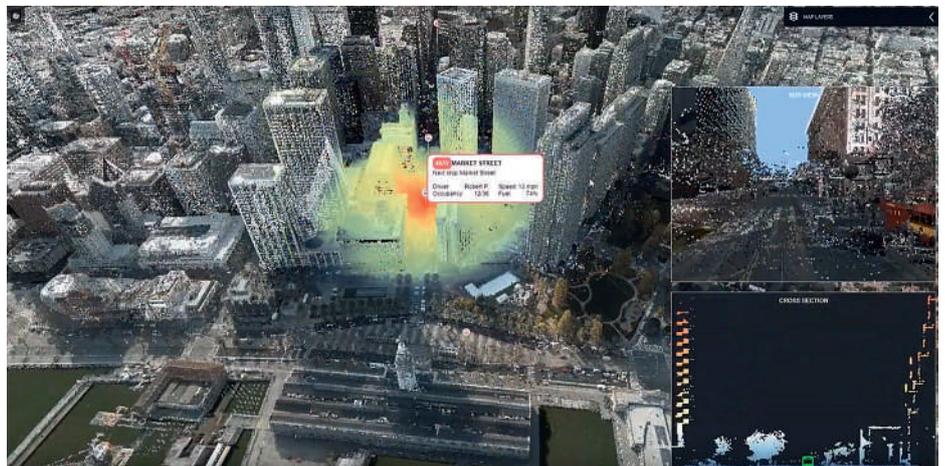
a web service based on the new OGC 3D Tile specification. 3D tiles 'are designed for streaming and rendering massive 3D geospatial content'. Thus, any mobile web or native app can now render once impossibly large datasets. Leveraging local resources such as the graphics card is another technique used to help improve mobile app performance.

Digital reality is also designed to handle real-time data. That might mean tracking moving objects or monitoring the state of stationary assets. Data from individual sensors can be fed to an aggregation point. This can then be visualised in a mobile digital reality application. Thus, the position and condition of any asset or component can be monitored. Automatic alerts can be triggered if a threshold is passed.

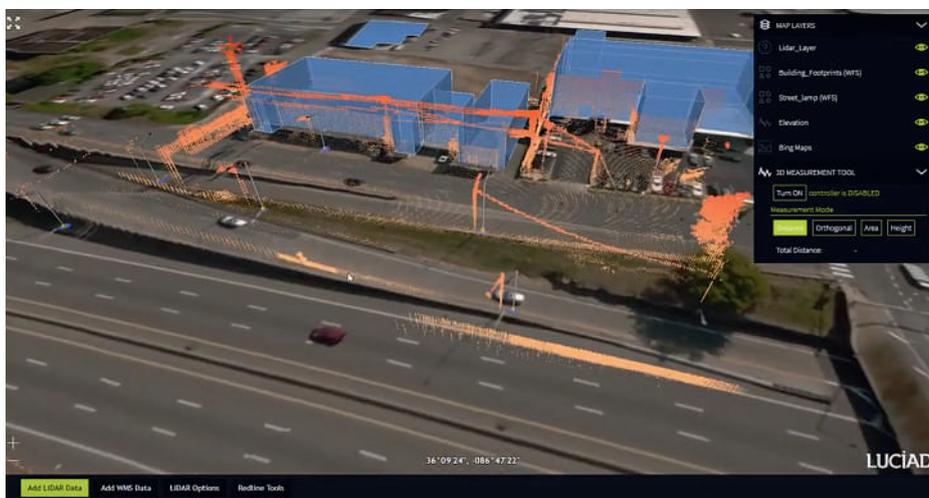
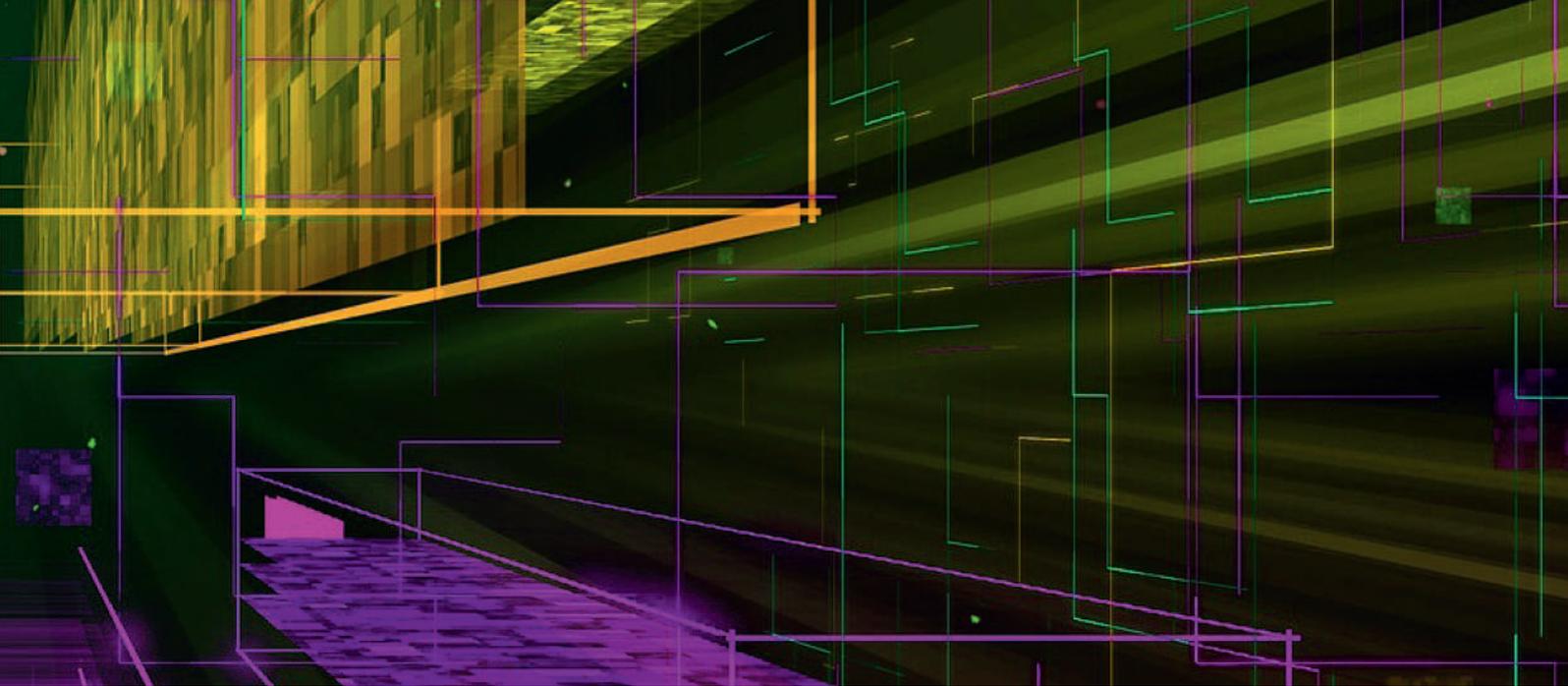
Visualisation and beyond

Digital reality also offers many exciting new ways to analyse data from any source. That might be diving deeper into big data or processing real-time data.

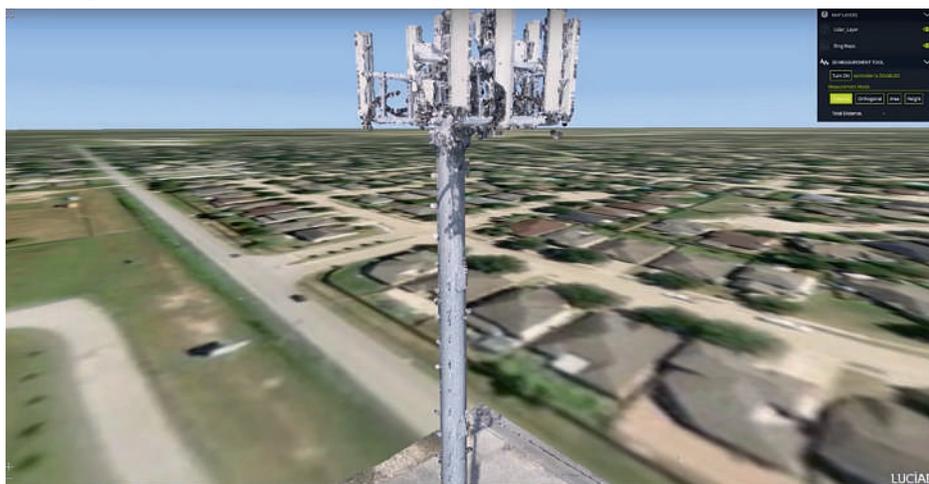
Luciad RIA, is an example of a popular digital reality platform. It provides a rich environment for building highly performant web apps.



Tracking the movement of buses in real time in San Francisco



Combing data from multiple sources in a single web interface



LiDAR data shared over the web for cell tower inspection

Digital reality has been eagerly anticipated by many in the geospatial community. As the volume of both static and dynamic data grows, digital reality is helping organisations use that data. These are outdoor, indoor, above and below ground data sources.

Digital reality helps answer 'what is,' and 'what if' questions. Sharing big data over the web allows wider access. That might

mean viewing LiDAR point cloud data from mobile mapping or UAV sources. Office staff can avoid the need for expensive field trips, and simply view, assess and extract features from that LiDAR source.

Using any mobile device, field staff have access to LiDAR data, maybe collected that day. This data could provide guidance for clearing encroaching vegetation, for example.

Those collecting and providing remote sensing big data products can now share that data with clients over the web before delivery. That's a huge time and cost-saver.

Fusing data sources

Digital reality integrates or fuses many data sources together in one interface. Visualising and analysing big data over the web is one area of focus. Real-time data is another. Digital reality will be an increasingly important tool in the emerging sensor driven Internet of Things (IoT). Sensors attached to both stationary and moving objects are providing streams of real-time data, which is being viewed and analysed in a digital reality environment. That might mean tracking buses to ensure they are on schedule. A number of departments of transport in the US are adjusting traffic lights to help buses stay on schedule, based on real-time data. Water utilities are monitoring equipment and water flows, to help discover potential problems. Digital reality is providing both a real-time data viewer and alerting mechanism for IoT real-time data flows.

There are many fascinating 'what if' scenarios. Augmented reality or superimposing a computer-generated image on a user's view of the real world is particularly interesting. Providing mobile digital reality web applications, which include planned construction projects, offers a new way to share and gather feedback. Citizens can see a planned bridge or building and how it might impact both themselves and their community before final construction approval

Geospatial technology continues its relentless advance. The possibilities new technologies like digital reality bring are almost endless. So far, we have really only just touched the surface..

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