

Geodata. Universal. Usable.

For a sustainable and digital society.



From Imagery to Interactive 3D Maps.

AnDOUC TechCast.

Dr. Alexander Willner (CISS TDI GmbH)

Online, 13.11.2025.



If there's only one thing...
...you should remember.



It is usability...

...what transforms information into insight.

An aerial photograph of a wetland landscape. The terrain is a mix of brown, tan, and teal colors, suggesting different types of vegetation or water levels. The teal areas are irregularly shaped and scattered throughout the brown landscape. The overall texture is grainy and organic.

Let me tell you why.

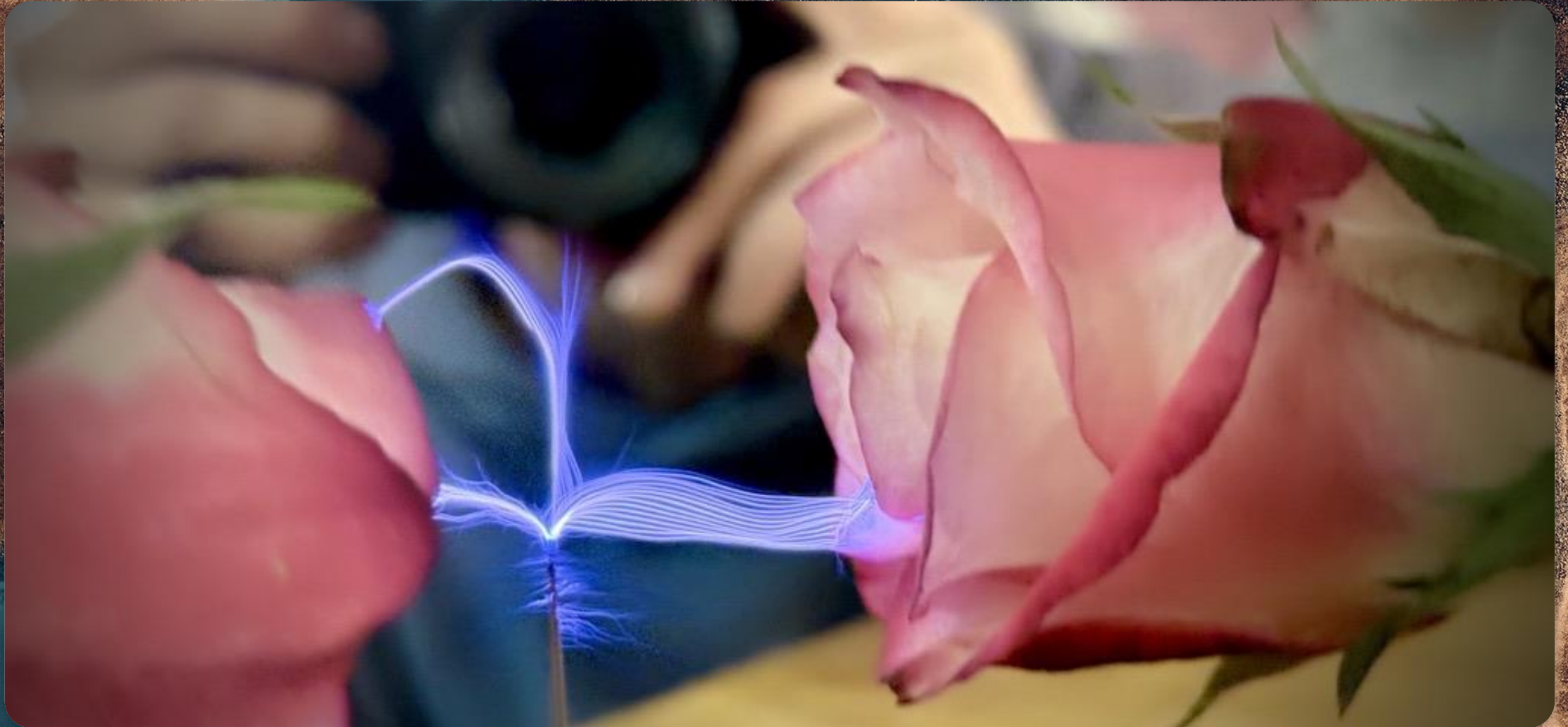
I'm the father of three wonderful young children.

You sometimes find yourself volunteering for school events.



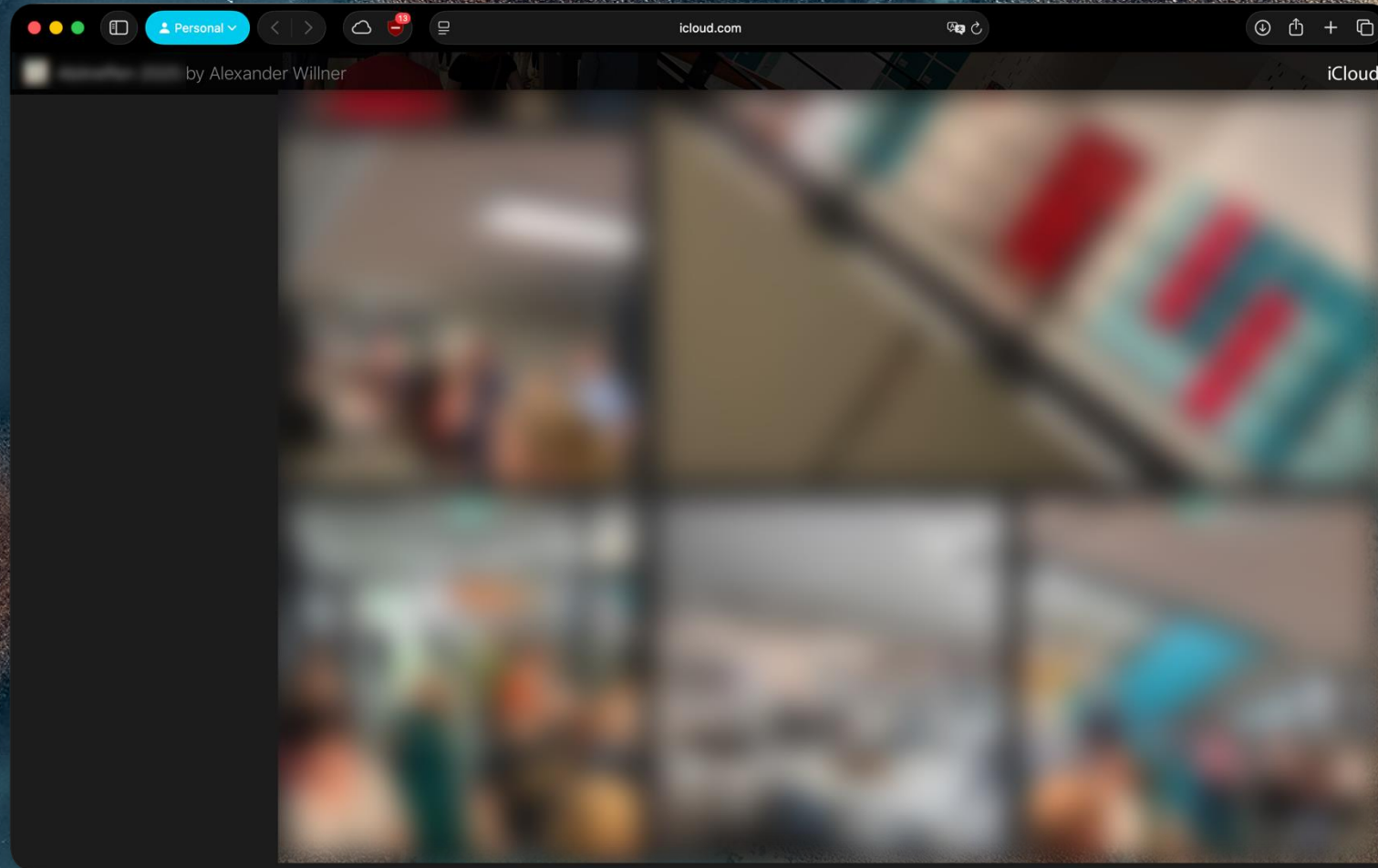
Taking some photos and videos of a school performance.

It was a lovely event — full of energy, emotion, and proud parents.



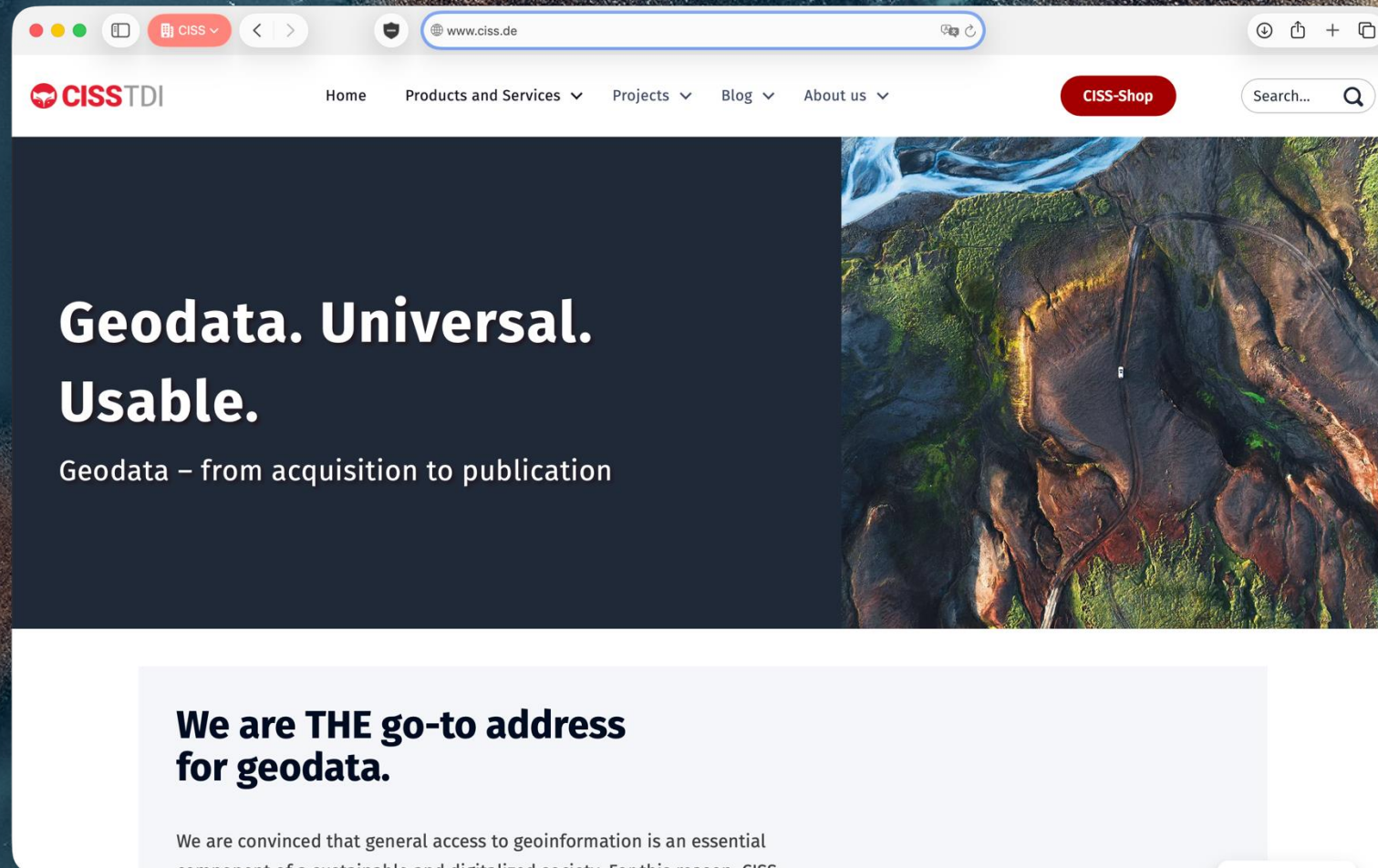
Today sharing is easy. One click in my photo library.

The simplicity hides the complexity of the problem in the background.

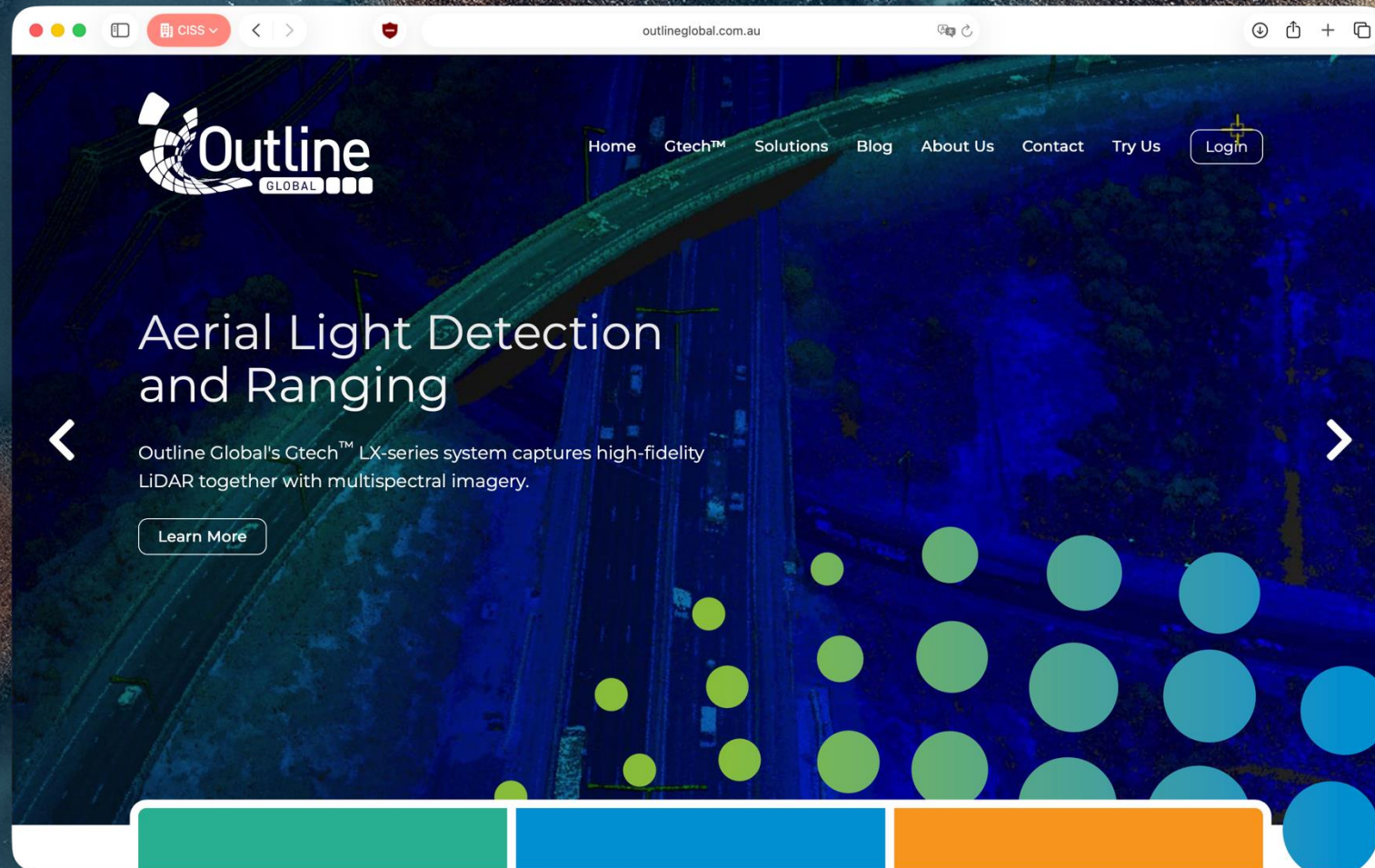


In our professional lives, things are a bit different.

We work with others that manage large amounts of spatial data.



About a year ago we met Outline Global.
Premium quality geospatial imagery, LiDAR and location-based AI.





Several terabytes of data...

...need to be processed and delivered. Clients must download, inspect, evaluate, approve, and sometimes reorder datasets.



This still happened the old-fashioned way.

Unstable transfers, different file formats, versioning, ...

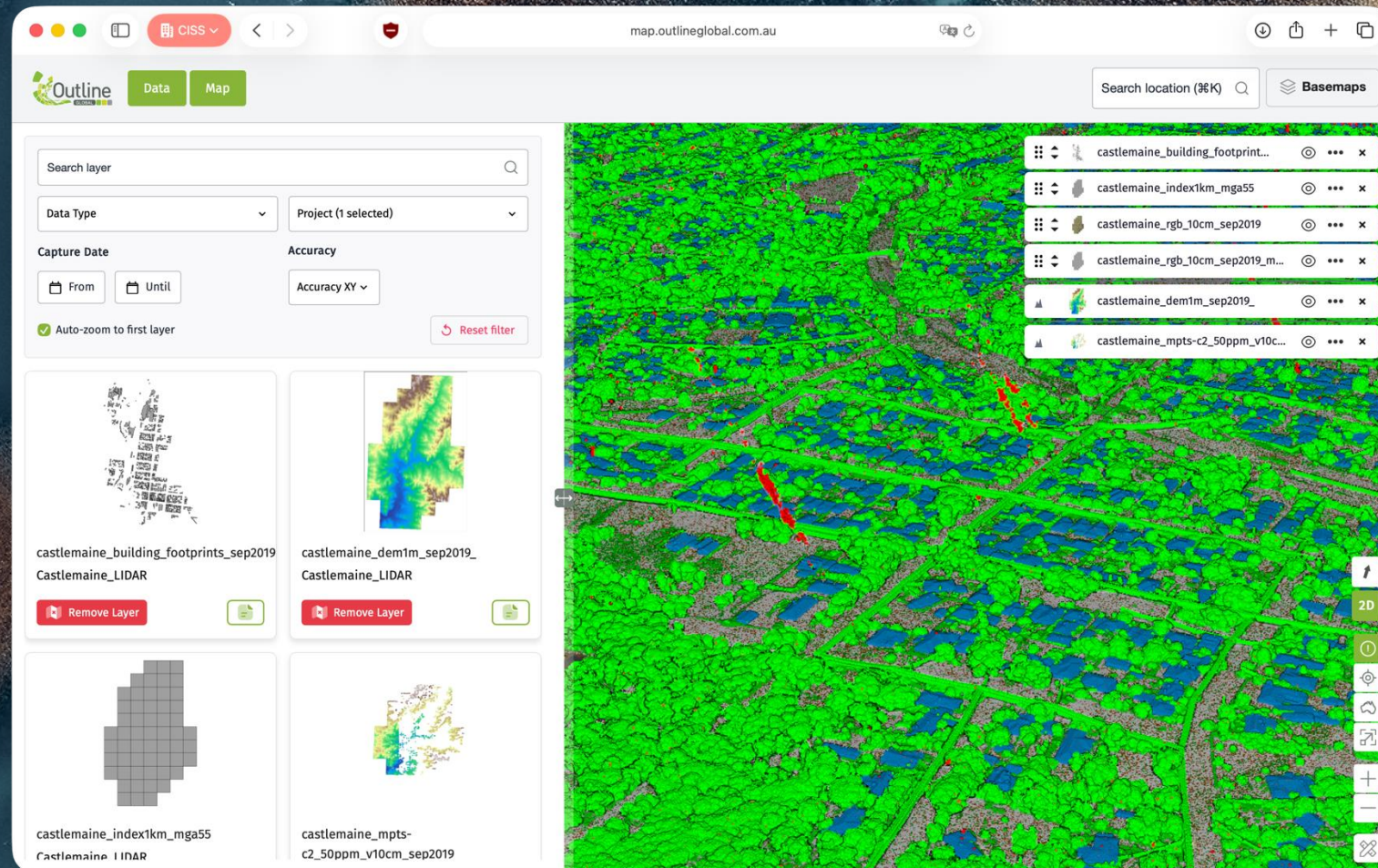


So we set out to change that.

A joint effort of Outline Global, Oracle and CISS TDI.

An “iCloud” for aerial and geospatial data.

For data generated by Outline Global and consumed by their clients.



The system was designed with three main parts.



Frontend

Portal developed by Oracle Consulting using APEX.



Map and Geoservices

Developed by CISS TDI using SvelteKit, Giro3D, OpenLayers, Three.js, FastAPI, Celery, Untwine, LASpy, GDAL, PDAL and many more.



Infrastructure

Deployed in an Oracle Cloud Infrastructure (OCI) tenant with Oracle Autonomous Database, MapViewer and Spatial Map that provide the OGC Services, do the hierarchy building, ...

An aerial photograph of a wetland landscape. The terrain is a mix of brown, tan, and teal colors, suggesting different types of vegetation or water levels. The teal areas are irregular and scattered, while the brown areas are more solid and cover larger portions of the landscape. The overall texture is grainy and organic.

How does it look like?

Map: Meta Data.

With details for different layers (Boundary, Index).

The screenshot displays the Outline Global web application interface. The browser address bar shows 'map.outlineglobal.com.au'. The application has a top navigation bar with 'Data' and 'Map' tabs, and a search bar containing 'Castlemaine'. On the left, there's a 'Search layer' input and a 'Data Type' dropdown. Below this, a 'Capture Date' section includes 'From' and 'Until' date pickers, and an 'Auto-zoom to first layer' checkbox. A 'Project (1 selected)' section shows 'Accuracy XY'. The main map area shows a grid overlay on a satellite image of Castlemaine. A 'Feature Information' popup is open, showing details for the 'castlemaine_index1km_mga55' layer. The popup includes a table of properties and values.

Feature Information 2 of 2

Current Layer: castlemaine_index1km_mga55

Property	Value
DEM	e249n5894_castlemaine_2019sep16_dem1m_v10cm_mga55.asc
LAS_ELL	e249n5894_castlemaine_2019sep16_mpts-c2_v10cm_ell-mga55.las
LAS_AHD	e249n5894_castlemaine_2019sep16_mpts-c2_v10cm_ahd-mga55.las
ORTHO	e249n5894_2019sep16_air_vis_10cm_mga55.tif
DSM	e249n5894_castlemaine_2019sep16_dsm1m_v10cm_mga55.asc
CHM	e249n5894_castlemaine_2019sep16_chm1m_v10cm_mga55.asc
BHM	e249n5894_castlemaine_2019sep16_bhm1m_v10cm_mga55.asc

Map: Vector / 3D Data.

For example Level of Detail (LOD).

The screenshot displays the Outline Global web application interface. The main map shows a 3D vector representation of building footprints over an aerial background. A 'Feature Information' popup is open, displaying details for the selected layer 'castlemaine_building_footprints_sep2019'. The popup includes a table with properties and values for a specific building footprint.

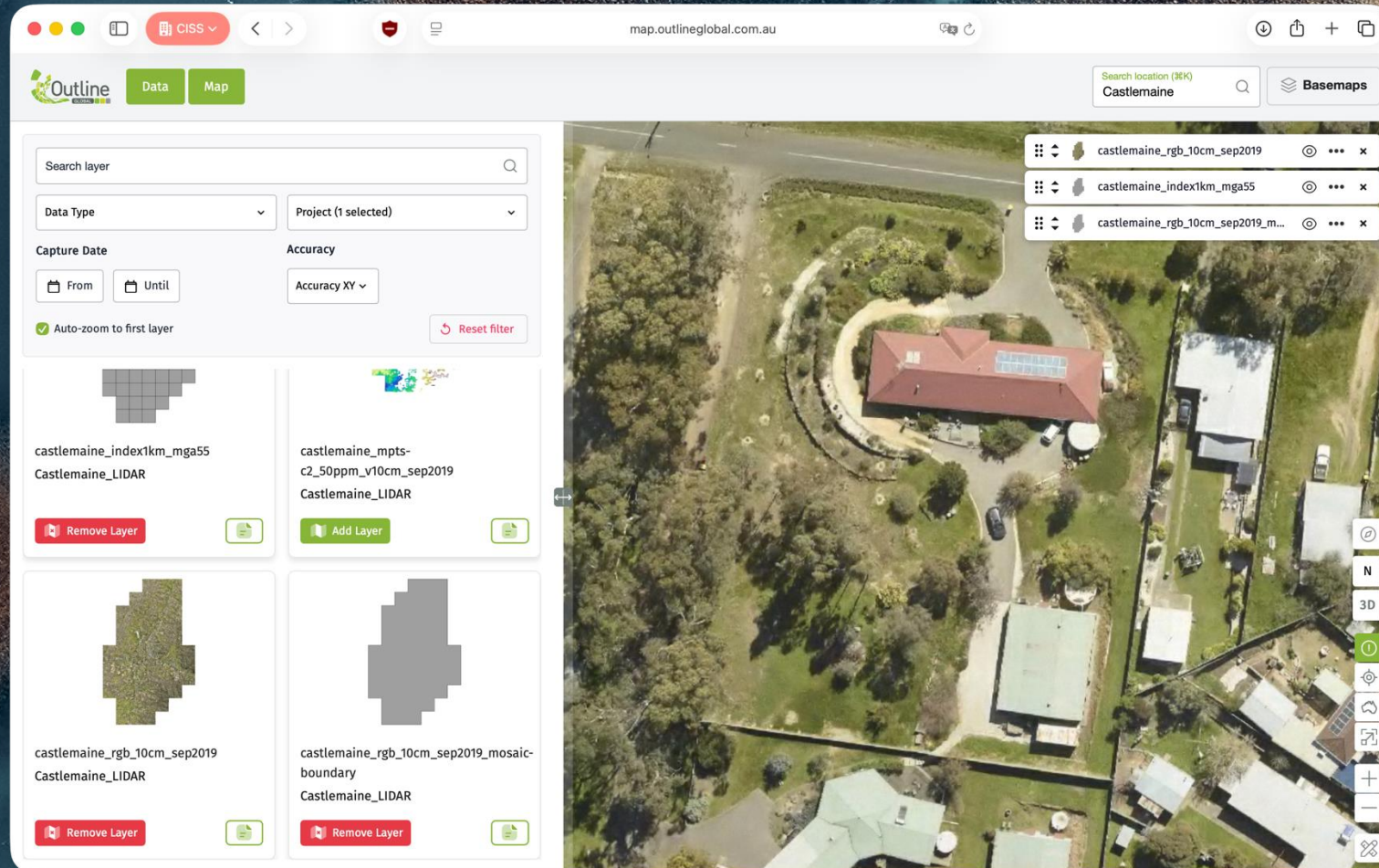
Feature Information

Current Layer: castlemaine_building_footprints_sep2019

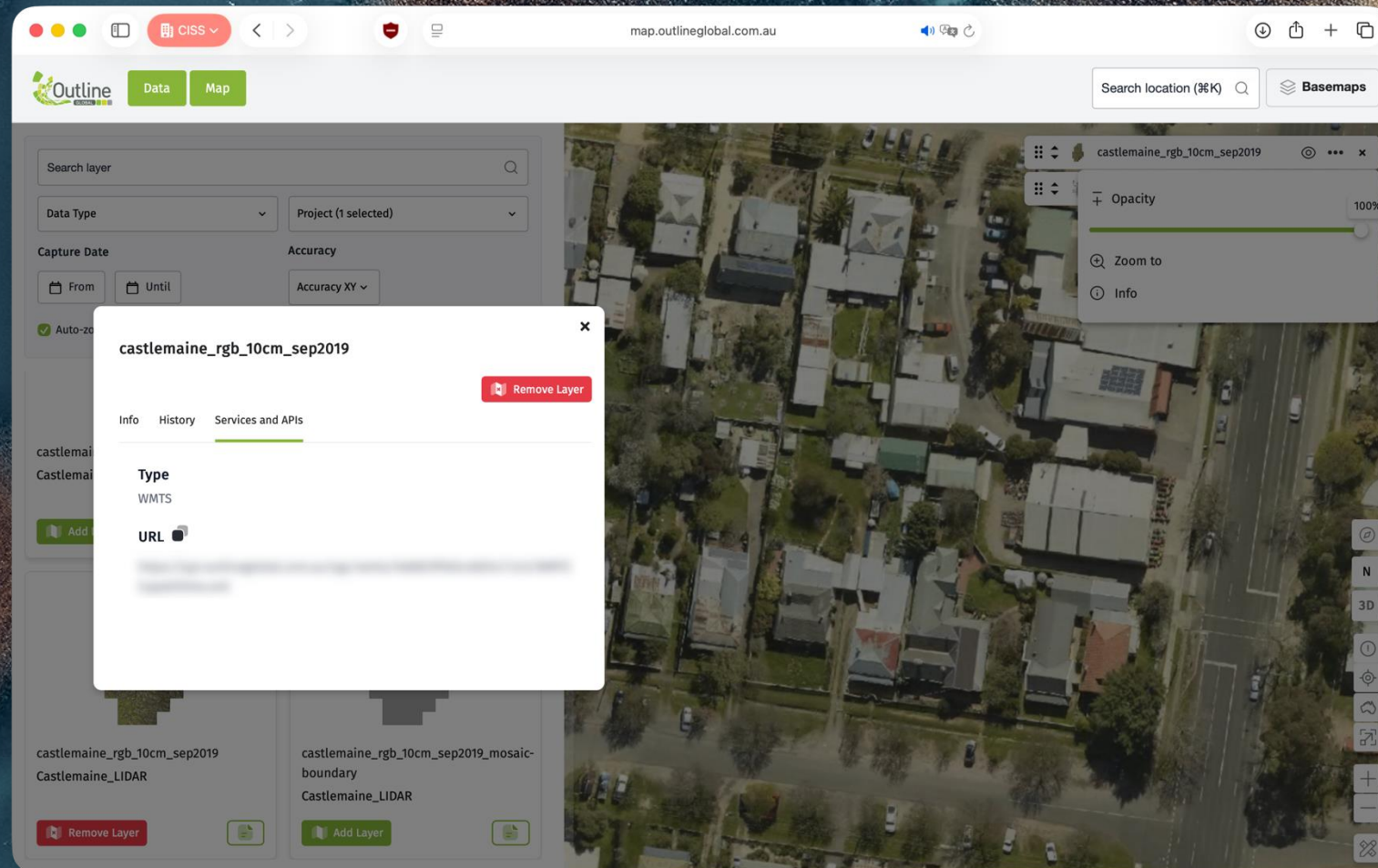
Property	Value
MODEL	LOD2.2-317_Baker_St
LOCATION	Castlemaine
FEATURE_TY	building
SURVEY_DAT	16/09/2019
METHOD	CAD Mapping from dense LiDAR point cloud
LOD	LOD2.2
AREA_M	617.509107194
Z_MIN	253
Z_MAX	296.3544
CENTROID_E	252593.661
CENTROID_N	5895091.334
CENTROID_Z	274.677

Map: Imagery.

With a higher resolution than a typical base map.

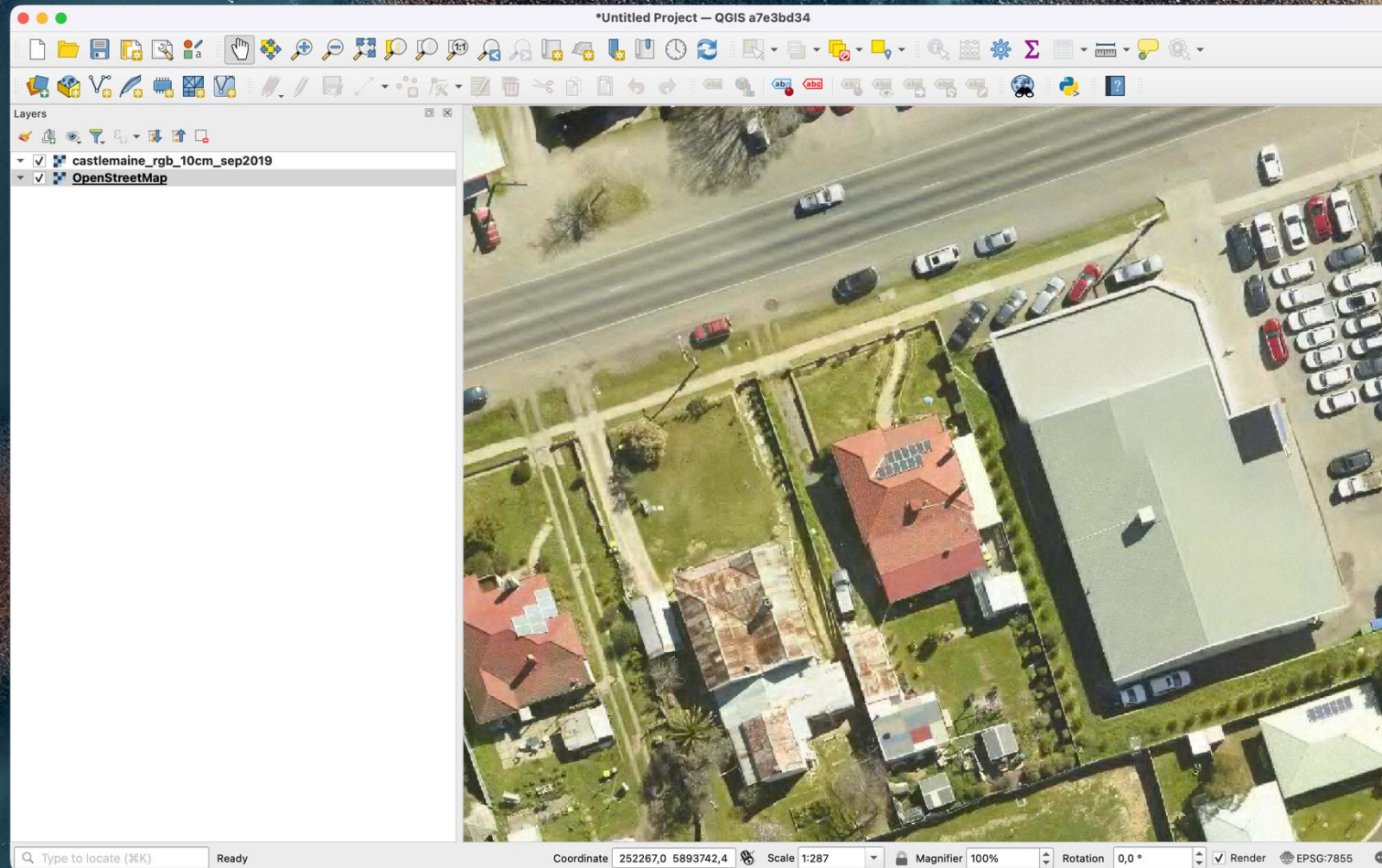


Map: OGC Endpoints.



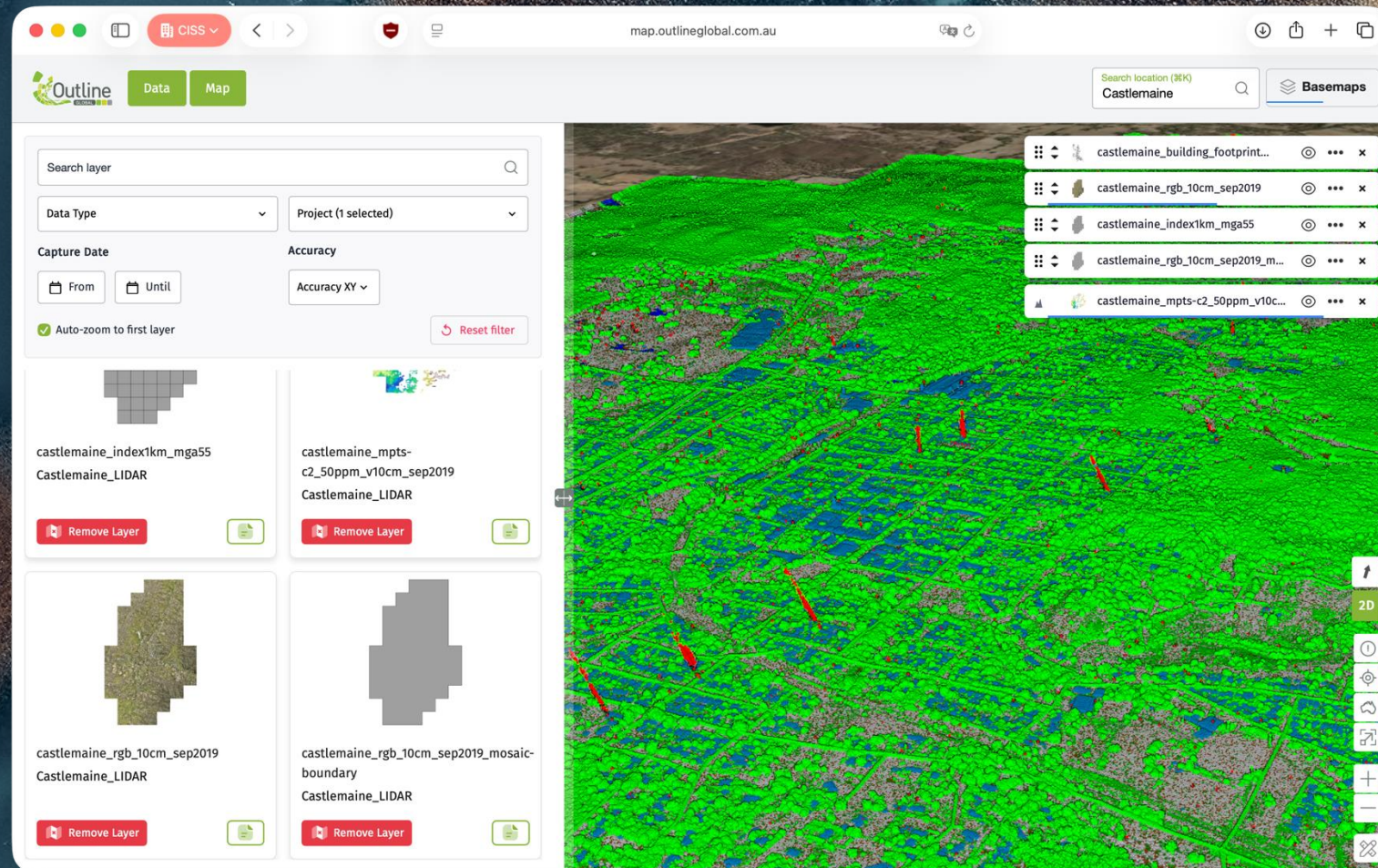
Map: Imagery.

Direct access in a GIS via OGC services (WMTS in this example).



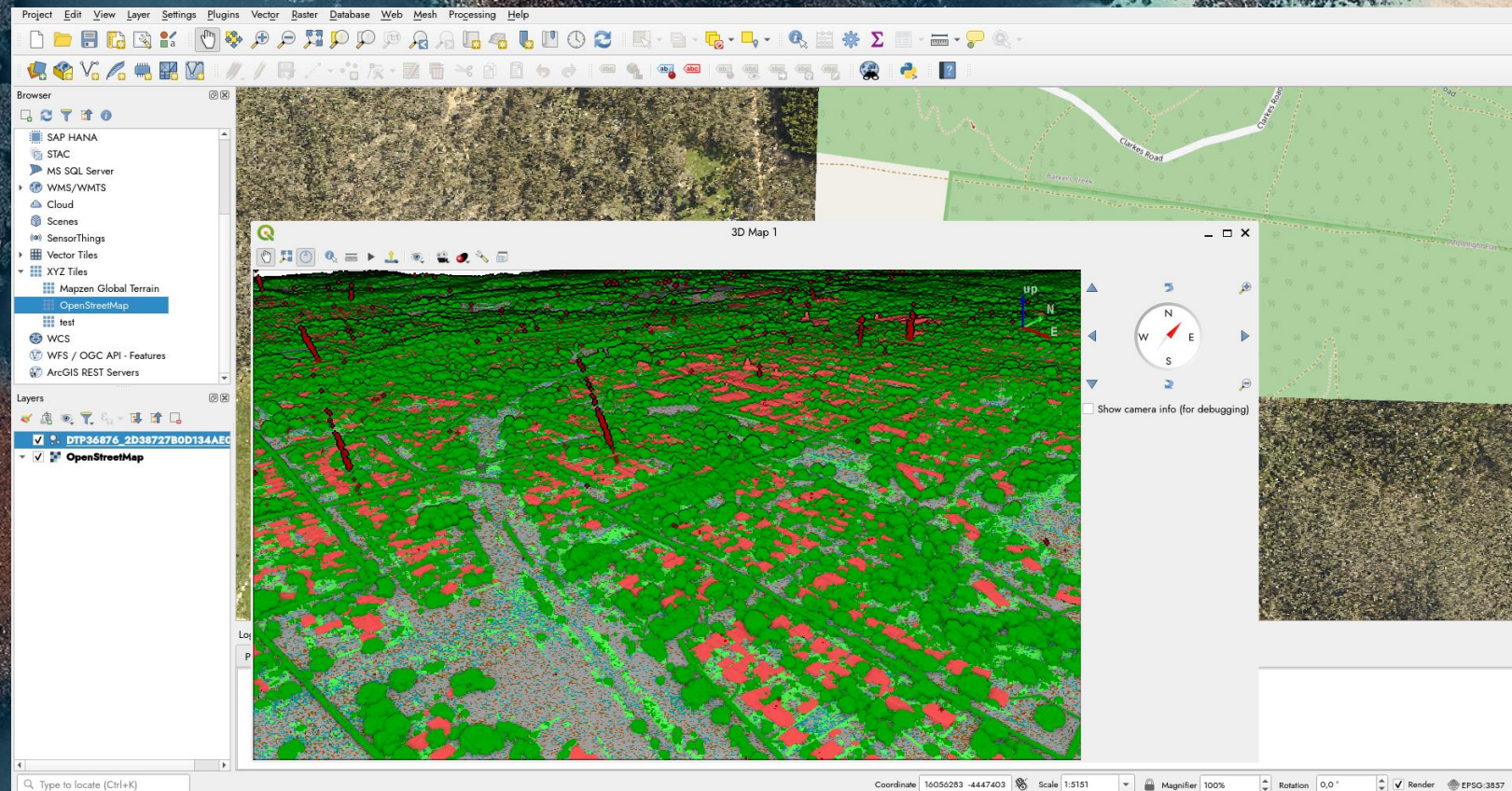
Map: Cloud Optimized Point Clouds (COPC).

Multiple detail levels for elevation, intensity, color, and classification.



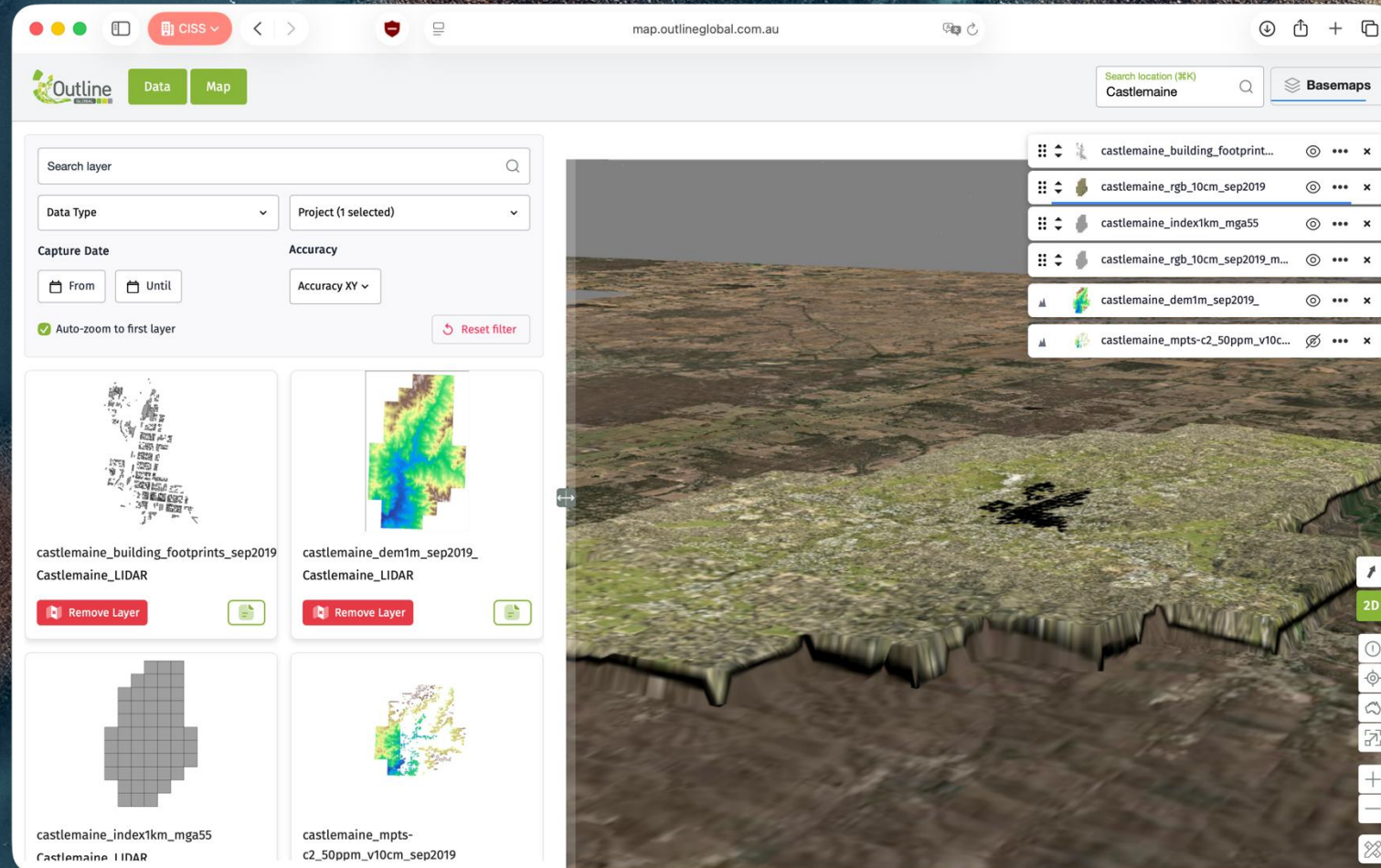
Map: Cloud Optimized Point Clouds (COPC).

Direct access in a GIS via HTTPS services.



Map: Digital Elevation Model (DEM).

A 2.5D digital representation of the surface.





Let's have a live demo, shall we?

Outline-Global-Oracle-TechCast.mov

Outline **Data** **Map**

Search location (⌘K) **Basemaps**

Search layer

Data Type Project (1 selected)

Capture Date Accuracy

From Until Accuracy XY

☒ Auto-zoom to first layer [Reset filter](#)

Castlemaine_LIDAR

[Remove Layer](#)

c2_50ppm_v10cm_sep2019
Castlemaine_LIDAR

[Remove Layer](#)

castlemaine_rgb_10cm_sep2019
Castlemaine_LIDAR

[Remove Layer](#)

castlemaine_rgb_10cm_sep2019_mosaic
Castlemaine_LIDAR

[Remove Layer](#)

castlemaine_building_footprint...

castlemaine_index1km_mga55

castlemaine_rgb_10cm_sep2019

castlemaine_rgb_10cm_sep2019_m...

castlemaine_mpts-c2_50ppm_v10c...

333 m²

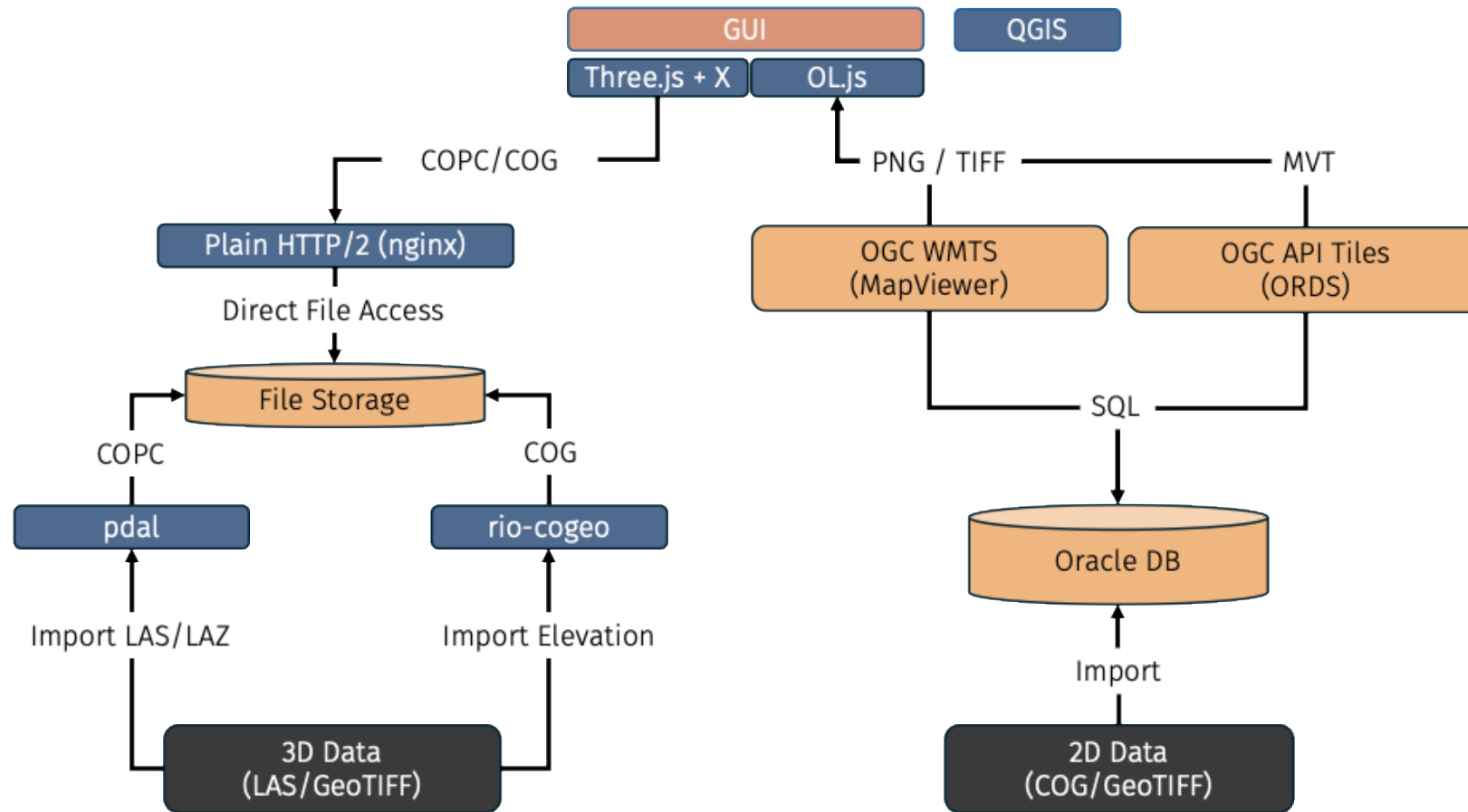
16.1 m

04:01 06:49

N 3D

Some more technical background.

Architecture of the 2D / 3D ETL pipeline with OGC endpoints.



Outlook.

Beyond that, many more ideas are waiting to be implemented. The foundation is strong.



Spatial ML Algorithms

Analysis and prediction of geospatial data.

Oracle 23ai has support for cluster analysis, outlier analysis, spatial correlation, regression analysis, spatial classification, spatial aggregation, ...



Geometric Intersection

On-demand polygon-based extraction and data conversion to allow users to select an area of interest and download only what they need and how they need it.

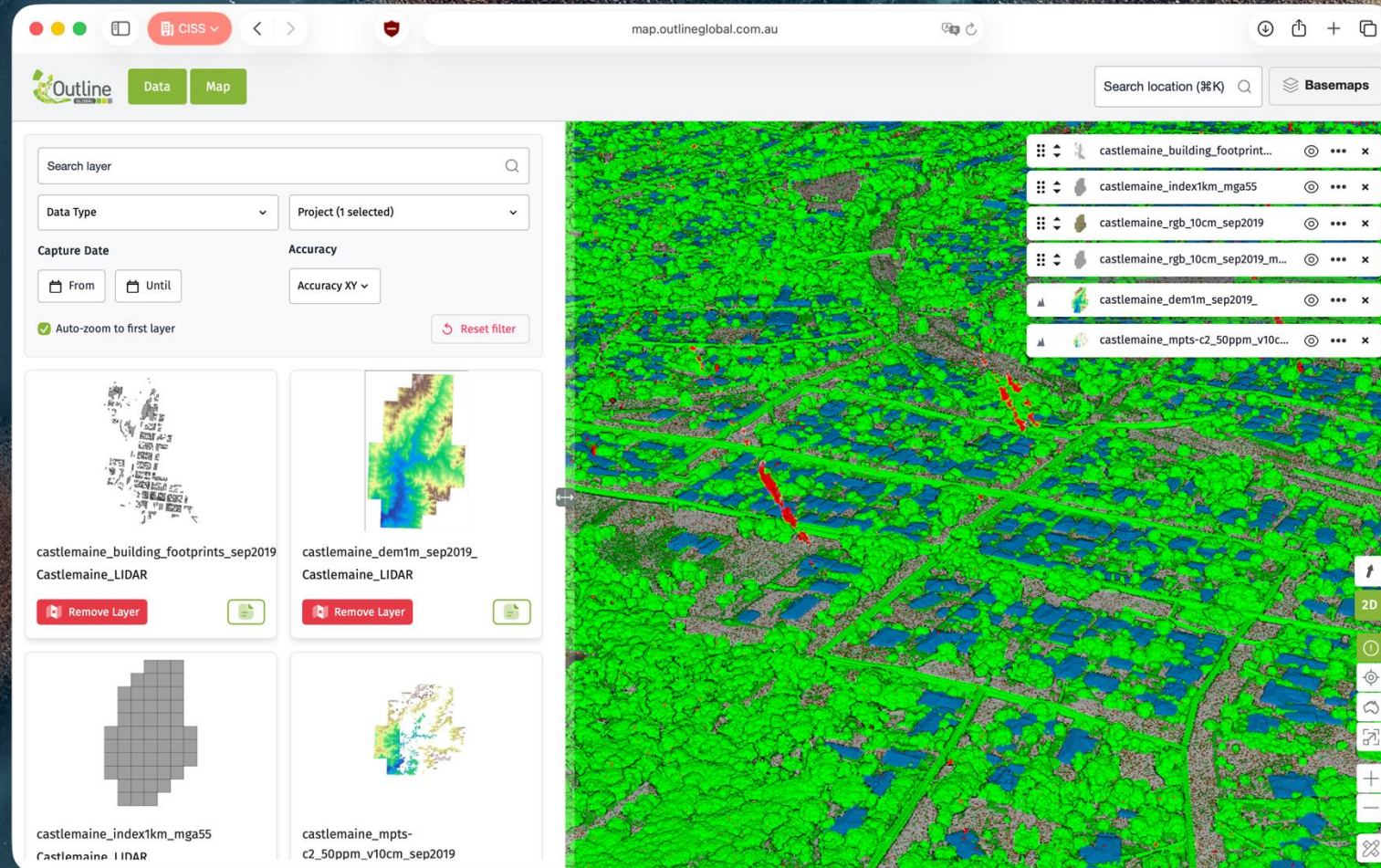


Order via Portal / API

Let customers select an area and type of information to request for flyovers.

The goal was an “iCloud” for aerial and geospatial data.

For data generated by Outline Global and consumed by their clients.





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...what transforms information into insight.

Here Today

Representing a Great Team



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