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An open, interoperable, transdisciplinary approach to a point cloud data service using OGC standards and open source software.

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High resolution point clouds and other topology-free point data sources are widely utilised for research, management and planning activities. A key goal for research and management users is making these data and common derivatives available in a way which is seamlessly interoperable with other observed and modelled data.

The Australian National Computational Infrastructure (NCI) stores point data from a range of disciplines, including terrestrial and airborne LiDAR surveys, 3D photogrammetry, airborne and ground-based geophysical observations, bathymetric observations and 4D marine tracers. These data are stored alongside a significant store of Earth systems data including climate and weather, ecology, hydrology, geoscience and satellite observations, and available from NCI's National Environmental Research Data Interoperability Platform (NERDIP) [1].

Because of the NERDIP requirement for interoperability with gridded datasets, the data models required to store these data may not conform to the LAS/LAZ format - the widely accepted community standard for point data storage and transfer. The goal for NCI is making point data discoverable, accessible and useable in ways which allow seamless integration with earth observation datasets and model outputs – in turn assisting researchers and decision-makers in the often-convoluted process of handling and analyzing massive point datasets.

With a use-case of providing a web data service and supporting a derived product workflow, NCI has implemented and tested a web-based point cloud service using the Open Geospatial Consortium (OGC) Web Processing Service [2] as a transaction handler between a web-based client and server-side computing tools based on a native Linux operating system. Using this model, the underlying toolset for driving a data service is flexible and can take advantage of NCI's highly scalable research cloud. Present work focusses on the Point Data Abstraction Library (PDAL) [3] as a logical choice for efficiently handling LAS/LAZ based point workflows, and native HDF5 libraries for handling point data kept in HDF5-based structures (eg NetCDF4, SPDlib [4]). Points stored in database tables (eg postgres-pointcloud [5]) will be considered as testing continues.

Visualising and exploring massive point datasets in a web browser alongside multiple datasets has been demonstrated by the entwine-3D tiles project [6]. This is a powerful interface which enables users to investigate and select appropriate data, and is also being investigated as a potential front-end to a WPS-based point data service.

In this work we show preliminary results for a WPS-based point data access system, in preparation for demonstration at FOSS4G 2017, Boston (http://2017.foss4g.org/)

[1] http://nci.org.au/data-collections/nerdip/
[2] http://www.opengeospatial.org/standards/wps
[3] http://www.pdal.io
[4] http://www.spdlib.org/doku.php
[5] https://github.com/pgpointcloud/pointcloud
[6] http://cesium.entwine.io