OGC Web Services for GBIF-Mediated Occurrence Data

One of the goals of the EU-funded EuroGEOSS project is to develop the infrastructure for a "biodiversity operational capacity" as a European contribution to the Group on Earth Observations Biodiversity Observation Network (GEO BON). One outcome of EuroGEOSS will be the Digital Observatory for Protected Areas (DOPA), an information system for assessing the state and pressure of protected areas in order "to support proper prioritisation for decision making and fund allocation processes". As a contribution to the DOPA, GBIF developed a number of OGC web services facilitating geospatial access to GBIF-mediated African biodiversity data.

One of the challenges when working with primary biodiversity data is the huge volumes of data. The GBIF data portal can be used to find records of interest, e.g., for a certain species or geographic region. However, in most cases, the data volumes preclude the option of browsing the data. Visualising the occurrences as maps offers another view of the data and browsing becomes feasible again. Yet, the number of records remains a demanding challenge and mapping tools such as GeoServer and MapServer are overwhelmed by the current 168 million geo-referenced GBIF-mediated occurrence records.

To tackle this, we created zoom-based views of the data. At large scales they provide aggregated density maps, while at higher resolution the full observation or specimen details are presented. Drilling down into the data details is as easy as zooming into a certain area of the map. To enable this, we created cluster maps with different resolutions, using grids ranging from one degree to 0.01 degrees in which individual occurrences are aggregated, linked these cluster maps to zoom-based style descriptors, and combined them into layer groups together with detailed views of the occurrence records.

Thus, we were able to create OGC Web Map Services (WMS) and Web Feature Services (WFS) that can be used in conjunction with Google Maps, Google Earth, OpenLayers and any other OGC conforming GIS application. A second set of services supports taxonomic filtering on any of the ranks of kingdom, phylum, class, order, family, genus or species. The initial web services were set up to provide only African data; however, the devised schema should be suitable for global occurrence data and also cope with growing record numbers in the future.