USGS Technical Documentation - Description

# Application Deployment Environment

**OS:** Ubuntu 16.04

**Web Server:** Apache 2.4

**Mid-ware Server:** Node.js (Express Framework)

**Database Server:** MySql 7.8

**Data Visualization Platform:** WebWoldWind@NASA server kit

# Programming Languages Used

**Client Side:** HTML5/CSS/DOM/JQuery/Ajax

**Server Side:** Node.js

# Key Interactive Features

**USGS Data Visualization – US Wind Turbine**

**Heatmap –** a new feature that is a two-dimensional representation of data in which values are represented by **colors**. The density heat maps provide an immediate visual summary of the concentration of placemarks.

**Auto Switch –** the feature takes advantage of using the altitude to automatically switch between the heat map and the placemarks.

**Toggle Switch –** the toggle switch temporarily allows the user to view either the place marks or the heatmap and ignores the setting based on the altitude, as with the auto switch.

**Placemark Popups –** hovering the mouse over a placemark on the globe will provide a popup containing key information about the point location.

**Smart Search –** the smart search has functions to **auto-complete** a partial query using the items in the database matching a given character string. **Auto**-**suggest** takes an unbounded list for related keywords and phrases from the data, which may or may not match the precise query string.

**Placemark Filters –** placemark colors change dynamically based on the filter users wish to apply. The purpose of the function is for a convenient visual outline of what information they wish to understand about the place marks.

**USGS Data Visualization – Map Service Viewer**

**Layer Menu –** the globe can have several overlays of layers taken directly from a large data collection provided by the USGS.

**Layer Selection –** checking a layer will automatically fly the user to the location which the layer will appear, also adjusting the altitude automatically base on the size of the layer. Every layer has the name of the location where they are situated in its name.

**Location Selection –** Defaulting to all layers, users can choose to have the layer menu only display layers from a specific continent, country, and state/city.

**Notes –** to guide users through the application functions, there are several dynamically changing notes that provide instructions or reminders to users based upon their actions.

# SERVER-SIDE Programs

To establish a strong, interactive communication bond between users and the application, server-side programs (also called mid-ware applications) are used to produce a response customized for each user's request to the website. This way, it is possible to provide a personally customized user interface based on the data stored in the database.

For example, users can signup for an account to access more features, including adding **new requests** for layers on the Map Service Viewer. Every request can be accessible to the user on their account as they wait for them to be approved.

On certain pages, users can search for specific saved data previously stored using the filter form options, matching all records that fit the set requirements.