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SETTING UP THE KENYA DATA CUBE

**Abstract**

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The Kenya Space Agency (KSA) has been mandated to promote, regulate and coordinate space related activities in the country. As part of promoting space related activities in Kenya, it has actively been involved in the query and analysis of space derived data for its socio-economic development. Thus KSA has invested in setting up infrastructure to be able to run analysis on the numerous amounts of space derived data as well as deliver the end products to the general public. This has led to projects in setting up and running open-source software systems on top of this infrastructure. One of these projects involves setting up an Open Data Cube instance to run analysis of freely available satellite imagery of the Kenya region, which we call the Kenya Data Cube.

The KSA private data center is managed through virtualization. The technology employed to effect the virtualization is VMWare essentials. The Kenya Data Cube environment is implemented as a virtual machine within the data center, running the Linux Ubuntu operating system. Python was then installed for the ubuntu operating system, using Conda as its package management system. Through Conda, the Open Data Cube library was installed, alongside its supporting libraries including Jupyter notebooks and other scientific libraries.

Having installed the Open Data Cube core libraries, its PostgreSQL database was set up. Next came the process of incorporating satellite imagery into the set up. This process is called indexing. The technique adopted to index the satellite imagery is the EO3 standard, provided in the Open Data Cube official documentation. Landsat imagery was downloaded from the USGS Earth Explorer site and indexed into the Open Data Cube instance.

Jupyterhub, a variant of the Jupyter notebooks, was used as the web based user interface used to gain access to the Open Data Cube core libraries.

One of the challenges encountered in this undertaking is in the technique employed to index the satellite imagery into the Kenya Data Cube. It involved downloading of gigabytes almost terabytes of satellite imagery, which took a lot of time and storage.

Another challenge encountered was in finding a good documentation for generating high level products, as well as adopting the existing Jupyter notebooks libraries for generating products.

We however believe that if we can overcome some of these shortcomings, the Open Data Cube is a promising initiative for developing nations.