

Integration of New Sensor Data in Open Data Cube

Parul Mittal
SCSIT, Devi Ahilya Vishwavidyalya, Indore

T. P. Girish Kumar,
RRSC-C/NRSC, Nagpur

Dr. Shraddha Masih
SCSIT, Devi Ahilya Vishwavidyalya, Indore

Abstract:- Datacubes are developing worldwide which stores spatio-temporal information in a more progressive fashion. Open Data Cube is an open source geospatial data management and analysis platform. Open data cube increases the impact of satellite data by providing functionality to analyze time series satellite data which will help to take informed decisions. This paper explains the method to ingest IRS LISS 3 sensor data into the datacube.

Keywords:- Open Data Cube, LISS 3, Metadata, Ingestion.

I. INTRODUCTION

Remotely sensed Earth Observations (EO) information are progressively accessible from a number of unreservedly and straightforwardly open archives. This information are exceedingly profitable on account of their exceptional and comprehensively steady data that they incorporate. However, the full information potential of EO data has not been yet realized. They remain still underutilized and stored in electronic silos of data[5]. This is due to several reasons: (1) increasing volumes of data generated by EO satellites; (2) lack of expertise, infrastructure, or internet bandwidth to efficiently

and effectively access, process, and utilize EO data; (3) the particular type of highly structured data that EO data represent introducing challenges when trying to integrate or analyze them; (4) and the substantial effort and cost required to store and process data limits the efficient use of these data[6].

To overcome these reasons or challenges, there is a need to look beyond traditional methods. To an ever increasing extent, datacubes are being perceived as an profitable method for arranging gigantic measures of gridded information along existence. There are as of now a few important instances of existing Data Cubes frameworks including the Australian, Colombian, African and Swiss national Data Cubes (Argyro). Open Data Cube is uninhibitedly accessible and enables national and provincial bodies to make their Data Cubes [1].

LISS-III provides 23.5m resolution in four bands with 140 Km swath. It is a Multi-spectral camera operating in four spectral bands, three in the visible and near infrared and one in the SWIR region, as in case of Resourcesat-2. LISS-3 has a product type Path-Row scene based and Geocoded 15' x 15'. For path-row scene based it has an area coverage of 140 x 140 and for Geocoded 15'x15' has an area coverage of 28 x 28.

LISS-3 (Linear Imaging Self Scanning sensor-3) of Resource Sat-2		
Bands	Wavelength (μm)	Resolution (m)
-	-	-
-	-	-
B2 - Green	0.52 - 0.59	24
B3 - Red	0.62 - 0.68	24
B4 - NIR	0.77 - 0.86	24
B5 - SWIR	1.55 - 1.70	24
-	-	-
-	-	-

Fig 1:- Bands in LISS 3

II. LISS 3 DATA CUBE CONFIG FILES

To develop a datacube of time series satellite scenes, there is a requirement of some configuration files, for every different sensor a metadata file will be downloaded with the scenes in case of landsat, but if talk about Resourcesat-2 there is a need to create metadata file in the form of xml, for each different sensor different product definition file has to be created in our case it is LISS 3, and also different ingestion file is also needed to finally ingest the data into the cube.

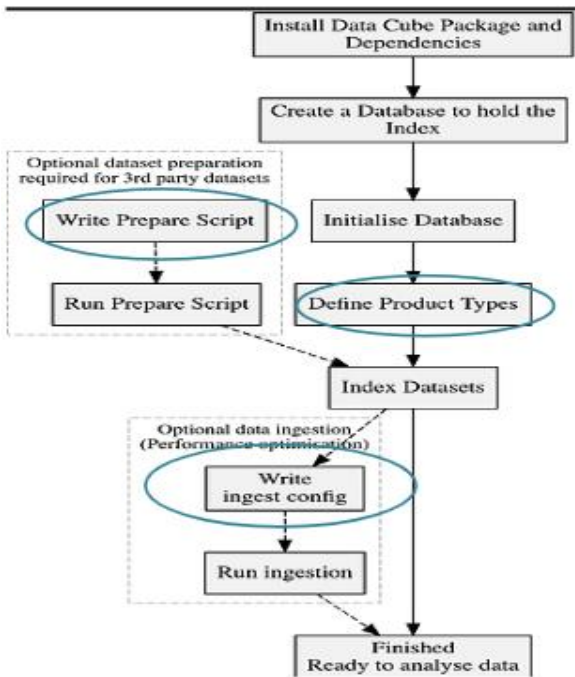


Fig 2:- Highlighting files requirement in ODC

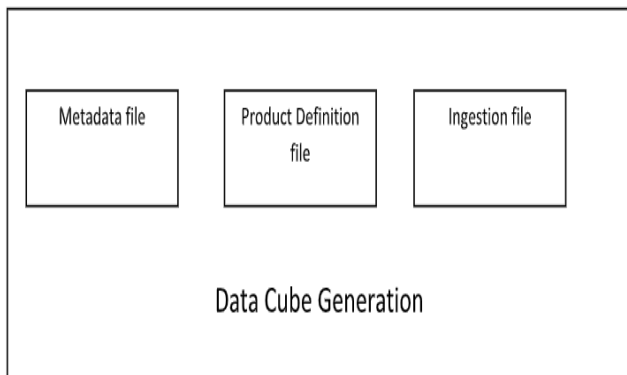


Fig 3:- Files needed for Data Cube

➤ **Metadata file:**

To generate the metadata file of LISS-3 there is need of python script. The python script is based upon xml file which has to be created before from the downloaded txt file with LISS 3 data.

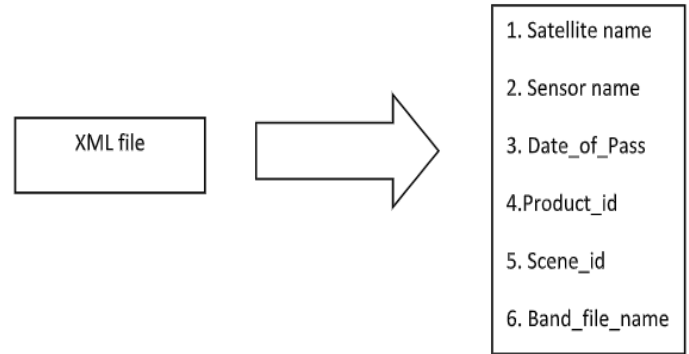


Fig 4:- Contents of xml file

Metadata yaml file will be generated from datacube command which consists of the python script which fetches the desired details from the folder name of the dataset, the xml file and the names of the bands present in the dataset folder.

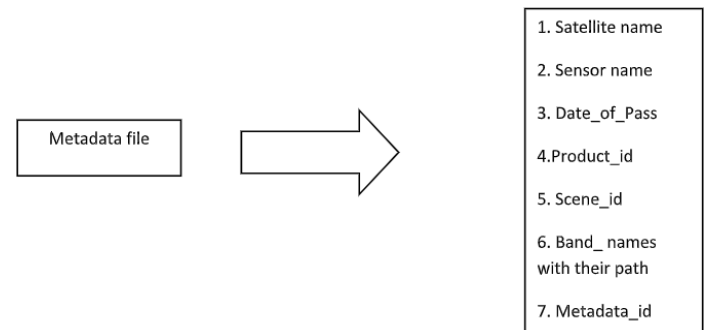


Fig 5:- Contents of generated Metadata file

➤ **Product Definition File:**

It is a a yaml file which contains the type of datasets which has to be ingested. It contains names of product type, satellite, sensor and the bands which are present in the specific sensor. The measurements is an ordered list of data, which specify a name and some aliases, a data type or dtype, and some options extras including what type of units the measurement is in, a nodata value, and even a way of specifying bit level descriptions or the spectral response in the case of reflectance data. Data Cube recognized the dataset through its metadata such as measurements platform and sensor names geospatial extents and projection acquisition time.

➤ **Ingestion File:**

An Ingestion Configuration file defines a mapping from the way one set of Datasets is stored, into a new storage scheme for the data. An Ingestion file is written in YAML and contains the following data: the measurements which have to be stored, projection of data , resolution of data, tiling of data ,data stored location, resampling and compression of data. For LISS 3 its product_type will be Path-Row and projection of the data will be stored as EPSG:4326.

III. CONCLUSION

An open data cube approach is free and open so it permit national governments, local organizations and other significant institutions to quantify advance towards accomplishing national needs and helps in investigation of prepared satellite data and application calculations. EO information can likewise help get increasingly precise, visit, and spatially or transiently extrapolated estimations, supplementing nation gathered information.

The authors hope that this report sheds some light on the required files of LISS 3 data that has to be created for Open Data Cube.

ACKNOWLEDGEMENT

Support from the Open Data Cube Slack Community is acknowledged.

REFERENCES

- [1]. <https://www.opendatacube.org/>
- [2]. Peter Bauma, Dimitar Misev, Vlad Merticariu, Bang Pham Huu, Brennan Bel; DATACUBES: A TECHNOLOGY SURVEY(July 2018); IGARSS 2018 - 2018 IEEE International Geoscience and Remote Sensing Symposium
- [3]. Argyro Kavvada and Alex Held: ANALYSIS-READY EARTH OBSERVATION DATA AND THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS(July 2018), IGARSS 2018 - 2018 IEEE International Geoscience and Remote Sensing Symposium
- [4]. Peter Strobl¹, Peter Baumann², Adam Lewis³, Zoltan Szantoi^{1,4}, Brian Killough⁵, Matthew Purss³, Max Craglia¹, Stefano Nativi^{1,6}, Alex Held⁷, Trevor Dhu: THE SIX FACES OF THE DATA CUBE(November 2017); Big Data from Space, At Toulouse, France
- [5]. Gregory Giuliana^{a,b}, Bruno Chatenoux^a, Andrea De Bono^a, Denisa Rodilaa^b, Jean-Philippe Richarda^a, Karin Allenbacha^a, Hy Daoa^c and Pascal Peduzzia: BUILDING AN EARTH OBSERVATIONS DATA CUBE: LESSONS LEARNED FROM THE SWISS DATA CUBE (SDC) ON GENERATING ANALYSIS READY DATA (ARD) (30 Nov 2017); Big Earth Data
- [6]. https://en.wikipedia.org/wiki/Australian_Geoscience_Data_Cube
- [7]. Killough, B. "CEOS Data Cube White Paper",get from <https://www.opendatacube.org/ceos>
- [8]. <https://datacube-core.readthedocs.io/en/datacube-1.3.2/ops/config.html>
- [9]. Resourcesat-2 handbook : http://lps16.esa.int/posterfiles/paper1213/%5BRD13%5D_Resourcesat-2_Handbook.pdf