PyCon Nigeria 2017

Using Python for GIS and Remote Sensing Operations

Slides and Notebook: https://github.com/forum2k9/pycon-ng-2017

About me:

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- If it exists, there is python module for it
- Geospatial python modules
  - For vector data: Shapely, Fiona, PyShp
  - For raster data: OpenCV, Rasterio, Scikit-image, GDAL
  - Others: Geopy, PySAL, PostGIS, SimpleKML (more on pypi)

3) Jupyter Notebook - demo

- Geocoding some addresses (GeoPy)
- Visualization on web map (Folium)
- Working with Points, Lines and Polygons
- Image Processing

Overview of GIS and RS

Anyone from one of these Geo data science fields?

~ Geography
~ Geophysics
~ Geodesy/Geomatics
~ Land Surveying
~ Land Navigation
~ Geo-IT
~ Cartography
~ Photogrammetry
~ LiDAR
~ Remote Sensing
~ GIS/Mapping
~ Electronic Charting /GIS
~ Seismic & Hydrocarbon Exploration
~ Mining
~ Sensor Technology
~ XYZ Positioning & Specialist Navigation
~ Environmental Research

Most likely you have interacted with GIS/RS tools

https://pycon.ng/venue/

Conference Venue

Lagos Chambers of Commerce and Industry Conference

Get Directions:

Enter Destination From input field below to get directions to our event location

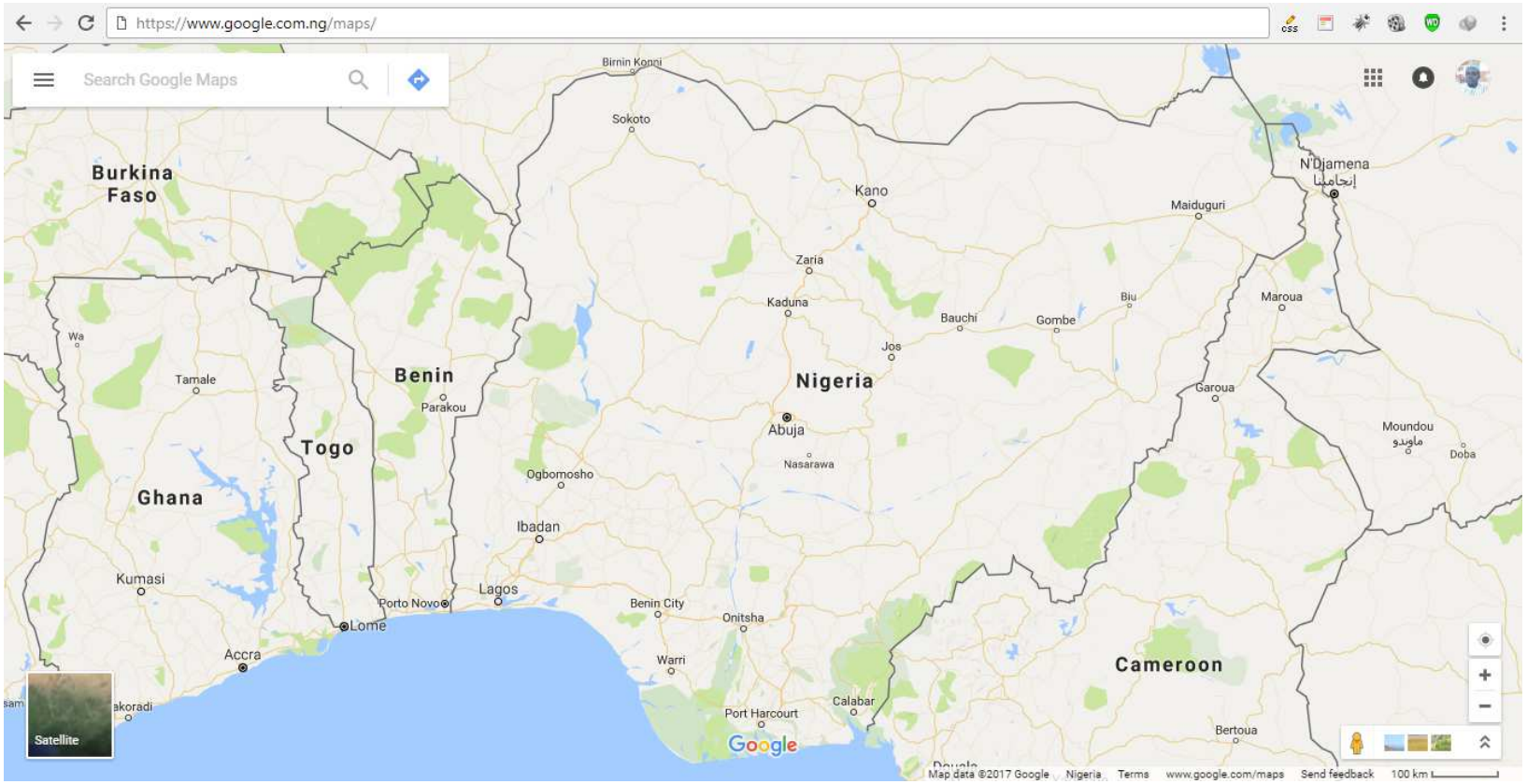
Venue

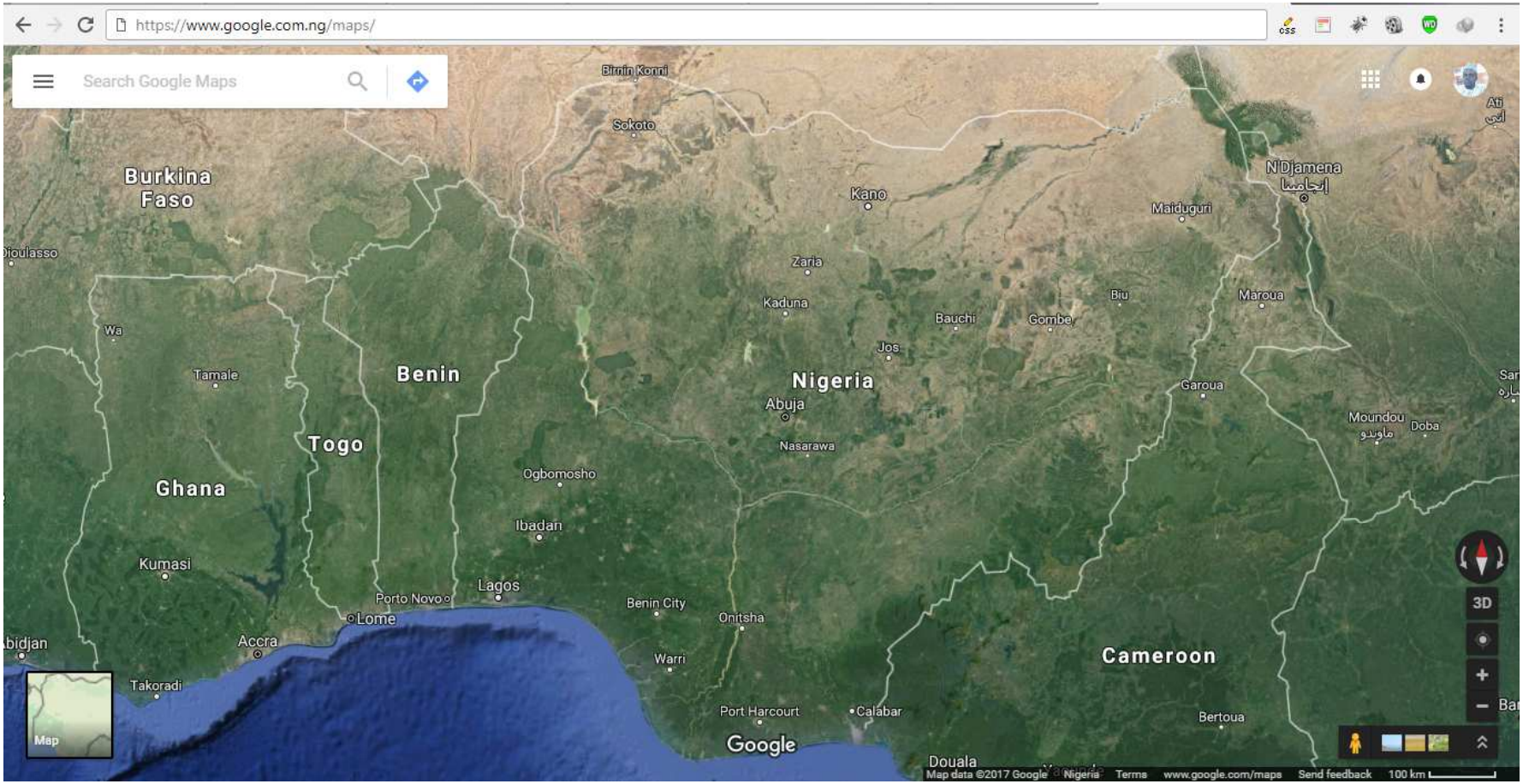
The Conference will hold at the Ground Floor, Lagos Chamber of Commerce and Industry Conference Center, Alausa, Ikeja
Phone: **+234**

Transport

If you are **Driving** the Conference center is well mapped. Use the Google Maps Navigation.
Public Transportation: The most straightforwrd way to get to the venue is take a bus from your originating location going to Ikeja. Make sure to confirm with the driver/conductor they would be taking the route leading to Secretariat. Come off at Barracks BusStop. Where you have the main traffic lights at the intersection. Walk backwards on the Alausa road that is parallel to the Lagos-Ibadan Expressway and the building would be on the right. **The best way is to make use of google Maps from the BusStop to the venue. The venue is a 10 minutes walk from Barracks busstop**

Working with maps and data (location and attribute)





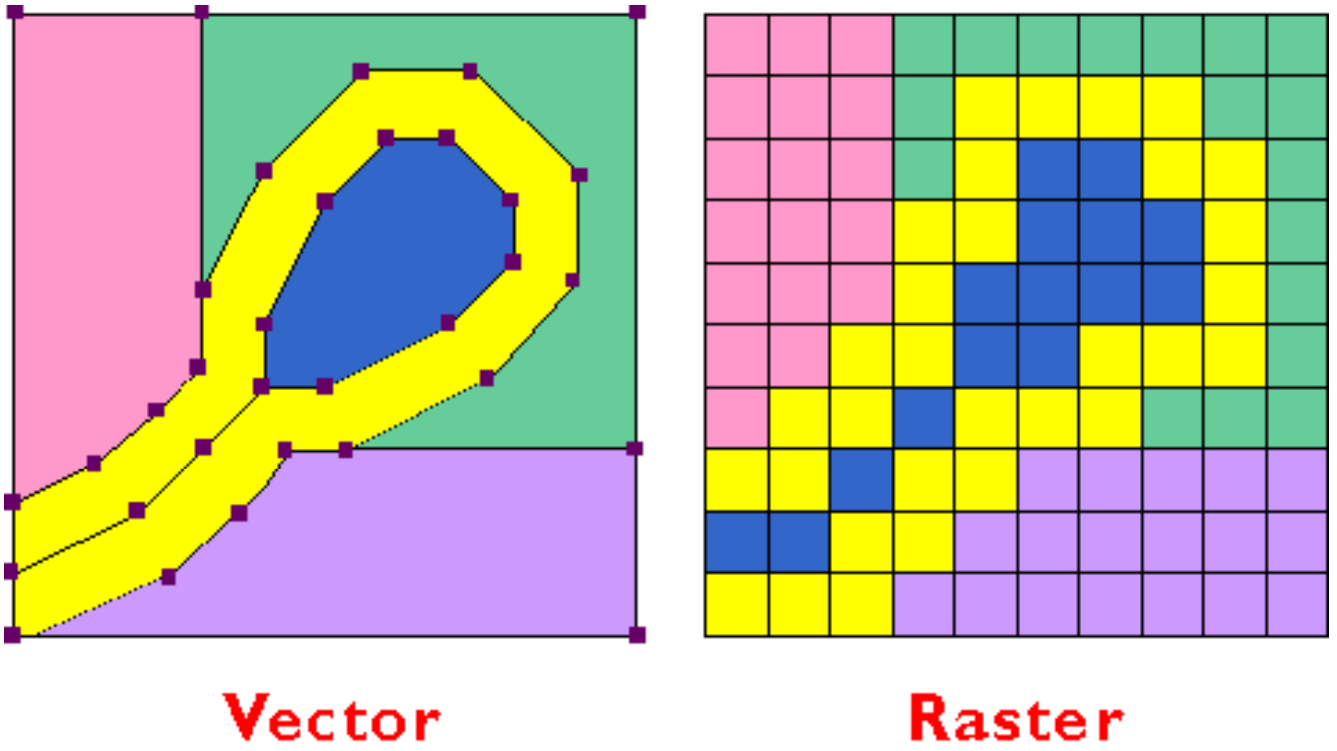
Maps/satellite imagery + attribute data = GIS/RS

Areas of application

1000 GIS Applications & Uses

http://gisgeography.com/gis-applications-uses

Dataset - Vector and Raster



Vector data: consists of individual points, Lines and polygons

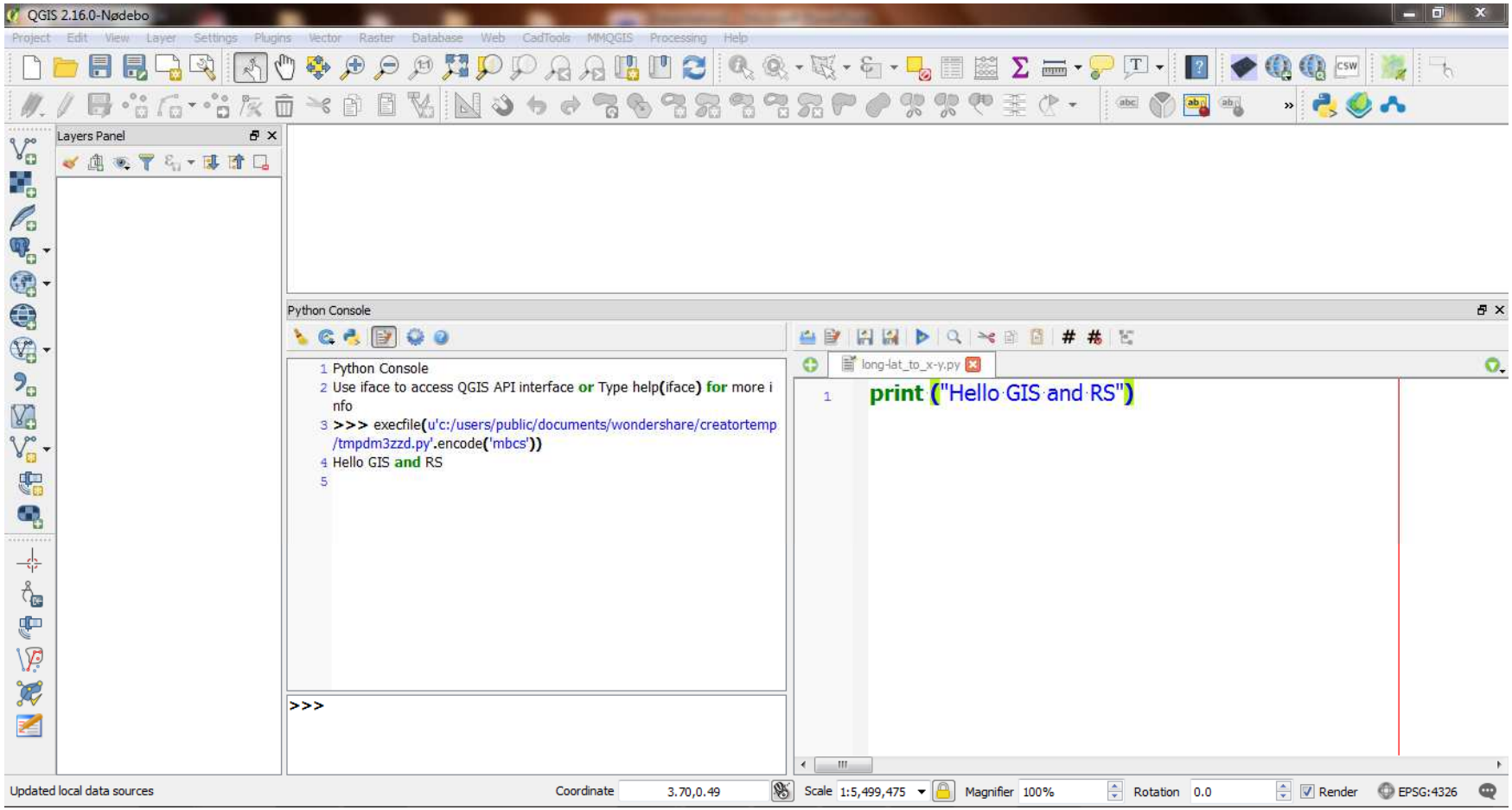
Raster data: is made up of pixels (or cells)

Traditional tool - ArcGIS and QGIS

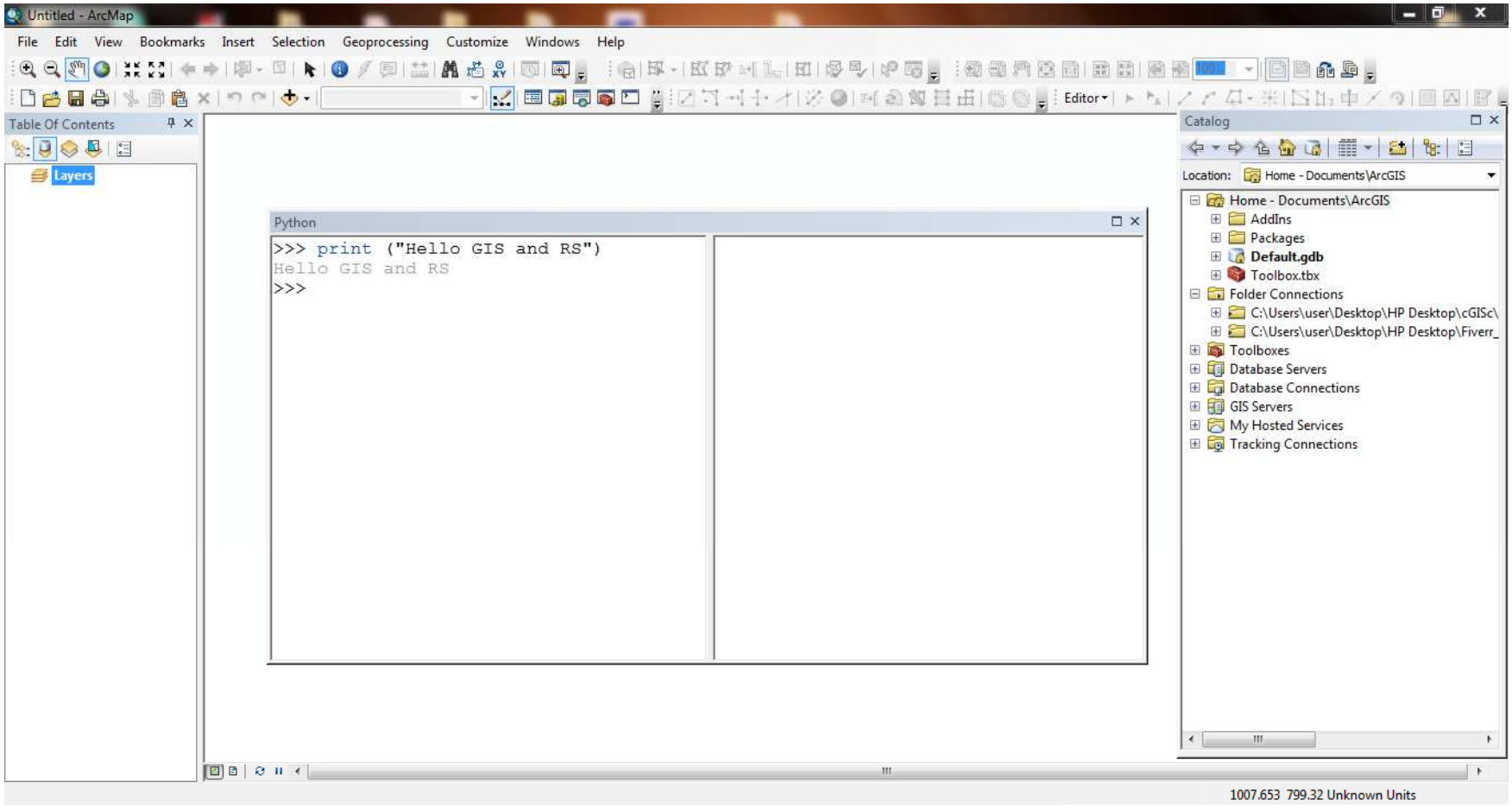
Open source: QGIS, GRASS, SAGA, gVSIG etc

Commercial: ArcGIS, Manifold, Geomedia, GlobalMapper etc

* The top tool in each category supports **Python** as its scripting language



The QGIS Python Console (Uses PyQGIS module)



The ArcGIS Python Console (Uses ArcPy module)

Python for GIS and RS

If it exists, there is python module for it

GIS/RS operations with Python can be conducted using:-

1) GIS Tools – ArcPy and PyQGIS

2) Native Python Tools

Geospatial python modules

For vector data: Shapely, Fiona, PyShp

For raster data: OpenCV, Rasterio, Scikit-image, GDAL

Others: Geopy, PySAL, PostGIS, SimpleKML (more on PyPI)

Jupyter Notebook - DEMO

The story: Places of Tourist Attractions in Lagos

- Working with Coordinates – Geocoding (Pyproj and GeoPy)
- Web-based Geo data visualization (Folium)
- Working with vector and raster (PyShp and OpenCV)

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