Q 1) Why did we choose this approach?

1) Component 1:
    a. Cartopy: It's one of the best tools to create and visualize scientific data on maps. We can integrate cartopy with the Matplotlib package to add the Google map such that the map is displayed in the background and scatter plot is on top of that.
    b. Jupyter Notebook: The interactivity of notebooks enables for fast execution and testing of code. The codes can be run in individual snippets and the graphs created can be viewed instantaneously.
    c. Google Maps API: Using Python and plain javascript with google maps api in a non-webserver application becomes really difficult. Moreover, we were using Jupyter notebook which didn't support such client server communication.
    d. Bokeh: It takes a lot of space when Image rendering is to be used. It throws memory out of bound error.

2) Component 2:
    a. Tableau: The instant geocoding in Tableau allows for rich and interactive plotting of spatial data.
    The data can be modelled to show interactively via dashboard.

3) Component 3:
    a. For region wise data, Bqplot has many built-in functionalities for enhanced interactivity with better visuals.

4) Component 4:
    a. To convey any story, we need to first look at the bigger picture and then delve deeper into the sub components.
    b. To tell the story about transportable Array stations, we have observed the flow as described below:
        i. Japan experiences one of the most massive Earthquakes.
        ii. The body waves from the Japan Earthquake traverse to the United States.
        iii. These body waves approach Transportable array stations.
        iv. Magnitude of the earthquake is captured from the movement of seismograms at the Transportable array station.
        v. The data obtained for each station over the period of 4 hours is plotted.

Q 2) Strengths of this approach.

1) Component 1:
    Cartopy's ability to plot the Maps and its ability to work with Matplotlib served to be of great use. As Matplotlib can extensively interact with different operating systems and graphic backends, 2D cross platform visualization graphics was achieved with better efficiency.

2) Component 2:
   Tableau as a tool provides various options to connect to variety of different data sources. This makes data interpretation easy and the readily available drag and drop options for one click analysis save a lot of time.

3) Component 3:
   Bqplot main strength is its functionality to help build customized visualizations. The attributes are interactive widgets enabling the user to implement features like zooming, panning etc.

4) Component 4:
   We used Corel Draw as it provides us each object's minute details and we can work on all the attributes of these objects.

Q 3) Weaknesses of this approach:

1) Component 1:
   a. Binding of every event and updation of every plot is chaotic.
   b. Changing the face color.
   c. Callback function doesn't give the time at which scatter plot is plotted. This causes a delay is ability to access the attributes.

2) Component 2:
   a. Loading the data in Tableau is time consuming.
   b. Not too many customizations for map plots.
   c. Tableau has difficulty merging data from different sources.

3) Component 3:
   a. While working with maps, plotting the longitude and latitude is a tedious process.
   b. Limited availability of color schemes.

4) Component 4:
   a. Time consuming and difficult to put everything in one page which was the initial idea

Q 4) What we wished we had been able to do:

1) Component 1:
   a. Use Google maps API for more marker interactivity using web server communication.
   b. We thought of using only one library for the entire visualization.
2) Component 2:
   a. Making a 3D Visualization of Japan earthquake.
3) Component 3:
   a. For tooltip, we were planning to present more information in pictorial format, but we couldn't figure out the way to integrate the dataset with the Bqplot package.

4) Component 4:
    a. The entire infographics was supposed to be included in one page and in sequential color palettes.
    b. We thought of plotting the earthquake epicenters of major earthquakes using the data with the help from Harvard research paper.

Writeup:

1) Component 1:
    a. Data Cleaning: Yogeshwar
    b. Logic: Vasu
    c. Data Management and Implementation: Vasu
    d. Interactivity features: Vasu and Roshini

2) Component 2:
    a. Choosing the right software: Akhila and Yogeshwar
    b. Data Cleaning, data management, Implementation: Akhila

3) Component 3:
    a. Data Cleaning, Logic, Implementation: Roshini
    b. Interactivity features: Vasu and Roshini
    c. Finding additional information: Yogeshwar
    d. Data cleaning for the additional information: Roshini

4) Component 4:
    a. Data cleaning: Yogeshwar
    b. Finding interesting statistics: Yogeshwar and Vasu
    c. Map visualizations using Tableau: Akhila
    d. Implementation: Yogeshwar and Roshini

5) Final Write up:
    a. We spread the work for one component each and then we merged the write up. Merging part is done by Akhila.

References:

1. Matplotlib :https://matplotlib.org
2. https://www2.census.gov/geo/pdfs/reference/guidestloc/All_GSLCG.pdf
3. http://scitools.org.uk/cartopy/docs/v0.15/
4. Bqplot: https://bqplot.readthedocs.io/en/stable/
5. http://www.bbc.com/news/world-asia-pacific-12715415
6. Tableau videos: https://www.tableau.com/learn/training
7. Special event in Spectrogram: http://www.seismology.harvard.edu/research/backproj.html
8. http://www.usarray.org/researchers/obs/transportable