Use Case Document –Emergency Response for Tsunami Early Warning System– V1.0

Kerala State Disaster Management using IBM Intelligent Operations Center

Presented by:

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1. Introduction to User Story

This user story talks about providing emergency response and managing disaster activities caused by Tsunami by leveraging the capabilities of IBM Intelligent Operations Center, ArcGIS and INCOIS NetCDF File.

This section of the documents explains the requirement of the user story and what we are trying to achieve from this user story. Below are the details of the user story:

Sno.	What is required?	Why is it required?
1.	See on Geo Map the places that are experiencing Tsunami in an area	We can 1. Monitor the area for any emergency situation 2. Keep track of surrounding assets around the affected area 3. Deploy emergency response team to the affected area
2.	Be able to get the details of Tsunami data 1. The data coming from INCOIS 2.The other necessary data like Wave height, District name, Taluk name etc	We can 1. Get appropriate data of the Tsunami event 2. Plan for quick actions at the time of any Tsunami event
3.	Be able to run SOPs for quick response	We can 1. Intimate appropriate departments and officers to take necessary actions 2. Make the response team ready for the rescue operations 3. Aware the public to take safety precautions at the time of emergency situations
4.	See on Geo Map the assets available around the affected areas. For example 1. Colleges/schools 2. Police Stations 3. Hospitals 4.Bus Stations	We can 1. Rehabilitate public to a safe location 2. People who needs medical attention can be sent to nearest hospitals 3. Availability of beds, Occupancy of Schools, Colleges and other assets etc can be determined
5.	Get historic data of Tsunami event occurred in the past	We can 1. Get the historical data of Tsunami event for evaluation 2. Analyze the data for determining the priority areas of interest 3. Get statistics of the events in terms of time, place and event occurrence
6.	Closure of the Event	We can 1. Evaluate event status correctly and determine the management of the event successfully.

2. Objective and Understanding of User Story

The key objective of this user story is to assist and manage any disaster caused due to Tsunami with actionable intelligence which will aid in taking proactive steps for the management of Tsunami events with smart decision making and quick response to the event.

The main objective in implementing this user story aims to address the following:

- Effective utilization of available nearby resources like schools, hospitals, police stations, bus stations etc.
- To include response action as a part of Standard Operating procedure, this in turn will help in closure of the event.
- To continuously monitor the status of the Tsunami event and take necessary actions or dispatch required amenities and resources effectively.
- Improve overall safety and security measures.
- Decrease the number of human loss and loss to the state and improve the quality of living.
- Enable strategy for data sharing within different departments of the state.

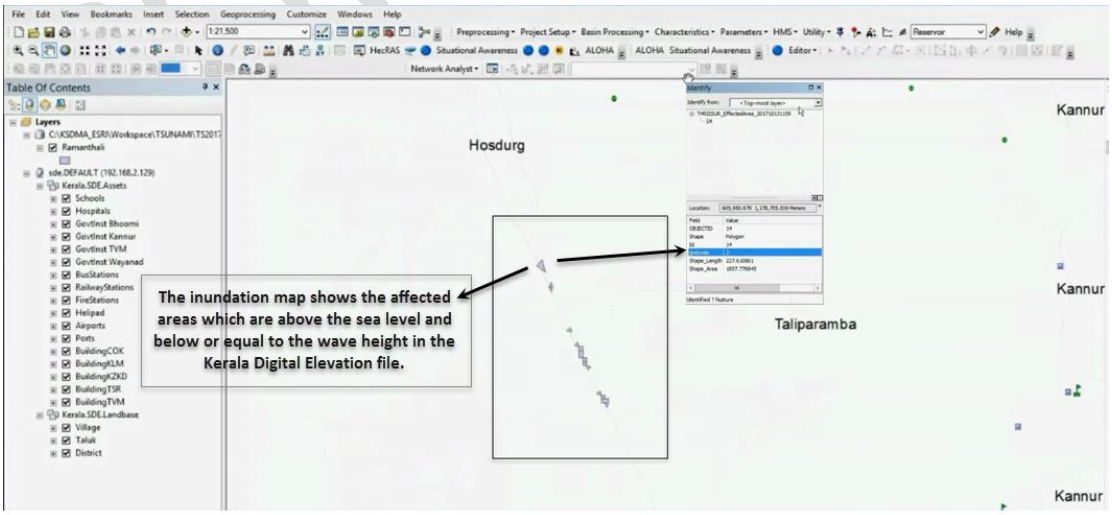
3. Proposed solution to User story

By following the best practices and leveraging IBM IOC, will meet the requirements stated in the user story by building solution using IBM IOC and the high level use case that is required for operator to monitor, manage and provide various functionality to manage a Tsunami event as well as gives quick response mechanism for emergency situations occurred at the time of Tsunami event.

STEP 1: create an inundation map on ArcGIS desktop:

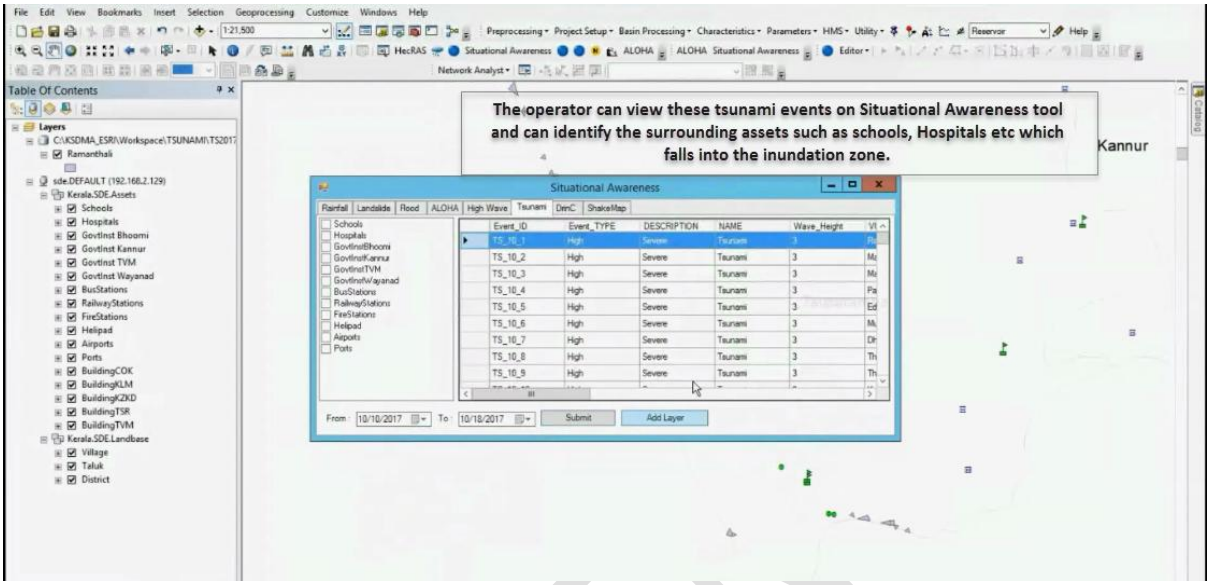
- ✓ The wave height data from NetCDF file is projected on the coastline using digital elevation model to create an inundation map on ArcGIS desktop.

- ✓ The inundation map shows the affected areas which are above the sea level and below or equal to the wave height in the Kerala Digital Elevation file.



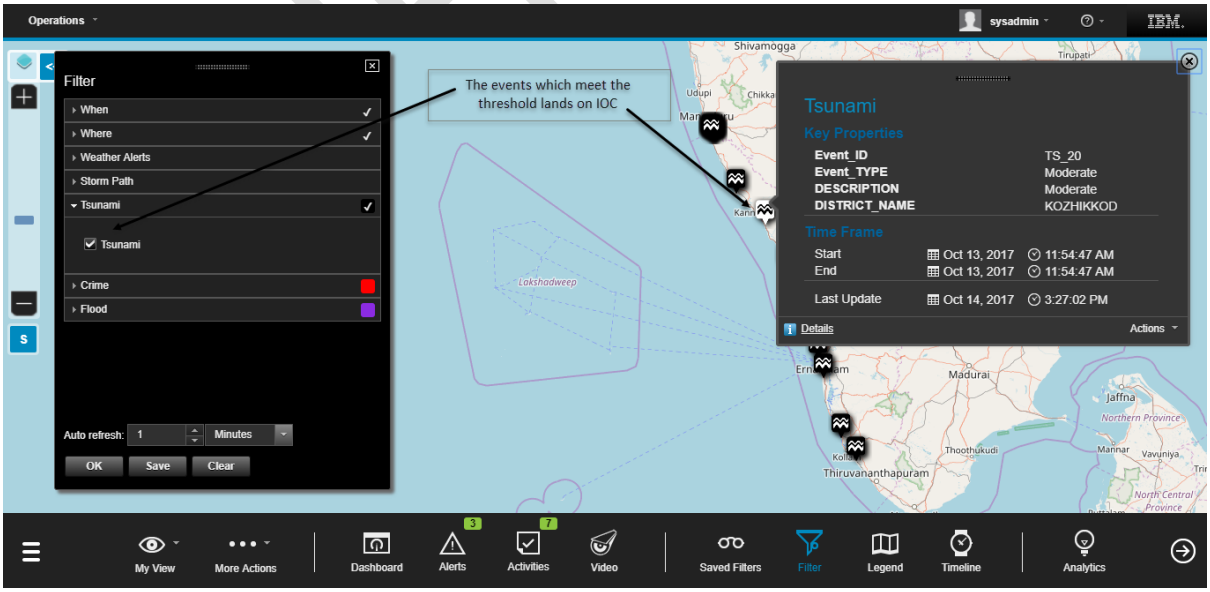
STEP 2: Identify the surrounding assets in the inundation zone:

- ✓ The operator can view these tsunami events by clicking on situational awareness tool and can identify the surrounding assets such as schools, hospitals, police stations etc which falls in the inundation zone.



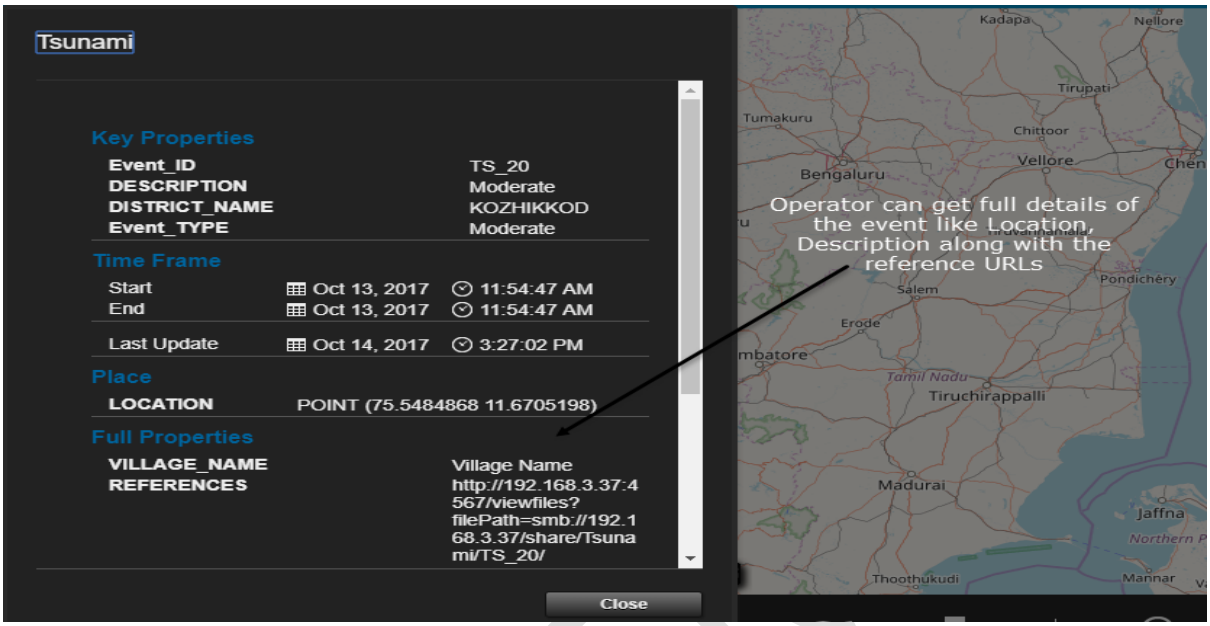
STEP 3: Tsunami event gets generated on IOC.

- ✓ As soon as IOC receives a Tsunami event, the operator can see and verify the key aspects of the event by clicking on that event



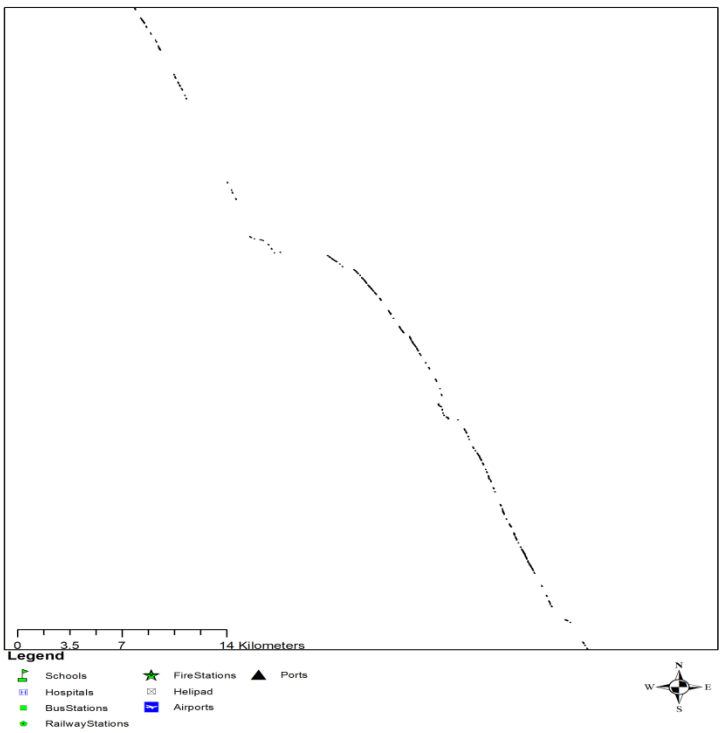
STEP 3: To get the full details of the Tsunami event:

- ✓ We can see the full details of an event by clicking on the details tab where it gives operator all the information about the event like place, location, Type of Tsunami event etc.



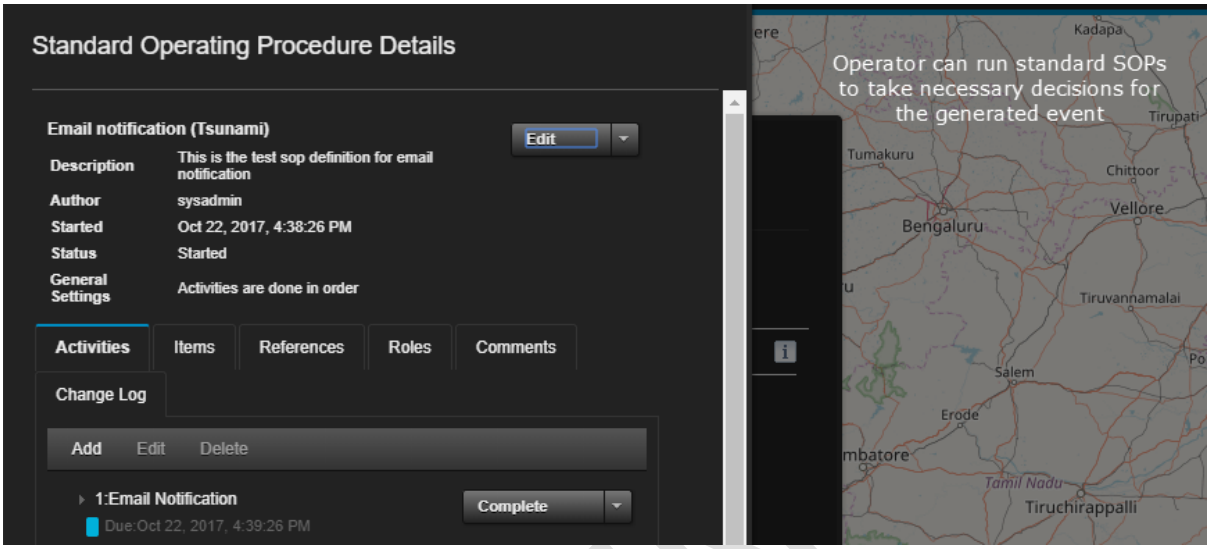
STEP 4: To see the available assets like police stations, schools, colleges, bus stations, hospitals etc present around the area where the event is generated:

- ✓ Operator can see the available assets and resources which can be used at the time of emergency situations in the affected area.



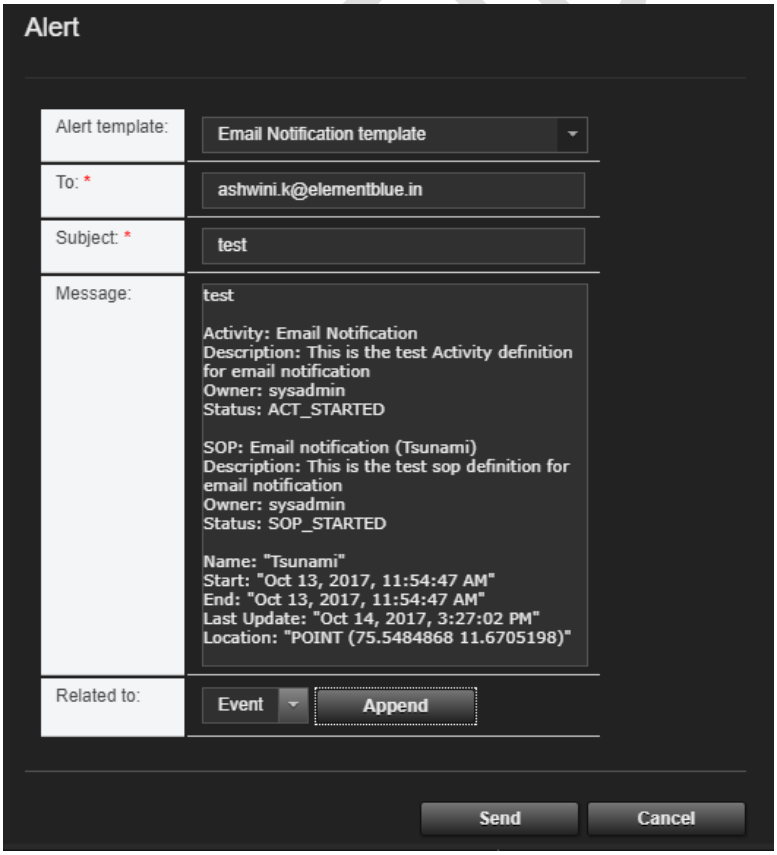
STEP 5: To Run Standard Operating Procedures for fast decision making:

- ✓ Operator can run standard SOPs for the Tsunami event which enables operator to make fast and reliable decision making and provides necessary steps to be carried out.



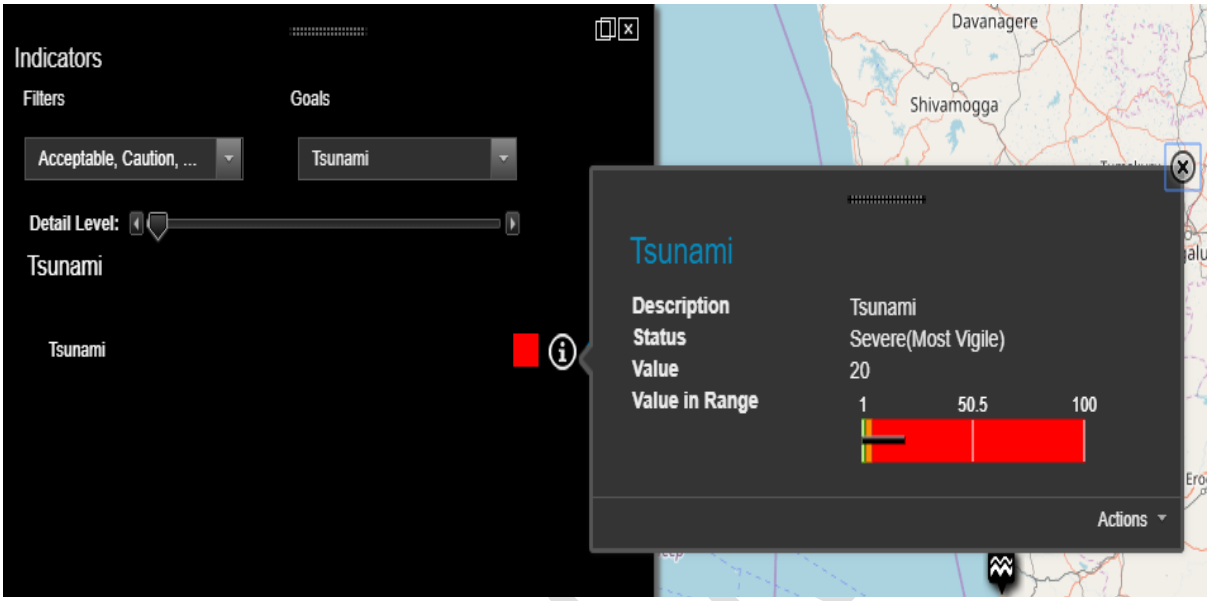
STEP 6: To send email notification:

- ✓ Operator can send email notifications to key personnel, city leaders as well as different departments informing them about the Tsunami events.



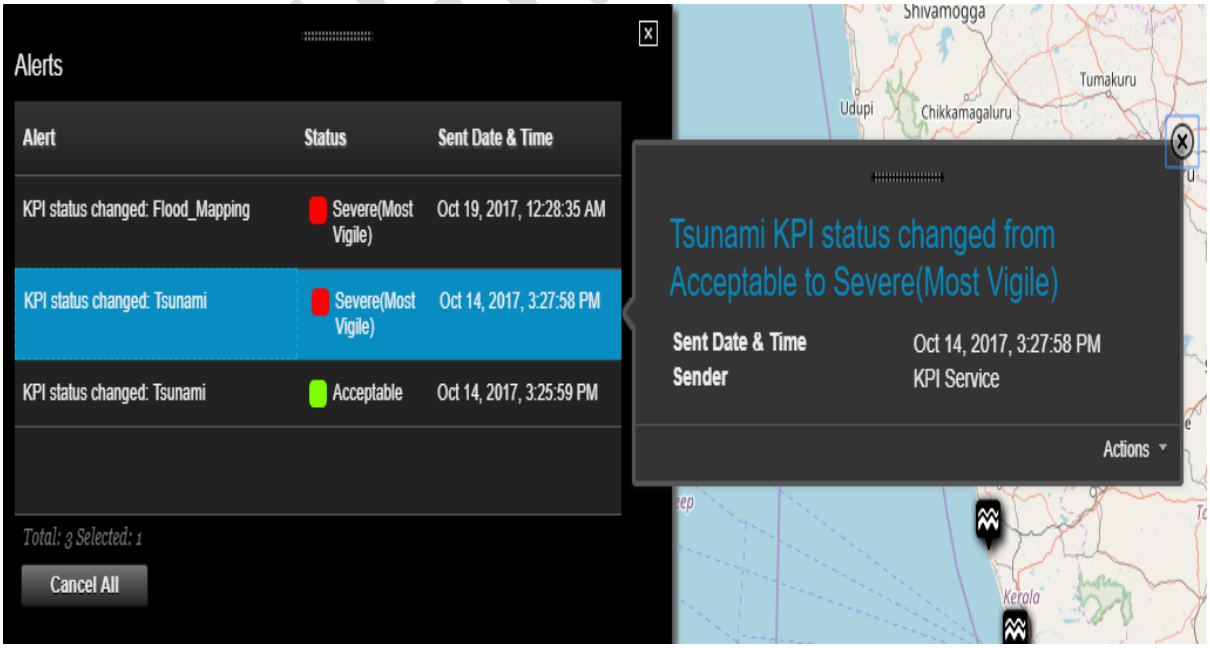
STEP 7: To see key performance indicators for the event:

- ✓ Operator can see key performance indicators which gives an insight of which events are needed to be emphasized more.



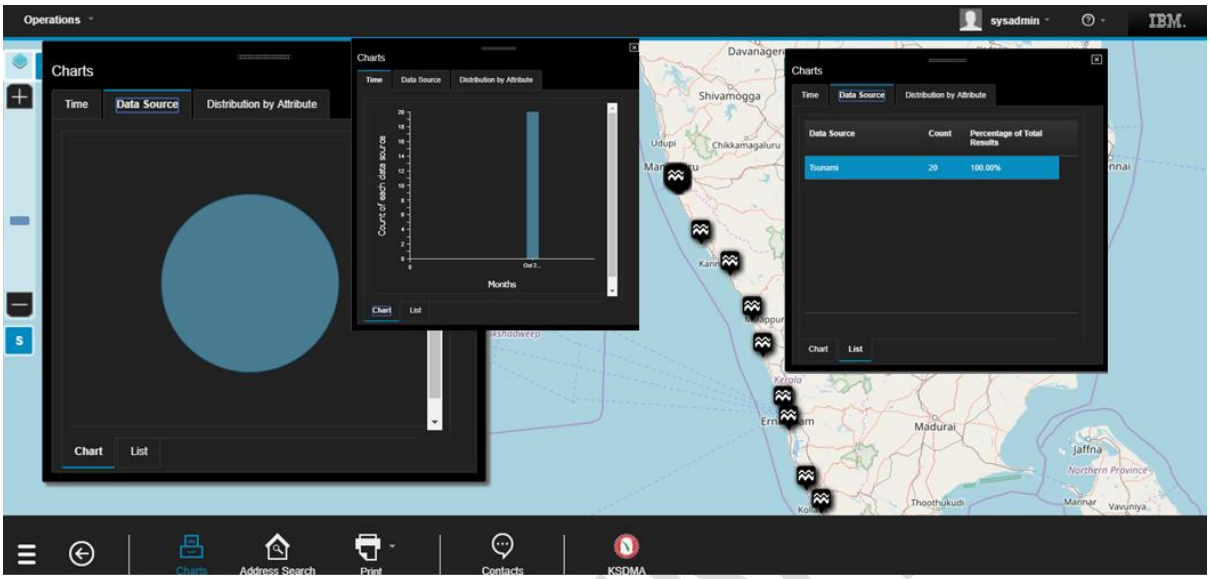
STEP 8: To receive alerts when a defined KPI changes:

- ✓ Operator can get alerts when a key performance indicator changes from one level to the other. For example if Tsunami event changes from acceptable level to Severe level the operator will get an alert



STEP 9: To get the statistics on pie chart for different types of events:

- ✓ Operator can get statistics of different types of events on a pie chart which shows the ratio of different events.



Solution will provide integrated data visualization, real-time collaboration, and deep analytics that can help leaders prepare for problems before they arise and to coordinate and manage problems as they occur, to improve the efficiency of operations.
Solution delivers the following major functions:

- Visual workspace
- Events and incident management
- Resource, response, and activity management
- Status monitoring
- Collaboration, instant notification, and messaging
- Reports
- Semantic model
- Preventive mechanism

This solution makes supervision and coordination of complex sub-systems more effective. The solution helps you evaluate the effectiveness of the decisions and applied procedures and make improvements. The solution helps to:

- Handle events and alerts, in both emergencies and non-emergencies.
- Organize response teams, enabling fast and clear communications between team members.
- Define and provide standard operating procedures for handling the different situations that arise, with the correct assignments, which are based on legal requirements or historical experience.
- Track the progress of the performance of those procedures, including the results of the actions.
- Locate resources with the required capabilities to handle the events.
- Enable the continuous improvement of the organization's services and responses.

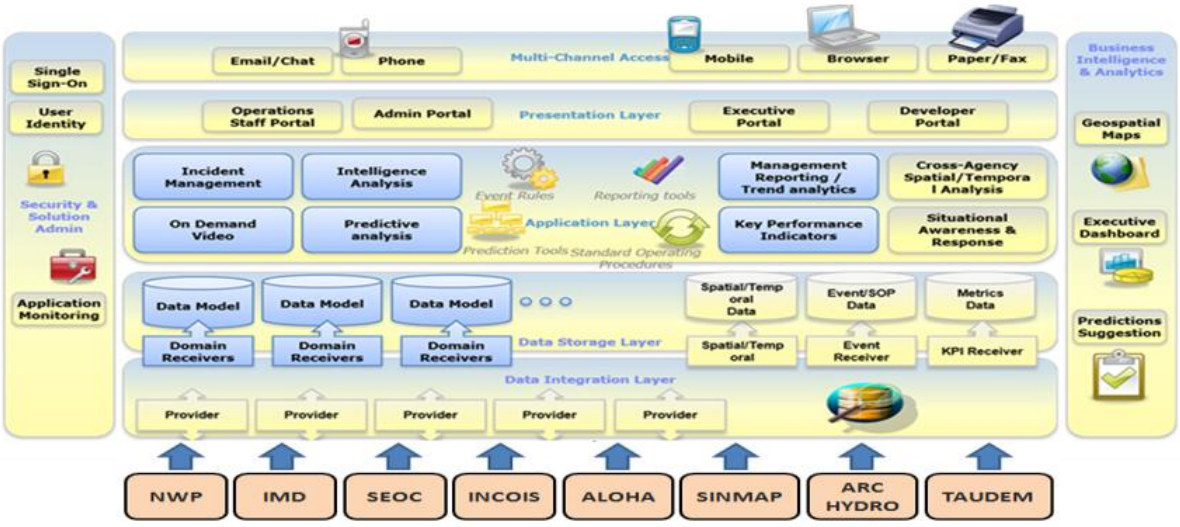
4. Solution Features, Functions and typical use case description

The following steps describe typical flows through the IBM Intelligent Operations Center solution infrastructure:

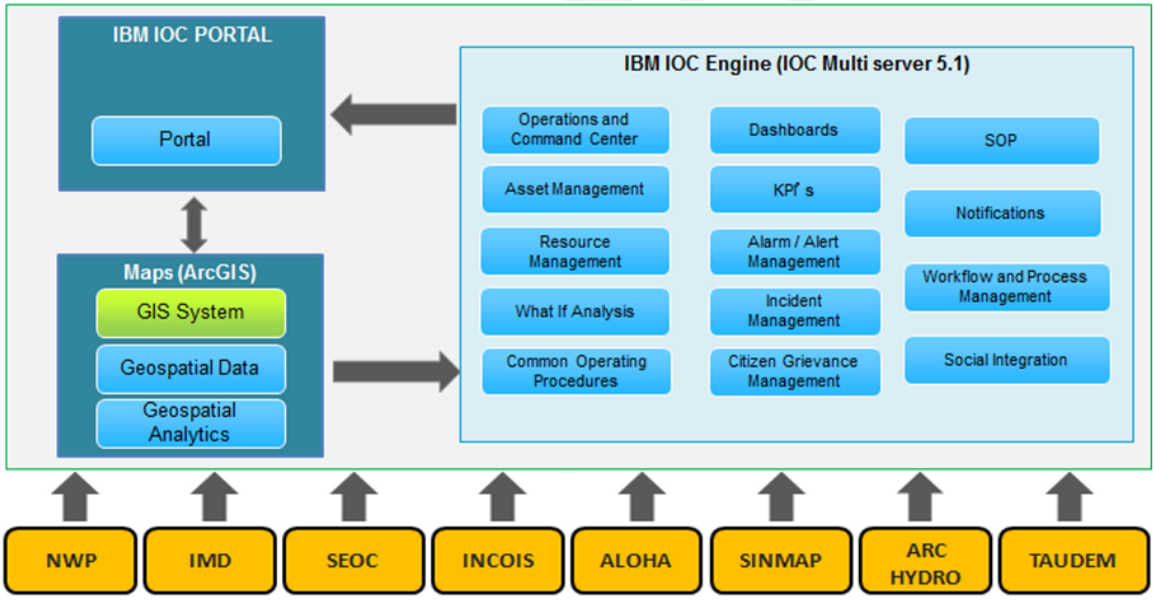
If IBM Intelligent Operations Center receives an event, it performs several actions to mediate or manage the event. Some of the actions include:

- Display the event as an item in the event list.
- Add an entry in the geospatial database and show the event location on the Map on the operator dashboard.
- Check the characteristics of the event against the SOP matrix, which maps event characteristics to specific procedures.
- If the event matches one of the defined SOPs, a new standard operating procedure workflow is initiated and is visible in the IBM Intelligent Operations Center portal My Activities window.
- Correlate events that are received within a specified time and location. For example, trigger a notification whenever two or more events happen within a specific period of time.
- Check the resources and capabilities database, link the event to the appropriate resource, and display the information in the user interface.

5. Solution Architecture



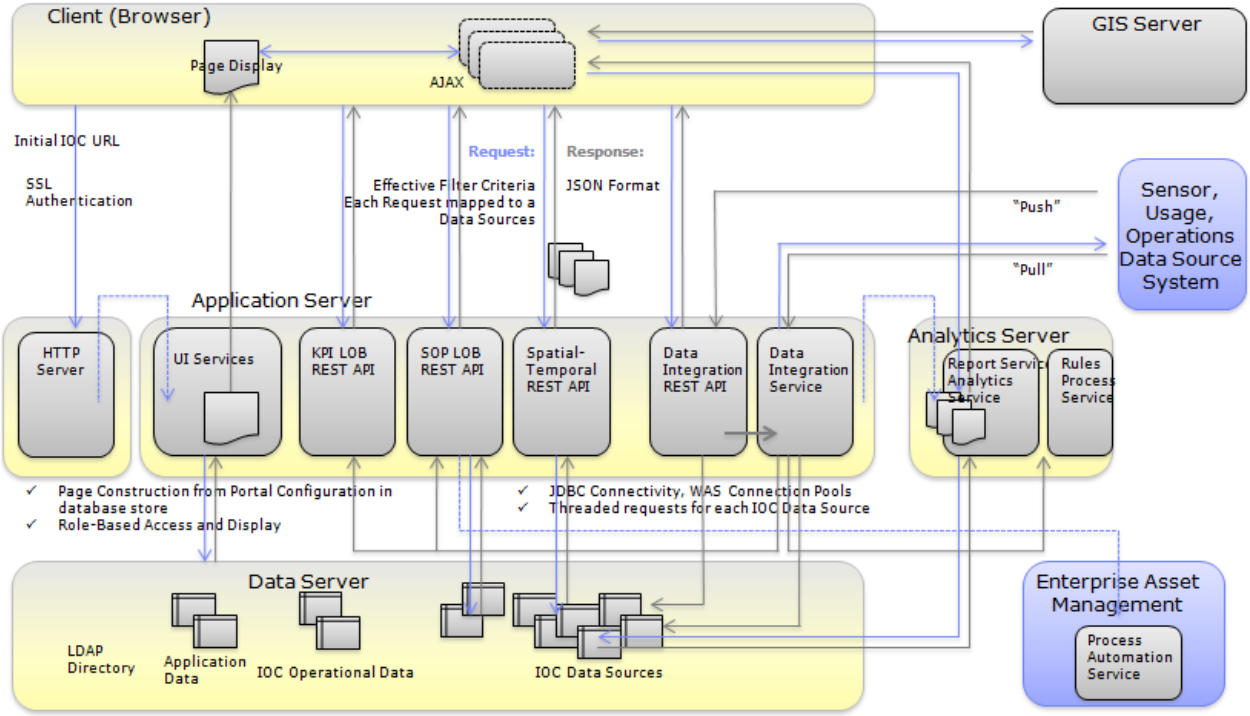
6. Integration Architecture and Approach



Integration approach to this user story is as follows.

1. REST Service based Integration: Alerts / data can be pushed from the subsystem using REST Services exposed by IOC

7. THE IOC 5.1 REQUEST/RESPONSE FLOW ARCHITECTURE



8. Conclusion:

Using this approach, we are able to achieve the following:

- Tsunami event has been closed successfully.
- Verifying the details of the Tsunami data if there is any event generated.
- Monitoring for emergency situation and providing quick response to the situation.
- Utilization of state resources and assets in an efficient way at the time of Tsunami.
- Analyzing the Tsunami events and giving an insight to emphasize on events which needed to be taken care of.