

Use Case Document –Emergency Response for Petro Chemical Accidents – 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 petro Chemical Accidents by leveraging the capabilities of IBM Intelligent Operations Center, ESRI Arcgis and Aloha tool.

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 where Petro Chemical accidents occurred 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 Petro Chemical Accident 1. The data coming from External sources about the location, Source of accident etc 2. The other necessary data like District name, Taluk name etc	We can 1. Get appropriate data of the Petro Chemical accidents 2. Plan for quick actions at the time of any Petro Chemical accidents
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 Petro Chemical Accidents occurred in the past	We can 1. Get the historical data of Petro Chemical Accidents 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.

1. Objective and Understanding of User Story

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

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

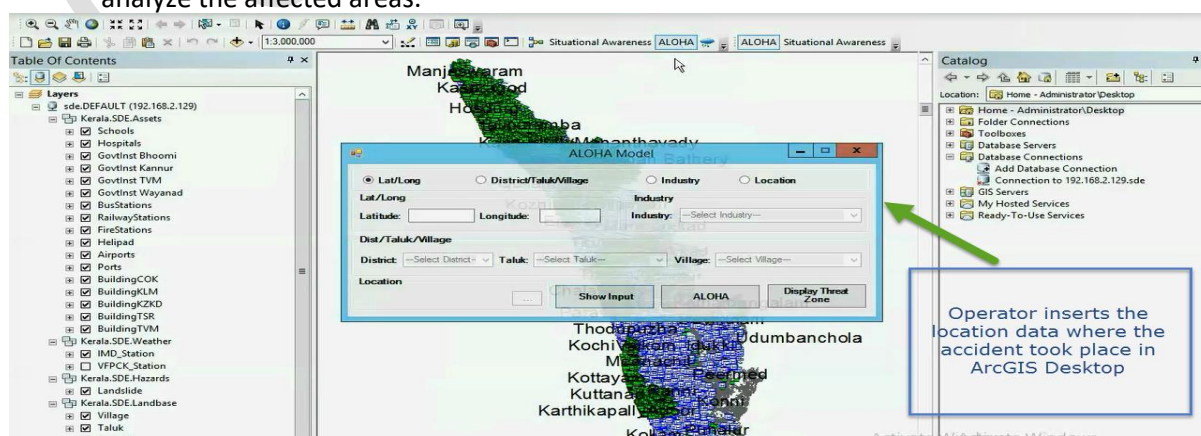
- Determine the source of accident and total prune affected area due to the accident.
- Effective utilization of available nearby resources like schools, hospitals, police stations, bus stations etc.
- To include response action as a part of Standard Operating procedure, this in turn will help in closure of the event.
- To continuously monitor the status of the Petro Chemical Accidents 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.

2. 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 Petro Chemical Accident as well as gives quick response mechanism for emergency situations occurred at the time of Petro Chemical Accident event.

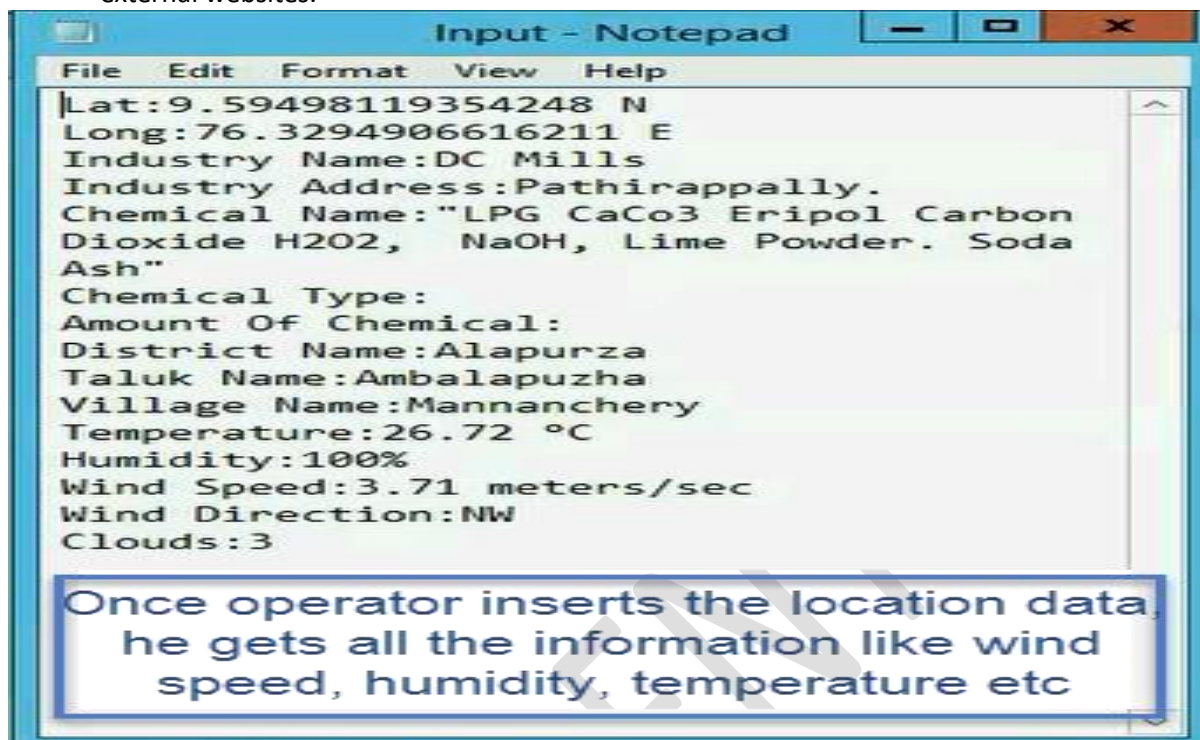
STEP 1: Petro Chemical Accident data are inserted into ArcGIS:

- ✓ Whenever operator receives reports about any petro chemical accident in an area from external sources, these information is fed into arcgis to create prune affected area and analyze the affected areas.



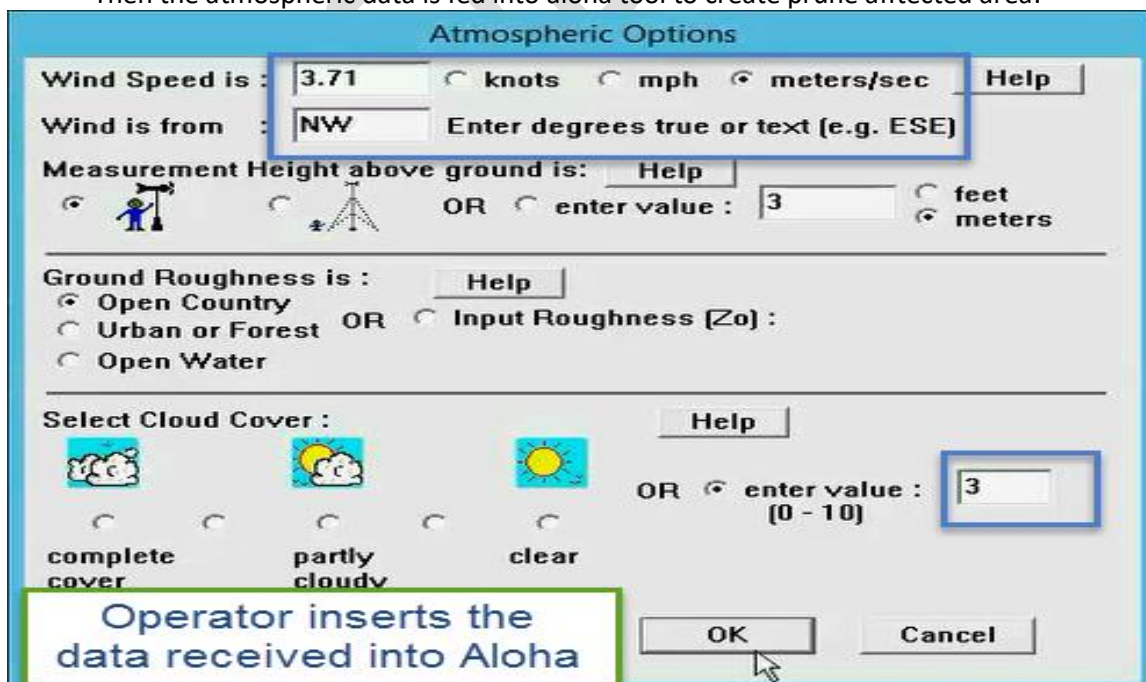
STEP 2: To get the atmospheric information about the area :

- ✓ As soon as operator inserts the location data, ArcGIS fetches the atmospheric data from external websites.



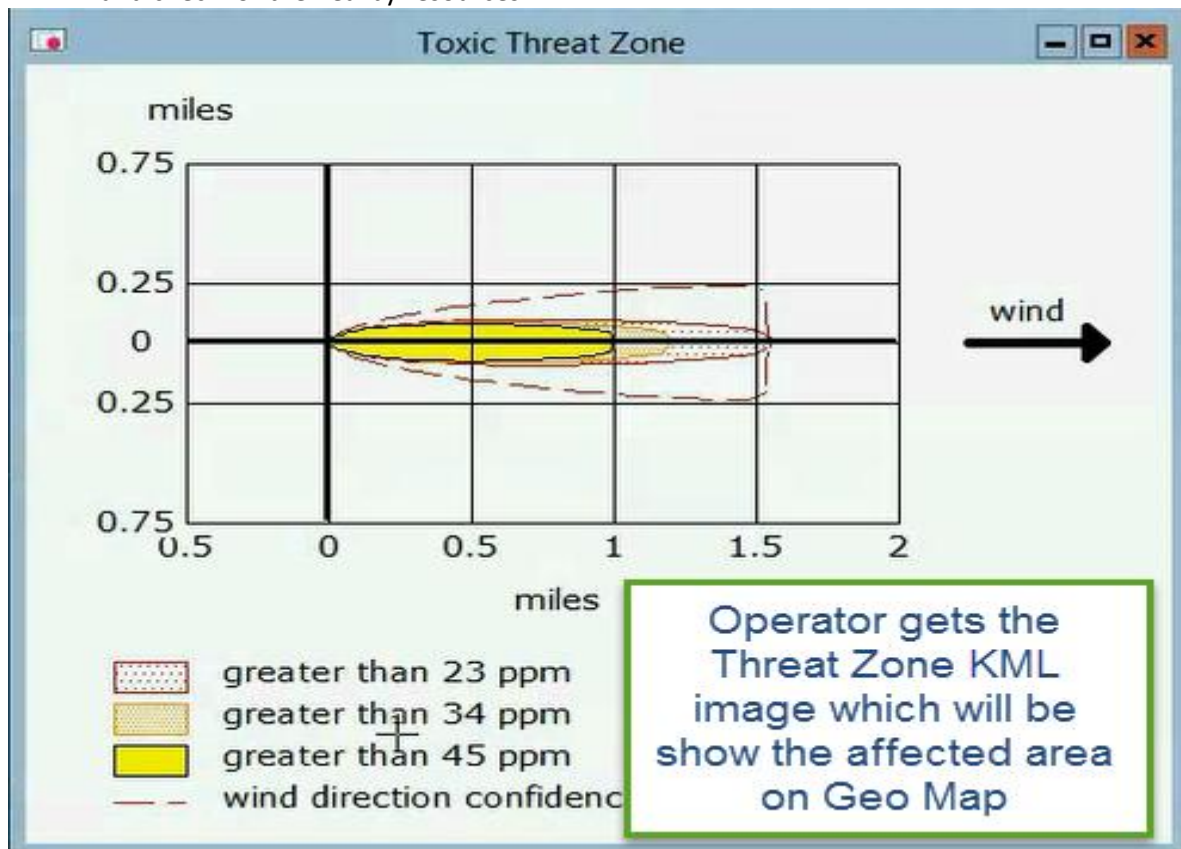
STEP 3: To insert the details of the Petro Chemical Accident into aloha tool:

- ✓ Then the atmospheric data is fed into aloha tool to create prune affected area.



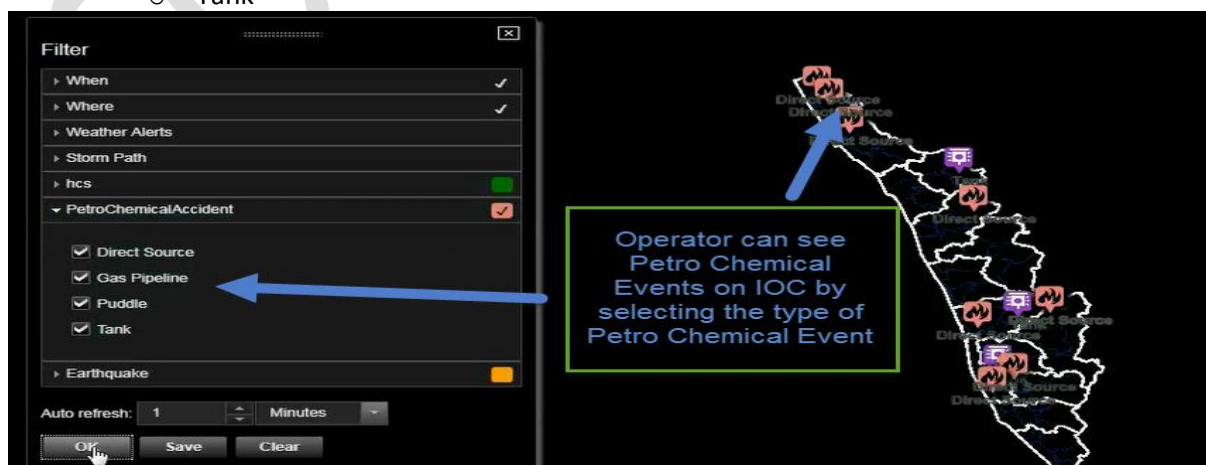
STEP 4: Operator gets the prune image which is to be overlaid on geo map:

- ✓ Operator gets the prune image which is overlaid on the map to see the total affected area and check for the nearby resources.



STEP 5: Petro Chemical accident event gets generated on IOC :

- ✓ Then Event is generated on IOC which is further categorized into 4 different types which as follows:
 - Direct Source
 - Gas Pipeline
 - Puddle
 - Tank



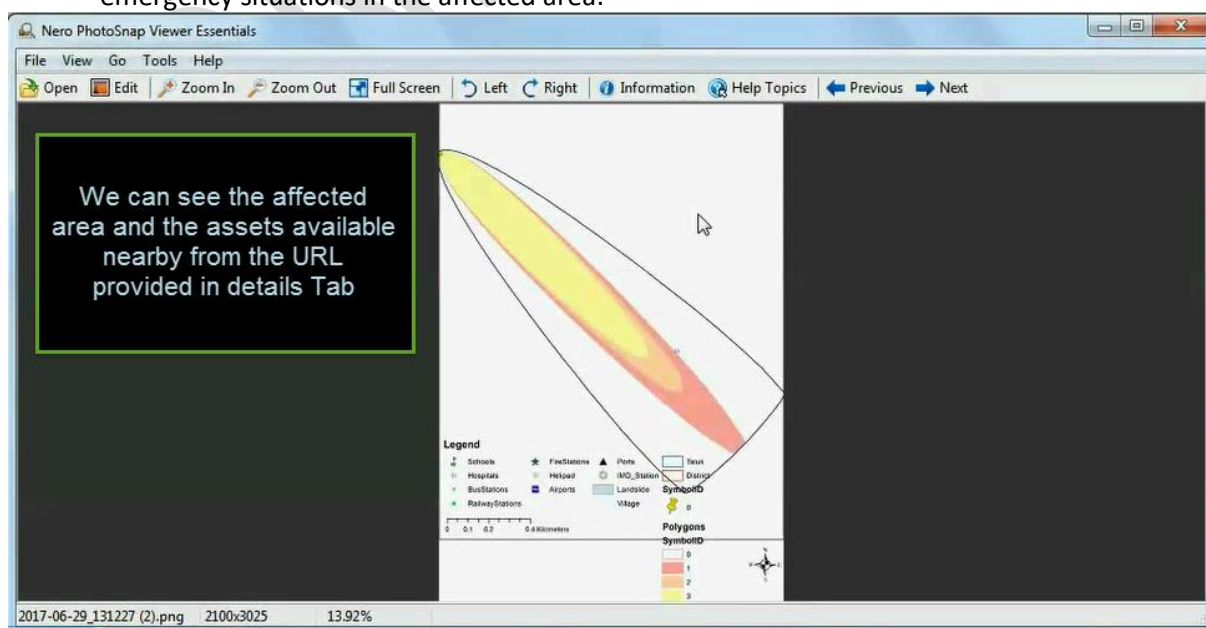
STEP 6: To get the full details of the Petro Chemical Accident event :

- ✓ 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, amount of chemical, temperature data etc.

Petro Chemical Accident	
Details of the event	
Chemical_Name	ACETAL
Chemical_Type	Pure Chemicals
Cloud_Cover	4 tenths
DISTRICT_CODE	District Code
DISTRICT_NAME	Alappurza
Download_REFERENCES	http://192.168.3.37:4567/viewfiles?filePath=smb://192.168.3.37/share/AL_OHA/DS_363/
Ground_Roughness	open country
Height_Above_Ground	3
Humidity	100
ID	7103
Industry_Address	Cheppad Karthikappally Alappuzha.
Industry_Name	BPCL
Inversion_Height	0
LEL	16000 ppm
Molecular_Weight	118.17 g/mol
SOURCE_Type	Direct
STATION_CODE	Station Code
STATION_NAME	Station Name
Stability_Class	

STEP 7: 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 8: To Run Standard Operating Procedures for fast decision making:

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

Standard Operating Procedure Details

LPG tanker on fire (Petro Chemical Accident) [Edit]

Description: LPG tanker on fire(PetroChemicalActivity)
 Author: sysadmin
 Started: Jul 1, 2017, 10:27:44 AM
 Status: Started
 General Settings: Activities are displayed

Operator can run SOP to take necessary steps

Activities | Items | References | Roles | Comments | Change Log

- 4:Activity-1.3: Evacuate 500 m from the Accident area
☐ No Due Date [Add Reference]
- 5:Activity-1.4: Ensure compliance of all the following procedures by concerned departments
☐ No Due Date [Add Reference]
- 6:Activity-1.5: Send Email notification to Concerned SEOC officer
☐ No Due Date [Add Reference]
- 7:Activity-1.6: Send Sms notification to Concerned SEOC officer
☐ No Due Date [Add Reference]
- 8:Activity-1.7: inform SEOC for availing the services of the Emergency Response Vehicle of Indian Oil Corporation
☐ No Due Date [Add Reference]

STEP 9: 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.

Indicators

Filters: Acceptable, Caution, ... Goals: Aloha(PetroChemical...)

Detail Level: [icon]

Aloha(PetroChemicalAccidents)

- Aloha_Direct_Source
- Aloha_Gas_Pipeline
- Aloha_Puddle
- Aloha_Tank

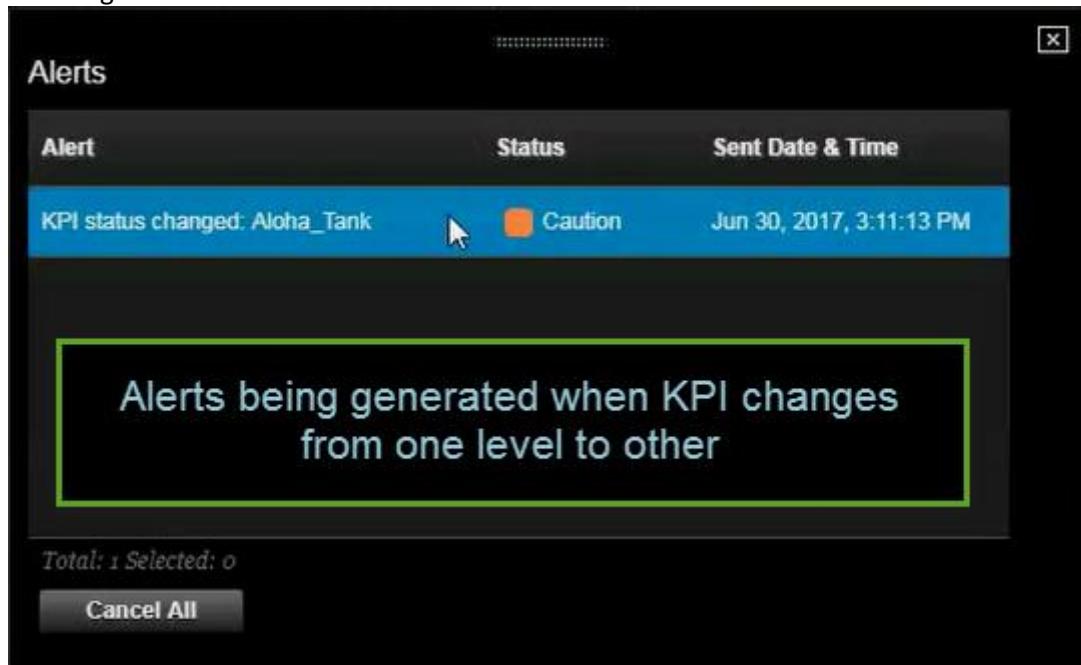
Aloha_Direct_Source

Description: Aloha_Direct_Source
 Status: Severe(Most Vigil)
 Value: 104
 Value in Range: 1 to 100

We can see the total value of each events and verify Key Performance Indicator for the events

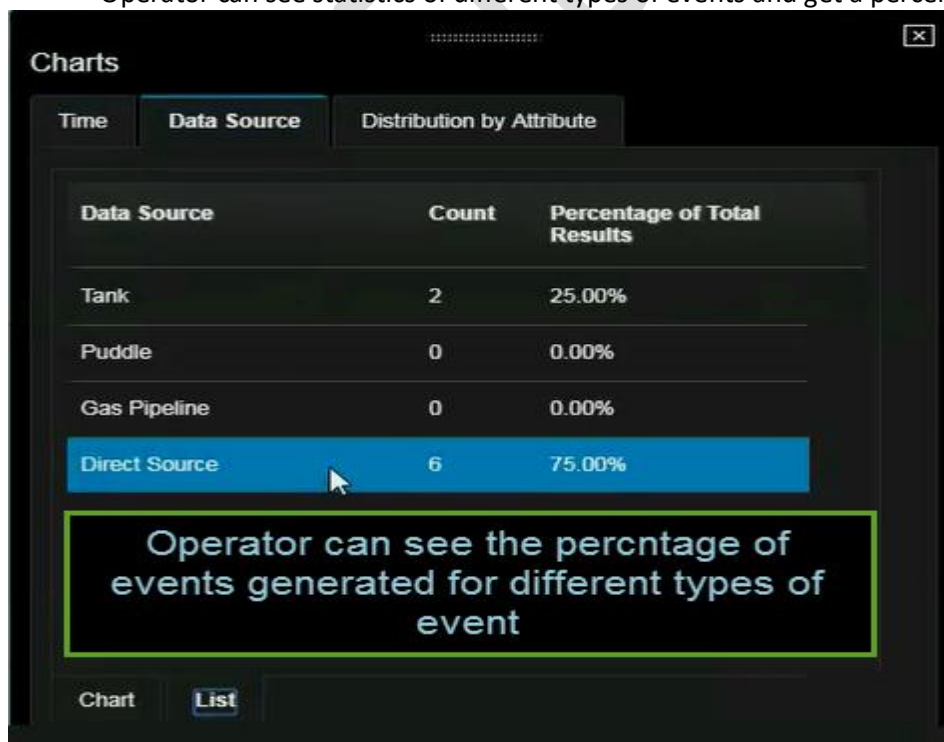
STEP 10: To receive alerts when a defined KPI changes:

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



STEP 11: To see the event statistics in terms of list:

- ✓ Operator can see statistics of different types of events and get a percentage of one another.



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.

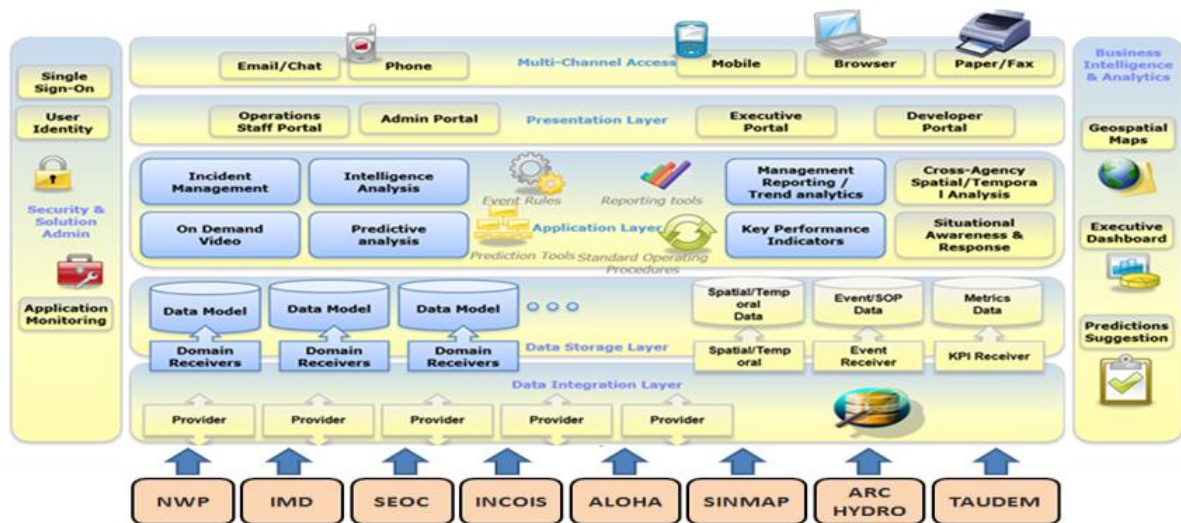
3. Solution Features, Functions and typical use case description

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

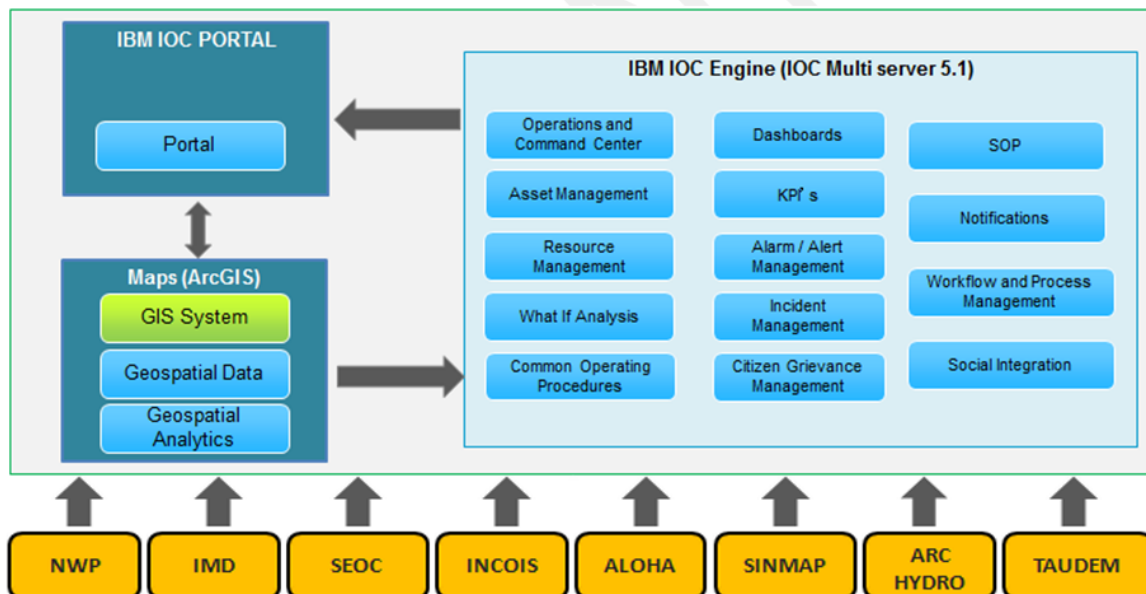
If IBM Intelligent Operations Center receives an event, it performs several actions to mediate or manage the event. Some of the actions include:

- 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.

4. Solution Architecture



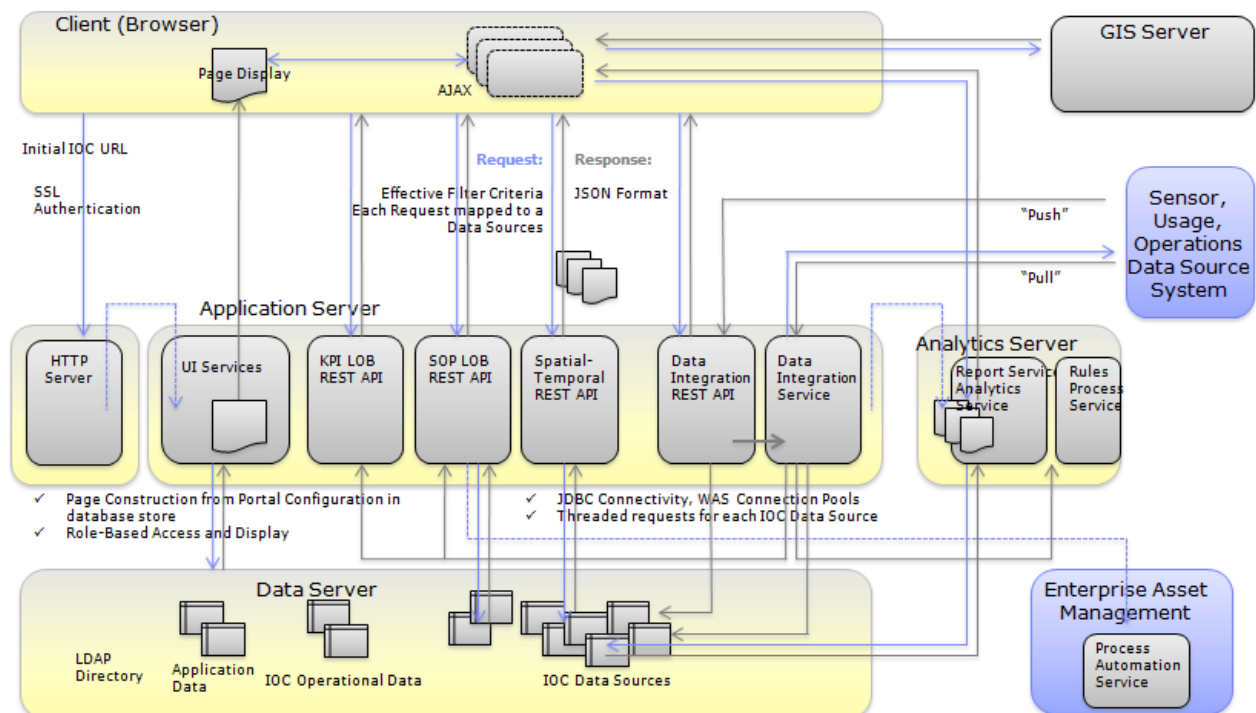
5. Integration Architecture and Approach



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

6. THE IOC 5.1 REQUEST/RESPONSE FLOW ARCHITECTURE



7. Conclusion:

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

- Petro Chemical Accident has been closed successfully.
- Verifying the details of the Petro Chemical Accident 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 Petro Chemical Accident.
- Analyzing the different types of Petro Chemical Accidents and giving an insight to emphasize on events which needed to be taken care of.
- Determining the extent of the prune of the accident and information about the total affected areas due to the accident.