PROBLEM STATEMENT

The Global News Organization is developing to design a notification system capable of notifying 5000 employees worldwide that should be able to handle both regular and emergency events and should work under worse conditions such as natural calamities. The system should let employees respond to the notification and the system can track the real-time Geo Location of employees.
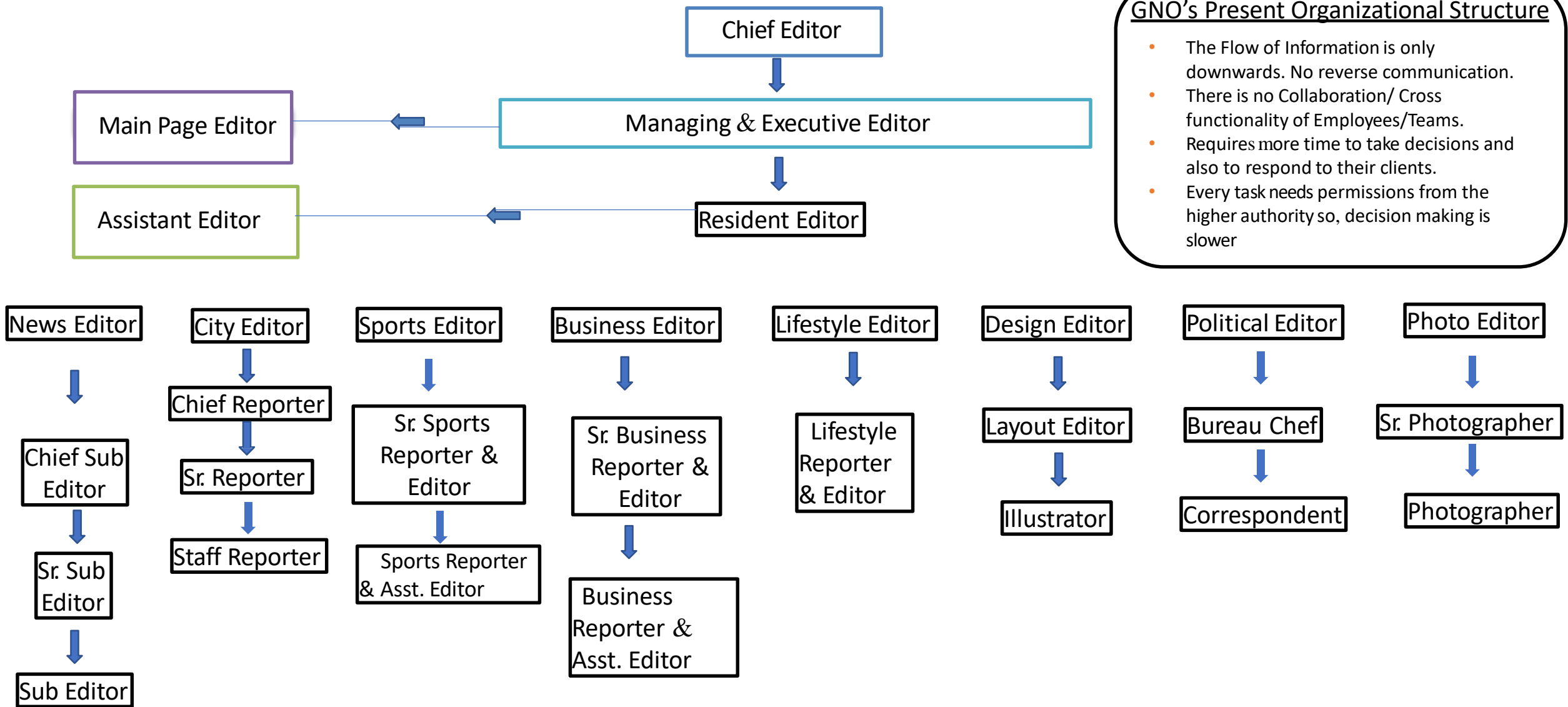
PROBLEM ANALYSIS

Goals	PURPOSE	CHALLENGES
•To Design a Notification system that can notify 5000 employees worldwide. •The System should be able to handles regular and emergency events. •Employee should be able to respond/react to the notification. •The System should be able work in extreme conditions such as natural calamities or major terror attacks. •The System should respect privacy of the employees.	•To track the location of the employee so that GNO can provide them notification and information in a easier manner, and also ensure that they can compete with their competitors and are far better than them. •To Alert employee in case of emergency and help track them if they need help from the company. •To adapt to latest technology so they can be have better and more responsive system while reducing the Cost and improve reliability.	•Making the Communication and location tracking work in real-time manner and making it feel seamless. •Restrict unauthorized access to the system to protect privacy. •To provide Employees privacy and not tracking their location or stop contacting employee during their holidays/leisure. •The system should be able to handle events in case of natural calamities or emergencies.

- The firm wants to leverage the technologies available to connect with employees to communicate.
- Since they don't have this feature the communication time is high which helps competitors to take advantage and the company has to face heavy losses.
- Company has to leave its old approach to communicate and has to follow new technologies and trends that would revolutionized the Industry and help company to beat the competitors and gain profit.

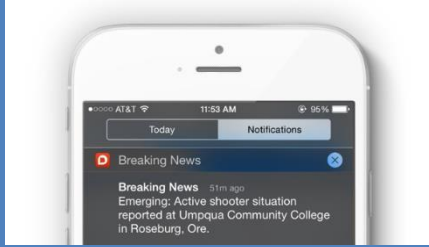| What?	**The firm is unable to provide notifications to employees, in a reliable and efficient manner whenever a major event occurs. Which leads to loss of revenue and make them less competitive in the market.**
Why?	The communication mode being used currently is inefficient. Due to slow communication schemes the firm isn't able to project and cover the news on time.
How?	Since the technology model is old and the communication model is inefficient to notify which leads to delay in news and company is loosing the competitive

Chief Editor

Chief Editor → **Managing & Executive Editor** → **Main Page Editor**

Managing & Executive Editor → **Resident Editor** → **Assistant Editor**

News Editor → **Chief Sub Editor** → **Sr. Sub Editor** → **Sub Editor**

City Editor → **Chief Reporter** → **Sr. Reporter** → **Staff Reporter**

Sports Editor → **Sr. Sports Reporter & Editor** → **Sports Reporter & Asst. Editor**

Business Editor → **Sr. Business Reporter & Editor** → **Business Reporter & Asst. Editor**

Lifestyle Editor → **Lifestyle Reporter & Editor**

Design Editor → **Layout Editor** → **Illustrator**

Political Editor → **Bureau Chef** → **Correspondent**

Photo Editor → **Sr. Photographer** → **Photographer**

| News Gathering & Processing the Information | Supervision & Direction for the Reporters, Editors and Staff |

SOLUTION – 1 (Smartphone Notification & Satellite phone with GPS Enabled and SOS System)

Smartphone Application System
- **The application notifies employees of normal and emergency notification.**
- **Employees can respond to notifications.**
- **Incase of emergency the employees can mark themselves as safe or unsafe.**
- **The GPS can be used to locate them**
- **The application can also be used to indicate reporters on where to visit for a immediate news coverage**

Satellite Phone
- This can be used when the employees do not have any network coverage.
- This device can be used to send emergency messages and communicate with the firm.
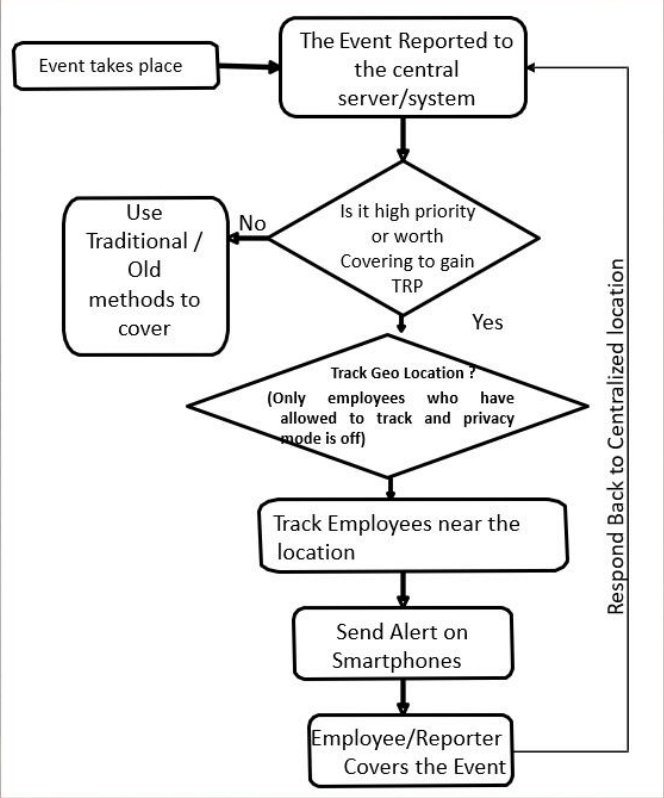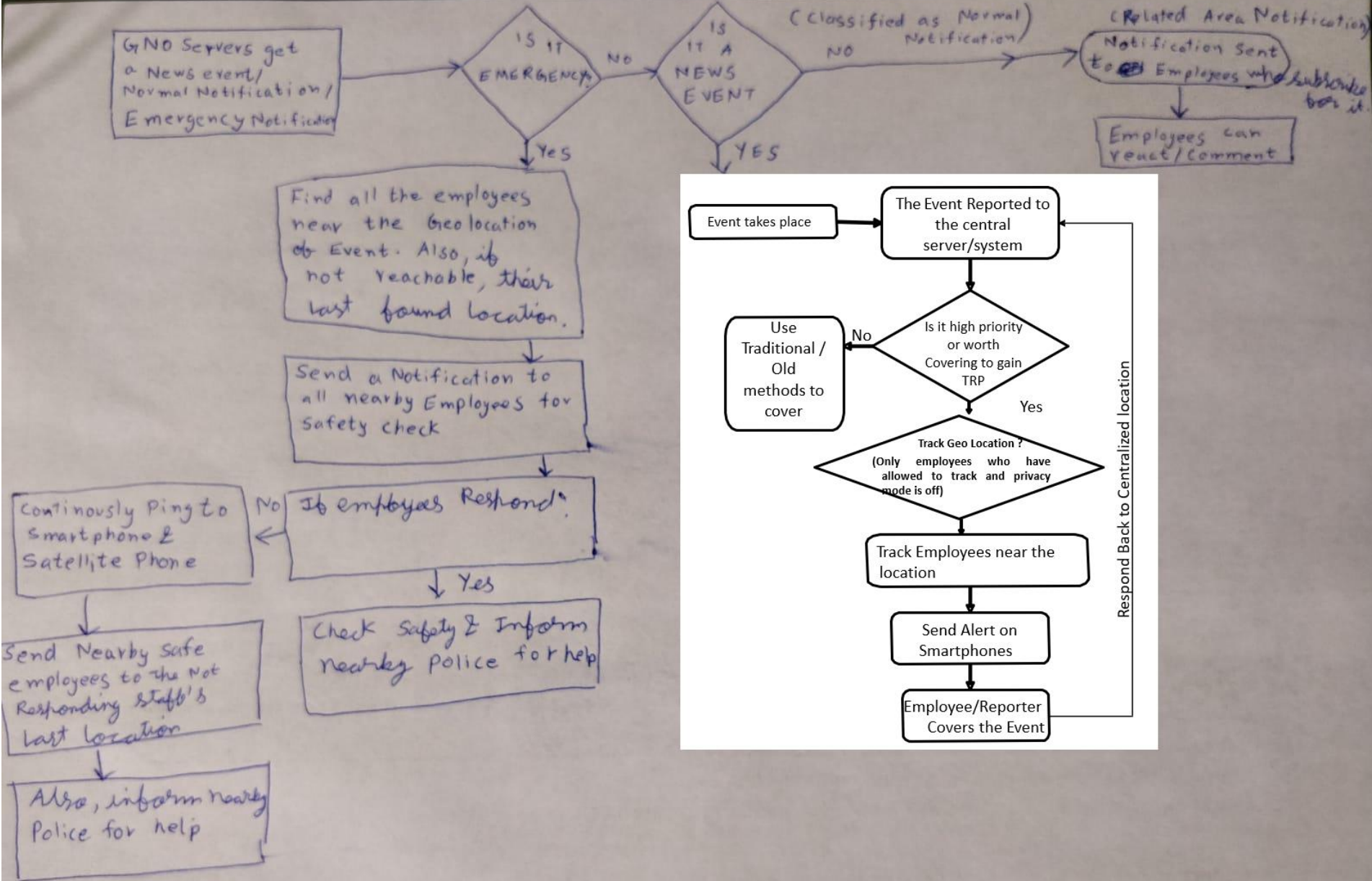- The firm can help them navigate and meet nearby employees to help each other.

Key Features
- Satellite Phones can work when no mobile network's work.
- Features to consider privacy settings.
- Satellite Phones always available so each employee continuously gets alerts.
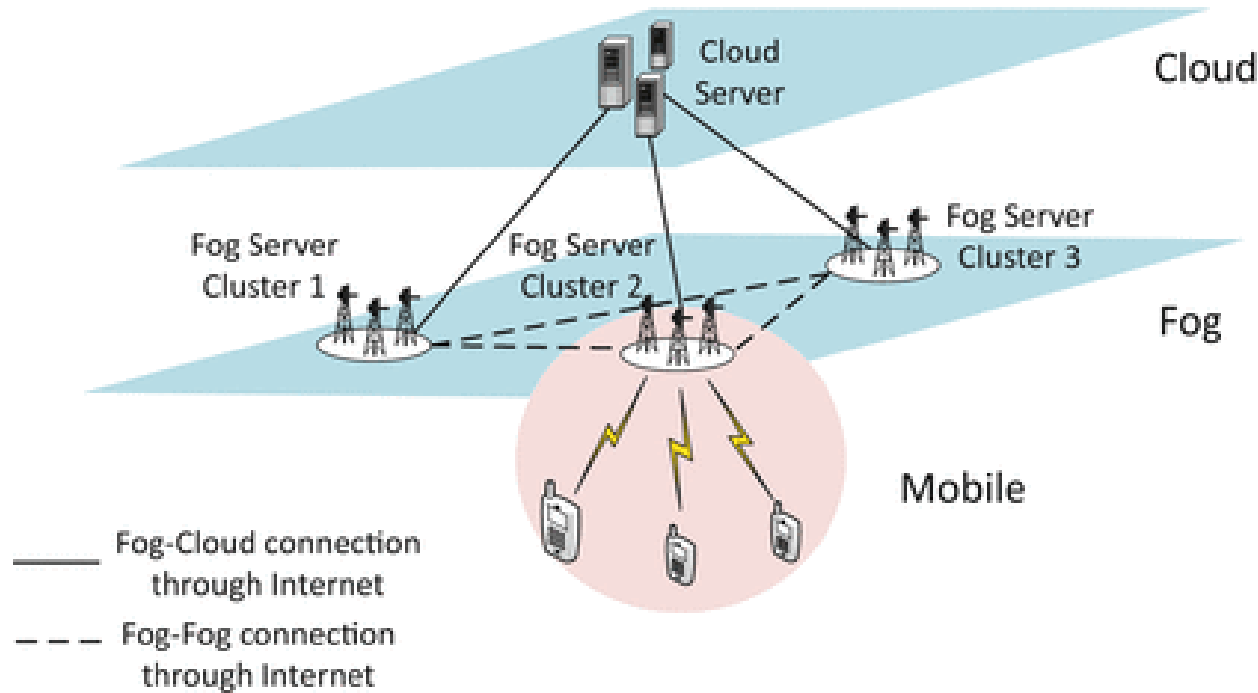- SOS System available to alert nearby emergency.

This slide contains details related 1,2,3,4,5,6,7,9

- This System will check if the notification is an emergency/News Event/Normal Notification these notification will be sent to employees with privacy off and vacation mode off,.
  - If it's a emergency event then the employees near the geolocation of the event are sent an emergency notification to their Smartphone and Satellite Phone.
  - If they Respond that they are safe. It's superb.
  - If they do not respond, the company will check for delivery receipt, if not delivered will check for multiple times to message to employee and will also inform the nearest police station for help and nearby employees to the last traced location.
  - If employee informs as unsafe, the app will try to send nearby employees for help and the cops.
- If it's a news event, then employees near the geolocation are informed and they can immediately use their smartphones to cover the event.
- If it's a normal notification then employees can react, comment and share.

Notification System working methodology

GNo Servers get a News event/ Normal Notification/ Emergency Notification

IS IT EMERGENCY? — No → **IS IT A NEWS EVENT** — No → (Classified as Normal Notification) → (Related Area Notification) Notification Sent to all Employees who subscribe for it

Employees can react/Comment

IS IT EMERGENCY? — Yes ↓

Find all the employees near the Geo location of Event. Also, if not reachable, their last found location.

↓

Send a Notification to all nearby Employees for safety check

↓

If employees Respond? — No → Continuously Ping to Smartphone & Satellite Phone

↓

Send Nearby safe employees to the Not Responding staff's Last Location

↓

Also, inform nearby Police for help

If employees Respond? — Yes ↓

Check Safety & Inform nearby Police for help

Event takes place → The Event Reported to the central server/system

↓

Is it high priority or worth Covering to gain TRP — No → Use Traditional / Old methods to cover

Is it high priority or worth Covering to gain TRP — Yes ↓

Track Geo Location? (Only employees who have allowed to track and privacy mode is off)

↓

Track Employees near the location

↓

Send Alert on Smartphones

↓

Employee/Reporter Covers the Event

Respond Back to Centralized location

SOLUTION – 2 Fog Computing

Cloud

Cloud Server

Fog

Fog Server Cluster 1   Fog Server Cluster 2   Fog Server Cluster 3

Mobile

——— Fog-Cloud connection through Internet

– – – Fog-Fog connection through Internet
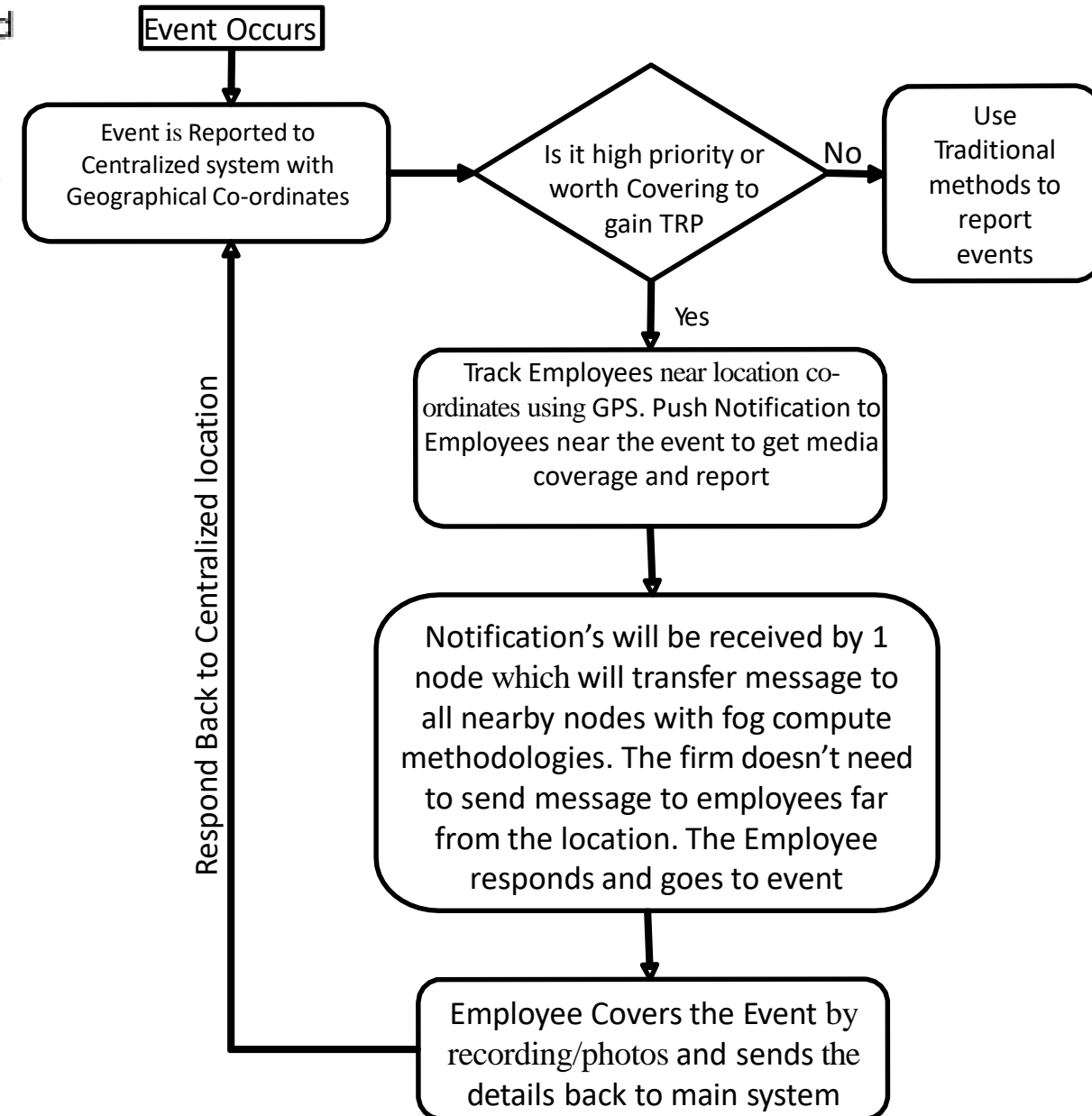
Key Features
- Track employees with the help of GPS on Mobile Phone or with the applications.
- Satellite Network or Satellite phones are not required
- Fog Network is Secure and no leakage of information.
- As soon as a node receives a message it Transfers the message to all nearby nodes.

Event Occurs

Event is Reported to Centralized system with Geographical Co-ordinates

Is it high priority or worth Covering to gain TRP — **No** → Use Traditional methods to report events

Yes

Track Employees near location co-ordinates using GPS. Push Notification to Employees near the event to get media coverage and report

Notification's will be received by 1 node which will transfer message to all nearby nodes with fog compute methodologies. The firm doesn't need to send message to employees far from the location. The Employee responds and goes to event

Employee Covers the Event by recording/photos and sends the details back to main system

Respond Back to Centralized location

- This System will check if the notification is an emergency/News Event/Normal Notification these notification will be sent to employees with privacy off and vacation mode off,.
  o If it's a emergency event then the employees near the geolocation of the event are sent an emergency notification to their FOG Device.
  o If they Respond that they are safe. It's superb.
  o If they do not respond. The FOG Device will continuously try to reach to some network so that it can help communicate in times of emergency. The company will check for delivery receipt, if not delivered will check for multiple times to message to employee and will also inform the nearest police station for help and nearby employees to the last traced location.
  o If employee informs as unsafe, the app will try to send nearby employees for help and the cops.
- If it's a news event, then employees near the geolocation are informed and they can immediately use their smartphones to cover the event.
- If it's a normal notification then employees can react, comment and share.

Cost Estimate for Satellite Phone & Smartphone based Application

Type 1:
All Employees get a satellite Phone: 500$ each * 5000 Employees
Satellite Phones telecommunication Costs per annum for 3 Years 350,000$
Smartphone Application Development, Deployment and Maintenance 100,000$
Application Server and Maintenance: 175,000$
Satellite Phone specific Application, Deployment, Testing and Maintenance: 250,000$
Total: 3,375,000$ (3.375 Million $)

Type 2:
Only highly moving employees such as reporters, videographers and Telecomm setup staff get a satellite Phone, Considering such employees to be 40% of the Employees: 500$ each * 2000 Employees
Satellite Phones telecommunication Costs per annum for 3 Years 350,000$
Smartphone Application Development, Deployment and Maintenance 100,000$
Application Server and Maintenance: 175,000$
Satellite Phone specific Application, Deployment, Testing and Maintenance: 250,000$
Total: 1,875,000$ (1.875 Million $)

Cost Estimate for FOG based Application and Device

Type 1:
All Employees get a FOG Compatible Phone: 250$ each * 5000 Employees
FOG based telecommunication Costs per annum for 3 Years 150,000$
Application Server and Maintenance: 175,000$
FOG Device specific Application, Deployment, Testing and Maintenance: 200,000$
Total: 1,775,000$ (1.775 Million $)

Solution 1: Satellite Phones are highly reliable and can give you contact at any point on earth. These devices with good batteries last for a week with one charge. Also there are smartphones for normal notifications and news events. This supports privacy mode and holiday mode.

The satellite phones are expensive but highly reliable in terms of emergency notification.

I would prefer to give all the employees a Satellite phone if the company has the budget to do it. Else they can give it to Reporters and relative staff initially and later give satellite phones to the rest of the employees.

Solution 2: Is unreliable in terms of emergency events.