



Vulnerability of 911 Outages and Analysis of Recent Events

Charlie Stortz

Vice President AMP Global Strategies

Introduction

The 911 emergency response system used in the United States today became a reality in 1968 when the first 911 call was made in Haleyville, Alabama, by Alabama Speaker of the House Rankin Fite and answered by U.S. Representative Tom Bevill. Since then, it has become part of our critical infrastructure that ensures public safety and well-being. Recent incidents, including the outage on April 17, 2024, and other related events, have spotlighted vulnerabilities within this system, affecting millions of individuals ability to access timely emergency assistance. However, this is not an isolated incident. On September 28, 2020, several states including Arizona, California, Colorado, Delaware, Florida, Illinois, Indiana, Minnesota, Nevada, North Carolina, North Dakota, Ohio, Pennsylvania, and Washington all reported 911 outages in various cities and localities. One common theme from these events points to the practice of deflecting a cause between technology providers. This white paper aims to explore the causes, consequences, and lessons learned from these incidents and the broader vulnerability of 911 outages.

Recent Outages: A Closer Look

On April 17, 2024, a major 911 outage occurred, impacting millions of people across Nevada, South Dakota, and Nebraska. A telecommunications company based in Louisiana initially attributed the outage to a third-party company installing a light pole, that they claim was unrelated to the services they provide. However, further details revealed that workers installing a light pole in Kansas City, Missouri, had cut into a fiber line which knocked out 911 service for emergency agencies in those states. While the service was restored within 2½ hours, and no reports of 911 outages in Kansas City this incident clearly demonstrates the vulnerability of the overall systems.

In addition to this incident, problems with 911 calls in a Texas city along the U.S. border with Mexico were reported around the same time. Officials determined that these issues were unrelated to the widespread outage but added to concerns about the overall reliability of the 911 system.

Potential Causes of 911 Outages

The reliability of the 911 emergency response system is paramount to ensuring public safety and well-being. However, various factors can contribute to outages that compromise this critical service. Among the leading causes are infrastructure interdependencies, where disruptions in unrelated projects such as the cut fiber line in Kansas City, can inadvertently affect 911 services. Human error also plays a significant role, as simple mistakes during construction or maintenance activities can lead to outages. Additionally, the lack of redundant systems and backup power sources can exacerbate the impact of these disruptions, highlighting the need for comprehensive solutions to enhance the resilience of the 911 system.

Infrastructure Interdependencies: The interconnected nature of modern infrastructure poses a significant challenge to the resilience of critical services like 911. The incident in Kansas City serves as a poignant example of how disruptions in seemingly unrelated infrastructure projects can have far-reaching consequences. When workers installing a light pole accidentally cut into a fiber line, that led to a widespread 911 outage across Nebraska, Nevada, and South Dakota. This incident underscores the importance of understanding and managing the interdependencies between different infrastructure systems to prevent unintentional disruptions to essential services.

Recommendations: Enhance coordination and communication between telecommunications companies, third-party vendors, and construction crews can help identify potential risks and implement measures to mitigate the impact on critical services.

Human Error: Despite advances in technology and safety protocols, human error remains a leading cause of 911 outages. In many instances, outages occur due to simple mistakes made by workers during construction, maintenance, or repair activities. For example, workers cutting into fiber lines without proper identification or awareness of their location can inadvertently disrupt vital communication networks.

Recommendations: Provide comprehensive training to workers on the importance of identifying and avoiding critical infrastructure during construction activities can help reduce the incidence of human errors leading to outages. By Implementing strict protocols



and safety measures, such as using advanced mapping technologies and conducting thorough site surveys before initiating work, can further minimize risks.

Lack of Redundancy: The resilience of the 911 system is heavily dependent on the availability of redundant systems and backup power sources to ensure continuous operation during unexpected disruptions. The outage on April 17 highlighted the vulnerabilities exposed by the lack of redundancy, as millions of people across three states were left without emergency access for 2½ hours due to a single fiber line being cut.

Recommendations: Invest in robust infrastructure with built-in redundancies, such as multiple fiber paths, backup power generators, and failover mechanisms, to help mitigate the impact of outages and ensure uninterrupted 911 service. Regular maintenance and testing of backup systems are also essential to identify and address potential vulnerabilities before they threaten service availability.

Addressing the root causes of 911 outages requires a multifaceted approach that encompasses infrastructure resilience, human error prevention, and the implementation of redundant systems. By understanding the interconnected nature of modern infrastructure, enhancing training and safety protocols, and investing in robust backup systems, we can significantly improve the reliability and resilience of the 911 emergency response system, ensuring it continues to serve as a reliable lifeline for individuals in need of urgent assistance.

Consequences of 911 Outages

The consequences of 911 outages extend beyond the immediate disruption of emergency services, impacting both individuals and communities in various ways. Delays in emergency response can jeopardize lives and possibly increasing the severity of injuries, highlighting the critical importance of timely assistance during emergencies. These outages can also induce public panic and disruption by disrupting daily activities and escalating tensions in critical situations. Moreover, incidents of service interruptions can erode public trust in the reliability and effectiveness of the 911 system, leading to skepticism and apprehension about relying on it during emergencies.



Delayed Emergency Response: The primary purpose of the 911 system is to ensure swift and effective response to emergencies. When outages occur, the ability to dispatch emergency services promptly is compromised, leading to potentially life-threatening delays. In critical situations where every second counts, such delays can have dire consequences, jeopardizing lives and possibly increasing the severity of injuries.

Impact: The inability to access timely emergency assistance can result in increased morbidity and mortality rates, particularly in cases of medical emergencies, accidents, or natural disasters where immediate intervention is crucial.

Recommendations: Implement advanced monitoring and alerting systems to help detect and respond to outages more quickly, enabling emergency services to activate contingency plans and minimize response times. Collaborative efforts between telecommunications providers, emergency services, and local authorities can also help streamline communication and coordination during outages, ensuring that alternative means of assistance are readily available.

Public Panic and Disruption: The sudden loss of access to emergency services can induce panic and anxiety among the public, leading to widespread disruption of daily activities and intensify the overall emergency. Without reliable access to 911, individuals may feel helpless and uncertain about how to seek assistance in critical moments, further escalating tensions and risks.

Impact: Public panic can impede the orderly evacuation or response to emergencies, hinder communication with emergency services, and create additional safety hazards. Moreover, disruptions to essential services, such as healthcare, transportation, and utilities, can compound the impact of the outage, affecting the broader community.

Recommendations: Educate the public about alternative ways to seek help during 911 outages, such as using non-emergency numbers or mobile apps, to help mitigate panic and facilitate smoother communication with emergency services. Public awareness campaigns, emergency drills, and community engagement initiatives can also help prepare individuals



and communities to respond effectively to emergencies, even in the absence of 911 services.

Loss of Trust: Incidents of 911 outages can erode public trust in the reliability and effectiveness of the emergency response system. When individuals experience difficulties accessing emergency services during critical moments, it can undermine confidence in the system's ability to provide timely and lifesaving assistance, leading to skepticism and apprehension about relying on 911 in future emergencies.

Impact: A loss of trust in the 911 system can deter individuals from seeking help when needed, delay response times as people hesitate to contact emergency services and reduce overall community resilience to emergencies.

Recommendations: Building transparency and accountability within the emergency response system can help restore and maintain public trust. Regular communication about the causes of outages, efforts to address vulnerabilities, and measures taken to improve system resilience can demonstrate commitment to public safety and foster trust among the community. Engaging with the public through feedback mechanisms, surveys, and community forums can also help identify concerns, address misconceptions, and reinforce confidence in the 911 system.

The consequences of 911 outages extend beyond the immediate disruption of emergency services, impacting public health, safety, and trust in the emergency response system. Addressing the root causes of outages, enhancing communication and coordination during emergencies, and fostering public awareness and trust are essential steps towards improving the resilience and reliability of the 911 system. By prioritizing the needs and concerns of the community and implementing robust solutions, we can ensure that the 911 system continues to serve as a trusted and effective lifeline for individuals in need of urgent assistance.

Lessons Learned and Potential Solutions

The recent challenges faced by the 911 emergency response system have underscored the need for comprehensive strategies to enhance its resilience and reliability. Lessons learned from these



incidents emphasize the importance of enhanced coordination among telecommunications companies, third-party vendors, and emergency services to prevent and quickly resolve outages. Investing in resilient infrastructure, implementing redundant systems, and conducting regular maintenance checks are essential for mitigating the impact of unexpected disruptions and improving the system's overall reliability. Furthermore, human error prevention through comprehensive training and strict protocols for construction activities near critical infrastructure is crucial to preventing service interruptions. Lastly, public awareness and education initiatives play a vital role in empowering individuals to seek alternative avenues for assistance during 911 outages, reducing the overall impact of service disruptions on public safety.

Enhanced Coordination: Strengthening coordination between telecommunications companies, third-party vendors, and emergency services is crucial to preventing and quickly resolving outages like those experienced recently. By fostering collaborative relationships and establishing clear communication channels, stakeholders can better identify potential risks, coordinate response efforts, and implement effective solutions to mitigate the impact of disruptions.

Recommendations: Developing formalized partnerships and joint planning initiatives between key stakeholders can facilitate proactive risk assessment, streamlined response coordination, and continuous improvement in emergency preparedness and response capabilities.

Infrastructure Resilience: Investing in resilient infrastructure, implementing redundant systems, and conducting regular maintenance checks are essential steps to mitigate the impact of unexpected disruptions and improve the overall reliability of the 911 system. By ensuring that critical infrastructure is robust, redundant, and well-maintained, we can enhance the system's ability to withstand and recover from disruptions, minimizing downtime and service interruptions.

Recommendations: Prioritizing infrastructure upgrades, investing in advanced monitoring and predictive maintenance technologies, and establishing rigorous quality assurance and compliance protocols can help enhance system resilience and reduce vulnerabilities to outages.



Human Error Prevention: Providing comprehensive training to workers and implementing strict protocols for construction activities near critical infrastructure are essential measures to prevent human errors leading to outages. By educating workers on the importance of safety and awareness when working near vital communication networks, we can reduce the risk of accidental damage and disruptions to essential services.

Recommendations: Implementing mandatory training programs, safety certifications, and regular competency assessments for workers involved in construction and maintenance activities near critical infrastructure can help instill a culture of safety and responsibility, reducing the likelihood of human errors leading to service outages.

Public Awareness and Education: Educating the public about alternative ways to seek help during 911 outages and promoting the use of non-emergency numbers or mobile apps can help mitigate the impact of service disruptions. By raising awareness and providing clear guidance on how to access assistance during emergencies, we can empower individuals to take proactive measures to protect themselves and their communities.

Recommendations: Launching public awareness campaigns, disseminating information through social media, community outreach programs, and partnering with local media outlets can help educate the public about the importance of preparedness and the available alternatives during 911 outages. Providing access to reliable non-emergency contact options and mobile apps can further enhance the resilience and accessibility of emergency services during disruptions.

The reliability and effectiveness of the 911 emergency response system are fundamental to safeguarding public safety and well-being in times of crisis. The recent challenges and outages experienced by the system serve as stark reminders of the vulnerabilities that exist and the critical need for proactive measures to enhance its resilience and reliability.

From the lessons learned, it is evident that a multifaceted approach is required to address the root causes of outages and strengthen the overall system. Enhanced coordination among telecommunications companies, third-party vendors, and emergency services is paramount to



fostering collaborative efforts, improving response times, and preventing future disruptions. Investing in resilient infrastructure, implementing redundant systems, and conducting regular maintenance checks are essential steps to mitigate the impact of unexpected disruptions, ensuring continuous and reliable service during emergencies.

Human error remains a significant risk factor contributing to outages, underscoring the importance of comprehensive training and strict protocols for workers involved in construction and maintenance activities near critical infrastructure. By instilling a culture of safety, awareness, and responsibility, we can reduce the likelihood of accidental damage and disruptions, further enhancing the reliability of the 911 system.

Additionally, public awareness and education initiatives play a crucial role in empowering individuals and communities to take proactive measures to protect themselves during emergencies. Educating the public about alternative ways to seek help, promoting the use of non-emergency numbers, and leveraging mobile apps can help mitigate the impact of service disruptions and foster resilience within the community.

As much as the U.S. population would like to believe that when dialing 911, someone will show up on their doorstep to provide aid and assistance, which in most cases does happen. However, without a dedicated effort to address some basic pitfalls, more cases of delays and failure will certainly be the norm. 911 is not a one size fits all set of systems. Addressing the complex challenges facing the 911 emergency response system requires a collaborative and concerted effort from policymakers, industry stakeholders, emergency services, and the public. By implementing robust solutions, enhancing coordination, investing in infrastructure resilience, preventing human errors, and raising public awareness, we can significantly improve the reliability, effectiveness, and responsiveness of the 911 system, ensuring it continues to serve as a trusted lifeline for individuals in need of urgent assistance.



- AMP Global Strategies is a leading Woman-Owned Small Business (WOSB) specializing in cutting-edge technology solutions for public, government, and school facilities. With a focus on enhancing safety and security, our advanced systems can detect and alert officials and law enforcement within seconds of a weapon being detected or fired, ensuring rapid response and intervention. We offer a comprehensive suite of services, including infrastructure, equipment, and consulting, catering to a diverse range of clients, including Government, Business, Healthcare, Schools, Universities, 911 Centers, and First Responder Communities both in the United States and internationally.

Our extensive capabilities span systems consulting/design, installation, and maintenance across various domains such as RF, Microwave, Tower Sites, Coverage Studies, FCC Licensing, Access Points, Access Control, Closed Circuit TV, Alarms, Uninterruptible Power Supply, Backup Generators, VoIP Phone Systems, IT Services, Weapons Detection, and Gunshot Detection. At the heart of our success lies our dedicated and experienced team of professionals, comprised of former and active public safety personnel, police officers, firefighters, and EMS Responders. Their invaluable first-hand knowledge and expertise drive our commitment to delivering reliable, quality communication systems that are cost-effective and tailored to meet the specific needs and budgets of our clients.

- Charlie Stortz - Charlie Stortz is a seasoned expert with over 30 years of hands-on experience in public safety technology. His comprehensive expertise encompasses Computer Aided Dispatch Systems (CAD), Geographic Information Systems (GIS), Land Mobile Radio (LMR) infrastructure, Video Management Systems (VMS), Gun Detection, and kinetic energy Gunshot Detection Systems. Throughout his career, Charlie has been instrumental in optimizing dispatch operations, designing robust communication networks, and enhancing situational awareness to bolster emergency response capabilities.

Throughout his career working with public safety technology, Charlie has contributed significantly to advancing best practices and standards aimed at mitigating vulnerabilities and strengthening the resilience of critical infrastructure. His insights and recommendations are invaluable in addressing the 911 outage vulnerability, providing actionable strategies to improve the reliability and effectiveness of emergency communication systems. Charlie's dedication, expertise, and commitment to leveraging technology for public safety make him a trusted advisor and thought leader in the field.