IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 2, Issue 1, September 2022
Impact Factor: 6.252

Next-Gen Emergency Communication Using Low-Power Wide-Area and Software-Defined WANS

Vaidehi Shah
Independent Researcher
shahvaidehi4795@gmail.com

Abstract: *Among the Internet of Things' (IoT) fastest-growing networks is the low-power wide-area network (LPWAN). Long-range communication and low power consumption are just two of the many exceptional attributes that have made LPWANs the most extensively used networking protocols in the IoT space. But this intriguing network faces a number of privacy and security risks. This paper reviews the integration of LPWAN with Software-Defined Wide-Area Networks (SD-WAN) to develop a robust, scalable, and intelligent communication framework specifically designed for emergency scenarios. Long-range, low-power connection provided by LPWAN technologies makes them perfect for environmental monitoring, remote sensing, and medical applications in disaster areas. However, LPWAN lacks the dynamic routing, quality of service (QoS), and real-time adaptability required for mission-critical communication. SD-WAN addresses these limitations through centralized orchestration, programmable policies, and network-wide optimization. By combining LPWAN's energy-efficient sensing with SD-WAN's programmable, centralized control, the proposed architecture supports low-latency, context-aware communication in infrastructure-limited environments. This work reviews the technical foundations, applications, and security challenges of both technologies and surveys recent advances in AI-driven routing, energy harvesting, and cognitive LPWAN. Despite progress, a unified LPWAN–SD-WAN framework for real-time, large-scale emergency response remains underexplored.*

Keywords: Communication Systems, LPWAN, Software-Defined Networking (SDN), Network Resilience, IoT Security