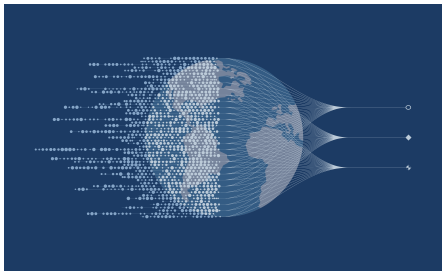

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Study of Internet Paths and Communication Methods in Seismic Networks in Indonesia for Earthquake Early Warning (Case Study of the Western Region of Java Island)

The implementation of Internet of Things (IoT) based Earthquake Early Warning Systems (EEWS) in Indonesia faces challenges in the efficiency of data communication lines to ensure real time earthquake detection. Currently used internet lines include VSAT private network, public GSM 4G, and GSM 4G leased line, with varying performance in terms of connection speed and stability. In addition, communication protocols such as SeedLink and Nanometrics Protocol are used in real time data transmission to support monitoring continuity. We aim to analyse the feasibility of VSAT, GSM, and leased line based internet lines and evaluate the effectiveness of data transmission protocols based on latency parameters, data completeness, and real time monitoring capabilities, with a case study in the western region of Java Island, which has a high level of earthquake vulnerability. The results show that the GSM 4G leased line with a private network provides the best performance in terms of latency and data completeness, while the Nanometrics Protocol with the Centaur digitizer produces adequate latency through an increase in the data compression factor. These findings provide strategic guidance for selecting the optimal communication path and protocol, thereby improving the speed, accuracy and reliability of the EEWS system in detecting earthquakes in vulnerable areas of Indonesia.

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