

## ABSTRACT

In this world, there are areas, the villages that have not received regular the spread of messages (e.g. government's information) through Internet. For the villages that are be served by scheduled public transports systems at least once a day, i.e. trains, there is an opportunity to receive messages from the Internet. The public transports serve as relay nodes that carry the messages from the cities that are to be delivered to the villages. Delay and Disruption-Tolerant Networks (DTNs) solve the problem of the spread of messages in intermittently connected network. DTNs is one communication network that requires routing protocol. DTNs routing protocol pays attention to how routing is done in an efficient way in intermittently connected networks. One of the developed routing protocols is based on probabilistic, i.e. Probabilistic Routing Protocol using History of Encounters and Transitivity (PRoPHET). PRoPHET or original PRoPHET is the only DTNs routing protocol that has detailed protocol specifications that are clearly defined in IRTF Internet Design. PRoPHET assume that nodes do not move randomly but encounter destinations that have been encountered before. In some original PRoPHET and original PRoPHETv2 testing, they are superior to other routing protocols. Testing in environments that use trains as relay nodes, original PRoPHET performance is worse than the epidemic. This happens because messages delivery to other relay nodes are assumed to encounter the destination (having a larger probability of encountering the destination) while the other relay nodes are moving away. The original PRoPHET and the original PRoPHETv2 performance can be improved by delivering a message to relay nodes that will encounter the destination. This can be done by delivering a message to relay nodes with lower probability values encountering the destination. The results obtained were delivery probability of a modified PRoPHET and a modified PRoPHETv2 41–96.43% more than the original PRoPHET and the original PRoPHETv2 in environments that use trains as relay nodes. The best spread of messages from stations to villages is obtained using modified PRoPHETv2 with delivery probability 96.43%.

**Keywords:** villages, spread of information, Internet, train, Delay- and Disruption-Tolerant Networks (DTNs), routing protocol, Probabilistic Routing Protocol using History of Encounters and Transitivity (PRoPHET), a lower probability of encountering the destination, modified PRoPHET, modified PRoPHETv2