博士論文題目　Enhanced dependability and feasibility in multi-hop relay networks considering finite buffer and power in relay nodes
(和文訳：中継ノードの有限記憶と電力を考慮したマルチホップリレーネットワークにおける際立つ高信頼性と実現性)

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Network delay or latency is targeted to be one of the bench mark in 5G and beyond networks. These networks are structured as having smaller cells and therefor to have more coverage need dense deployments. As such new paradigms of network design need to be considered from the onset. In low power networks like wireless sensor, most of the traditional protocols do not hold because of the resource constrain in power and memory and processing capabilities. The purpose of this work is to study the impact of finite buffers in the overall delay performance of packets in a heterogeneous traffic environment. In heterogeneous traffic environments different classes of traffic have different quality of service requirements. With this in mind, we propose and design a virtual buffer extension or a distributed buffer storage algorithm for nodes in a network depending on the topology. The topology considered in this work is multi hop mesh network structure and also networks with multiple routes. The structure is as follows the main base stations are arranged in a multihop fashion which act as intermediate relays. Client or mesh nodes cluster around each base station ,this results in the base station carrying both its mesh clients traffic and that from the other basestation in the same hierarchy. We begin by building a case on the theoretical aspects of buffer extension for consideration to use in practical systems. the ultimate objective is to study different topologies in a mesh fashion and the interplay with network coding and routing.

Buffer expansion may find application in resource constrained environments like wireless sensor networks(WSN) and Wireless Body area networks(WBANS) as well as application in low power wide area networks such as sigfox and LORA. This also has can have application in developing nations where the digital divide is large and the use of low cost networks in such environment can deliver the needed infrastructure for Medical and social services use. As future work, we would like to study the effects of implementing such a technique on the power consumption of a node and network lifetime.