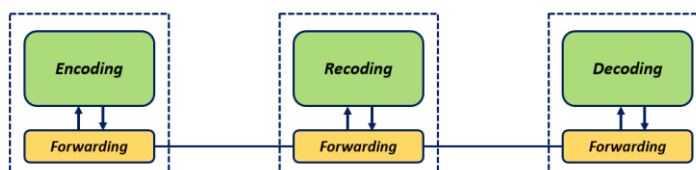




Task Description for Student/Diploma/Master Thesis

Topic: *Leveraging Network Programmability to Improve The Performance Of Network Coding*



Description:

Network coding has demonstrated its great potential to improve the performance in various scenarios such as unreliable communication networks and distributed storage systems. Due to the potential of network coding, recent years witness tremendous variations (e.g., Fulcrum coding). NCKernel, network coding support in Linux kernel, has been proposed to prove the practicality of network coding.

However, NCKernel is mainly used for handling network coding functions. The network support has not been considered yet in NCKernel. For instance, forwarding function is needed to allow recoder to receive the packets from encoder and then forward them to decoder. To tackle this issue, NCKernel relies on NCnet that is a separate software entity dedicated to provide the network support for NCKernel. The use of NCnet in NCKernel introduces latency overhead. Therefore, the goal of this work is to improve the performance of NCKernel. Particularly, the forwarding function (i.e., similar to a layer-2 switch) will be directly implemented in NCKernel. The forwarding function should be transparent to sender and receiver, i.e., the sender only needs to know the IP address of the receiver and the network coding functions will be implemented in the network. The student is expected to fulfill the following tasks:

Tasks:

- Literature review
- Find a research problem (optional)
- Propose a solution
- Evaluate the proposed solution
- Write up a report

Requirements:

- Basic knowledge of computer networks
- Basic knowledge of Linux
- Programming languages: C and Python

Language: English

Our offer that helps students focus on their work:

- Testbed
- Measurement tools and scripts

Keywords: network coding, NCKernel, network programmability

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