Proposal: Unidirectional NCM

Andreas Bauer, Lion Steger

January 2021

1 Objective

As of now, the NCM module features bidirectional sessions only. Our goal is to replace the current session handling with unidirectional session handling.

For this change we need to consider the following components: the underlying random linear network coding library (`rlnc`), session management (`session.c`) and generation management (`generation.c`).

The `rlnc` library can presumably be used as is, by simply ignoring the reverse direction of the coding matrix. Optionally we might consider taking steps to make use of the full coding matrix.

Session and generation management on the other hand is to be reengineered from scratch. The rewrite will include designing a revised acknowledgment scheme to fit the unidirectional coding scheme.

2 Milestones

1. Abstract formulation of encoding and acknowledgment scheme, drafting the changes to be made.
2. First prototype: Incorporates the formulated encoding and acknowledgement scheme. Required functionality: Supports transmission of an ICMP Echo Request/Response.
3. Optional: Reengineer the rlnc instead of ignoring the reverse direction of the coding matrix.
4. Final version supporting full functionality of the bidirectional version.
5. Final presentation.

3 Timeline

- Beginning of February: Understanding the current code base using bidirectional sessions and refresh understanding of linear coding schemes
- Mid February: Milestone 1.
- Beginning of March: Implementation of the session and generation logic (Milestone 2.)
- March 24th: Milestone: Final version ready (Milestone 4.)
- March 31st Final deadline
- Beginning of April: Prepare the final presentation (Milestone 5.)