Network Coding for Content-Centric Networking / Named Data Networking: Requirements and Challenges

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Draft history

- Document in the Network Coding Research Group (NWCRG), will be presented on Thursday
- v0 initially presented in Singapore.
- v1 updated according to feedback from presentations in ICNRG and NWCRG
- Still evolving.
Key idea

• Both NC and ICN use orthogonal methods to improve content distribution → combine them!
• Create prefix names for coded content
  - Network coding info embedded in name or header
• Use ICN to retrieve this content
• Receive encoded packets, decode, voila.
• Session-less nature of ICN well suited for ICN, can leverage multiple interfaces, can receive packets from multiple sources, etc.
• As always, devil is in the details
Requirements/Challenges

• What are the requirements:
  – Content naming
  – Transport
  – In-Network caching
  – Seamless mobility
  – Security and privacy

• What are the challenges:
  – Convolutional coding
  – Rate and Congestion control
  – Security and Privacy
  – Routing Scalability
Deltas
Feedback from IETF 100

- Definition of the security envelope (NC in or out)
- Coding is producer or consumer based?
  - Issue of encoding latency if consumer specifies the LC
- Clarify the “Elastic Window” case
- Add clarification to “seamless mobility” and “security” considerations
- Some placeholders from preliminary need to be filled out
Open issues

• More detailed presentation in NWCRG
  – Thursday 3/22

• Next step: what would a practical scheme look like?

• Welcome feedback and contributions