

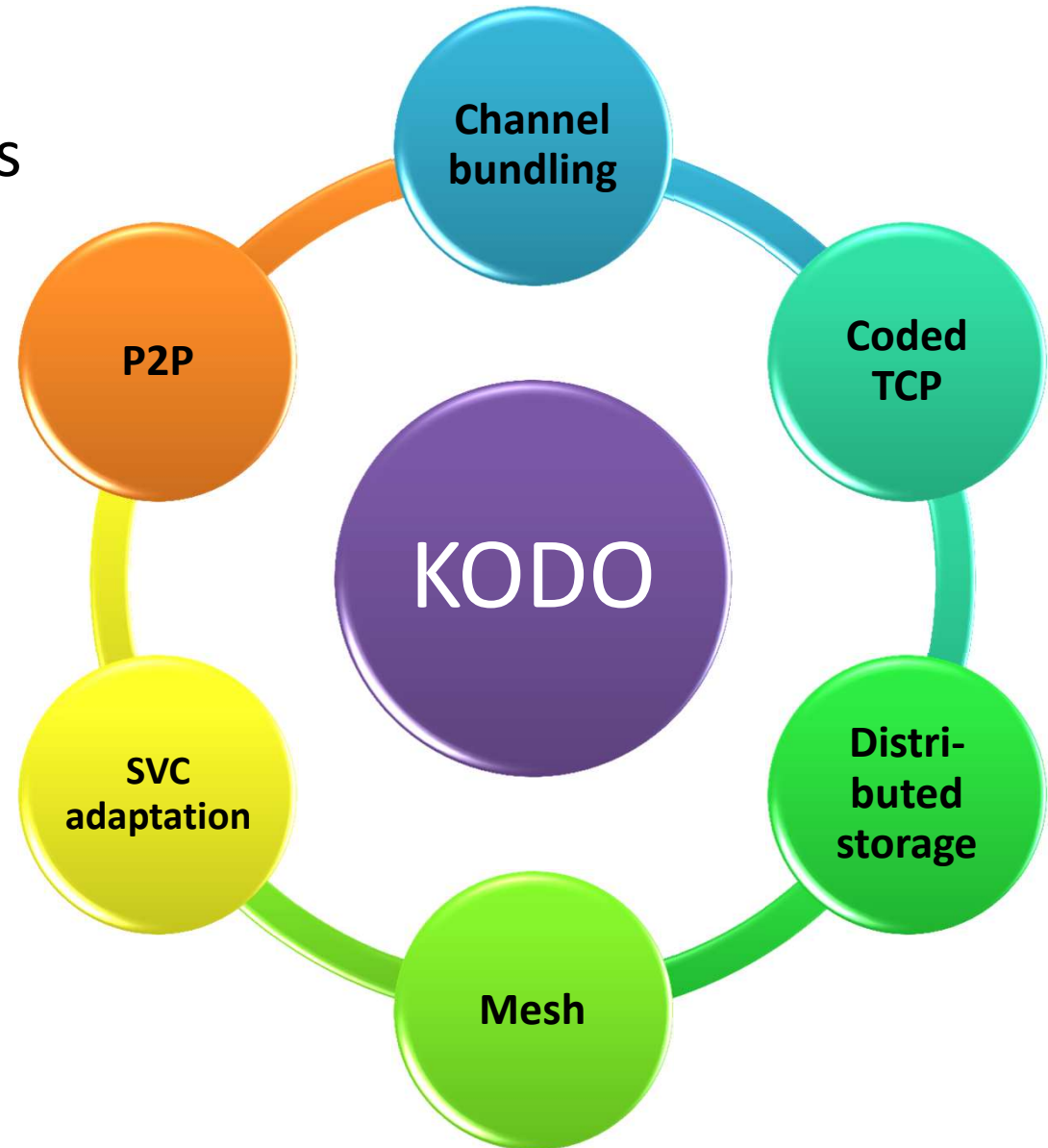
Application Fields and Implementation of Network Coding

Frank Fitzek

Aalborg University

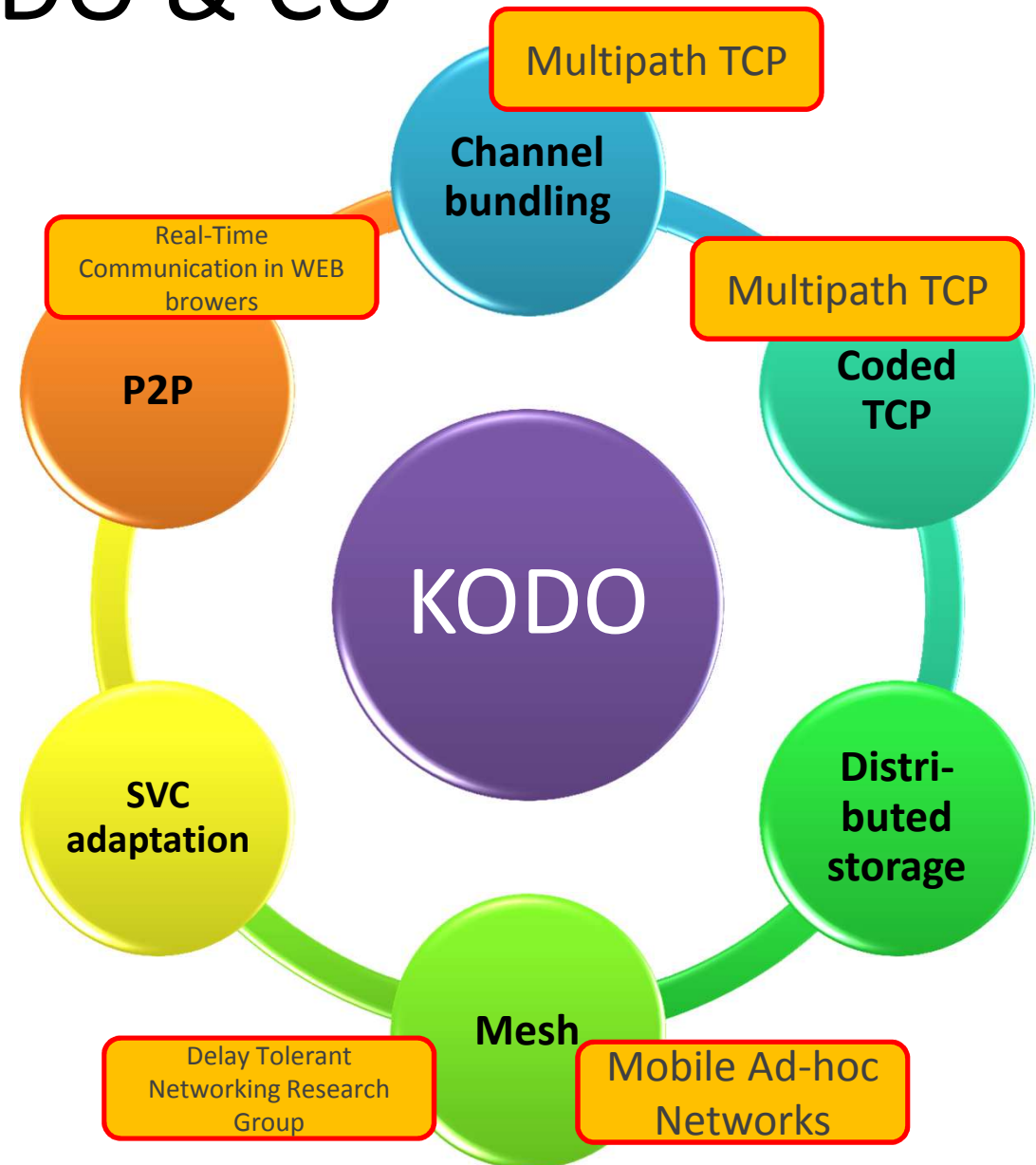
KODO & CO

- Header-less protocols for KODO
 - Communication
 - Storage



KODO & CO

- Header-less protocols for KODO
 - Communication
 - Storage
- Impact on IETF
 - Mobile Ad-hoc Networks
 - Multipath TCP
 - Real-Time Communication in WEB-browsers
 - Delay Tolerant Networking Research Group
 - etc ...



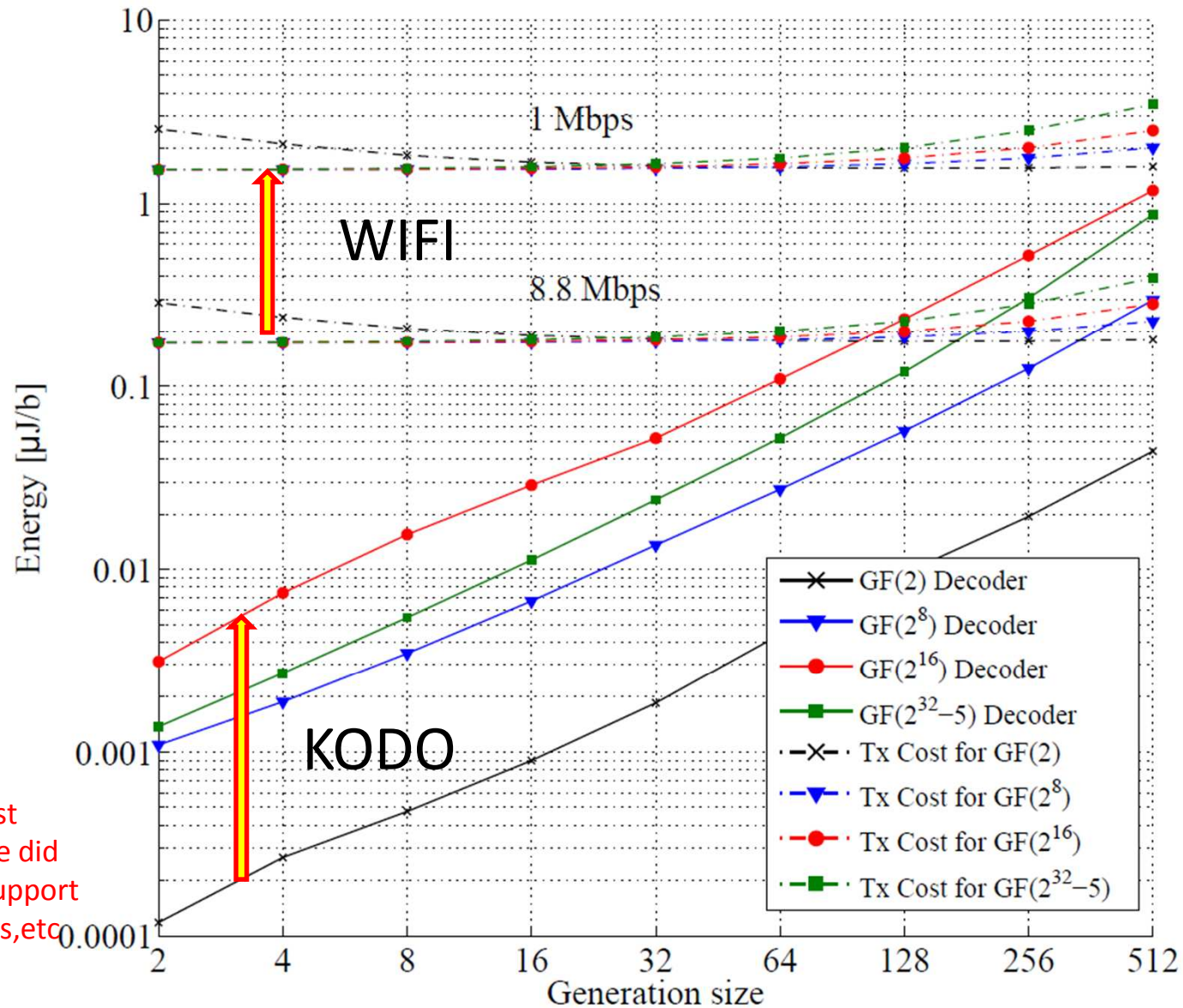
Performance Evaluation KODO

- Performance depends on the platform
- KODO is cross-platform, and we test on several devices
- Main interest
 - Coding speed (from a couple of KB/s to 500 MB/s)
 - Resource allocation (CPU, memory)
 - Energy consumption

Performance Evaluation KODO



Performance Evaluation KODO: Energy



Remark: Coding performance is worst case scenario, as we did not use hardware support (SIMD), sparse codes, etc...)

Mesh Implementation

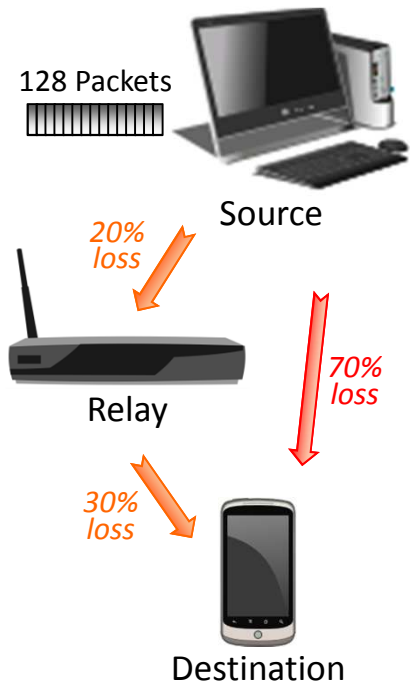


Mesh Implementation

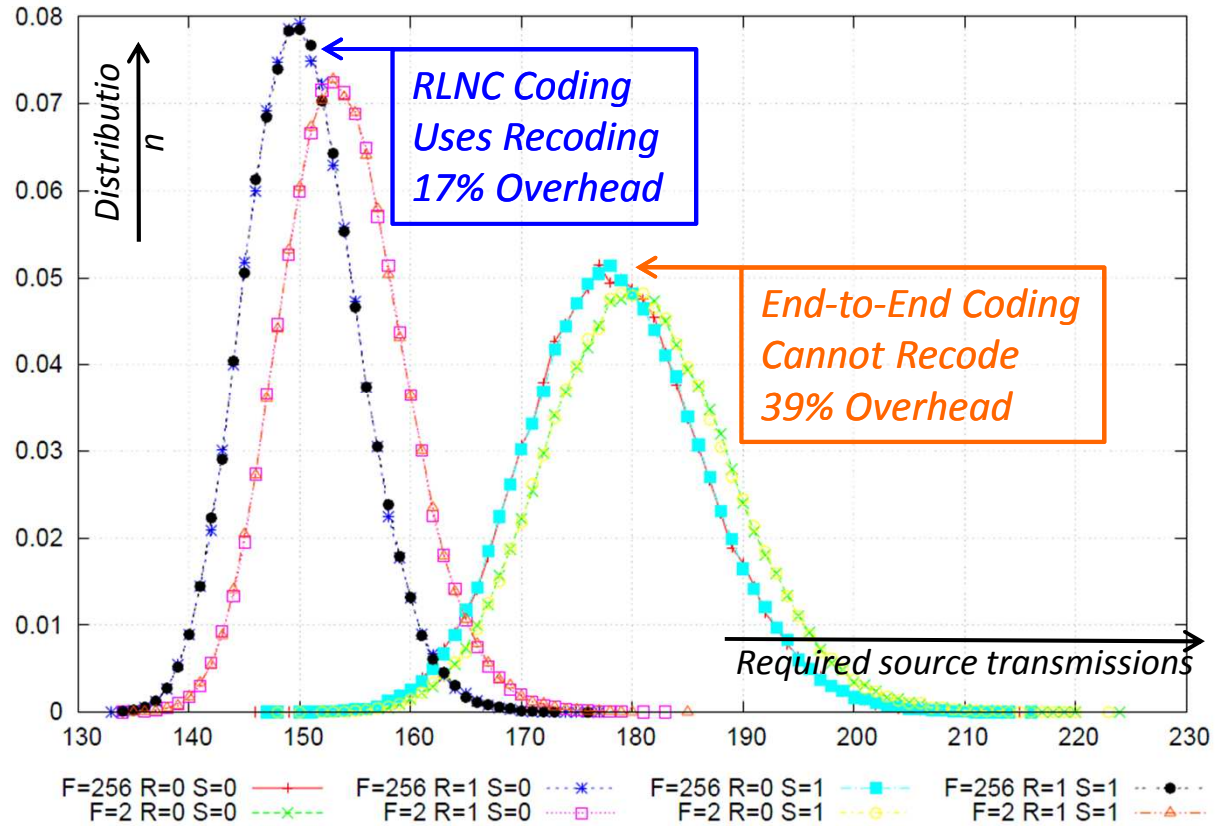
- Interflow network coding
 - Entering Linux Kernel 3.10 via B.A.T.M.A.N. routing
 - Testing at BATTLEMESH v6
 - Sensor network results
 - Medium Access and Inter NC
- Intraflow network coding
 - Using RLNC at the mesh routers
- Combination of Inter and Intra NC: CORE

Recoding RULES!

WiFi Relay Topology

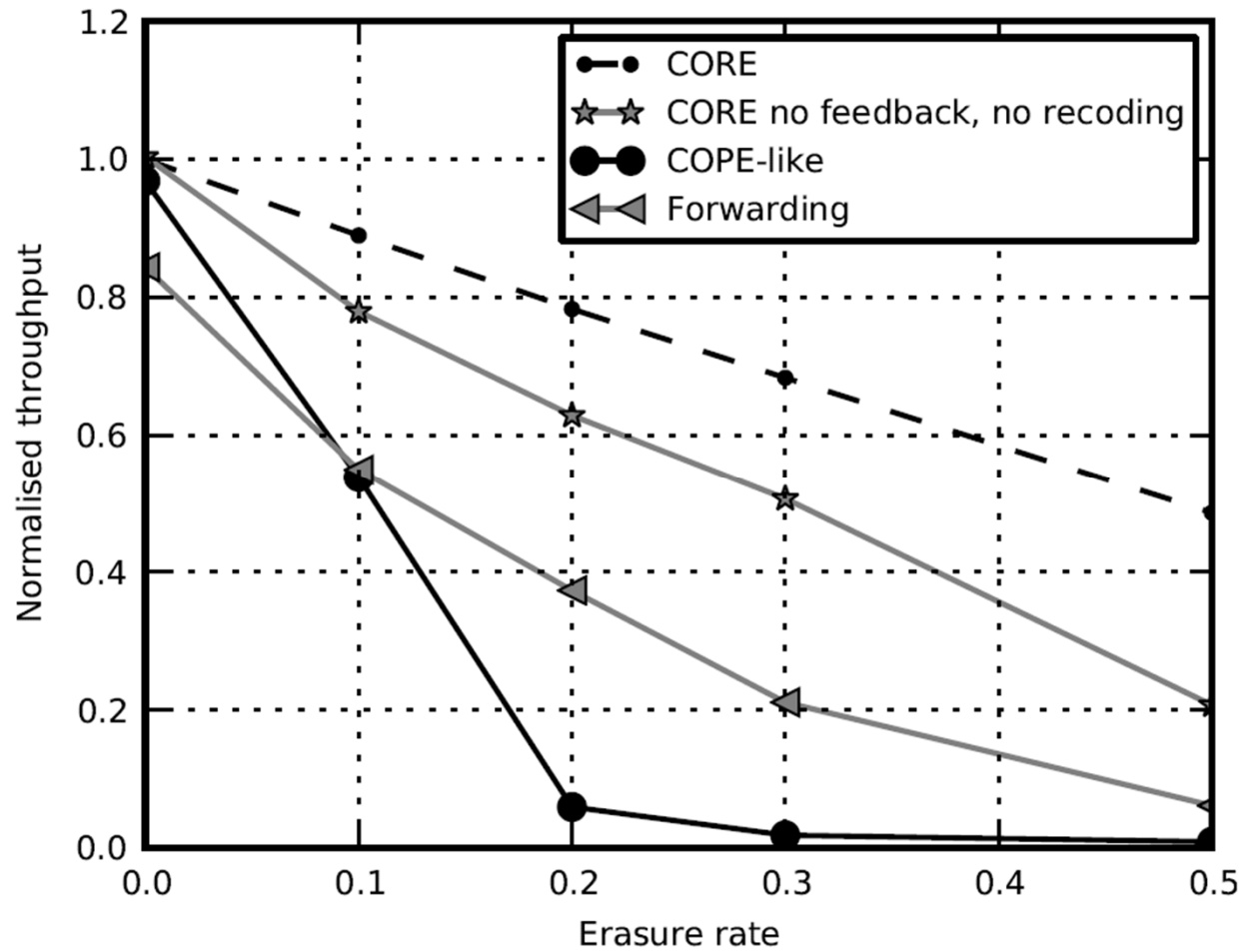
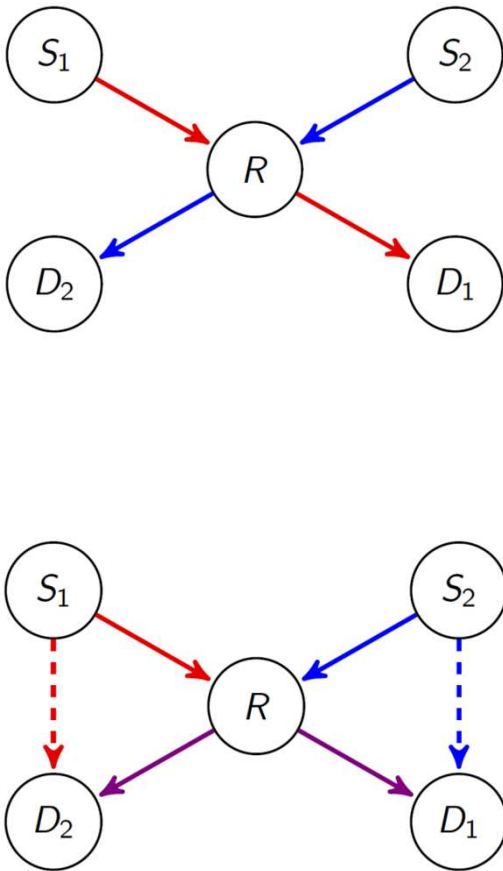


Task 8 : G128 with e1 0.2 e2 0.3 e3 0.7



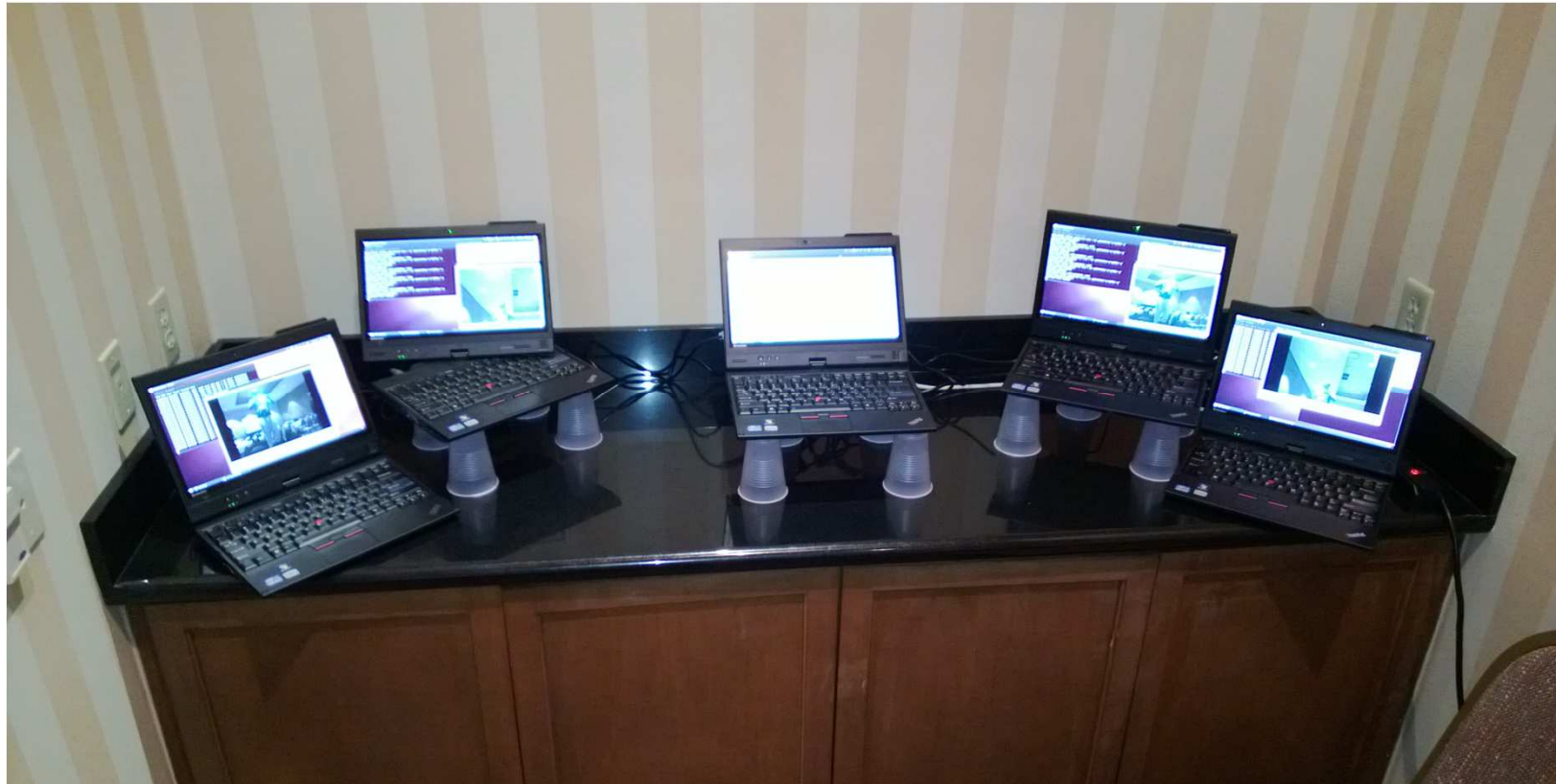
Slide by Kerim Fouli /Frank Fitzek
(CodeOn/Steinwurf)

CORE



CORE: sophisticated signalling scheme, no retransmissions by the relay ...

CORE Demonstrator



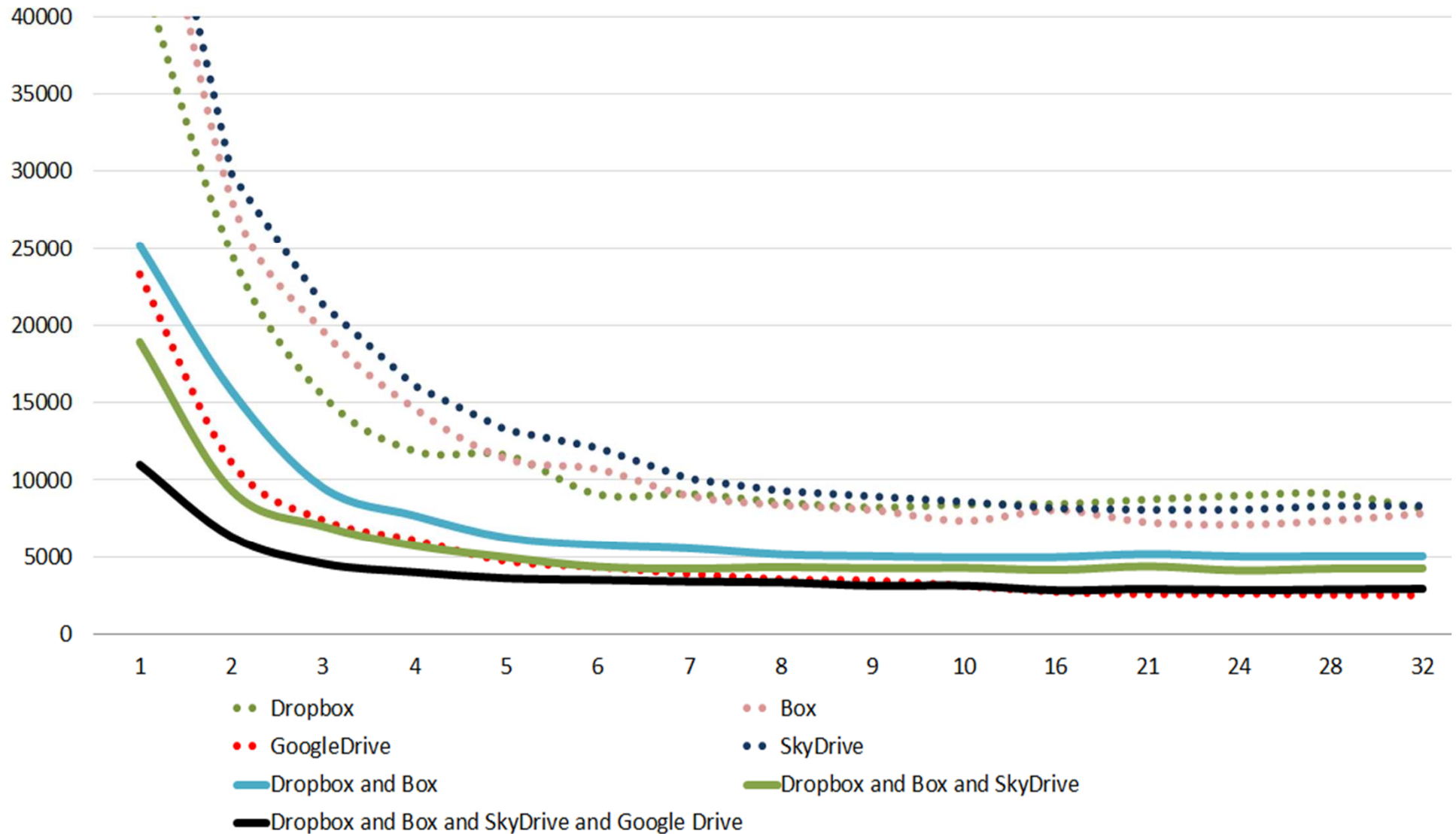
- On youtube: <http://www.youtube.com/watch?v=mKiHKtZRFVU>
- (Search for “CORE Network Coding”)

Distributed Storage



Distributed Storage

Download time versus number of parallel storage entities



Conclusion & Outlook

- NC has potential impact at many WG at IETF
- RLNC has unique properties over other E2E codes (sliding window, recoding, etc)
- KODO is easy to integrate in running projects

- Training session for NC plus KODO integration in Berlin and Palo Alto in 2013 (take a flyer)



October 15 – 16, 2013 Berlin
Network Coding Training



November 5 – 6, 2013 Palo Alto
Network Coding Training