

Transport Protocol Issues of In- Network Computing Systems

draft-kunze-coinrg-transport-issues-03

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Premise of the Draft

“Today's transport protocols offer a variety of functionality based on the notion that the network is to be treated as an unreliable communication medium. Some, like TCP, establish a reliable connection on top of the unreliable network while others, like UDP, simply transmit datagrams without a connection and without guarantees into the network. These fundamental differences in functionality have a significant impact on how COIN approaches can be designed and implemented. Furthermore, traditional transport protocols are not designed for the multi-party communication principles that underlie many COIN approaches. *This document raises several questions regarding the use of transport protocols in connection with COIN.*”

- Draft outlines use cases and research challenges for this vision

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Updates on various aspects (see later)

Added new section on multi-party communication and its challenges for transport

Renamed main section and updated sub-sections

Section 3: Addressing

- Linked to service routing discussion in [draft-sarathchandra-coin-appcentres-03]
- Amended research questions by
 - Aspects of node selection
 - Aspects of constraint-based decision of that selection
 - Aspects of representing treatment by COIN nodes

Section 4: Flow Granularity

- Added text on notion of short-term messages vs long-term resource management between endpoints
 - Possibly separate message/transaction handling from overall resource management
 - Applying error control to messages while applying congestion control to endpoint relation
- Impacts choice of what could be executed where by COIN nodes

Section 5: Collective Communication

- New sub-section with linkage to [draft-sarathchandra-coin-appcentres-03]
- Possible ephemeral/short-lived multipoint communication may question viability of current transport solutions
- Possibility outlined for COIN nodes to support group division into sub-groups

Updates on Section 8

- Renamed 'transport features' covering reliability and congestion/flow control
- Reliability
 - Mentioned possible opportunity to use COIN nodes for reliability in relation to **network coding**
 - Added question on **unit of reliability**, linking to 'message' discussion in flow granularity section
 - Added question on possible use of multi-source
- Flow/congestion control
 - Added discussion on impact of separating error and flow control as well as impact of collective communication (particularly for forward unicast requests leading to single multicast response)

Future Plans

- Clearer linkage to various use cases in revised/future use case draft
- Increase linkage to other COIN drafts in relevant areas, e.g., computing frameworks, programmable forwarding nodes, micro-services draft
- Possibly turn research questions into requirements language
- Solicit more input for draft
- **Adopt as RG draft?**