Transport Protocol Issues of In-Network Computing Systems

draft-kunze-coinrg-transport-issues-05

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RECAP: Premise of the Draft

"[E2E], however, does consider that "***sometimes an incomplete version of the function provided by the communication system may be useful as a performance enhancement***". We link this consideration to the field of computing in the network (COIN), which encourages explicit computations in the network, introducing an intertwined complexity as the computations on the end-hosts depend on the functionality deployed in the network.

Such thinking, to some extent, **challenges traditional ``end-to-end'' transport protocols** as they are not designed to address in-network computation entities or to include more than two devices into a communication, even for inherent functionalities provided by the transport protocol. Some of the resulting problems when considering in-network computation in the context of an overall E2E problem are already presented in [I-D.draft-kutscher-coinrg-dir-02].

This draft focusses on the potential opportunities and research questions for the design of transport protocols that may assume the availability of in-network computing capabilities."

Intention of this Draft

- Provide insights into (transport) technology areas
  - Research questions and challenges
  - Ongoing efforts and concepts under study

- Outline possible future work (in COIN and elsewhere)
  - Gap analysis

-> Goal is to contribute to the objectives of COIN to foster "*Research on potential new transport protocol, …required or enabled by in-network compute.*" [COIN charter, scope #4]

General Structure

Restructured around *technology areas*

Added for **overview** purposes

Added here for future extension to move beyond pure overview to the identification of gaps to support the possible **formulation of future needed work**

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Section 3: Technology Areas

- Regrouped here to then link into gap analysis in Section 5

- Updates to
  - Section 3.1 by linking to ongoing INT-area WG work on Internet Addressing
  - Section 3.3 by adding ongoing work in ICN RG but also BIER WG

-> ***What research questions and related concepts & ongoing efforts are missing?***

Section 5: Gap Analysis

- Added this with same sub-section structure as Section 3 to mirror technology overview with gap analysis

- Only added introductory paragraph outlining the intentions, no content in individual sections yet

-> Do we want such section or not for COIN?

Future Plans

- Clearer **linkage to various use cases** in revised/future use case draft

- More **existing work** (such as MTP work presented at HotNet2021 as new transport work)

- Possibly turn research questions into **requirements language** at later stage

- **Gap analysis** -> really need help here

- **Adopt as RG draft towards one key output towards scope #4 in COIN charter?**

Contributors needed!!

(gap analysis, related work, new work, …)