

It is time to re-consider  
"computing in the network"

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# Background

- 1981: *"End-To-End Arguments in System Design"*
- 1998: *"Active Networking and End-To-End Arguments"*
- 2018:
  - Softwarization of the networking functions(SDN, NFV)
  - Rising of programmable switching and P4 programming language
- Active Research Activities
  - In-Net Computing for high performance distributed systems in DC
    - DNN (Deep Neural Network) training
    - Frontend KV (Key-Value) caching
    - Consensus system such as Paxos
    - ACM SIGCOMM 2018 Workshop on In-Network Computing (NetCompute 2018)
  - Low latency/high BW services are driving Distributed Computing
    - Advanced AR/VR
    - NSF Workshop on Grand Challenges in Edge Computing, 2016
    - ACM SIGCOMM 2018 Workshop on Mobile Edge Communications (MECOMM 2018)

# COIN: Computing in the Network

- Proposing an IRTF RG: COIN
- Goals:
  - Understanding the use cases and different types of network programmability and their different characteristics
  - Understanding relationship to and impact on existing Internet protocols and frameworks.
  - Investigating architectural questions such as system architecture and protocol designs for in-network computing
  - Developing common terminology, concepts and potentially system elements such as data plane protocols and management concepts.
  - Providing guidance for potential future IETF work on distributed and in-network computing

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