

# Proposed RG: COIN Computing in the Network

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## Note Well (IRTF)

This is a reminder of IETF policies in effect on various topics such as patents or code of conduct. It is only meant to point you in the right direction. Exceptions may apply. The IETF's patent policy and the definition of an IETF "contribution" and "participation" are set forth in BCP 79; please read it carefully. The IRTF follows the IETF's policies.

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Definitive information is in the documents listed below and other IETF BCPs. For advice, please talk to the RG Chairs or IRTF Chair:

- BCP 9 (Internet Standards Process)
- BCP 25 (Working Group processes)
- BCP 25 (Anti-Harassment Procedures)
- BCP 54 (Code of Conduct)
- BCP 78 (Copyright)
- BCP 79 (Patents, Participation)
- <u>https://www.ietf.org/privacy-policy/</u> (Privacy Policy)



## **Administrivia**

- Datatracker documents, proposed charter and milestones
  - https://datatracker.ietf.org/rg/coinrg/about/
- GIT will replace the wiki as the "go to " place for all coinrg information
  - <u>https://github.com/irtf-coinrg/prg-materials</u>
- WIKI <u>–</u> (to be phased out)
  - https://trac.ietf.org/trac/irtf/wiki/coin
- Mailing list coin@irtf.org
- Remote participation
  - Meeting link: http://www.meetecho.com/ietf104/coinrg/
  - Slack Workspace: https://join.slack.com/t/coinrg/shared\_invite/enQtNjk4MTQwMTcxNjUzLWJjZTk3ODhlYjVm NGMzOTg4M2VmNmI5NWZjMzZhNzI3ZmM5ZmMyOTQzZDcyMDNlZjM3MDc1NmM0MTg5Z mYzMjM

## Agenda

#### Administrivia and RG status:

Agenda and Note well Charter discussion List of PRG Drafts Summary of the interim meeting Summary of the Hackaton

#### Next steps:

Charter updates and milestones Interim in September Meeting in Singapore

#### **Presentations:**

(1) Dirk Kutscher, What is Computing in the Network? (10 min) https://datatracker.ietf.org/doc/draft-kutscher-coinrg-dir/
(2) Joerg Ott, Different Approaches to In-Network Computing. (10 min) https://datatracker.ietf.org/doc/draft-kutscher-coinrg-dir/
(3) Adrien Wion, Using Service Function Chaining for In-Network Computation (10 min) (4) Ike Kunze, Industrial Use Cases for In-Network Computing (10 min) https://datatracker.ietf.org/doc/draft-kunze-coin-industrial-use-cases
(5) Junchen Jiang, Modern Video Analytics at Scale and In-network Functions (10 min)
(6) Jesper Eriksson, SDN evolution from OpenFlow to P4 (10 min)
(7) Dirk Trossen, In-Network Computing for App-Centric Micro-Services (10 min) https://datatracker.ietf.org/doc/draft-sarathchandra-coin-appcentres-00
(8) Peng Liu, Requirements for Computing in the Network (5 min) https://datatracker.ietf.org/doc/draft-liu-coinrg-requirement-00

### COINRG – Charter

- Our goal:
  - Foster research in computing in the network to improve performance for networks, applications
- Focus:
  - Architectures
  - Protocols
  - Real-world use cases, applications, work in progress
- Charter:
  - We have modified the charter after Prague and the June interim meeting.
  - Item2 in "scope": ...Identify potential benefits to these networks from innetwork functionality, including but not limited to compute, cache, manage, control, etc.
  - Item3: Research on novel architectures, data-plane abstractions and new network/transport protocol designs ...
  - Item4: Research on potential new transport protocol, new privacy and security mechanisms required or enabled by in-network compute.

## **COINRG – Milestones**

- Dec 2019 (post 106)
  - Articulate COIN challenges
    - Related drafts: draft-kutscher-coinrg-dir, draft-liu-coinrg-requirement
  - Capture the SoTA of the COIN landscape
    - Related draft: draft-kutscher-coinrg-dir

#### • Apr 2020

- Target COIN case studies, from architecture, implementation and use case standpoints
  - Related drafts: draft-he-coin-managed-networks, draft-kunze-coin-industrial-use-cases, draft-montpetit-coin-xr
- Identify COIN network-related eco-system dependencies
  - Related drafts: draft-mcbride-edge-data-discovery-overview
- Discuss/catalog COIN requirements and implications for network elements (including network services, network SW stacks, network HW design, etc.)
  - Related drafts: draft-mcbride-edge-data-discovery-overview , draft-he-coin-managednetworks , draft-kunze-coin-industrial-use-cases

#### • Nov 2020

• Work toward defining a COIN scope appropriate for the IRTF, within which new architectures, mechanisms and protocols can be proposed

## **Existing IDs**

#### • New Drafts:

- draft-kunze-coin-industrial-use-cases-00
  - https://datatracker.ietf.org/doc/draft-kunze-coin-industrial-use-cases/
- draft-kutscher-coinrg-dir-00
  - https://datatracker.ietf.org/doc/draft-kutscher-coinrg-dir/
- draft-liu-coinrg-requirement-00
  - https://datatracker.ietf.org/doc/draft-liu-coinrg-requirement/
- draft-sarathchandra-coin-appcentres-00
  - <u>https://datatracker.ietf.org/doc/draft-sarathchandra-coin-appcentres/</u>

#### • Existing Drafts:

- draft-he-managed-networks-01
  - https://datatracker.ietf.org/doc/draft-he-coin-managed-networks
- draft-montpetit-coin-XR-03
  - https://datatracker.ietf.org/doc/draft-montpetit-coin-xr
- draft-mcbride-edge-data-discovery-03
  - <u>https://datatracker.ietf.org/doc/draft-mcbride-edge-data-discovery-overview</u>

#### **Collaborators welcome!**

# Hackathon Summary (1)



- Participants:
  - Emile Stephan, Orange
  - Diego Lopez, Telefonica
  - Andrew Alston, Liquid Telecom
  - Sara Al-Kokhon, U. Toronto
  - Thomas Sheffler, Hochschule f
    ür Technik und Wirtschaft Berlin
  - Rémi Pellan, Pierre-Louis Caron-Auger and Marc Leclerc, Noviflow
  - Jeffrey He, Eve Schooler, Marie-José Montpetit, COIN co-chairs
  - Hemant Singh (remote)
- Invaluable support from Noviflow P4 experts – thanks to Pierre-Louis and Rémi!!!



# Hackathon Summary (2)

- What we did:
  - Basic examples to get everyone onboard
  - IPV6 Switch ML from the remote participant
    - Relates to the work on "Scaling Distributed Machine Learning with In-Network Aggregation" (IPv4)
    - The p4-16 code is checked to to the repo:
      - <u>https://github.com/IETF-Hackathon/p4-ipv6-switch-ml</u>
    - There is a discussion on the list about this work
  - P4 to Golang
  - Packet Filtering
    - Store a packet compare any new packet to this one and an action is performed
    - Link to alerting, ML, decision systems
  - Ideas gathering for future projects (picture to be uploaded)
- What we learned:
  - The need to come prepared (VMs take time)
  - The usefulness of experts in a field still expanding
  - You can get participants the same day
  - You do a lot if 2 days
  - The teamwork is great!
- We will have another hackaton in Singapore now that the 'team' well organized!





Instructions to presenters: please try to link your work to the charter and highlight where changes are necessary!

### **Next Meetings**

- Virtual interim meeting in early October (date TBD in e-mail poll) to address the charter and first set of milestones
- Meet at IETF 106 in Singapore (November 16-22)