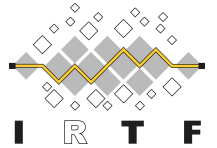# COIN
Computing in the Network

Jeffrey He, Eve M. Schooler, Marie-José Montpetit,
IETF106 - November 22, 2019

# Note Well – Intellectual Property

- **The IRTF follows the IETF Intellectual Property Rights (IPR) disclosure rules**

- By participating in the IRTF, you agree to follow IRTF processes and policies:

  - If you are aware that any IRTF contribution is covered by patents or patent applications that are owned or controlled by you or your sponsor, you must disclose that fact, or not participate in the discussion

  - The IRTF expects that you file such IPR disclosures in a timely manner – in a period measured in days or weeks, not months

  - The IRTF prefers that the most liberal licensing terms possible are made available for IRTF Stream documents – see RFC 5743

  - Definitive information is in RFC 5378 (Copyright) and RFC 8179 (Patents, Participation), substituting IRTF for IETF, and at https://irtf.org/policies/ipr

Note Well – Privacy & Code of Conduct
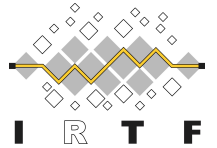
- As a participant in, or attendee to, any IRTF activity you acknowledge that written, audio, video, and photographic records of meetings may be made public

- Personal information that you provide to IRTF will be handled in accordance with the Privacy Policy at https://www.ietf.org/privacy-policy/

- As a participant or attendee, you agree to work respectfully with other participants; please contact the ombudsteam (https://www.ietf.org/contact/ombudsteam/) if you have questions or concerns about this

- See RFC 7154 (Code of Conduct) and RFC 7776 (Anti-Harassment Procedures), which also apply to IRTF

Goals of the IRTF
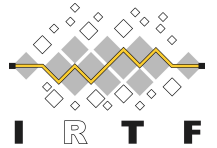
- The Internet Research Task Force (IRTF) focuses on longer term research issues related to the Internet while the parallel organisation, the IETF, focuses on shorter term issues of engineering and standards making

- **The IRTF conducts research; it is not a standards development organisation**

- While the IRTF can publish informational or experimental documents in the RFC series, its primary goal is to promote development of research collaboration and teamwork in exploring research issues related to Internet protocols, applications, architecture, and technology

- See "An IRTF Primer for IETF Participants" – RFC 7418

COIN

- Our goal:

  Foster research in computing in the network to improve performance for networks, applications, users

- Scope:
  - Architectures
  - Protocols
  - Real-world use cases, applications, work in progress

- Focus:
  - The core-to-edge compute continuum.

Agenda (1)

- **Chairs presentation (10 minutes)**
  - Scribe, administrivia, IPR and agenda bashing
  - Hackathon summary (MJ/Jeffrey)
  - Drafts update (Eve)
- **Moving from PRG to RG: Comments from the IAB review** (5 minutes)
- **Research Presentations**
  - Joeg Ott: *User-driven in-network computing at the (IoT) edge* (15 minutes)
  - Alessandro Bassi: *Vertical agriculture* (15 minutes)
  - Jeff Elpern: *Data plane programmability and telemetry* (10 minutes)
  - Michel Bonfim: *Service Function Chaining* (10 minutes)

Agenda (2)

- **Drafts Presentations/updates**
  - Joerg Ott/Dirk Kutscher: *Directions for Computing in the Network* (draft update) (15 minutes)
    - https://datatracker.ietf.org/doc/draft-kutscher-coinrg-dir/
  - Klaus Wehrle/Ike Kunze: *Transport Protocol Issues of In-Network Computing Systems* (new draft) (15 minutes)
    - https://datatracker.ietf.org/doc/draft-kunze-coinrg-transport-issues/
  - Peng Lui: *Requirement of Computing in network* (draft update)(10 min)
    - https://datatracker.ietf.org/doc/draft-liu-coinrg-requirement/
- **Compute-first-networking side meeting report:**
  - Jeffrey He: Framework of Compute First Networking (CFN) (10 minutes)
    - https://datatracker.ietf.org/doc/draft-li-rtgwg-cfn-framework/
- **Future plans**

Moving from PRG to RG: Comments from the IAB Review

- **1 year IAB review on 11/18/2019**
- **Main comments:**
  - Give greater consideration to security/privacy/trust (SPT)
    - SPT models are critical if the work is to be relevant
    - Threat modeling is key
  - Stress the Internet focus as compared to other initiatives looking at Edge computing
- **Actions for the group:**
  - Invite security/privacy/trust expert(s) to engage with COIN
  - Encourage I-D writers to bolster their privacy/security/trust
  - Revisit the use cases from a security point of view
  - Find others in the community who are approaching COIN from the computing standpoint vs the networking standpoint
  - Investigate topics: 5G Slicing security models, DC APIs for COIN

Hackathon Summary

- **Overall goal**
  - Familiarization with data-plane programming
- **Original problem**
  - Packet filtering for big data applications (started in Montreal)
- **Current work**
  - A set of individual projects
- **Future work**
  - A common project to be defined by the (P)RG

Our projects

- Tutorials for newcomers to P4

- Monitoring in Service Function Chaining (SFC domains) (Michel)

- Packet filtering for the detection of critical events in industrial and autonomous systems – running prototype! (Khooi)

- BGP route origin validation (ROV): hit a snag but pivoted to the a working use case (Aris/Luuk/Khooi)

The team

Alessandro Bassi
Michel Bonfim ☆
Jeffrey He
Aris Cahyado Risdianto ☆
Evangelos Haleplidis ☆
Luuk Hendriks
Marie-José Montpetit
Padma Pillay-Esnault ☆
Eve Schooler
Émile Stephan
Khooi Xin Zhe ☆

☆ first time participants

Drafts Update (1)

- In Network Computing Enablers for Extended Reality
  - draft-montpetit-coin-xr-03

- Edge Data Discovery for COIN
  - draft-mcbride-edge-data-discovery-overview-02

- In-Network Computing for Managed Networks: Use Cases and Research Challenges
  - draft-he-coin-managed-networks-01

- In-Network Computing for App-Centric Micro-Services
  - draft-sarathchandra-coin-appcentres-01

Drafts Update (2)

- Industrial Use Cases for In-Network Computing
  - draft-kunze-coin-indutrial-use-cases-01
- Transport Protocol Issues of In-Network Computing Systems
  - draft-kunze-coinrg-transport-issues-00
- Directions for Computing in the Network
  - draft-kutscher-coinrg-dir-01
- Requirement of Computing in network
  - draft-liu-coinrg-requirement-01

Presentations

Advice to presenters:
Link your work to the charter and to the
cloud-to-edge continuum

Future Plans

- **Interim meeting mid-February**
  - Document management
  - New research topics
    - Invited talks?
  - Vancouver hackathon preparation
    - Tools development
    - Architecture evolution and multistream processing project