IETF Hackathon
-IFIT & APN6

IETF 108
July 20-24, 2020
Online

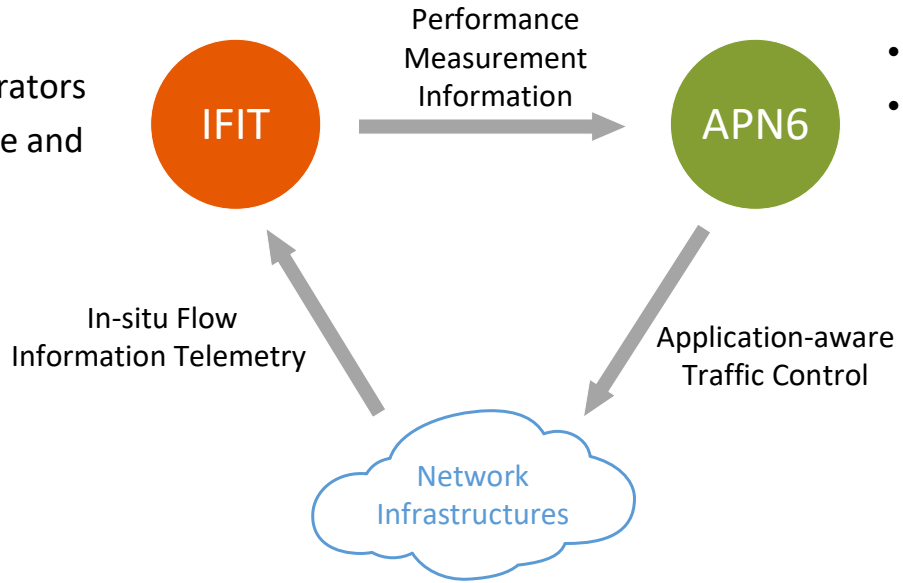
Hackathon Plan

- Implemented a demo for IFIT and APN6 respectively, based on *P4*
- Conducted some simulations of these demos, based on *BMv2*
  - IFIT Documents:
    https://tools.ietf.org/id/draft-song-opsawg-ifit-framework-06.html
    https://tools.ietf.org/html/draft-ietf-ippm-ioam-data
    https://tools.ietf.org/html/draft-ietf-ippm-ioam-ipv6-options
    https://dl.acm.org/doi/abs/10.1145/3342280.3342292
  - APN6 Documents:
    https://tools.ietf.org/html/draft-li-apn-problem-statement-usecases-00
    https://tools.ietf.org/html/draft-li-apn-framework-00
    https://tools.ietf.org/html/draft-li-6man-app-aware-ipv6-network-02
    https://tools.ietf.org/html/draft-zhang-apn-acceleration-usecase-00
    https://tools.ietf.org/html/draft-liu-apn-edge-usecase-00
  - APN6 Community: https://github.com/APN-Community

IFIT & APN6

- Fine-grained closed-loop traffic control

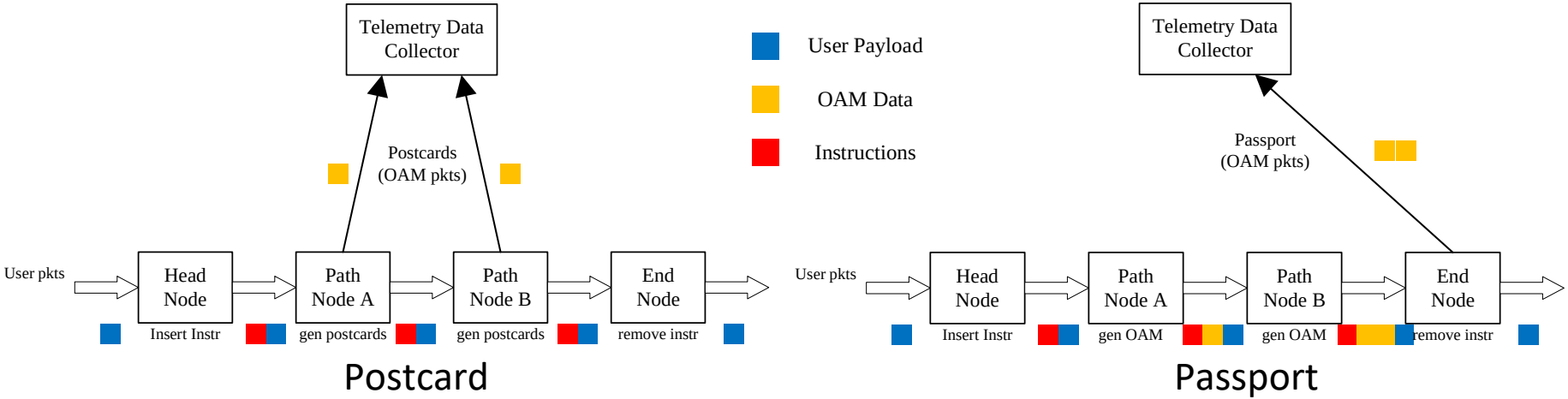
- In-situ telemetry for operators
- Provide reliable, real-time and diverse types of data



- Application-aware control
- Based on service requirements

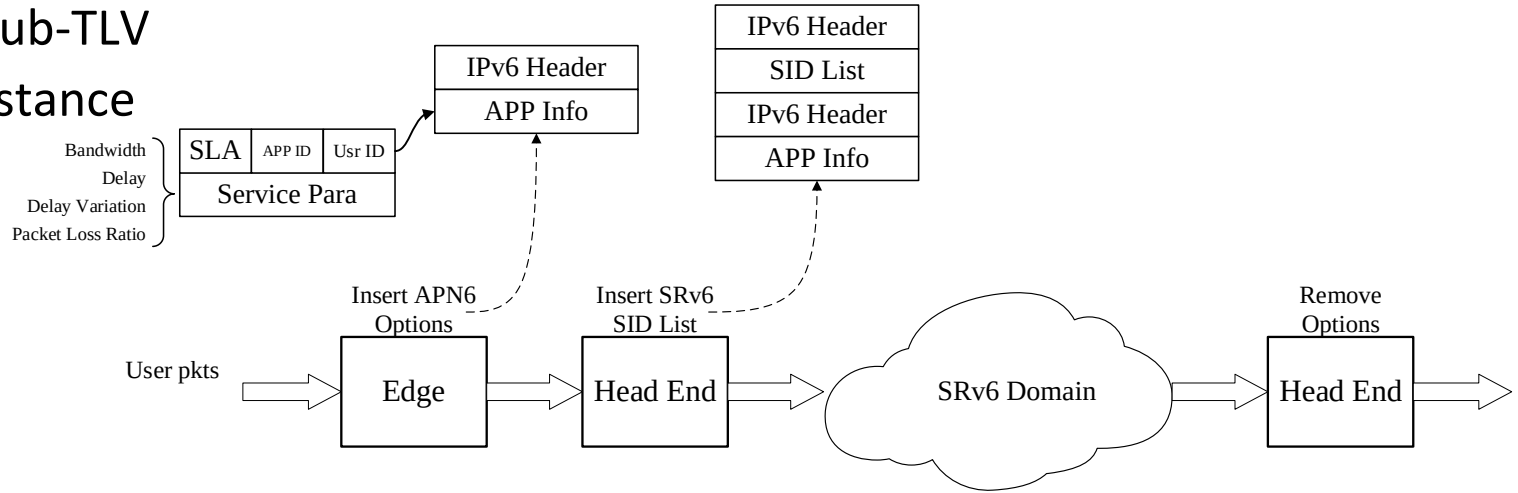
IFIT Introduction

- In-situ telemetry for operators.
  - Encapsulate IOAM Options to indicate desired types of data.
  - Transit Nodes can obtain indicated data under some set conditions
- 2 modes of IOAM telemetry



APN6 Introduction

- Application-aware traffic control.
  - Make use of the IPv6 extensions header to convey the service requirements, in the form of APN6 options and optional Sub-TLV.
  - Determine the SRv6 SID List based on the encapsulated options and Sub-TLV
- An Instance



Implemented Functions

- We've implemented the demo based on *P4*, and conducted some simulations based on *BMv2*.
- Functions in Demo
  - IFIT:
    1. The encapsulation of IOAM Options for specified flows
    2. Transit Nodes obtain specified data, support 4 types
    3. Both Postcard mode and Passport mode are implemented
  - APN6:
    1. The encapsulation of APN6 Options and Serice-Para Sub-TLV, support 2 types of APN6 Options and 4 types of Sub-TLV
    2. The encapsulation of the SRv6 SID List according to IPv6 DA and APN6 options
    3. Basic SRv6 END SID processing

Outcomes

- Simulation Videos:

We've uploaded the simulation videos of IFIT and APN6 to the public cloud, you can get them through the following 2 links. We've confirmed that the resolution can support the clear view of terminals.

IFIT Simulation: https://1drv.ms/v/s!AlsZ1mjF7rg4ynhJhrrHXdvQaH5K?e=1GN5Lg

APN6 Simulation: https://1drv.ms/u/s!AlsZ1mjF7rg4ywU7nCHbniBHwr2h?e=ubZa1H

(You can set the resolution on the playback bar)

Future Plan

- Transplant the Demos to the *Barefoot Tofino switch*.
- Deploy the simulation on *CENI*

- CENI: An experiment infrastructure

Characteristics:

1. For the next-generation networks, Cyberspace security, and Space Terrestrial Integrated Network
2. Contain OTN, SDN, and Programmable network
3. The NOS that support 400 cities, 1100 nodes

Wrap Up

Team members:

Dr. Weihong Wu: wwh_bupt@foxmail.com or lara@bupt.edu.cn

Prof. Jiang Liu: liujiang@bupt.edu.cn