# Path Tracing
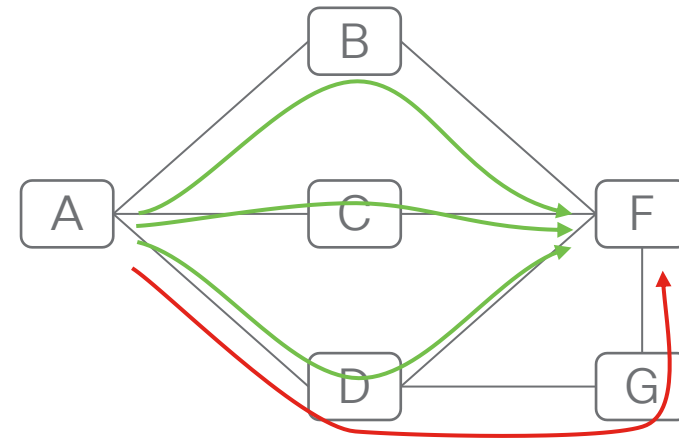
Clarence Filsfils, Ahmed Abdelsalam, Pablo Camarillo, *Sonia Ben Ayed*

# How did the packet arrive from A to F?

- 3 possible "valid" ECMP paths
  - Any drop?
  - End-to-End Latency homogeneity?

- An invalid path is possible
  - Routing or FIB corruptions

- 40-year-old unsolved IP problem

# Stamping Trajectory in PT Header

- Each transit router records in PT header:

  - Outgoing interface ID

  - Timestamp (with 60µs accuracy in WAN; 200ns accuracy in DC)

  - Load

- Highly compressed for low MTU overhead

  - Only 3 bytes per hop!

- Implemented at linerate: **Reports true packet experience**

- Native interworking with legacy nodes

  - Seamless deployment

- Hardware/XR feature (shipping in 7.8.1) with analytics app
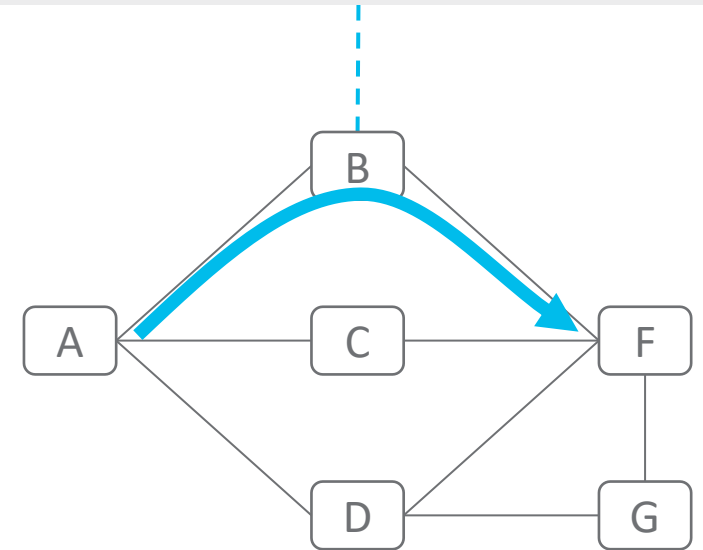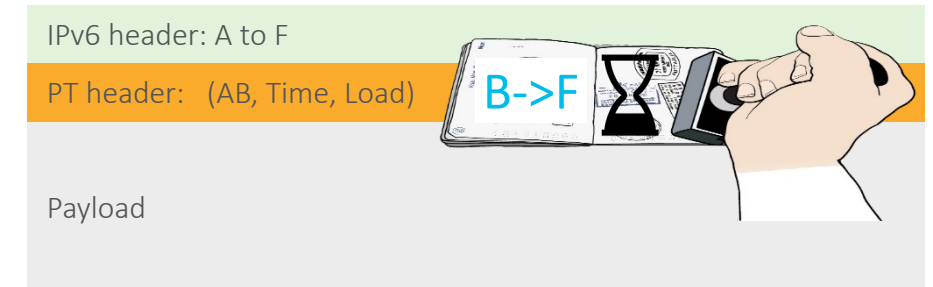
# Mature Eco-System

- ## PT Midpoint Shipping – IOS XR 7.8.1
  - Cisco 8000 (Silicon One Q200; native SDK)
  - NCS5700 (DNX2 – J2; native SDK)
  - ASR9000 (LS)

- ## Rich Eco-system
  - Cisco, Broadcom, Marvell, +others
  - SAI/SONiC in progress
  - Linux, FD.io VPP, P4, Wireshark, TCPDUMP

- ## Ongoing standardization
  - Path Tracing in SRv6 networks (ietf.org)

CISCO

The bridge to possible