



Workshop on P4 Programmable Switches

Hands-on Session 4: Calculating Packets Interarrival Times with P4 Switches

Ali AlSabeh, Jorge Crichigno
College of Engineering and Computing, University of South Carolina
<http://ce.sc.edu/cyberinfra>

University of South Carolina (USC)

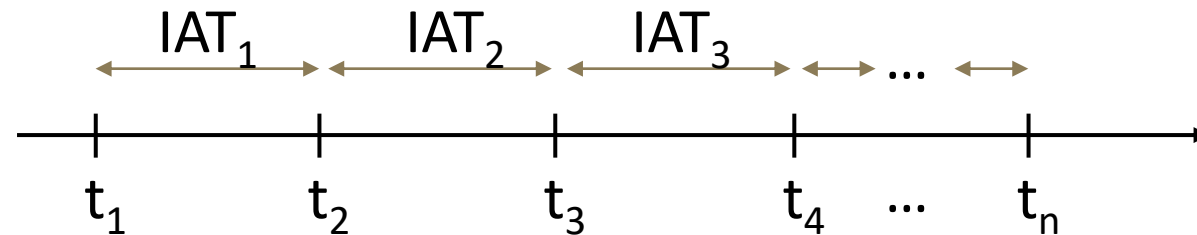
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Calculating Packets Interarrival Times using Hashes and Registers

Lab activities are described in Lab 10, P4 Programmable Data Planes: Applications, Stateful Elements, and Custom Packet Processing lab series

Interarrival Times

- The interarrival time (IAT) is the time between two consecutive packets belonging to the same flow
- Calculating IAT is not possible on a general-purpose CPU, especially when the traffic rate is high
- Programmable switches offer a granular timestamp that can be leveraged to compute the IAT of packets



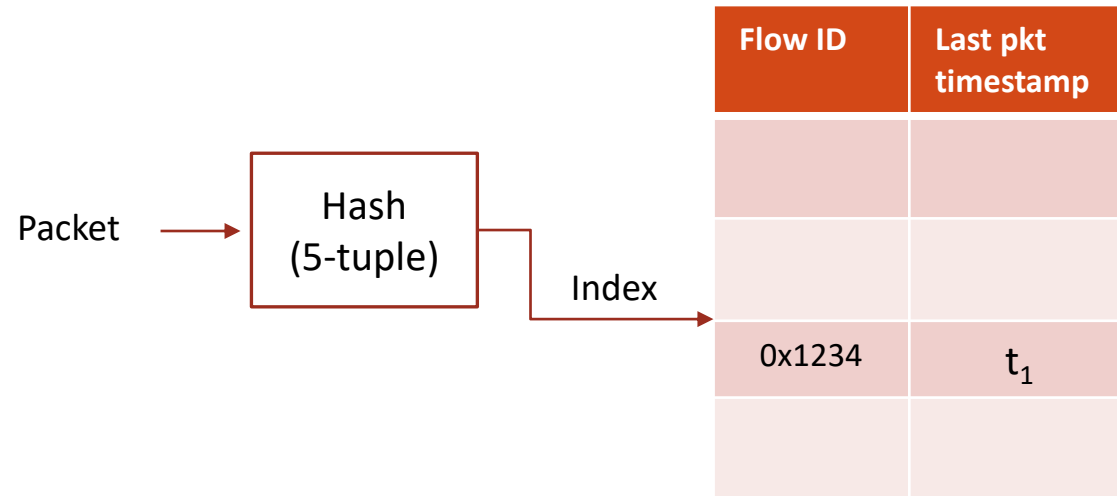
Hashing in P4

- The interarrival time (IAT) is the time between two consecutive packets belonging to the **same flow**
- A flow can be identified by its 5-tuple fields:
 - Source IP address
 - Destination IP address
 - Source port
 - Destination port
 - Protocol
- It is possible to hash multiple fields in P4 and get a single digest value
- Cyclic Redundancy Check (CRC) is an example of a hash algorithm provided by the v1model

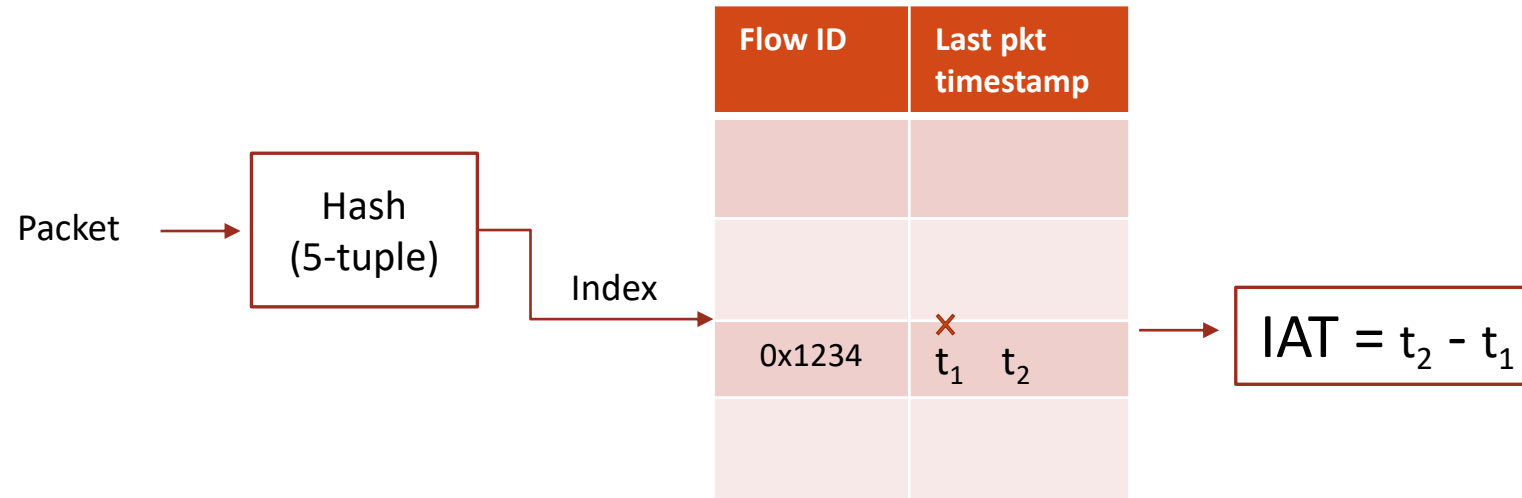
IAT Calculation in P4



IAT Calculation in P4



IAT Calculation in P4



Lab Topology and Objectives

- The topology consists of four hosts: h1, h2, h3 and h4; one P4 switch: s1; one legacy switch
- The hosts h1 and h3 send packets with a custom header (`interarrival`)
- A flow is identified by the source IP and the destination IP of the packet
- The P4 switch s1 computes the IAT and inserts its value into the custom header
- Hosts h2 and h4 receive packets from hosts h1 and h3, respectively
- The IATs are shown on hosts h2 and h4

• Headers:

<code>interarrival</code>
IPv4
Ethernet

