HashCuckoo Public Diagrams

Local Prediction Mechanism

Local Database · Selection Module · Local Prediction Module

CSA Views

Hash-based mechanism

Network Operator

SDN Controller

Data Selection Module

Historical Database — Reports

IP Address 181.7.20.6

Query Manager — Aggregator

L_0 181.7.20.6
L_1 181.7.20.*
L_2 181.7.*.*
L_3 181.*.*.*
L_4 *.*.*.*

Prediction Module

Flow Features

Control Messages

Programmable Switches

Network Core

AS

IXP Infrastructure

Sample Selection Module → Local Prediction Module

Flow Reports (Samples)

Update Views

Critical Flow Alert

Analysis Feedback

ip.scr : port
ip.dst : port
ip.proto
packet

Ingress → Extract Flow Features → Hash-based Mechanism → ? → Mitigation

No Mitigating

Egress

Packet Processing Pipeline in P4 Edge Switches

Sample Selection Module

Historical Database — Samples

IP Address 181.7.20.6

CSA Processor

Aggregator

L_0 181.7.20.6
L_1 181.7.20.*
L_2 181.7.*.*
L_3 181.*.*.*
L_4 *.*.*.*

CSA Generations

Update (Views)

Flow Reports (Samples)

Target Switch

Hash-based Mechanism

V_{i-1} | 0 | 1 | 1 | 1 | 1 | 0 | Updating
V_i | 1 | 1 | 0 | 1 | 0 | 1 | Active

Views

$h_1(k)$ $h_2(k)$ $\cdots$ $h_n(k)$

k

V_{i+1} | 0 | 0 | 0 | 1 | 1 | 0 | Updated/ Next

ASes — ASes — ASes — ASes

P4 Edge
Switches

Network Core

Local
Prediction
Module

P4 Edge
Switches

ASes — ASes — ASes — ASes

Prediction-based
Identification

Threshold-based
Identification

Flow
start   HashCuckoo   [15]   [13]   [9][10]

t_0 t_1 t_2 t_3 t_4 t_5

Data plane   Control plane   *Thresholds*   Data plane   Control plane