A Hands-on Workshop on P4 Programmable Switches

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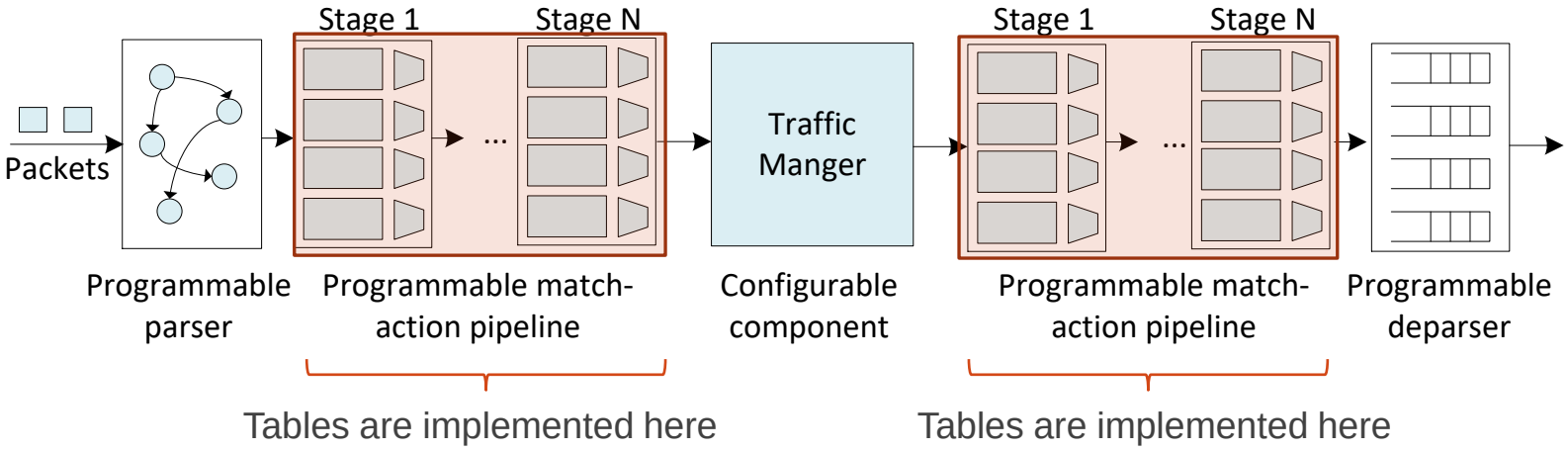
Hands on Session 3: Intro to Match-action Tables

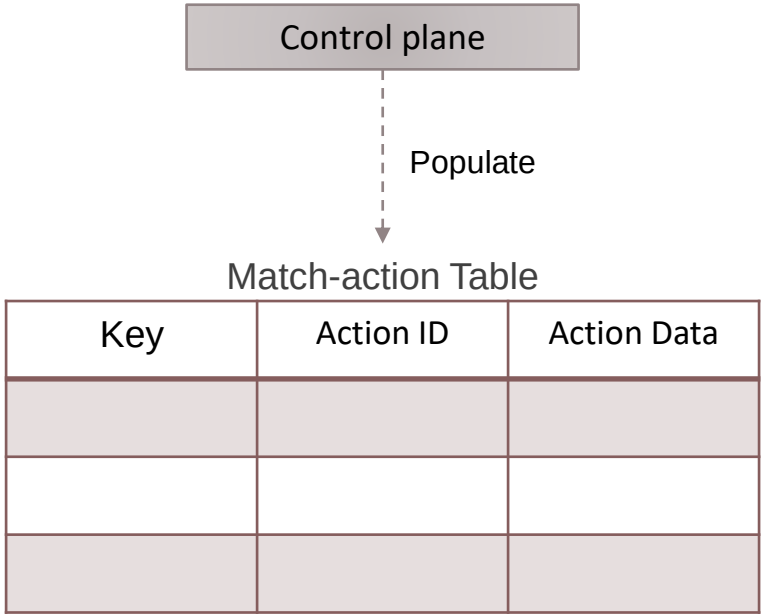
Lab 6: Introduction to Match-action Tables

Match-action Pipeline

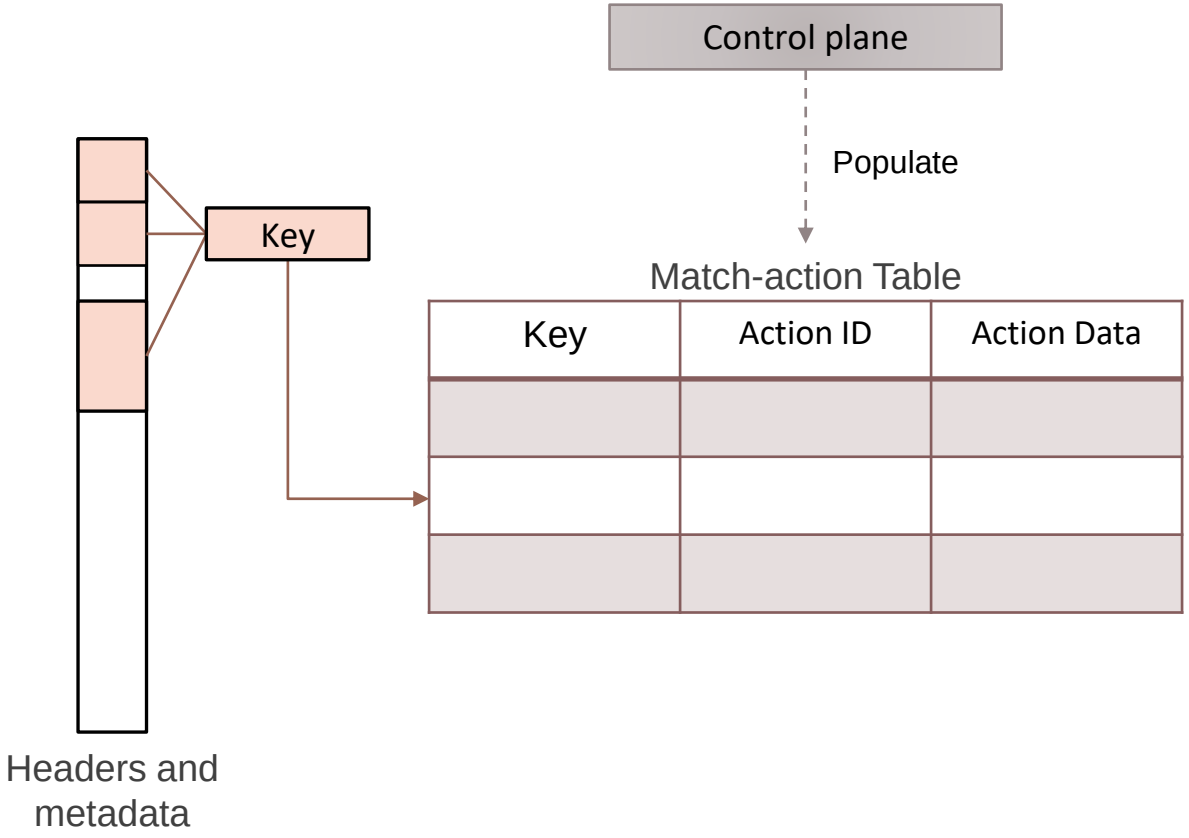
- Tables define the processing logic inside the match-action pipeline
- They can be used to implement traditional switch tables (e.g., routing, flow lookup, access-control lists)
- They can implement custom user-defined complex logic



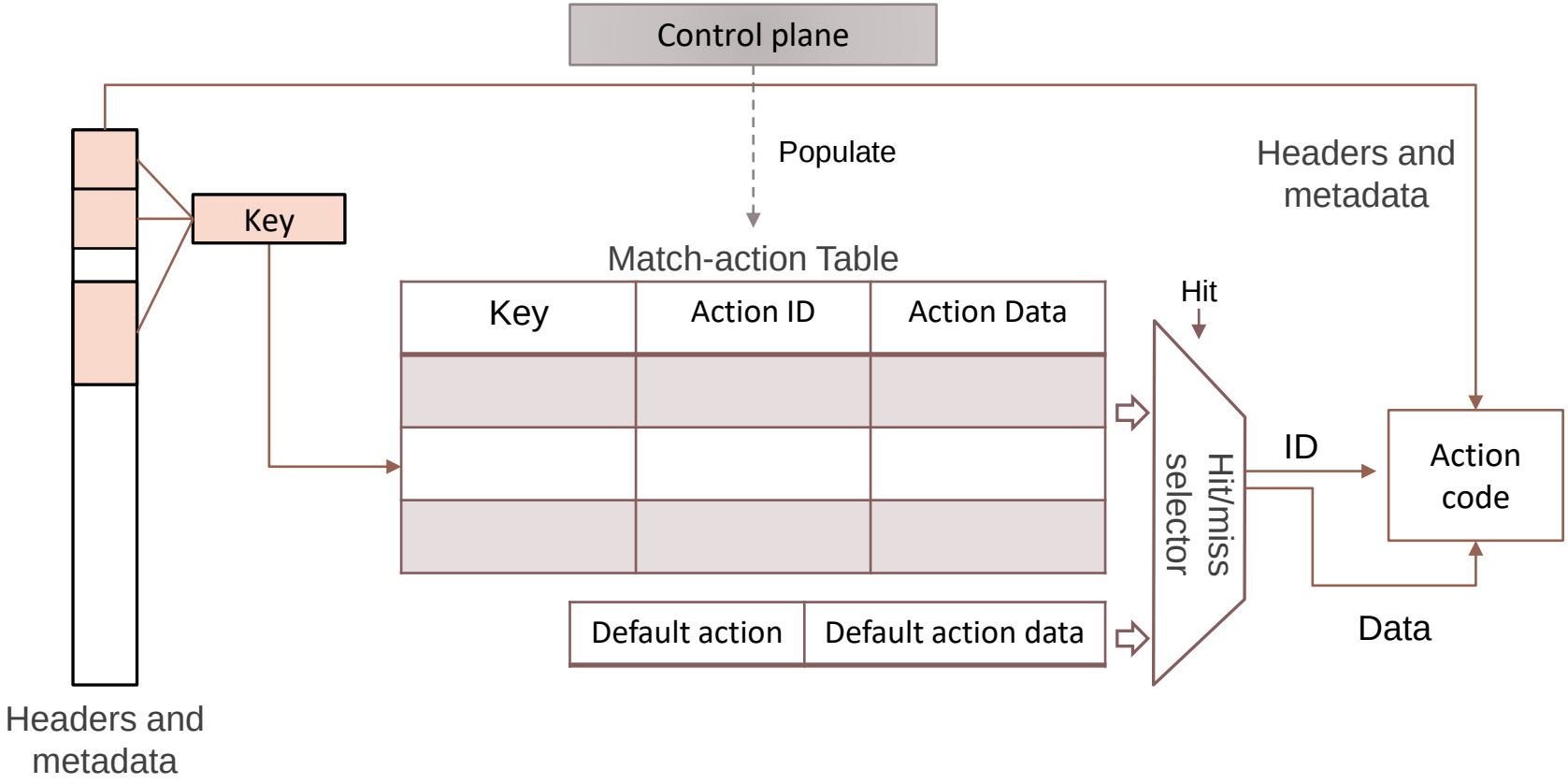
Match-action Table



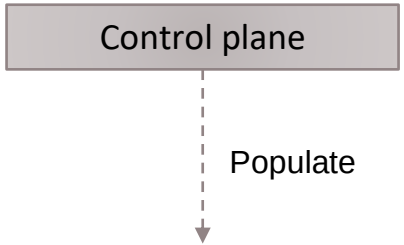
Match-action Table



Match-action Table



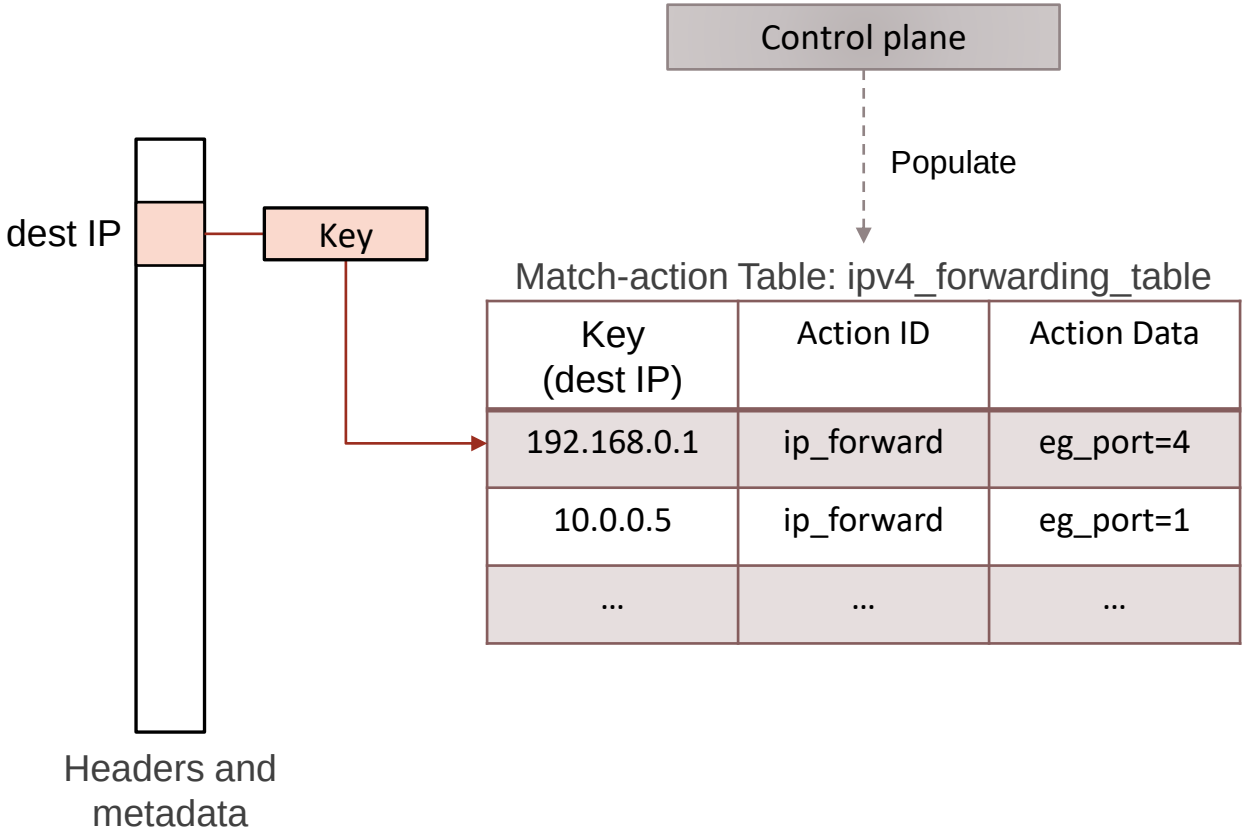
Example: IPv4 Forwarding



Match-action Table: ipv4_forwarding_table

Key (dest IP)	Action ID	Action Data
192.168.0.1	ip_forward	eg_port=4
10.0.0.5	ip_forward	eg_port=1
…	…	…

Example: IPv4 Forwarding



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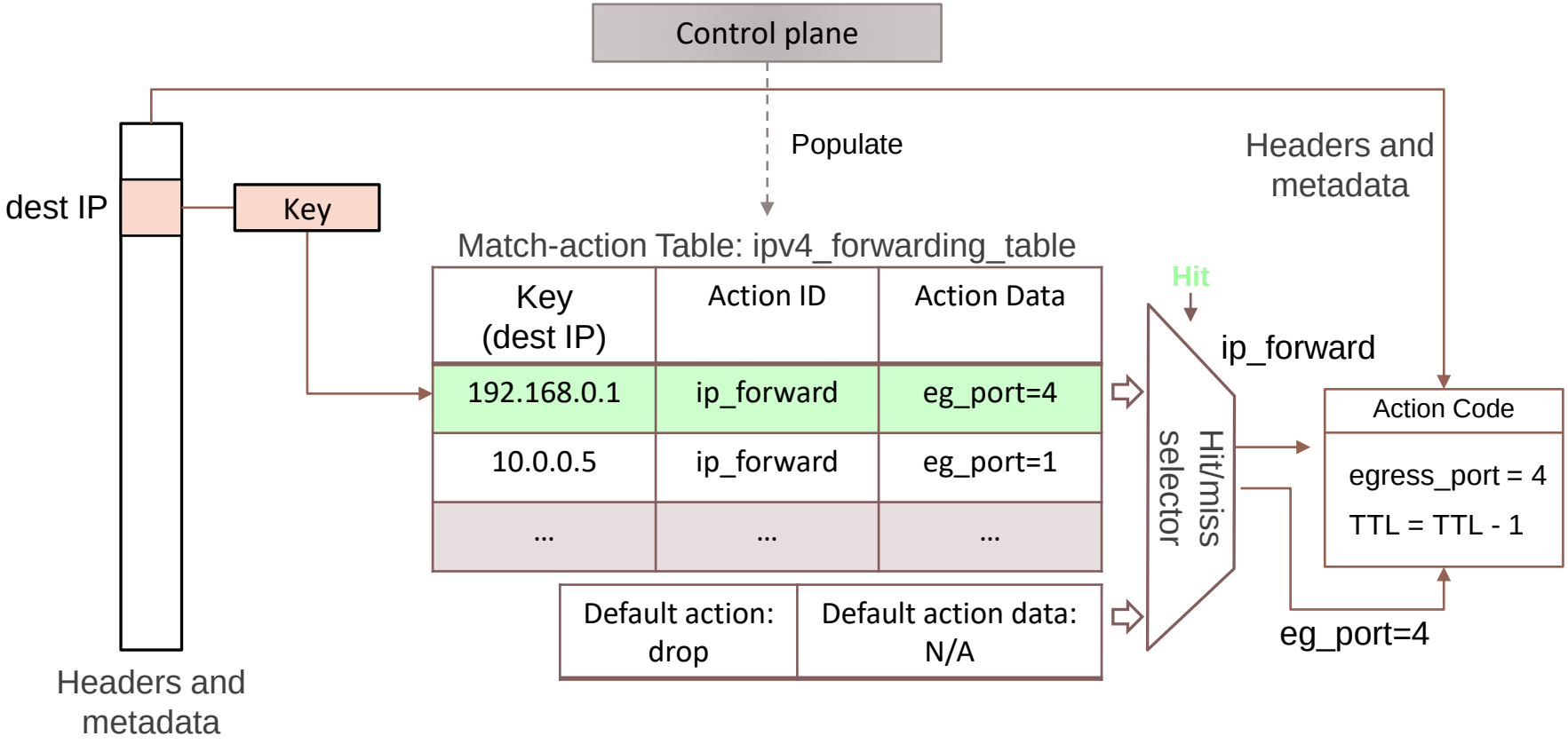

Lab Topology and Objectives

- The topology consists of three hosts: h1, h2, and h3; one P4 switch: s1
- Implement a table that matches on the destination IP address in the packet headers using the Longest Prefix Match (LPM)
- Implement another table that matches on the destination IP address in the packet headers using the exact match
- Assign the output port based on the matched IP address
- Update the MAC addresses in the headers
- Decrement the Time-to-Live (TTL)