Tutorial 3

Agenda

- What can P4 do?
- Hands on-
  - Basic forwarding
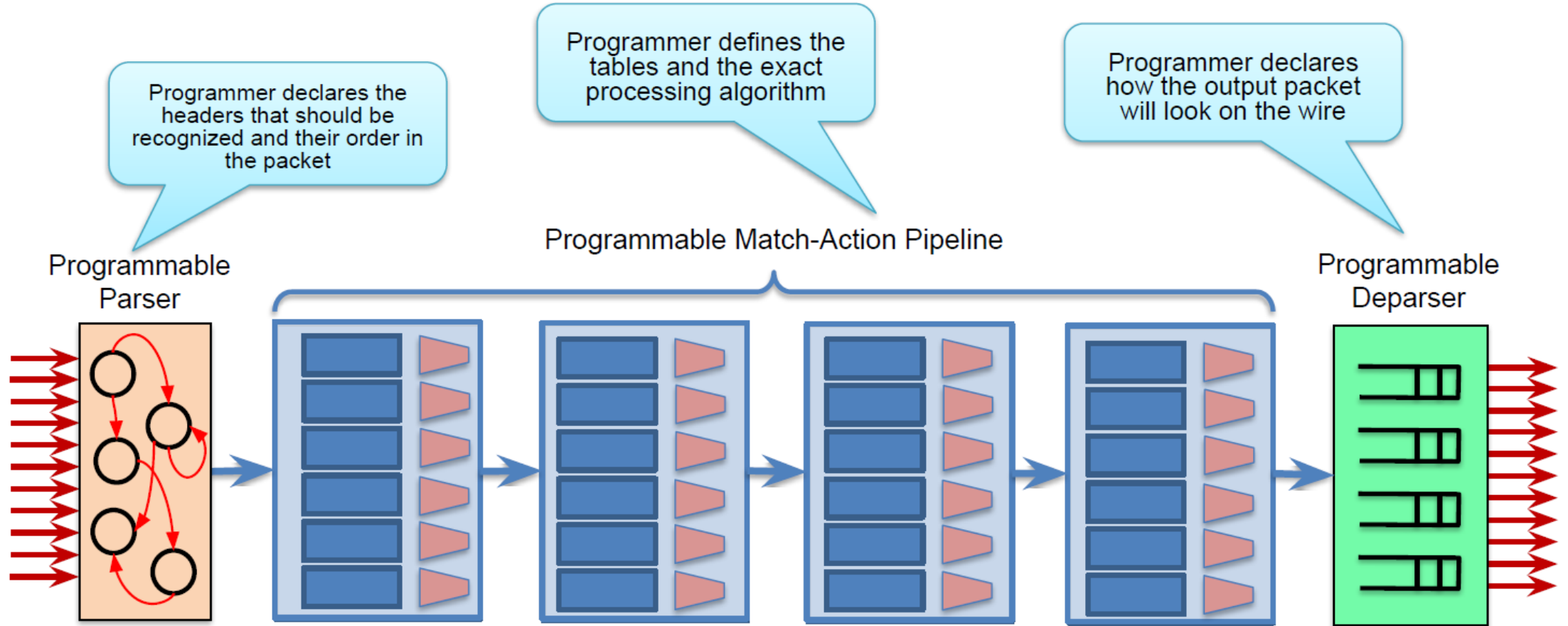 - Explicit congestion notification
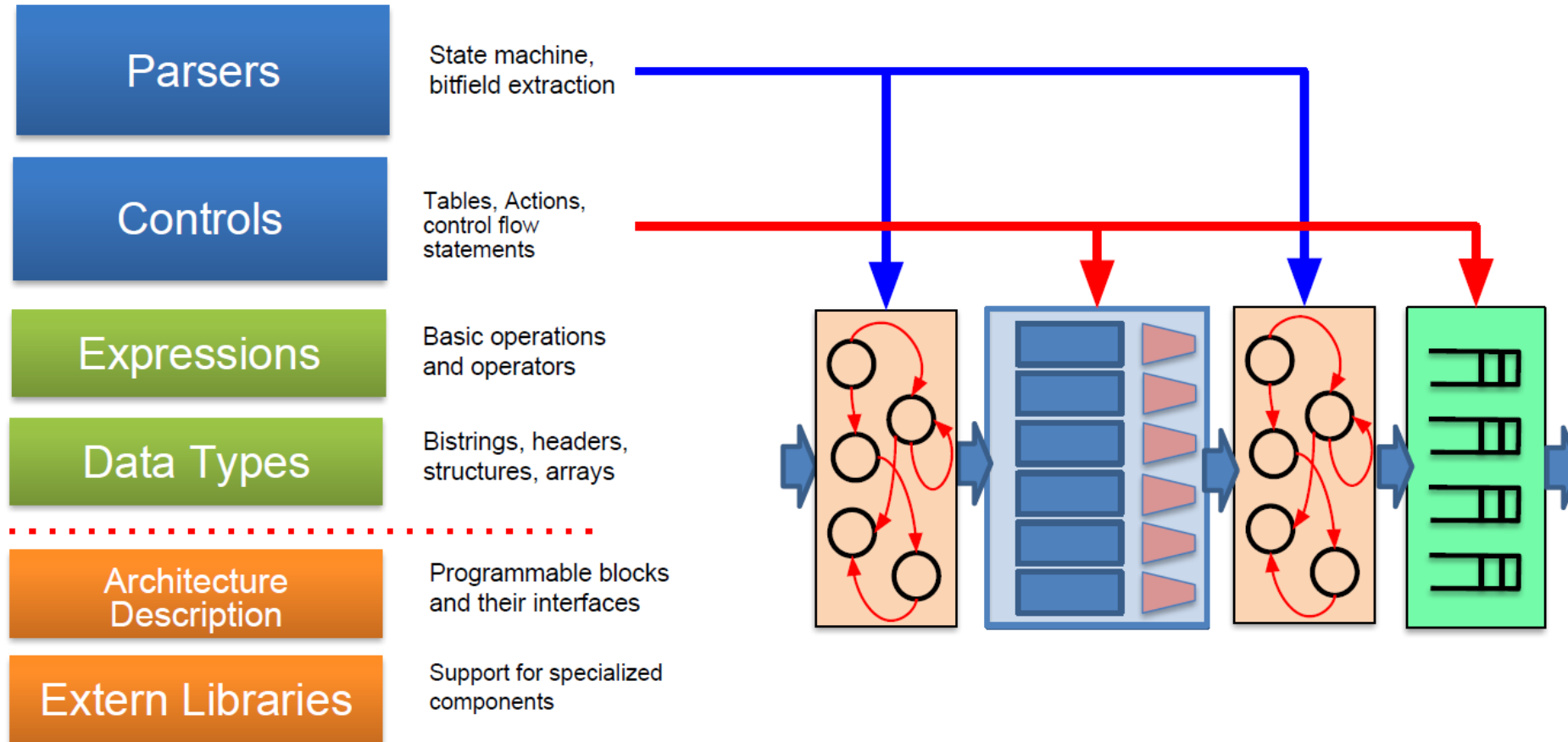 - Multi-Hop Route Inspection

What can P4 do?

- Layer 4 load balancer
- Low latency congestion control
- Aggregation for MapReduce applications
- Fast In-network caches
- And many more

PISA reminder

Language elements

|	
Parsers	State machine, bitfield extraction
Controls	Tables, Actions, control flow statements
Expressions	Basic operations and operators
Data Types	Bistrings, headers, structures, arrays
Architecture Description	Programmable blocks and their interfaces
Extern Libraries	Support for specialized components

Basic Forwarding

- Basic router:
  - Parse Ethernet and IPv4 headers
  - Find destination
  - Update MAC address
  - Update TTL
  - Set egress port
  - Deparse header

Basic topology

h1
(10.0.1.1)

s1

h2
(10.0.2.2)
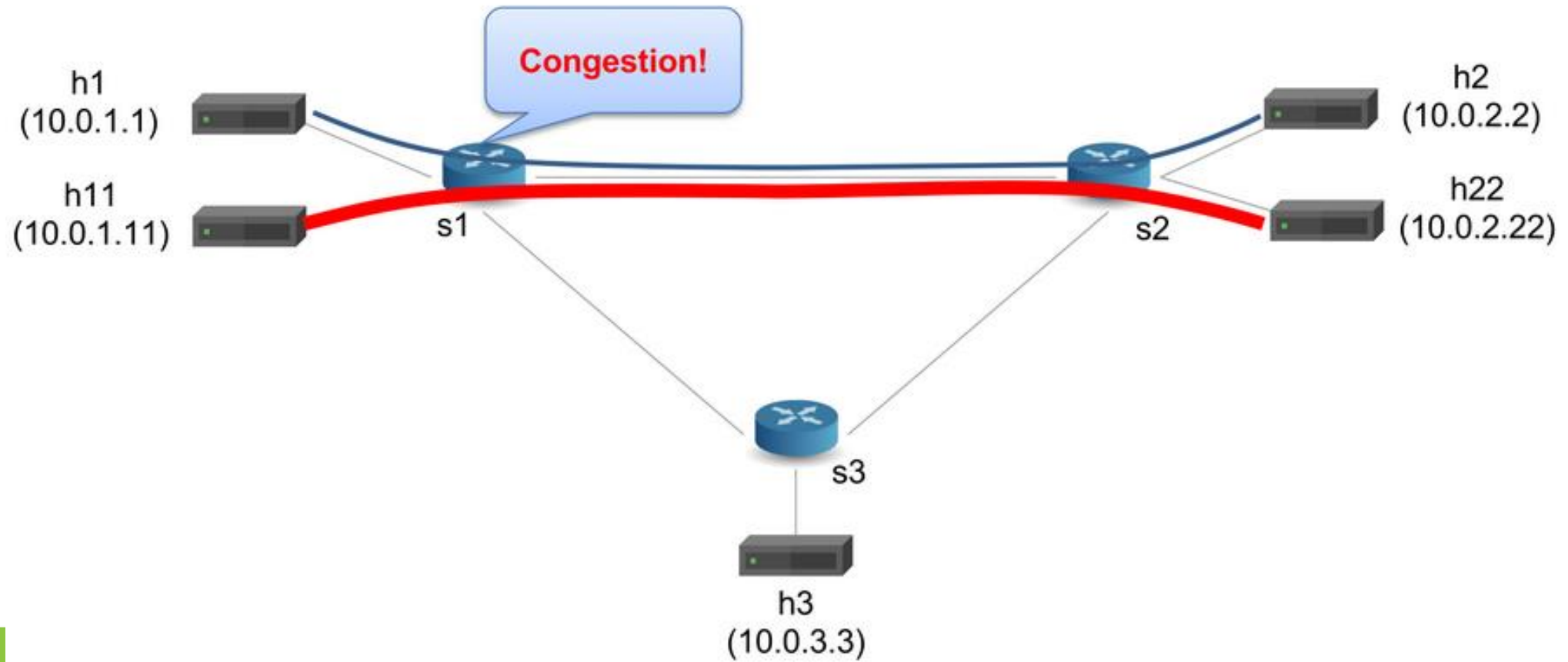
s2

s3

h3
(10.0.3.3)

P4
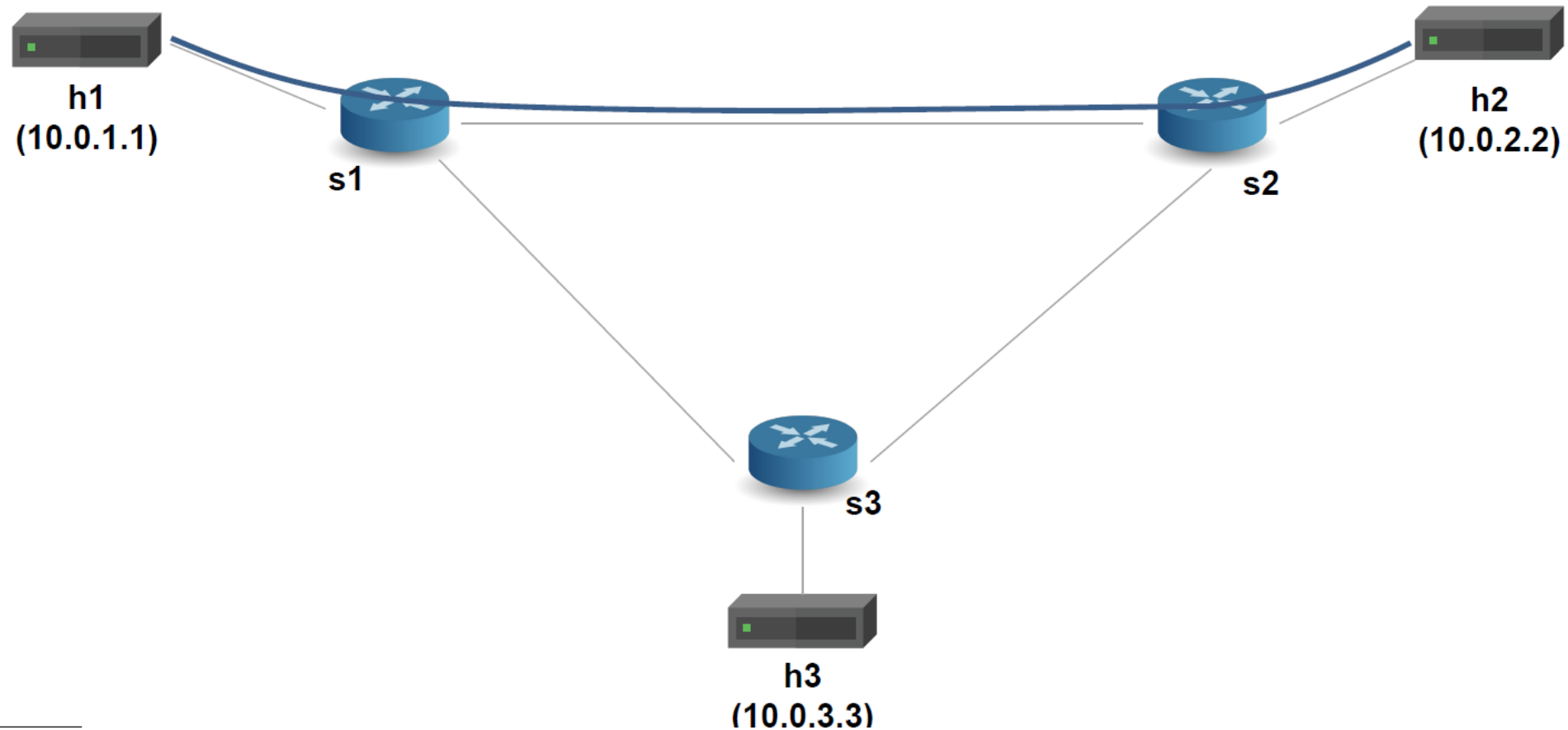
ECN- Explicit Congestion Notification

- Parse Ethernet & IPV4

- Create an action:
  - Set the egress port for next hop
  - Update ethernet destination address
  - Update ethernet source address
  - Decrement TTL

- Egress control block that checks the ECN and metadata and sets the ECN accordingly

ECN topology

Multi-Hop Route Inspection(MRI)

- MRI allows users to track the path and the length of queues that every packet travels through.

- Requires adding ID and queue length to the header stack of every packet.