OSSDN PIF Project
IR Experiments

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Simple IR – Goals

- Simplicity
  - Minimal set of IR elements
- Flexibility
  - Allow broad range of flexibility (e.g., like POF)
- Expressibility
  - Enable constraints to be expressed as needed
- Reusability
  - Independent chunks of IR can be combined to create datapath config

Simple IR – Basic IR elements

- Event definitions
  - Packet received
  - Timer expiry
  - Conditional expression (e.g., threshold crossing)
- Data definitions
  - Packet data (e.g., header fields)
  - Packet metadata
  - Global and/or flow table metadata
- Action definitions
  - Invokable procedure that operate on packet and context
- Match Action Table definitions
  - Packet type
  - Flow entry types
  - Built-in entries

Relation to AIR –
(initial guess…)
Use/extend AIR types
- header
- metadata
- action

Redefine AIR types
- table
- control_flow
- processor_layout

Eliminate AIR types
- value_set
- value_map
- parse_state
- parser
- traffic_manager

Simple IR – Datapath Engine Abstraction

- Ports
  - Traffic; Control
- Event scheduler
- Storage model
  - Received packet; Packet for transmission (copy w/ modifications)
  - Packet metadata; flow metadata; global data
- Packet processor
  - Primitive instruction set; built-in actions
- Ingress queue
  - Packet handling in case pipeline BW < port BW
- MAT pipelines
  - Ingress packet processing; Egress packet processing; Event handling
- Group table
- Egress Queues/Transmission Selection

Simple IR – Control Interface

- Datapath capability discovery
  - Reporting datapath configuration to controller
- Flow Mod
  - Flow entry type w/ parameter binding
- Group Mod
  - Group entry type w/ parameter binding
- Storage Mod
  - R/W persistent (flow, global) state
- Notifications
  - Reporting state changes to controller
- Datapath configuration (limited applicability)
  - Creating/modifying datapath configuration on-the-fly