Stateful PIF

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Statefulness: Use Cases

- L2 bridge
  - Learning ingress port based on source MAC
  - Lookup based on dest MAC

- Flexible statistics gathering
  - Extract say IP addresses from packet
  - Maintain packet / byte counts per pair
  - On timeout, send to controller or local software

- *Many other use cases exist - short illustration of types of capabilities*

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IR: Existing Concepts (extract)

- Protocol header = fields with types and sizes
  - Arranged in parse tree
- Metadata = fields with types and sizes
- Table = lookup mechanism; key has fields + types + sizes; result is action

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IR Statefulness: New Concepts

- Protocol header = fields with types and sizes
  - Arranged in parse tree
- Metadata = fields with types and sizes
- Match table = lookup algorithm; key has fields + types + size; result is action

=>

- Structure = collection of fields with types and sizes
  - Use for: protocol parsing, metadata, match table keys, state table keys, state table values, events
- Event = structure sent to run-time API / local callback / network
  - Publish / subscribe mechanisms
- State table = lookup, lookup and add/modify/delete operations (actions)
  - Key a structure -- construct from packet / metadata fields
  - Value a structure -- use in actions (e.g. get/set data, increment for stats)
  - Timeout => state table notification (as event)

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Discussion