**Motivations**

- To explore the current capabilities of the P4 specifications to establish autonomous paths.
- To study the feasibility of hybrid SDN approaches such as ARP-Path/P4Runtime.

**ARP-Path P4 Implementation**

```c
extern ArpPath {
    ArpPath(bit<64> size);
    /* Broadcast traffic and ARP request processing (LT) */
    void flood(bit<64> addr, in bit<32> port, in bit<16> ethType);
    /* Unicast traffic forwarding (according to LT) */
    void forward(in bit<64> addr);
    /* ARP Reply processing (LT and timestamp update) */
    void path_reply(in bit<64> addr, in bit<32> port);
    /* Statistics collection from the LT */
    void sum_entry(out bit<32> n);
}

control ArpPathPipeline(inout headers_t hdr, inout standard_metadata_t metadata,
                        ArpPath extern_arpa_path) {
    apply{
        if (hdr.ethernet.dataLen == BROADCAST)
            extern_arpa_path.flood(hdr.ethernet.srcAddr, metadata.ingress_port.
                                  hdr.ethernet.ethertype);
        else{
            extern_arpa_path.forward(hdr.ethernet.dstAddr);
            if (hdr.ethernet.ethertype==ARP_TYPE){
                extern_arpa_path.path_reply(hdr.ethernet.srcAddr, metadata.ingress_port);
            }
        }
    }
}
```

**Limitations**

- ARP-P4 does not need to use any local controller.
- The ARP-P4 switch can interact with P4 Runtime and ARP-Path so ARP-P4 is a hybrid switch.
- The ARP-P4 performance is very similar than ECMP when the load has low load, while the performance on high load decreases due to BMv2 Target implementation.

**Conclusions**

- ARP-P4 does not need to use any local controller.
- The ARP-P4 switch can interact with P4 Runtime and ARP-Path so ARP-P4 is a hybrid switch.
- The ARP-P4 performance is very similar than ECMP when the load has low load, while the performance on high load decreases due to BMv2 Target implementation.