HyPer4: Virtualizing the Programmable Data Plane (PDP)

**PDP Virtualization Benefits**
- Present illusion of multiple PDPs
- Portably extend switch feature set
- Virtual networking between PDPs

**HyPer4 written in P4: Why?**
- Explore P4 language reflexivity
- Hope for broad switch compatibility

**But...**
- Resource requirements multiplied
- P4 model not well suited for the task

**P4 configuration**
```
hp4.p4
```
```
convert
```
```
hp4.json
```
**p4 populate**
```
target.p4
```
```
target commands
```
```
hp4 table commands
```
**DEMO 1: live network reconfiguration**
```
A: l2_sw
```
```
B: l2_sw
```
```
C: l2_sw
```
**DEMO 2: split personality**
```
ports 1-2: l2_sw
```
```
ports 3-4: firewall → router
```

**DEMO 1:**
- A: `arp_pxy → l2_sw → arp_pxy`
- B: `l2_sw → firewall → l2_sw`
- C: `l2_sw → firewall → router → l2_sw`

**DEMO 2:**
- `h1 → h2 → h3 → h4`
- `prints 1-2: l2_sw`
- `prints 3-4: firewall → router`