Running OVS with a P4 Coprocessor

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Agenda

1. P4 Usages
2. Independent Functions
3. Why a Coprocessor?
4. Motivating Example
5. Call to Action
Network as a Programmable Platform

**Key Tenets:**

1. Common pipelines & programming model
2. Common software framework
3. Telemetry and observability across
Where is P4 Used Today?

Mix & Match Where it is Needed

1. P4 Native Apps
2. Runtime Contract
3. Application Sequencing
4. Programmable Hardware
Independent Data Planes

Use P4 to explicitly sequence them

SDN Control
Visibility & Orchestration

Business Logic
Network Stack
Sends a Packet

Kubernetes Networking

OVS Network Virtualization

Linux Tunnels

strongSwan IPsec IKE & ACLs

FRR Server Routing

Packet is Sent Over Network!
Independent Control Planes

We use the kernel to organize these today

SDN Control
Visibility & Orchestration

OVS
Open vSwitch

FRR
Server Routing

OVS
Network Virtualization

Kubernetes
Networking

strongSwan
IPsec
IKE & ACLs

Linux Tunnels
Why a Coprocessor?
Support OVS w/ Minimal Changes

Tried Adding P4 Directly to OVS

Tried Adding a New P4 Dataplane to OVS

Coprocessor Approach:
Add OVS into a P4 Control Plane
Independent Control Planes

Use a P4 Contract toOrganize

- FRR
- Server
- Routing
- OVS
- Network
- Virtualization
- P4Runtime
- netlink
- Linux
- Tunnels
- SDN Control
- Visibility & Orchestration
- strongSwan
- IPsec
- IKE & ACLs
- Kubernetes
- Networking
Example: K8s + OVS + IPsec

1. FRR running BGP
2. strongSwan IPsec
3. Linux VXLAN
4. OVS Virtual L2
5. Kubernetes LB, Policy
6. SDN for Monitoring & Debug
OVS Using P4Runtime

Recap from Earlier Presentation:
- Existing Dataplanes Preserved
- P4Runtime ops added when OpenFlow is used (e.g., adding L2 entries)
- Optional Acceleration of OVS using a P4 Dataplane Alongside
Call to Action

Run this today at https://ipdk.io
Runs on software & hardware targets

Solves Complex Use Cases w/ Existing Control Planes

Coprocessor model to add ‘alongside’ option
Thank You