Hybrid Networking Stack Demo

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What we’ll discuss today

▸ What is a Hybrid Network Stack?
▸ What is CNDP?
▸ Live Demo*
▸ Summary
▸ Q&A
A Network Stack for applications that use XDP/AF_XDP without reimplementing the full Linux Network Stack.

- Control Plane (CP) and User Plane (UP) separation.
- Traffic (Application/Non Application) filtered at the earliest point (HW or XDP) to the right target.
What is Cloud Native Data Plane (CNDP)?

**CNDP** is a new open source cloud native packet processing framework that aims to offer:

- A collection of **userspace libraries** for accelerating packet processing for cloud applications.
- A **Hybrid Networking Stack** (UP) that interworks with the Linux kernel networking stack.
- The **Kubernetes components** to provision and manage a CNDP deployment.

**AF_XDP** A new address family in the kernel that takes advantage of XDP
Goal: Build a Hybrid Networking stack application that accomplishes DPDK-like speeds with Kernel smarts.

Scenario:
- Two clients in two different networks
- Interconnected via vRouters that learn the routes using OSPF.
Zoom in: CNDP-FRR Node

Live Demo/Demo Recording
Performance findings

The performance of AF_XDP is currently dependent on the deployment scenario.

- **North/south traffic** with AF_XDP in native mode **yields comparable performance to DPDK**.

- **East/west traffic** from a vEth pair **incurs significant cost** with AF_XDP in native mode.

- **East/west traffic** from a vEth pair with AF_XDP in generic mode **yields much better performance** than AF_XDP in native mode or the Linux stack.
Summary

It’s possible to leverage eBPF + AF_XDP through CNDP to build a Hybrid Networking Stack application that can meet the need of high performance use cases.

AF_XDP challenges include:
- xdp hints via kfuncs is a great cornerstone for offloads support
- Onus is on the infra to lifecycle manage BPF programs.
- AF_XDP multi-buffer support integration.
- `East-West` virtual interfaces performance optimization (AF_XDP native-mode).
Useful links

- https://github.com/CloudNativeDataPlane/cndp
- https://github.com/maryamtahhan/cndp-frr
Thank you