OpenFastPath

OPNFV Design Summit

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NOKIA

What is OpenFastPath (OFP)?

IP fast path incubation project between Nokia, Enea and ARM
- Developers and supporting staff active from all three companies
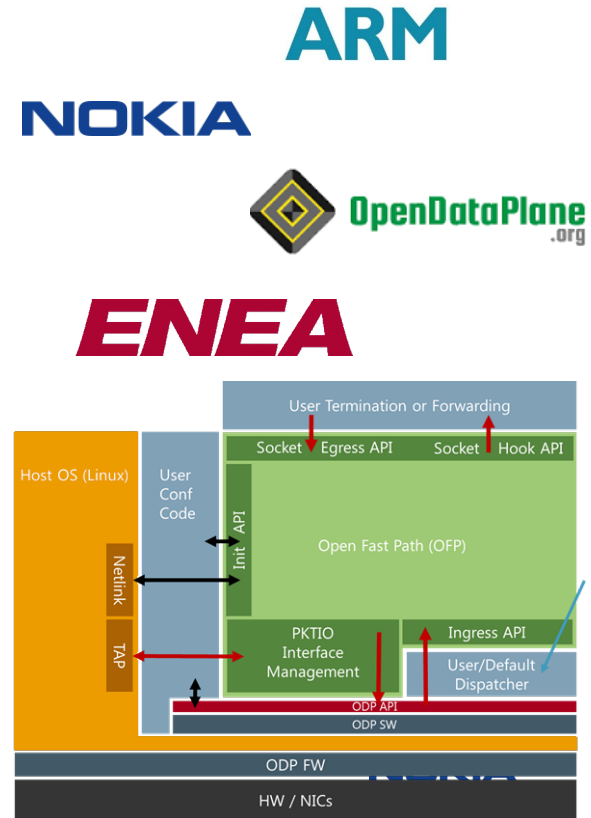
Organized as an Open source project
- Democratic governance model
- Using open source software
- BSD license
- Source code on GitHub
- Mailing list, shared Google docs, weekly calls, Freenode chat etc

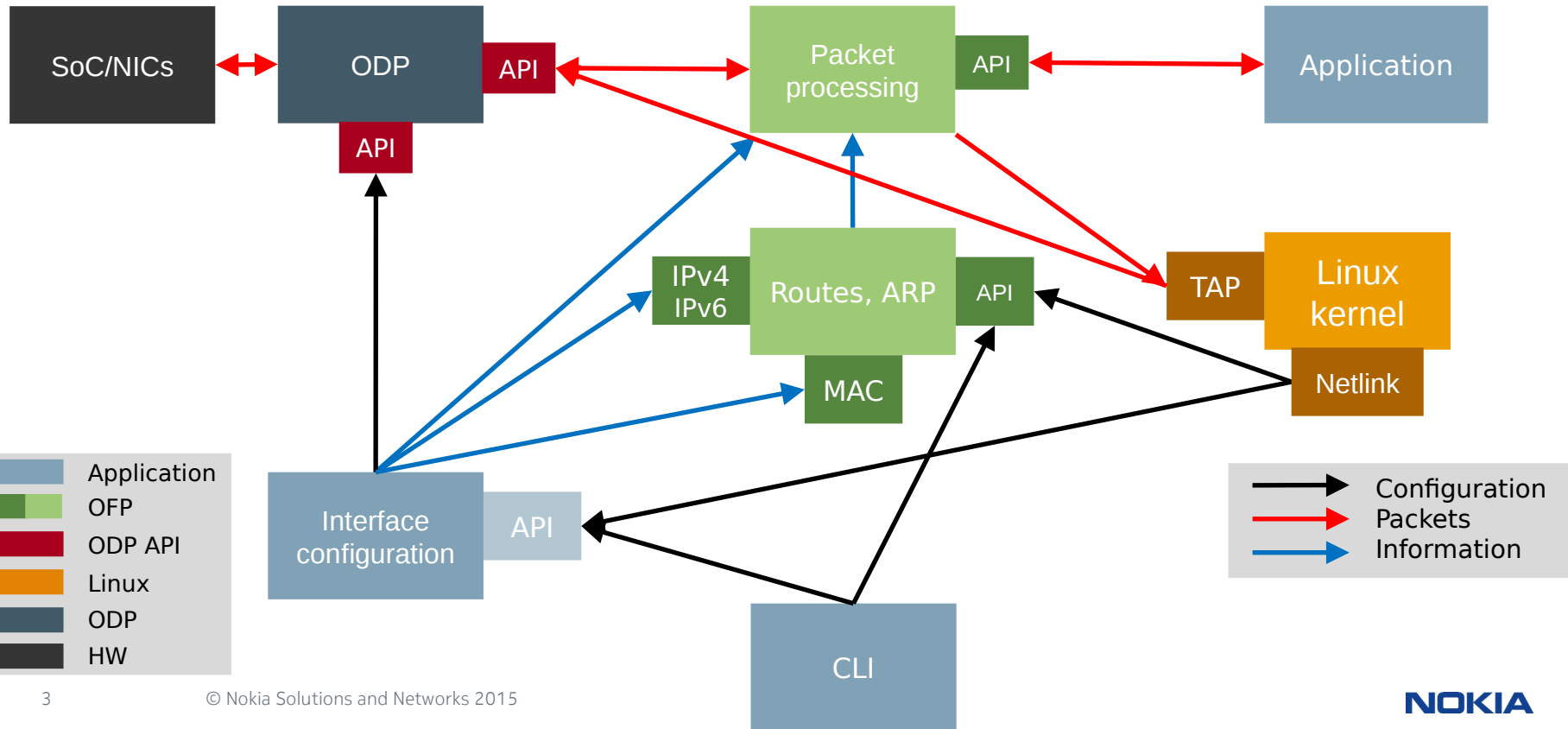API's towards hardware is based on ODP (Open Data Plane)
- Maximizes portability and software reuse

Linux user space IP fast path implementation
- Maximizes throughput and scalability by minimizing Linux overhead
- Leverages Linux for slowpath and route/ARP table updates

Components of an OpenFastPath system

SoC/NICs ⟷ ODP — API ⟷ Packet processing — API ⟷ Application

ODP — API

Routes, ARP — API — IPv4 IPv6 — MAC

TAP — Linux kernel — Netlink

Interface configuration — API

CLI

Legend:
- Application
- OFP
- ODP API
- Linux
- ODP
- HW

- Configuration
- Packets
- Information

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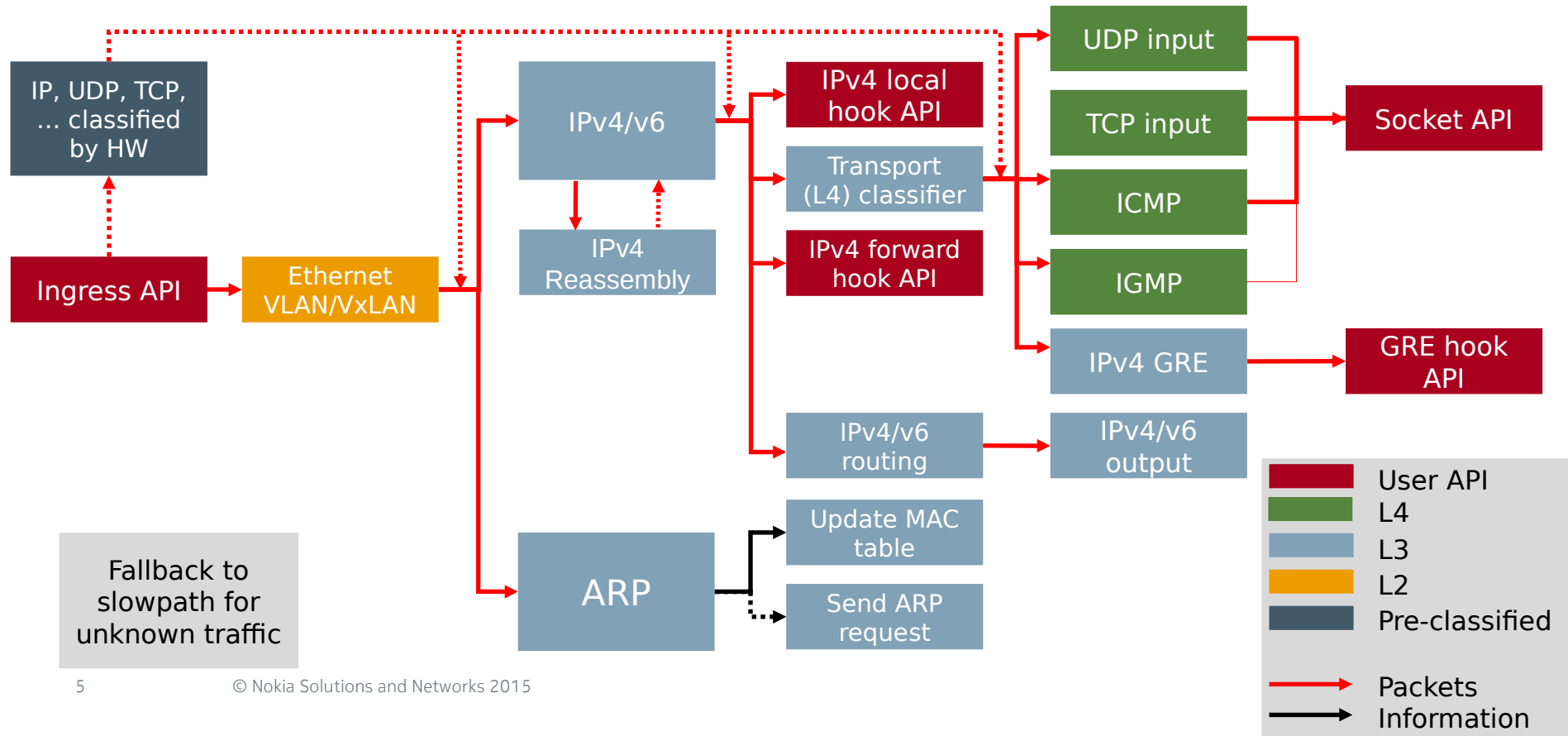
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Demo

- OpenFastPath uses OpenDataPlane as a library

- We use the linux-generic backend that uses Linux sockets, in order to get the whole thing running on a laptop

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Ingress Packet Processing

IP, UDP, TCP, ... classified by HW

Ingress API → **Ethernet VLAN/VxLAN** → **IPv4/v6** → **IPv4 Reassembly**

IPv4/v6 → **IPv4 local hook API**

Transport (L4) classifier → **UDP input**, **TCP input**, **ICMP**, **IGMP**

IPv4 forward hook API

UDP input, **TCP input** → **Socket API**

IPv4 GRE → **GRE hook API**

IPv4/v6 routing → **IPv4/v6 output**

ARP → **Update MAC table**, **Send ARP request**

Fallback to slowpath for unknown traffic

Legend

■ (red)	User API
■ (green)	L4
■ (blue)	L3
■ (orange)	L2
■ (dark)	Pre-classified
→ (red)	Packets
→ (black)	Information

Egress Packet Processing

Socket/Egress API	User API
UDP output	L4
TCP output	L4
ICMP error	L4
IPv6 output	L3
IPv4 output	L3
IPv4 Fragmentation	L3
IPv4 GRE tunneling	L3
Ethernet Vlan	L2

Legend:
- User API
- L4
- L3
- L2
- Pre-classified

→ Packets
→ Information

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