



DPDK

—SUMMIT—

NORTH AMERICA

Running P4 Programs as DPDK Applications

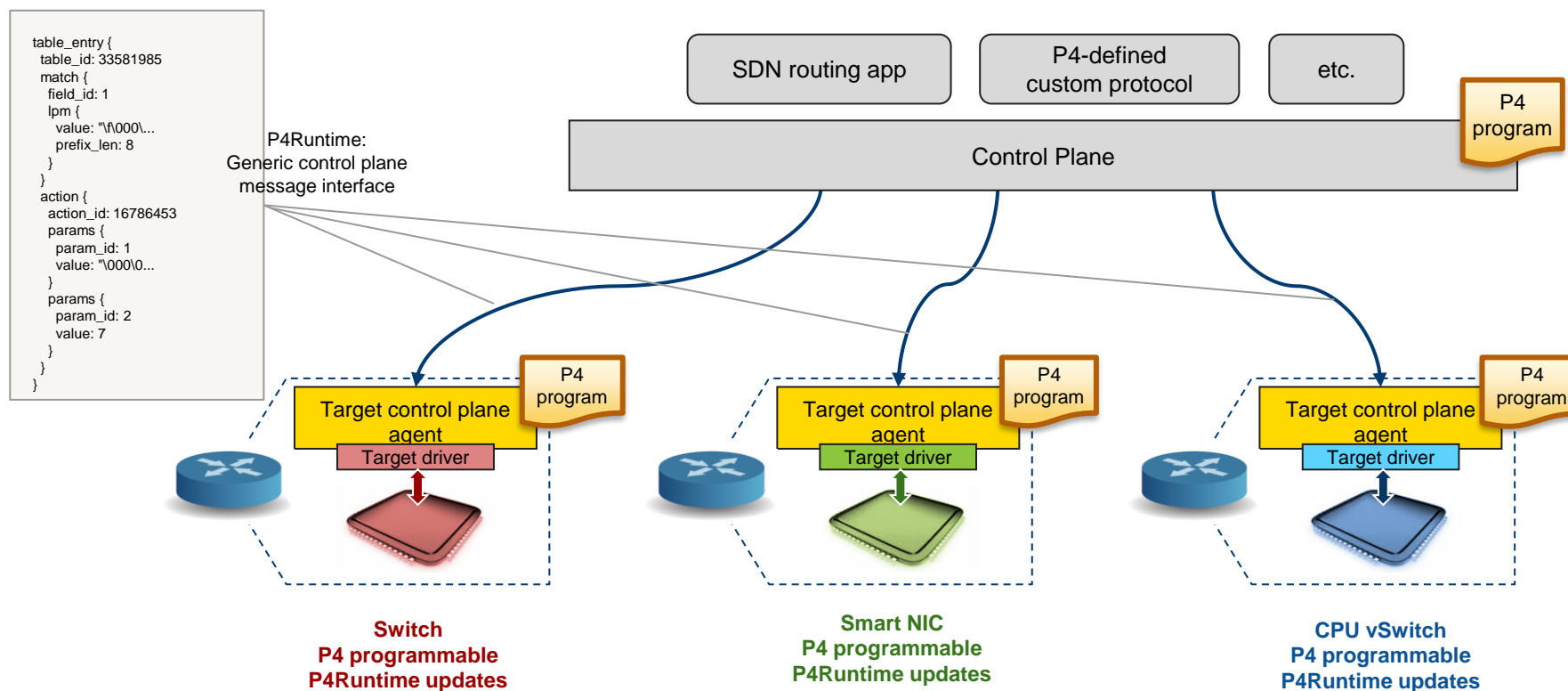
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- SW framework to run P4 programs on multi-core CPUs.
- Goal: Develop better and faster vSwitches by combining the P4 language flexibility with the DPDK performance.
- Open-source project on p4.org and dpdk.org
 - P4C compiler: <https://github.com/p4lang/p4c/tree/main/backends/dpdk>
 - DPDK back-end: <http://git.dpdk.org/dpdk/tree/lib/pipeline>
 - DPDK reference target agent: <http://git.dpdk.org/dpdk/tree/examples/pipeline>

It is real, you can take it and use it!

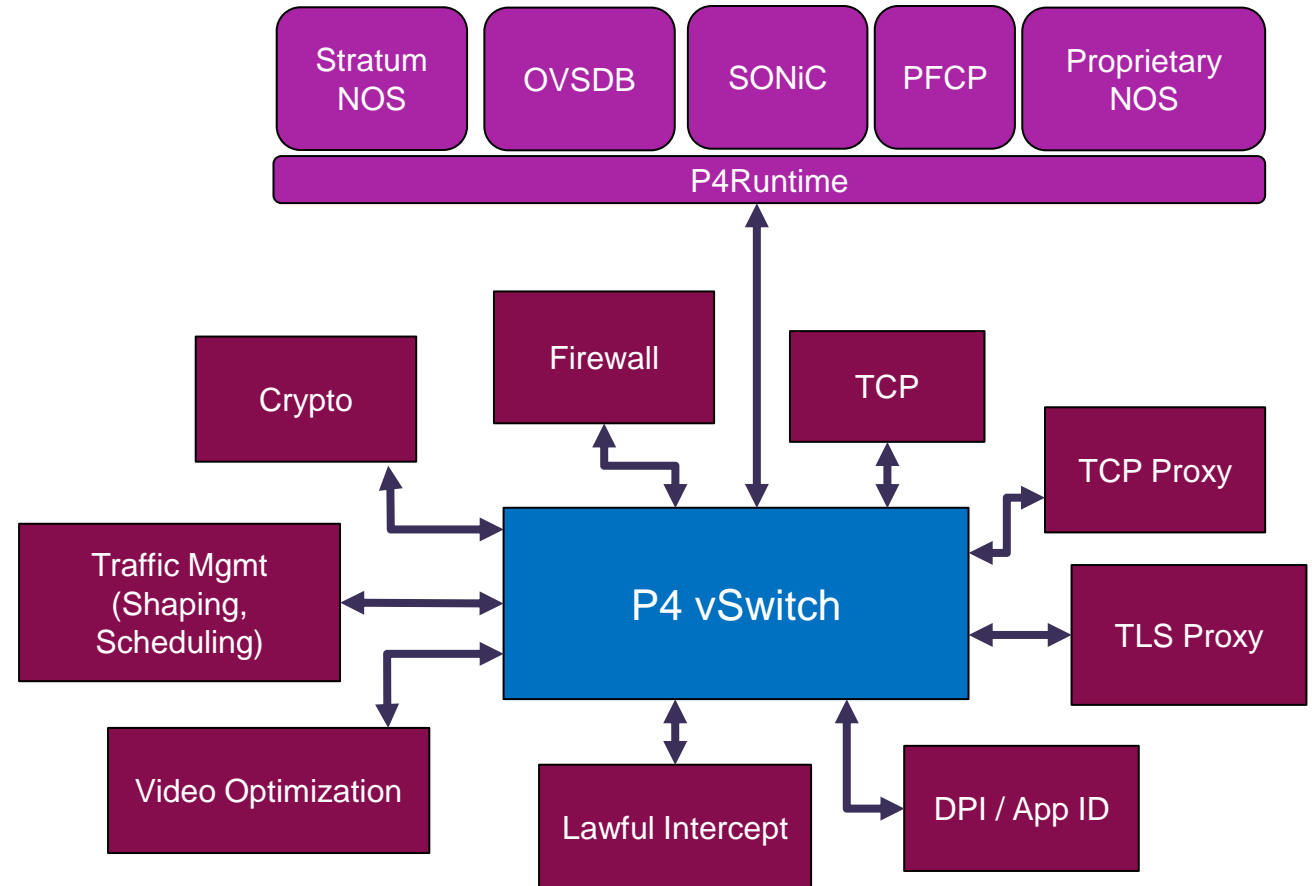
Why CPU target for P4? Flexible infrastructure.



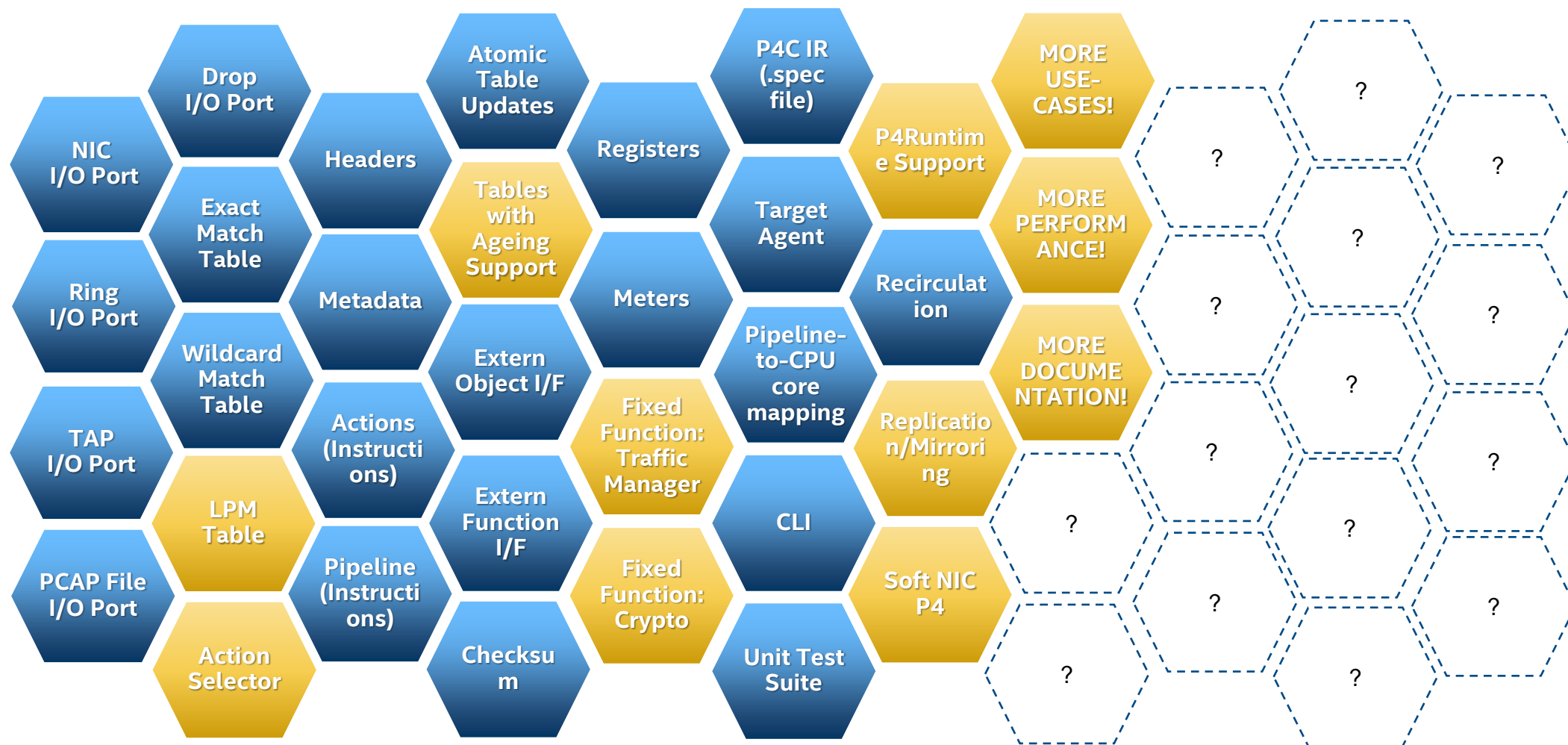
Unify all your switch pipelines (switch, NIC, CPU) under the same P4 environment for better integration and productivity.

Why CPU target for P4? Better network stacks.

- Keep the data plane short and crisp in P4!
- All header processing should be part of the P4 vSwitch, everything else is plugged in as a port in the P4 switch.
- The P4 switch also connects with NICs and accelerators.
- Nothing is predefined, only what is actually used is defined: protocols, meta-data, tables, actions, data path, etc.
- Classification, ACLs, FIB, tunnels, NAT, meters, markers, stats, etc.
- Decoupled control plane manages the P4 vSwitch through the standard P4Runtime RPC interface.

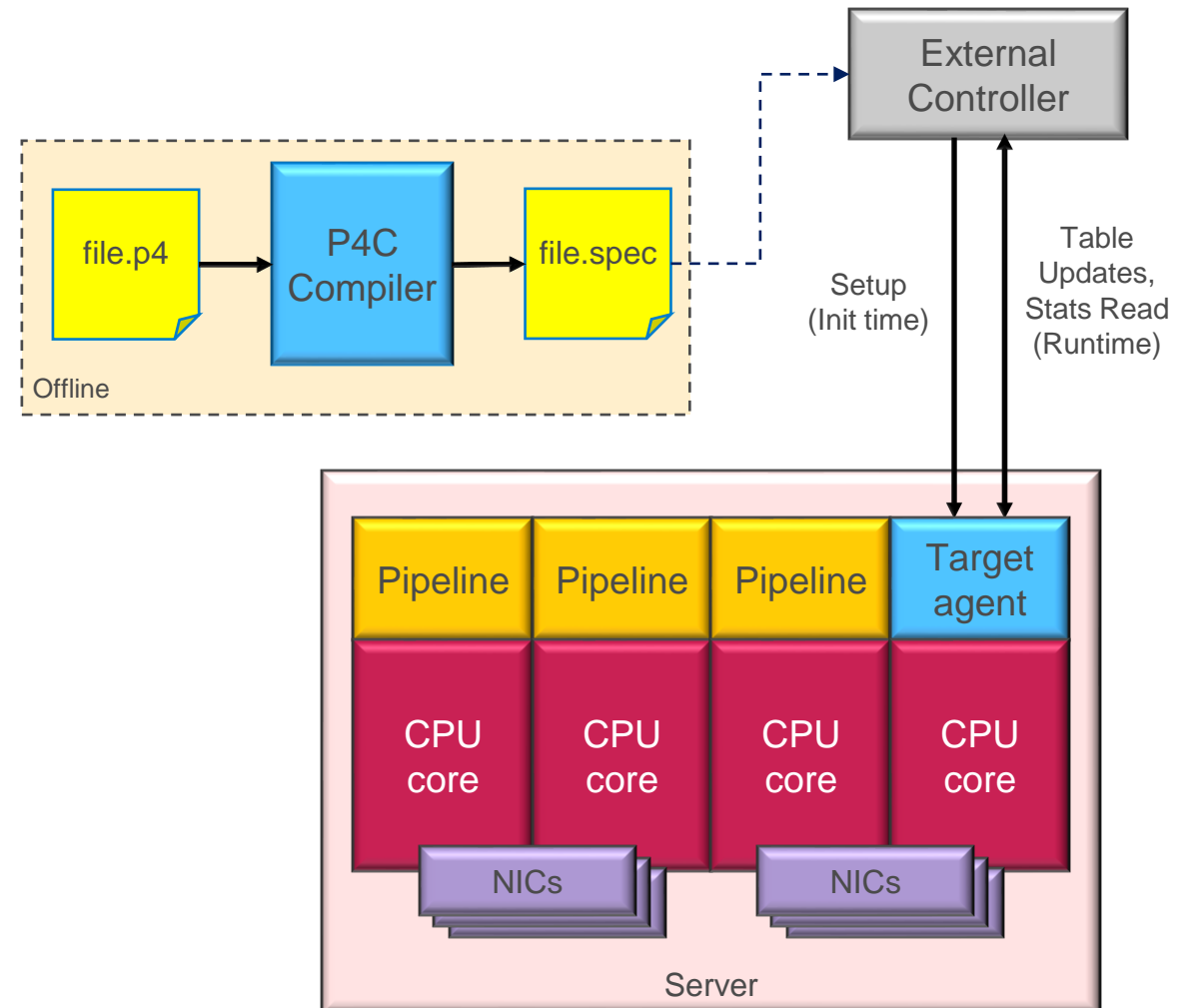


P4 DPDK Feature Set



How does P4-DPDK work?

- Offline process: The .p4 file is translated to an intermediate representation .spec file.
- The .spec file defines the P4 objects to be created for the pipeline (headers, meta-data, actions, tables, data path, etc).
- The P4 actions and apply blocks are translated to instructions from a pre-defined set. The instruction operands are the P4 objects defined above, not low-level x86 instructions. Essentially, P4-DPDK is a P4 virtual machine.
- The external controller connects to the target agent to load the P4 blob (the .spec file) and for run-time table updates and queries (e.g. stats).
- The target agent creates the P4 objects for each pipeline at initialization based on the .spec file and maps each pipeline to a CPU core.
- Each CPU core executes one or multiple pipelines by running the associated instructions for each input packet. Each pipeline is single threaded.



Call to action

- The P4-DPDK project needs you!
- We need you to implement your apps in P4 and run them with P4-DPDK.
- Please report issues and workarounds. Code patches with bug fixes and new features are also highly appreciated 😊.
- Thank you!



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