

P4 at Intel

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Once in a generation transition/inflection

Cloud computing: the 2nd fundamental structural transition in the history of IT

You are here



Clouds vs. Classic Data Centers



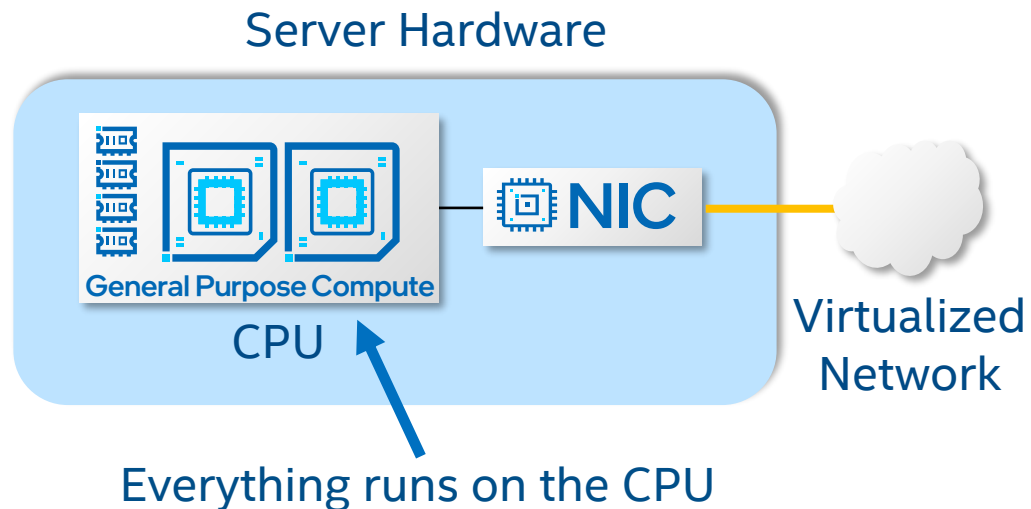
Different use case leads to a different system architecture

Cloud System Architecture

Separate Infra and Tenant

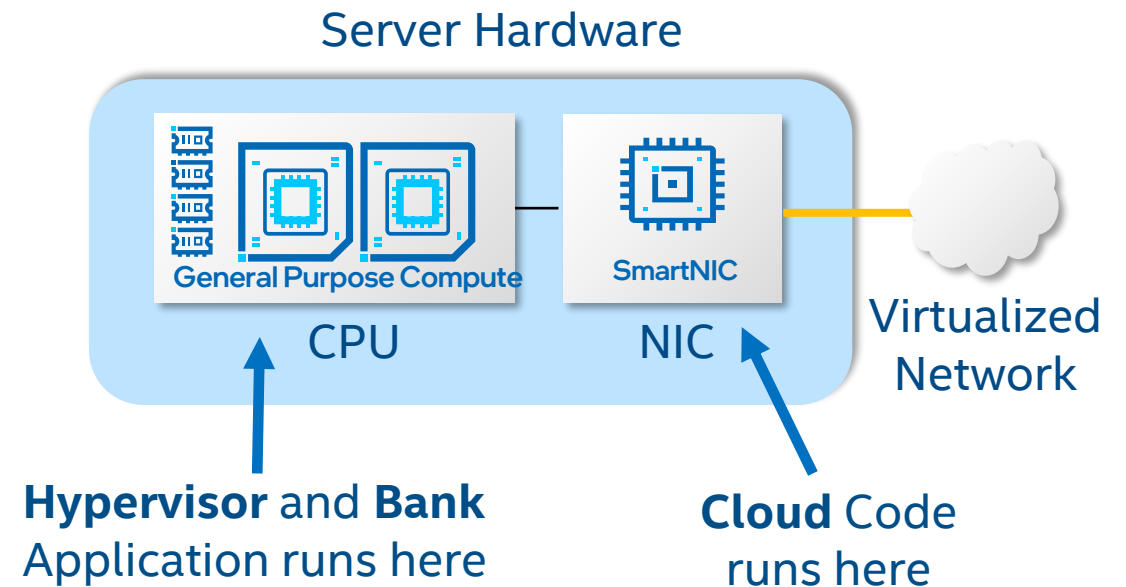
Bank with a classic Data Center

- Bank owns hardware
- Bank manages hypervisor
- Bank runs application



Bank using Public Cloud

- Cloud owns hardware, manages SmartNIC
- Hypervisor may be managed by either party
- Bank runs application



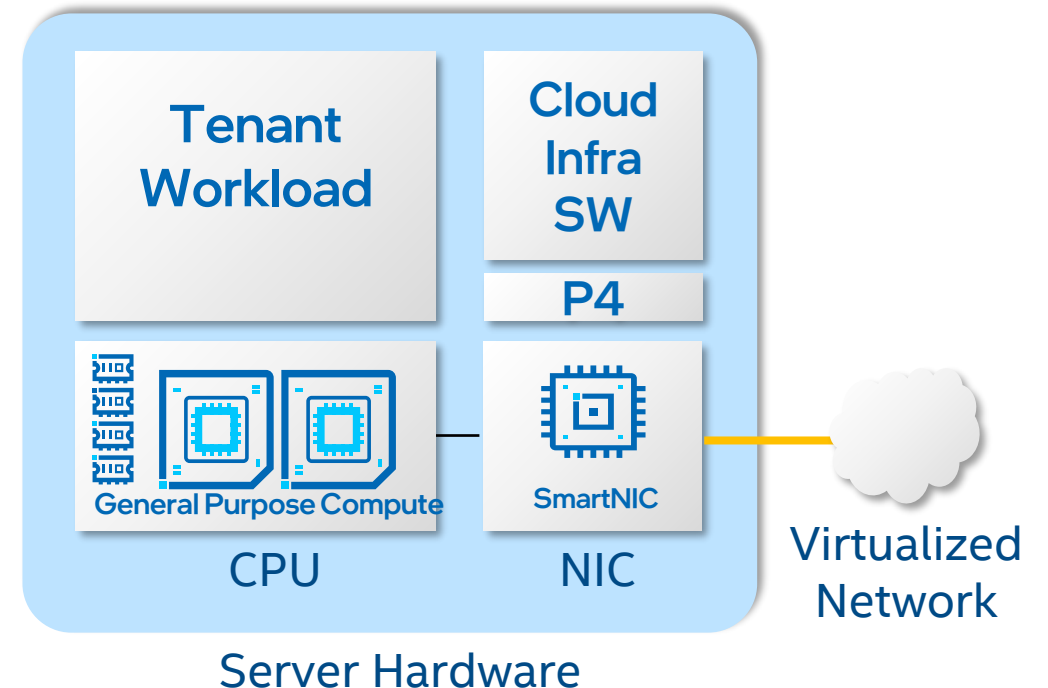
SmartNIC's in Clouds

- Most of the large clouds have them
- Common functionality
 - Root of trust and provisioning
 - Storage offload
 - Network offload
- Different architectures
 - FPGA based
 - Dedicated Silicon
- Broad variety of protocols
 - No two major public clouds have the same storage protocol

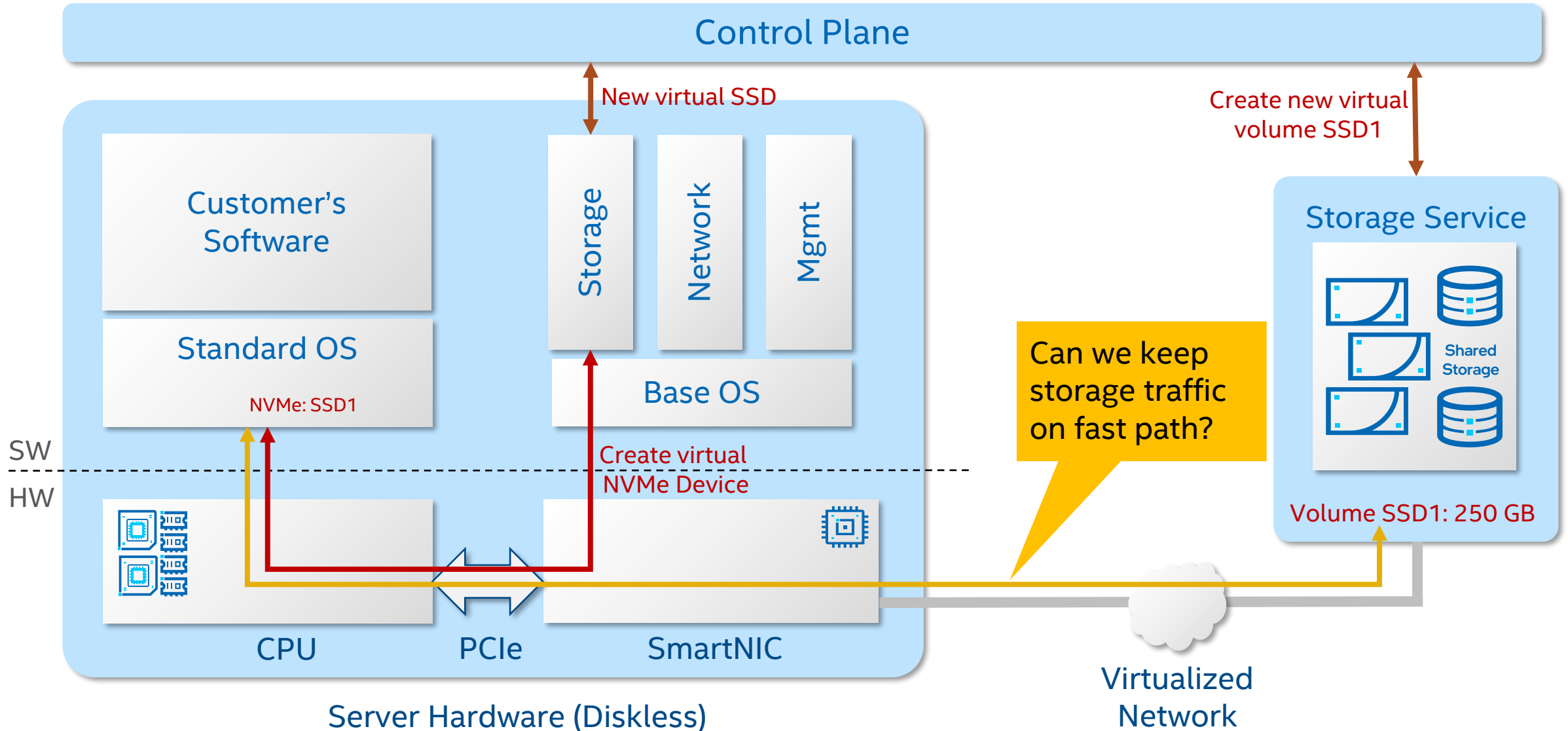
P4 for SmartNICs

Vendor-neutral way to express pipelines

- SmartNICs have packet processing pipelines
- P4 is great for expressing them
 - Better than proprietary C API's
 - Can make use of existing tool chains
 - Standardization makes it easier to port the software that runs on these NICs



SmartNIC Storage Acceleration



P4 for Storage Acceleration

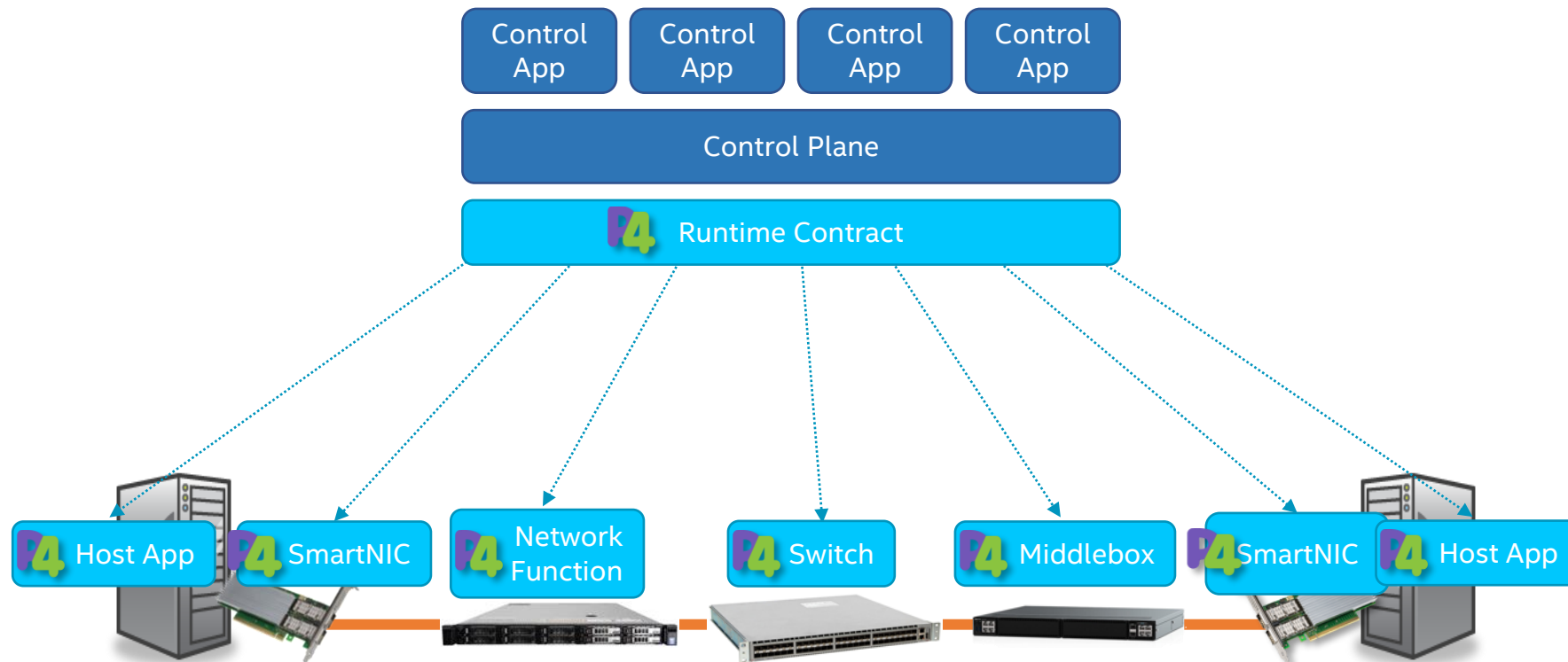
The #1 use case of SmartNICs in clouds is storage

Can I accelerate this with P4?

- Right now, not part of P4 spec
- Should be possible
 - Decrypt/Auth packet
 - Parse protocol header
 - Compress/Uncompress
 - Hand over to storage service accelerator

Feature request to the P4 community: Add Storage Primitives!

Network as a Programmable Platform



The "Contract" now can include services beyond networking

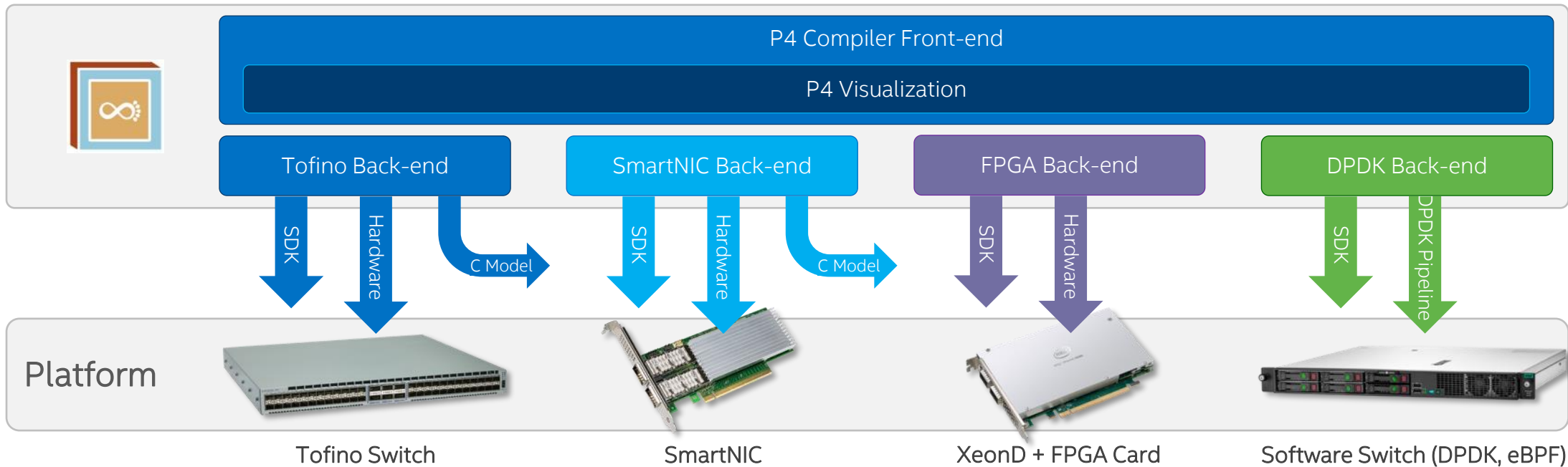
- Middlebox that looks into Ceph protocol?
- Not just about networking, but cloud orchestration

P4 at Intel

Broad enablement across product families

Open Abstraction for
Programming Infrastructure
& Advanced Applications

```
P4 Program
table routing {
  key = { ipv4.dstAddr : lpm; }
  actions = { drop; route; }
  size : 2048; }
control ingress() {
  apply {
    routing.apply(); }
}
```



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