Direct device access from the SmartNIC towards datacenter disaggregation

Master's thesis meeting : week 5

Nicolas Jeanmenne

Table of contents

NVMe-oF

- NVMe-oF Performance Characterization and the Path to Low-Overhead Flash Disaggregation
  - Analyze NVMe-oF / SPDK and validates it's usage with a smartNIC
  - $\approx 12\mu s$ overhead compared to direct-attached software $\Rightarrow$ implementation on *Frodo* should have similar overhead
- Lightpool : made it possible to use NVMe-oF to transfer data into distributed DB.
  - SmartNIC could be combined with NVMe-oF to offload CPU
- Scalio : uses NVMe-oF to offload ARM cores on the smartNIC
  - NVMe-oF target offload : standard implementation on the server-side DPU's host channel adapter via PCIe P2P

Conclusion

- Lightpool and Scalio show that using NVME-oF with a smartNIC appears to be a viable approach
- NVMe-oF target offloading looks even more promising to reduce the smartNIC ARM cores workload via PCIe P2P
  - ARM cores should only be used for the control path
  - Care must be taken about data coherence between smartNIC and SSDs

TODOs for week 7

- Finish SPDK setup on *Frodo*
- Investigate SPDK to write data blocks from the smartNIC towards NVMe

That's all for today !