SOFA-STORAGE: CREATING A VENDOR AGNOSTIC FRAMEWORK TO ENABLE SEAMLESS STORAGE OFFLOAD USING SMARTNICS

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Terminology

Workload domain

Trusted control plane

Control nodes
- Scheduler
- Node manager

Compute nodes
- VM
- Hypervisor
- Smart NIC
- BMC
- HW card

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Motivation

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Smart NIC
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SmartNICs today
But no common APIs
Mission statement

“Define a single API to leverage SmartNICs from different vendors to improve security and performance in a Cloud environment.”
SOFA: Secure Offload Framework for the Cloud

Vendor agnostic API

Vendor specific API

Datapath

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Volume lifecycle

- **CREATED**
  - CTRLCreateVolume
  - CTRLAttachVolume
  - CTRLDetachVolume

- **NODE_READY**
  - CTRLDeleteVolume
  - DPUUnpublishVolume
  - DPUPublishVolume

- **PUBLISHED**
  - CTRLDeleteVolume
SOFA-Storage PoC

Vendor agnostic API
Vendor specific API
Datapath
SOFA-Storage PoC

Vendor agnostic API
Vendor specific API
Datapath
SOFA-Storage PoC

Vendor agnostic API
Vendor specific API
Datapath
Kubernetes Container Storage Interface (CSI)

Control node
- kubectl
- CSI controller
- Vendor plugin

Worker node
- kubectl
- CSI node
- Vendor plugin

Storage system

Vendor agnostic API
Vendor specific API
Datapath
Control node

- kubelet
  - CSI SOFA plugin
  - CSI controller vendor plugin

Worker node

- kubelet
  - CSI SOFA plugin
  - CSI node vendor plugin
  - SmartNIC
    - SOFA Storage
      - BF plugin
      - mlx-snap
      - CSI node vendor plugin

Vendor agnostic API

Vendor specific API

Datapath
Open Source @ github.com/ibm/sofa-storage
THANK YOU
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