



OPEN SOURCE NETWORKING DAYS

Networking Optimization in Edge Computing

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Engineering Manager of Networking and Storage

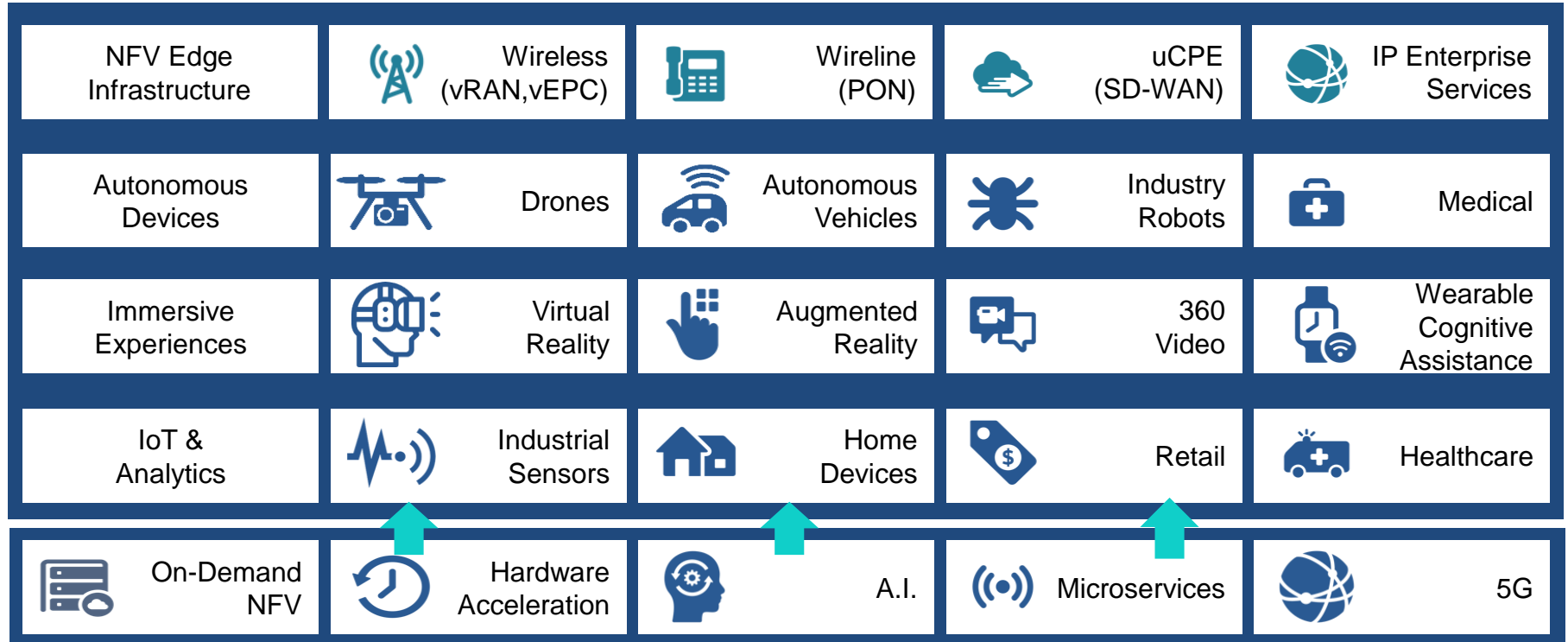
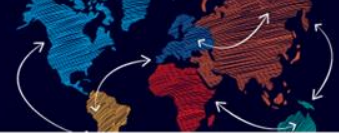
Intel Open Source Technology Center

Agenda

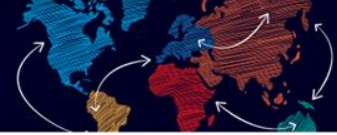


- Why Edge Computing?
- What is Edge Computing?
- StarlingX based on OpenStack for Edge
- Challenges
- Regional Controller
- OVS-DPDK and SR-IOV
- Other Enhancements in OpenStack Neutron
- Containerized Network

Emerging Technologies in IoT & Networks



Why Edge Computing?



Emerging technologies are demanding lower latency and accelerated processing at the edge

- NFV Edge Infrastructure
- Autonomous Devices
- Immersive Experiences
- Industrial IOT



Edge Cloud

Performs data processing at the edge of the network, near data sources

Low Latency
< 20ms

Optimal

High Latency
~25 – 200ms

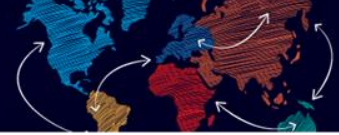


Central Cloud

Highly centralized computing resources of cloud service providers

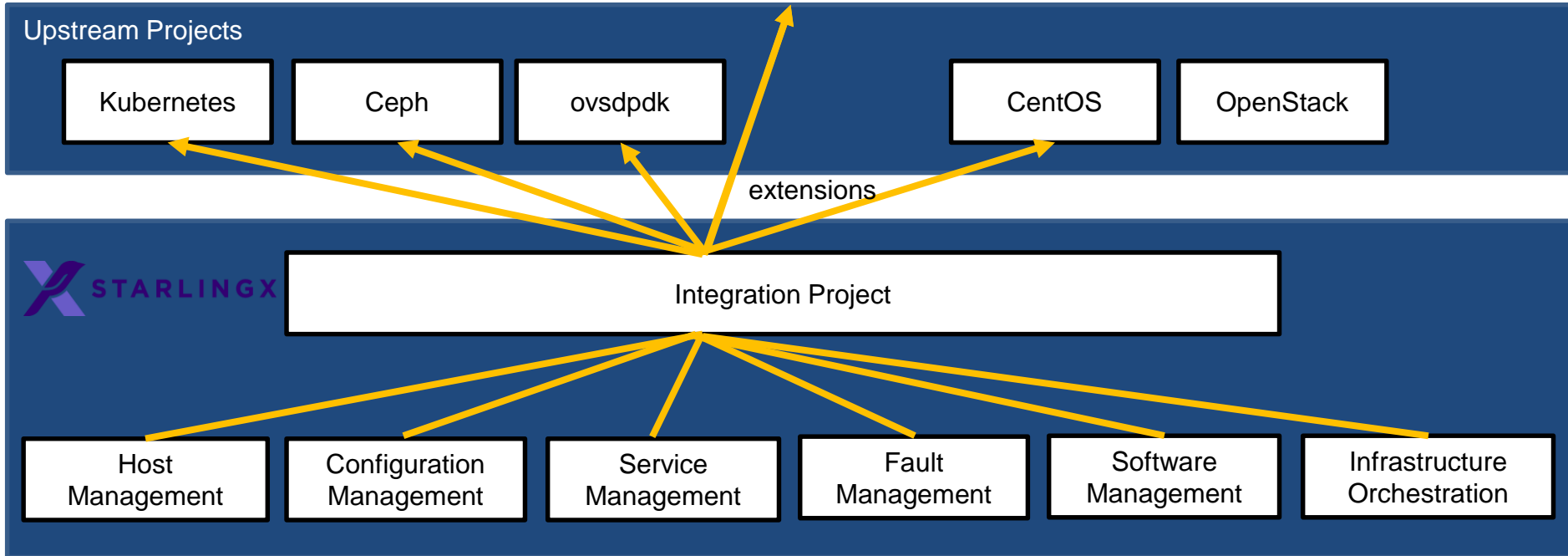
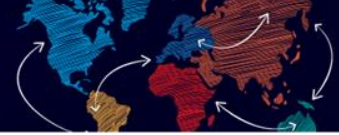
Not Optimal

What is Edge Computing?

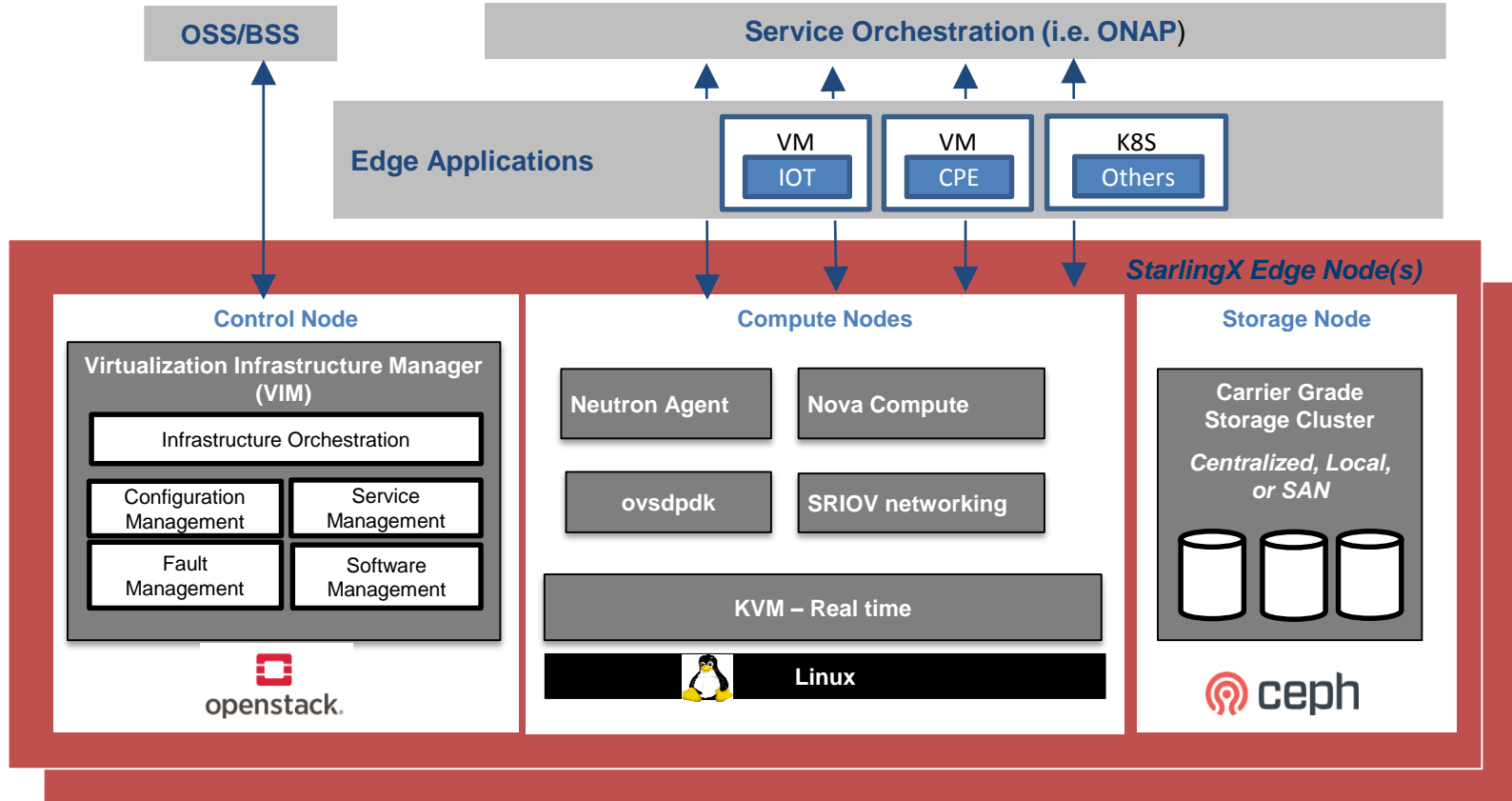


- Extensions Beyond Cloud Computing and Data Centers
- Close to Users and Data Sources, Edge Sides
- Converged Platform of Networks, Compute, Storage and Applications
- Real-Time, Optimized, Data Localization, Intelligence, Security and Privacy
- High Performance and Low Latency
- Large-Scale but Small-Size
- Zero Touch Provisioning and Automation, Remote Management, Autonomous Devices
- Self-Healing, Easy Upgrading, and Long Life Power Supplier

High Level Structure of StarlingX for Edge



StarlingX Architecture Details

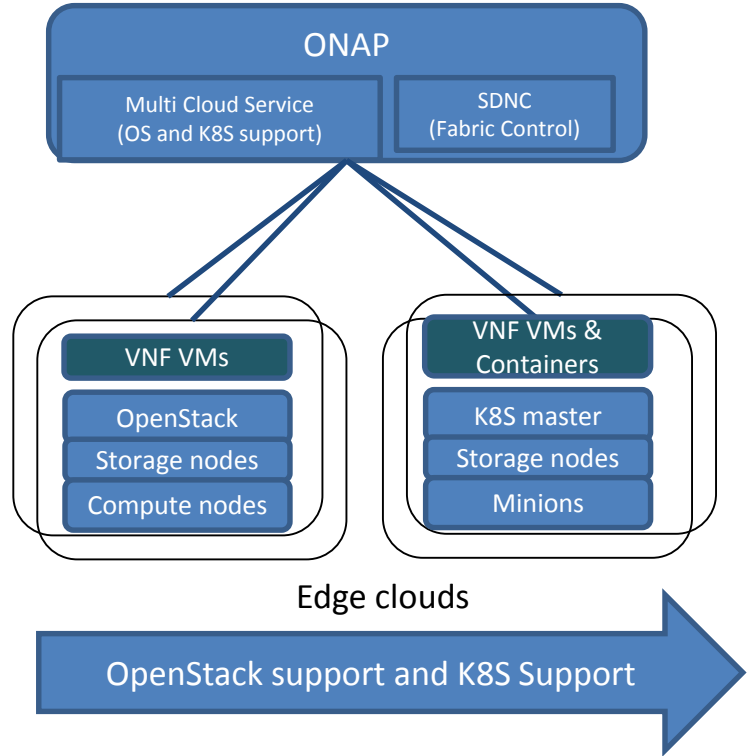
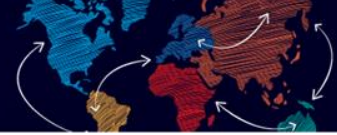


High Level Challenges in OpenStack for Edge

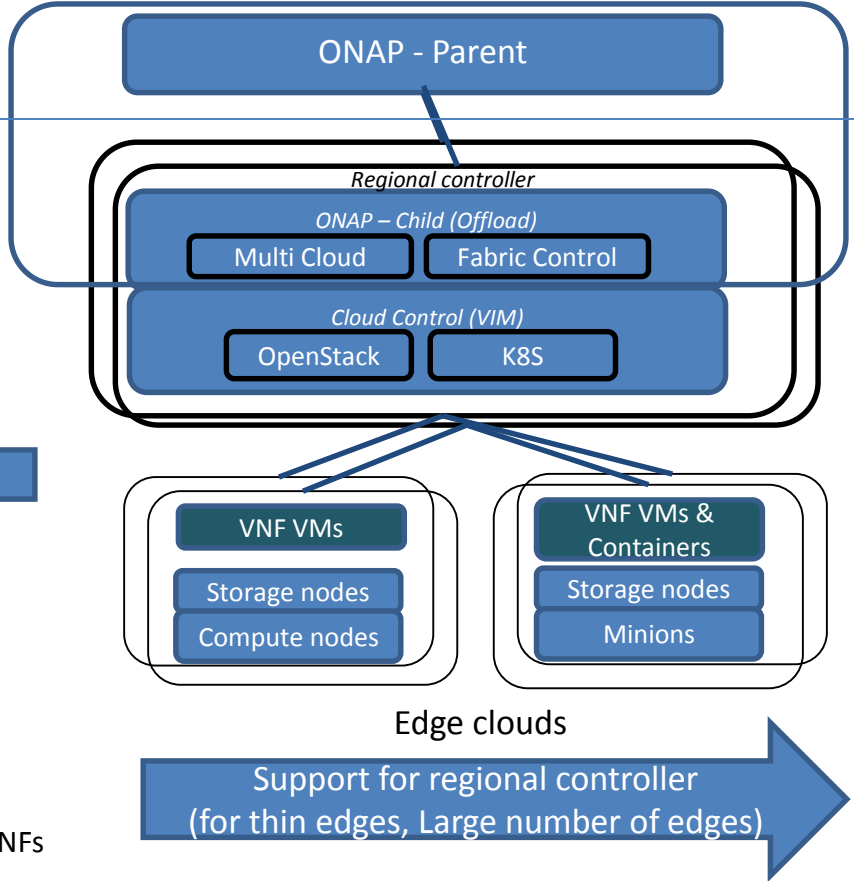


- Scalability of the Controller
- Wide Area Network limitations
- Security Management
- Maintainability
- Fault Tolerance

ONAP based Service Orchestration and Deployment

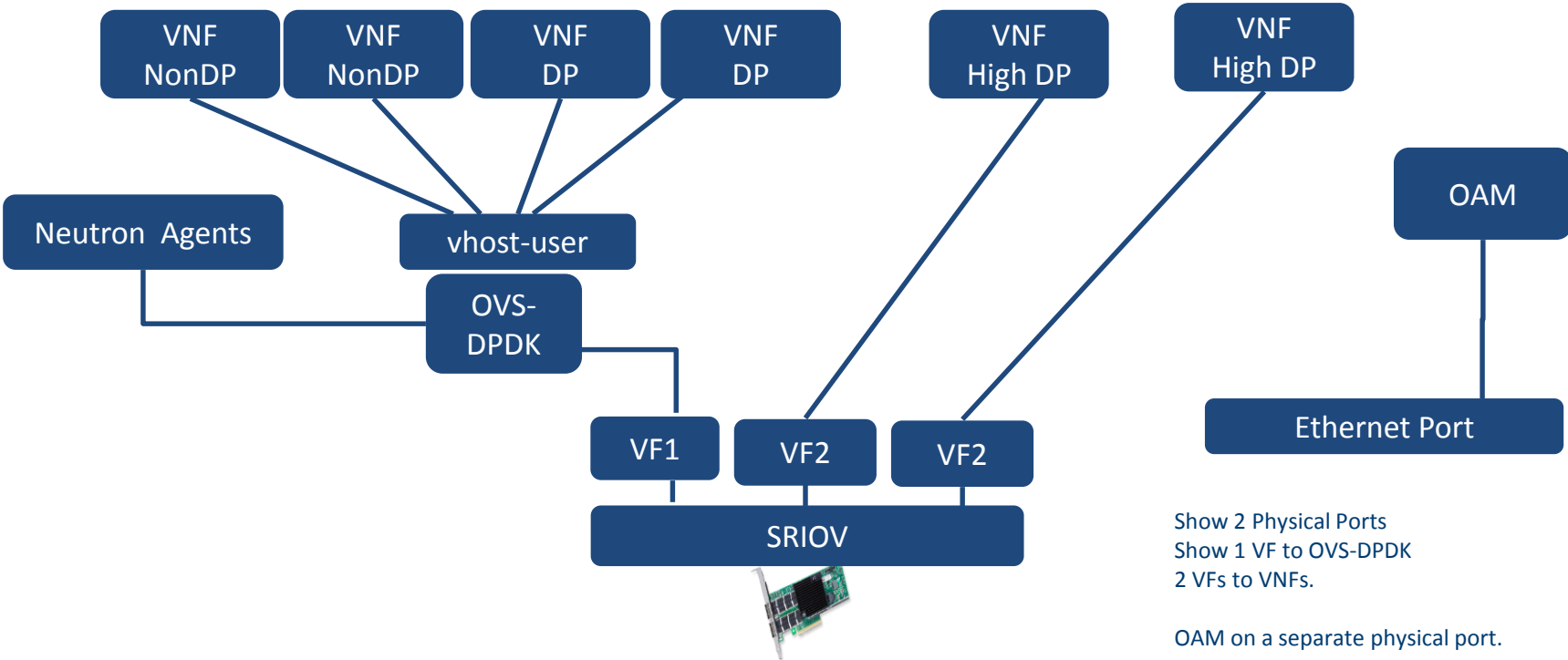


Support for both OpenStack edges and Kubernetes edges
Support for Kubernetes edges that manage both VM and container VNFs
Fabric control to manage switch



Support for regional controller
(for thin edges, Large number of edges)

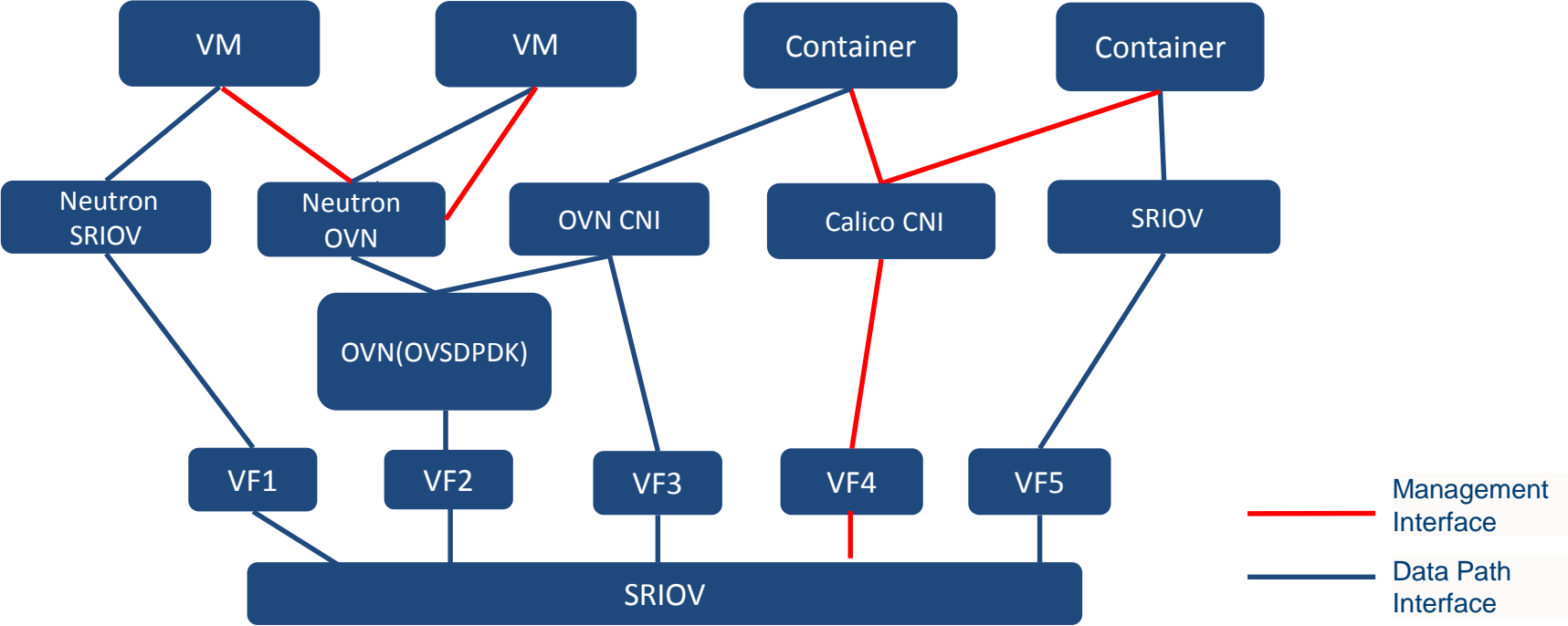
OVS-DPDK and SR-IOV



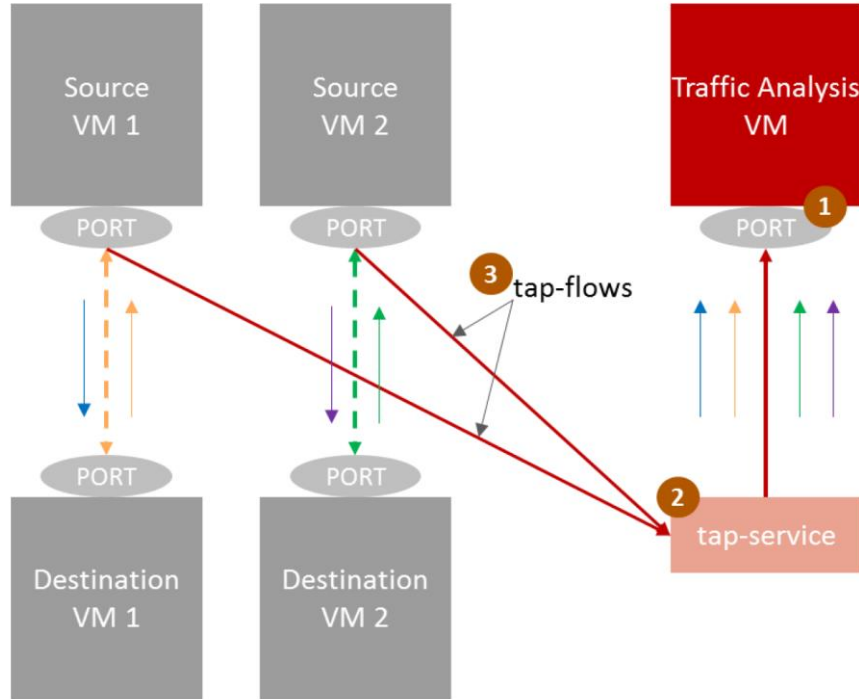
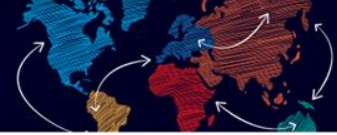
Show 2 Physical Ports
Show 1 VF to OVS-DPDK
2 VFs to VNFs.

OAM on a separate physical port.

OVS-DPDK and SR-IOV

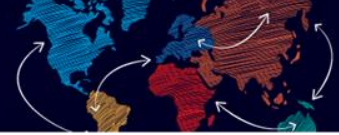


Port Mirroring with SR-IOV VFd



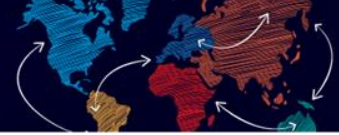
<https://blueprints.launchpad.net/neutron/+spec/port-mirroring-sriov-vf>

Other Neutron Enhancements

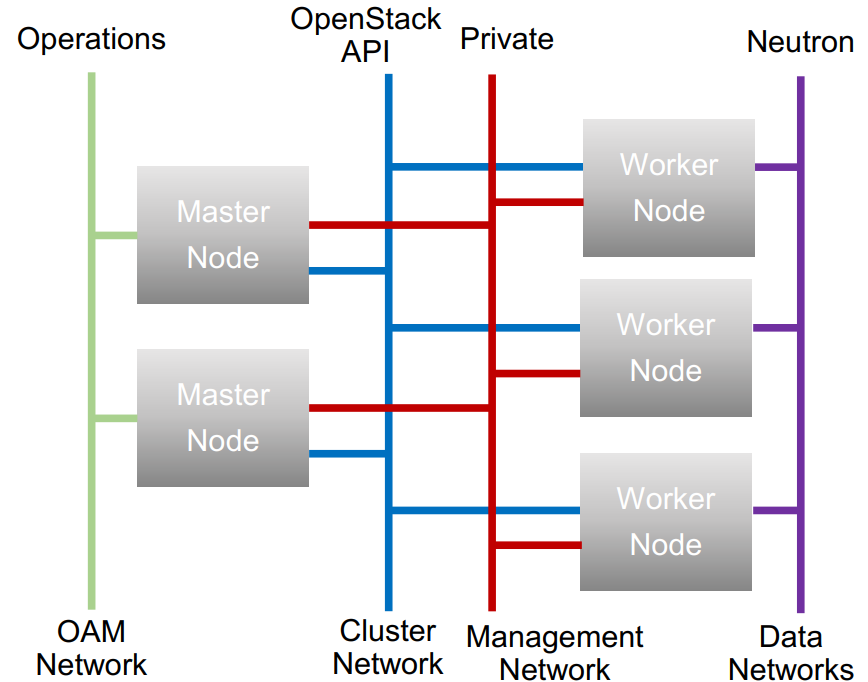


- OVS-DPDK support in Helm
- Segment Range Management of Self-service Networks
 - <https://blueprints.launchpad.net/neutron/+spec/segment-range-mgmt-of-tenant-networks>
- Provider Network Management
- Rescheduling of DHCP Servers and Routers
 - <https://blueprints.launchpad.net/neutron/+spec/rescheduling-of-dhcp-servers-and-routers>
- Fault Management
- OVS support for Networking VLAN Transparency
- VLAN Trunk
- OVS-DPDK firewall driver enhancement
- Security Group

Containerized OpenStack Network



- Management network would be for platform services only and isolated from the cluster
- OpenStack services exposed on cluster network via an K8S ingress controller
- NFV-VIM APIs need to be accessible from both the OAM and cluster networks
- Platform services need access to several OpenStack APIs
- Ceph service need access from cluster network



Thank you!



- For More Information, Please Visit www.akraino.org and www.starlingx.io
- Call For Join!!!

A stylized world map is centered on a dark blue background. The continents are filled with a dense, hand-drawn texture of fine lines in various colors: North America is light blue, South America is yellow, Europe and Africa are red, and Asia and Australia are teal. White curved arrows connect the continents in a clockwise cycle, starting from North America, moving to South America, then Europe, Africa, Asia, and finally Australia, symbolizing a global network or flow of information.

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