

Tungsten Fabric & Akraino Edge Stack

 tungstenfabric



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Tungsten Fabric Linux Foundation Project



<https://tungsten.io/>



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Networking for Akraino Edge Stack

Networking is most overlooked and underestimated component in any stack

Networking is focal point for most of the security and scalability issues

Tungsten Fabric is fully distributed and Microservices based SDN controller addressing security, scale and advance networking services

Production grade networking stack for Data Center and Public & Edge cloud

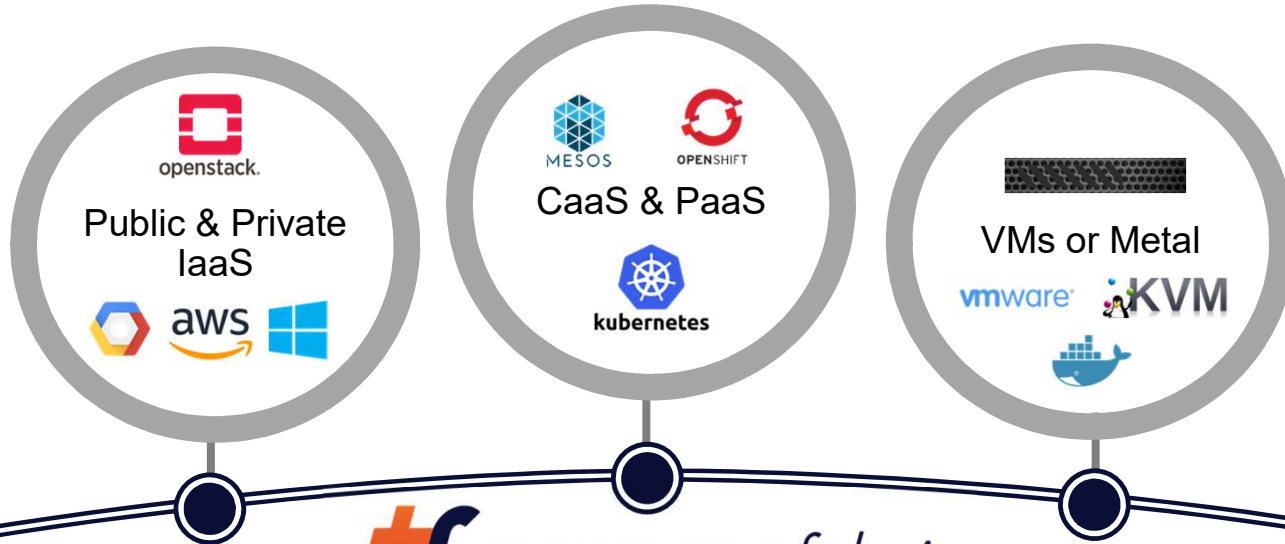
Highly available and ISSU (In Service Software Upgrade) support

Full Fabric Management – Overlay & Underlay Networks

Tungsten Fabric as SDN Controller

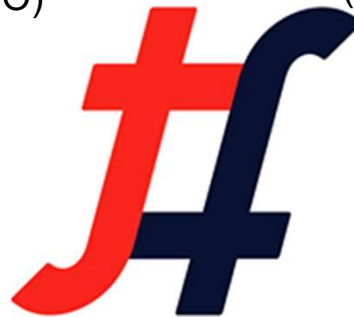
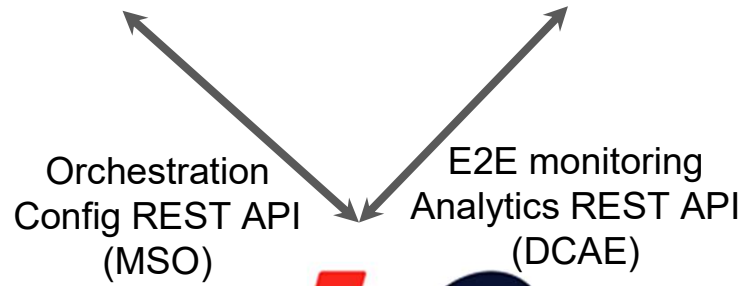
RULE THEM ALL WITH ONE

automated secure open SDN Controller

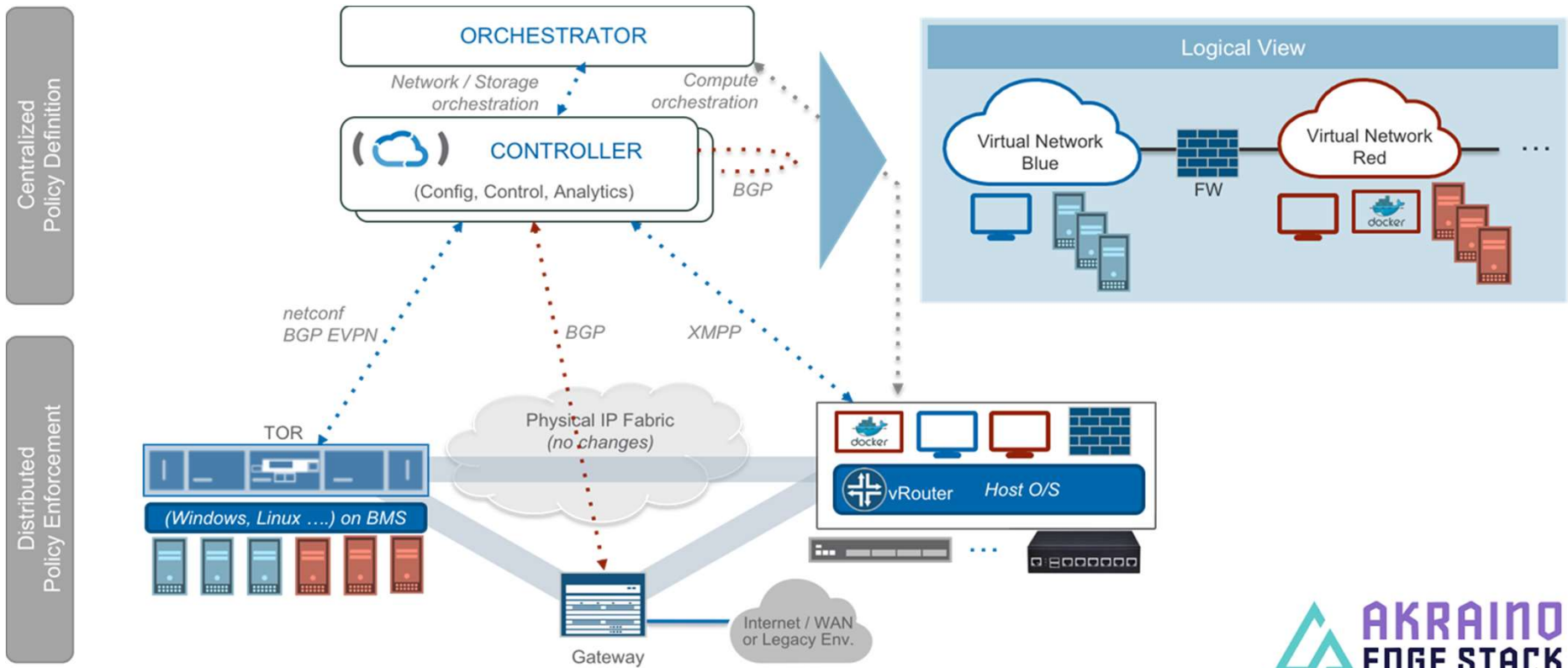


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Tungsten Fabric Integration with ONAP

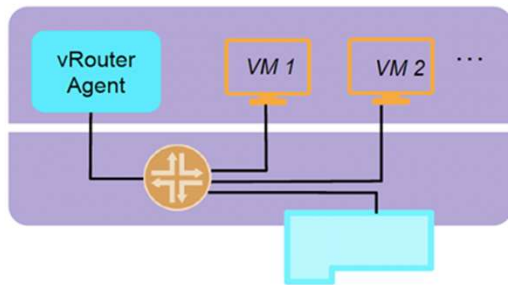


Architecture Overview



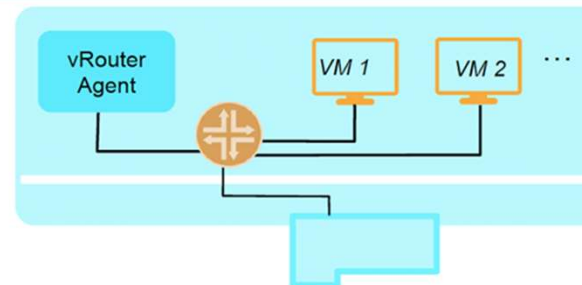
TF VROUTER DEPLOYMENT MODELS

KERNEL VROUTER



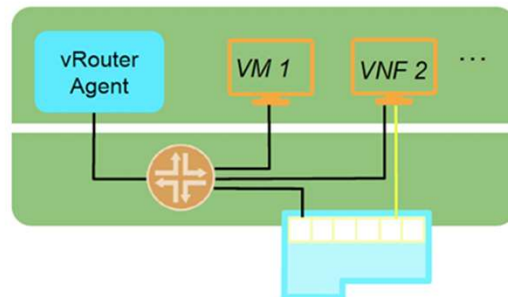
- This the normal operation where fwding plane of vRouter runs in the kernel and are connected to VMs using TAP interface (or veth pair for containers)
- vRouter itself is enhanced using other performance related features:
 - TSO / LRO
 - Multi-Q Virtio

DPDK VROUTER



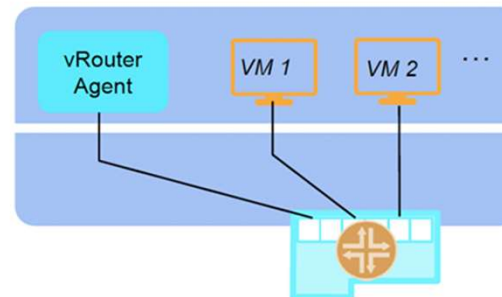
- vRouter runs as a user space process and uses DPDK for fast path Packet I/O.
- Full set of SDN Capabilities Supported
- Requires the VMs to have DPDK enabled for performance benefits

SRIOV/ VROUTER COEXISTENCE



- Some workloads can directly SRIOV into the NIC, while others go through the vRouter
- Sometimes a VNF can have multiple interfaces some of which are SRIOV-ed to the NIC
- Interfaces that are SRIOV-ed into NIC don't get the benefits/ features of vRouter

SMARTNIC VROUTER

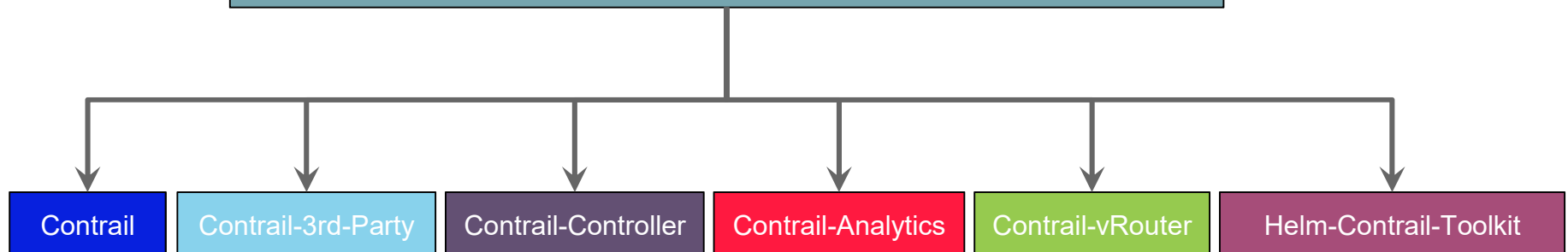


- vRouter fwding plane runs within the NIC
- Workloads are SRIOV-connected to the NIC



Tungsten Fabric Helm Design

Tungsten Fabric Helm Charts



- **Contrail:** Parent helm chart for all contrail networking
- **Contrail-Third Party:** Helm chart for Contrail third-party components
- **Contrail-Controller:** Helm chart for contrail controller
- **Contrail-Analytics:** Helm chart for contrail analytics
- **Contrail-vrouter:** Helm Chart for contrail vRouter (DPDK & Kernel)
- **Helm-Toolkit-Contrail:** Chart where we define common templates/method used by a" other contrail charts

TF Helm Microservices Architecture (Helm Charts)



Ingress

analytics-api
Cluster-SVC-Networking

Service

analytics-ingress
Cluster-SVC-Networking

Service

analytics-api
Cluster-SVC-Networking

POD – DaemonSet (7/7)

Container (1/7)

contrail-analytics-api
Host-Networking

Container (2/7)

contrail-analytics-nodemgr
Host-Networking

Container (3/7)

contrail-collector
Host-Networking

Container (4/7)

contrail-snmp-collector
Host-Networking

Container (5/7)

contrail-query-engine
Host-Networking

Container (6/7)

Contrail-topology
Host-Networking

Container (7/7)

Contrail-alarm-gen
Host-Networking

Contrail-Analytics

POD – DaemonSet (3/3)

Container (1/4)

contrail-control
Host-Networking

Container (2/4)

contrail-dns
Host-Networking

Container (3/4)

contrail-named
Host-Networking

POD – DaemonSet (5/5)

Container (1/5)

contrail-config-api
Host-Networking

Container (2/5)

contrail-config-nodemgr
Host-Networking

Container (3/5)

contrail-svc-monitor
Host-Networking

Container (4/5)

contrail-schema-transf
Host-Networking

Container (5/5)

contrail-device-mgr
Host-Networking

Contrail-Controller

Container (1/2)

contrail-vrouter-agent
Host-Networking

Container (2/2)

contrail-vrouter-nodemgr
Host-Networking

Container (1/4)

contrail-control-nodemgr
Host-Networking

Ingress

config-api
Cluster-SVC-Networking

Ingress

webui
Cluster-SVC-Networking

Service

config-api
Cluster-SVC-Networking

Service

config-ingress
Cluster-SVC-Networking

Service

web-controller
Cluster-SVC-Networking

Service

web-ingress
Cluster-SVC-Networking

POD – DaemonSet (2/2)

Container (1/2)

contrail-webui
Host-Networking

Container (2/2)

contrail-webui-middleware
Host-Networking

Container (1/3)

contrail-vrouter-agent-dpdk
Host-Networking

Container (2/3)

contrail-vrouter-dpdk
Host-Networking

POD DaemonSet (2/2)

Container (3/3)

contrail-vrouter-nodemgr
Host-Networking

POD - DaemonSet

analyticsdb
Host-Networking

POD - DaemonSet

analyticsdb-nodemgr
Host-Networking

POD - DaemonSet

analytics-zookeeper
Host-Networking

POD - DaemonSet

kafka
Host-Networking

POD - DaemonSet

configdb
Host-Networking

POD - DaemonSet

configdb-nodemgr
Host-Networking

POD - DaemonSet

config-zookeeper
Host-Networking

POD - DaemonSet

redis
Host-Networking

Contrail-Third-Party

Kubernetes Cluster

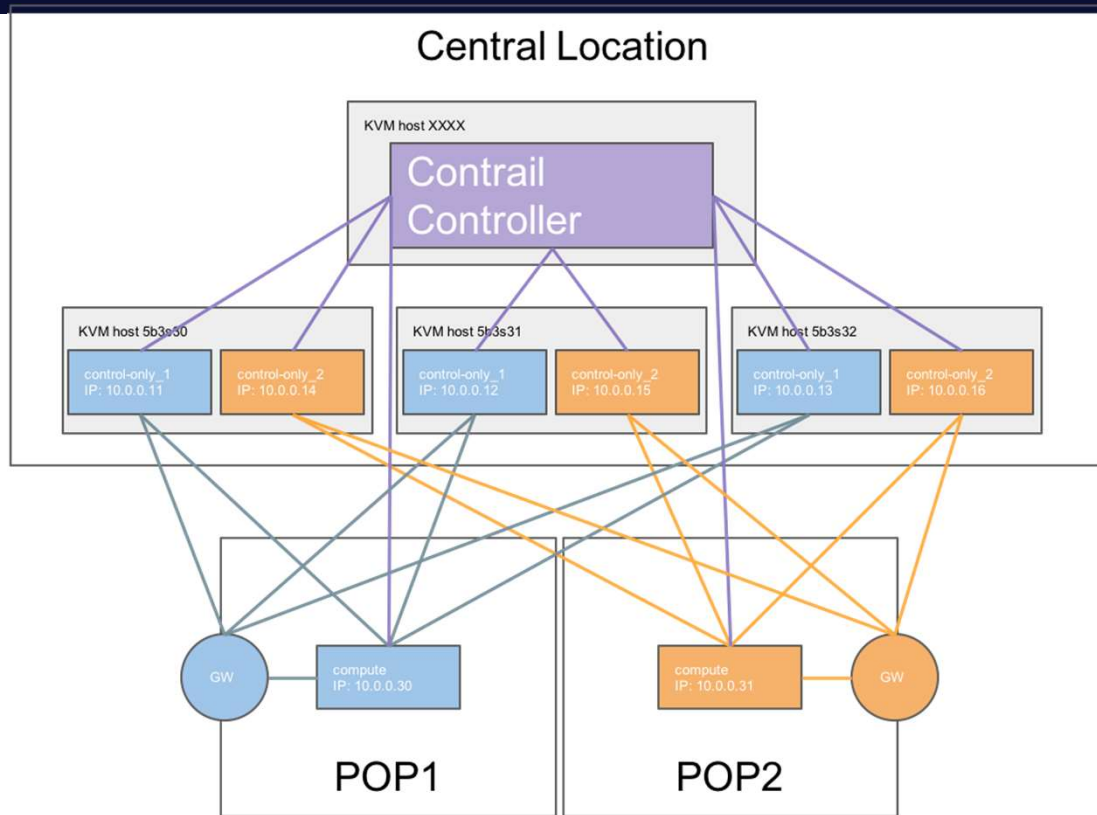
- contrail-config
- contrail-control
- contrail-webui
- contrail-analytics
- contrail-vrouter

Contrail Helm Toolkit

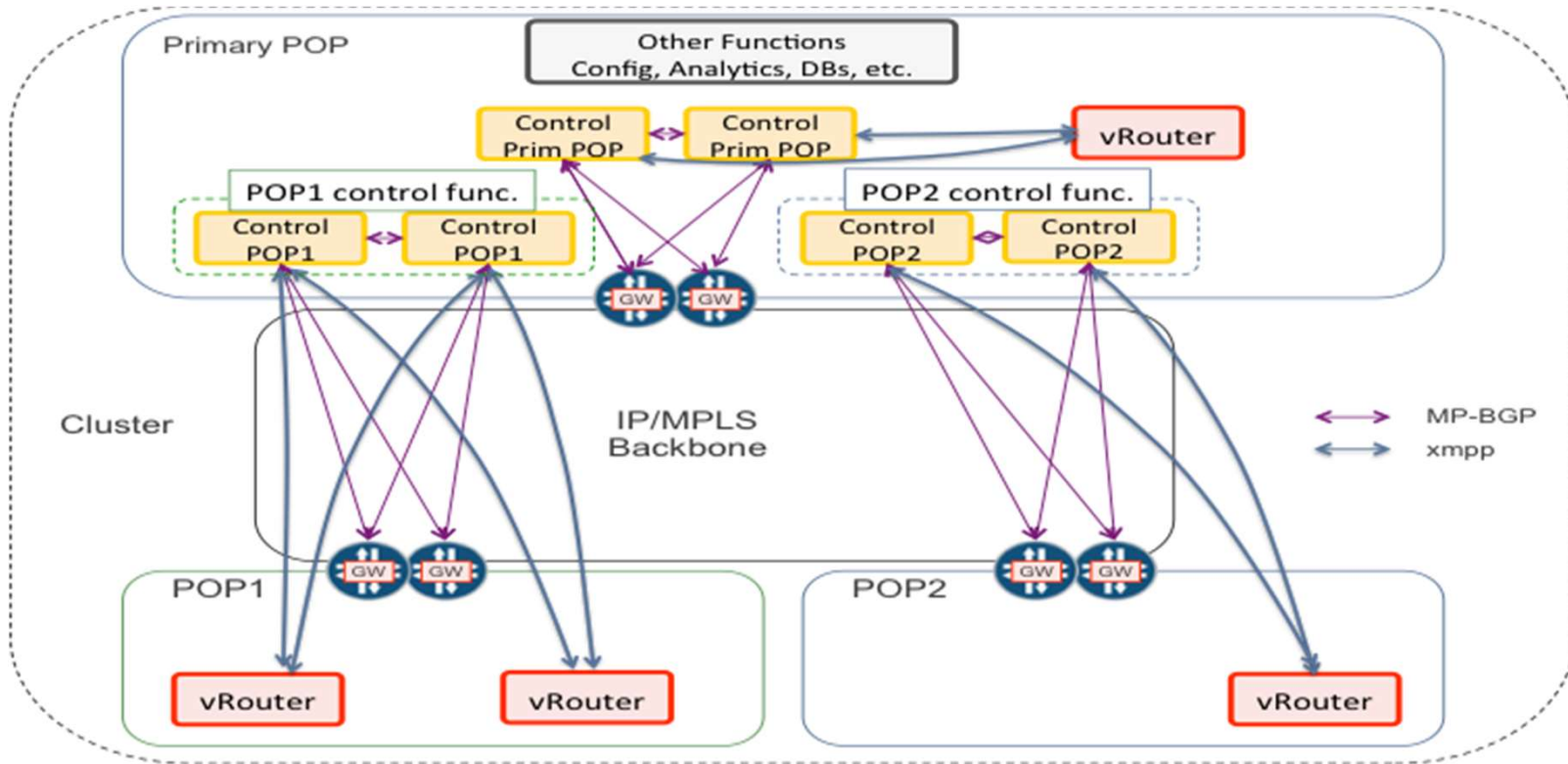
- Other Containers:**
- Contrail-status
 - node-init
 - vrouter-init-kernel
 - vrouter-init-dpdk

Contrail-vRouter

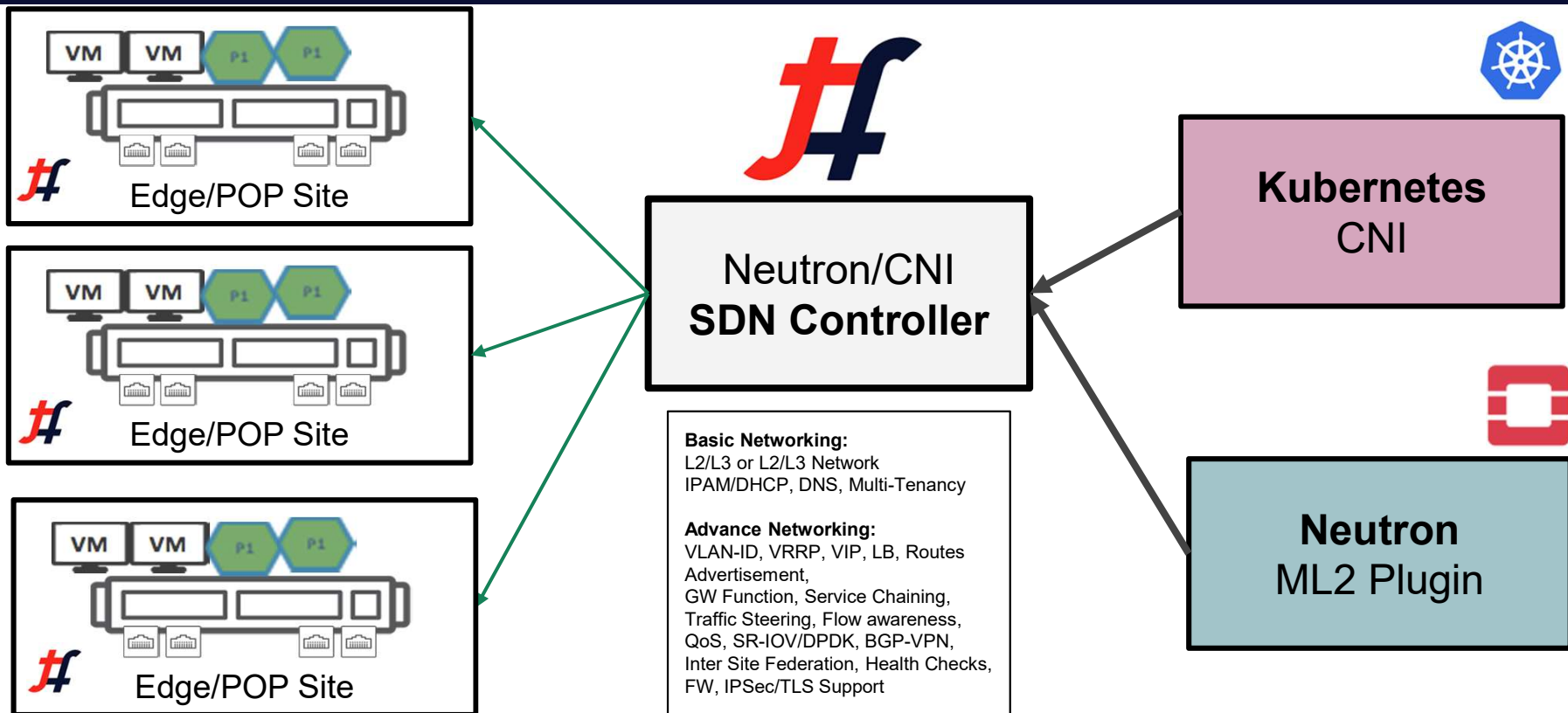
Tungsten Fabric Remote Compute



Tungsten Fabric Remote Compute (cont.)



Tungsten Fabric as Single SDN for VMs & PODs



Tungsten Fabric INSTALLATION



ANSIBLE



Tungsten Fabric K8s CNI (A single YAML Install)



[Ubuntu Single YAML](#)



[CentOS Single YAML](#)

Reference: <https://github.com/Juniper/contrail-kubernetes-docs>



Try Tungsten Fabric



<https://tungstenfabric.github.io/website/Tungsten-Fabric-10-minute-deployment-with-k8s-on-AWS.html>





Carbide Sandbox Environment

Tungsten Fabric + Kubernetes on AWS

<https://tungsten.io/start/>

