Northbound Connections of VPP for NFV in Containers and Kubernetes

FastData.io – VPP

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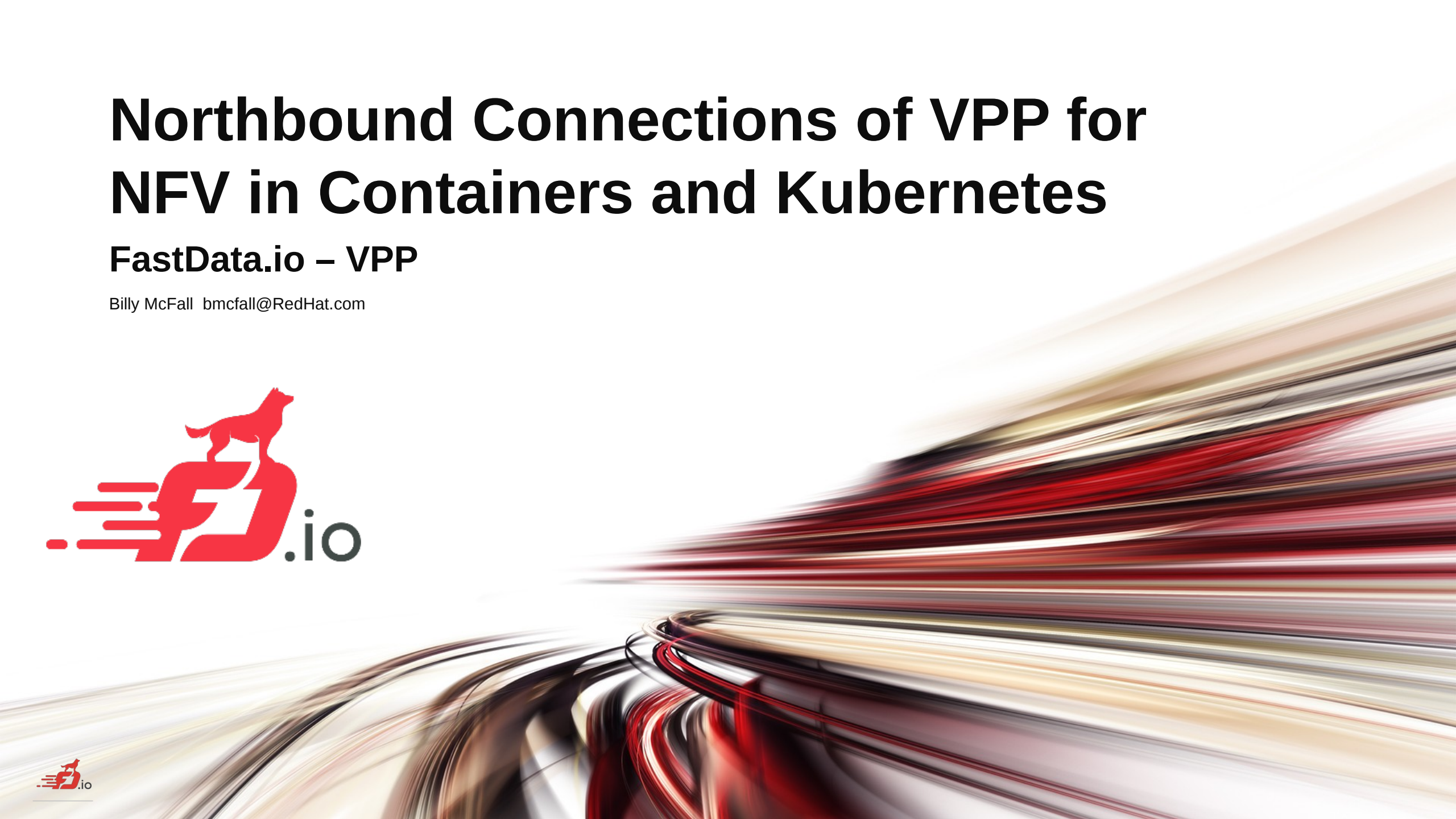


Agenda

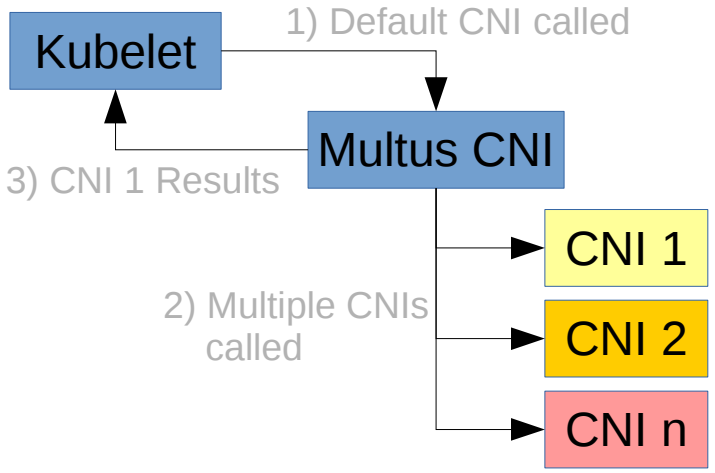
- ~~Ligato~~ ← Previous Session
- Multus CNI / Userspace CNI
- Network Service Mesh
- Summary

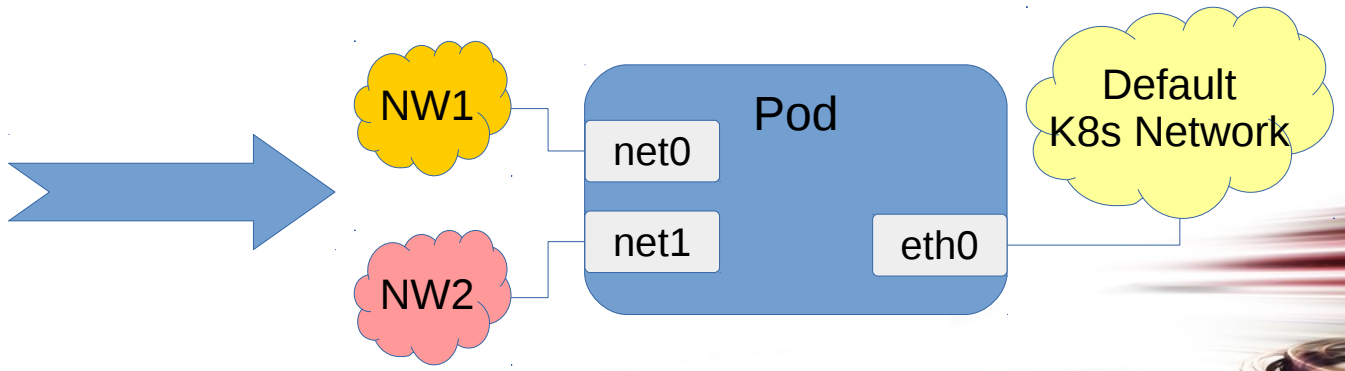
MULTUS

Multus CNI / Userspace CNI

What is Multus CNI?

- Multus CNI is a reference implementation of the “Kubernetes Network Custom Resource Definition De-facto Standard” put forward by the Kubernetes Network Plumbing Working Group.
- Multus CNI is a “meta-plugin”
  - Kubelet calls its one and only CNI, which in this case is Multus CNI.
  - Multus, based on CRD (CustomResourceDefinitions) calls multiple CNIs.
  - Multus returns status of default CNI (for default K8s Network) and logs results for others.
- Kubernetes is only aware of Default Network.

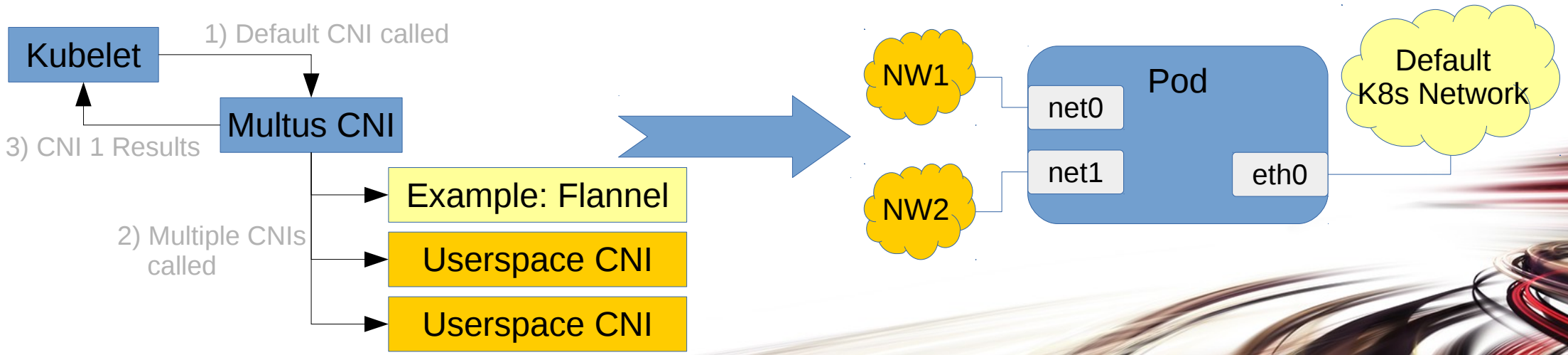




Multus CNI / Userspace CNI

What is Userspace CNI?

- Userspace CNI inserts DPDK based interfaces into a container.
    - Enables high speed Userspace Interfaces in container.
    - Enables L2, L3, Tunneling protocols in container.
- Because it is using Multus, Kubernetes is unaware of the additional interfaces and networks.
- Currently supports VPP or OvS-DPDK.

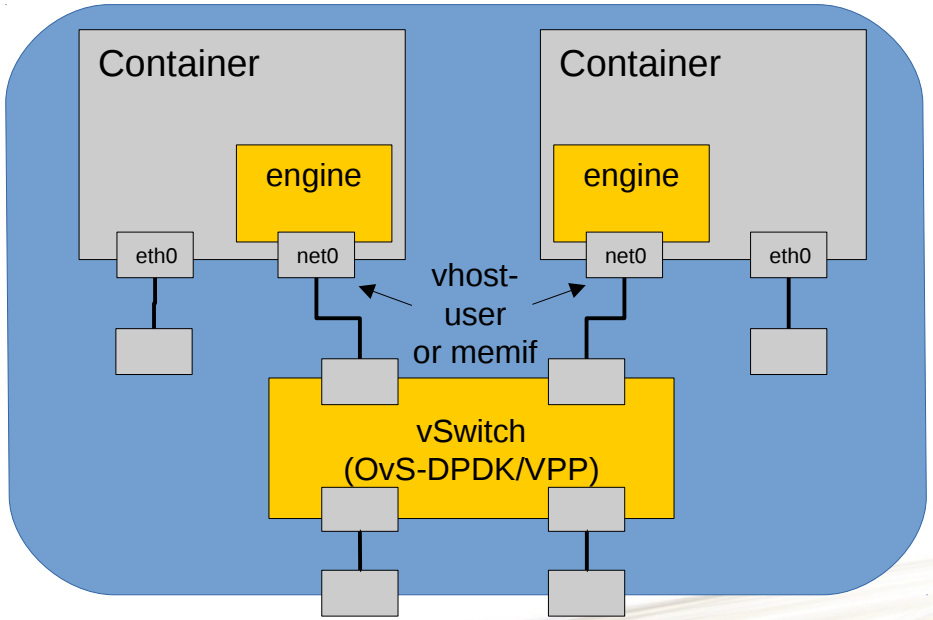


Multus CNI / Userspace CNI

Userspace CNI – More Detail

Steps:

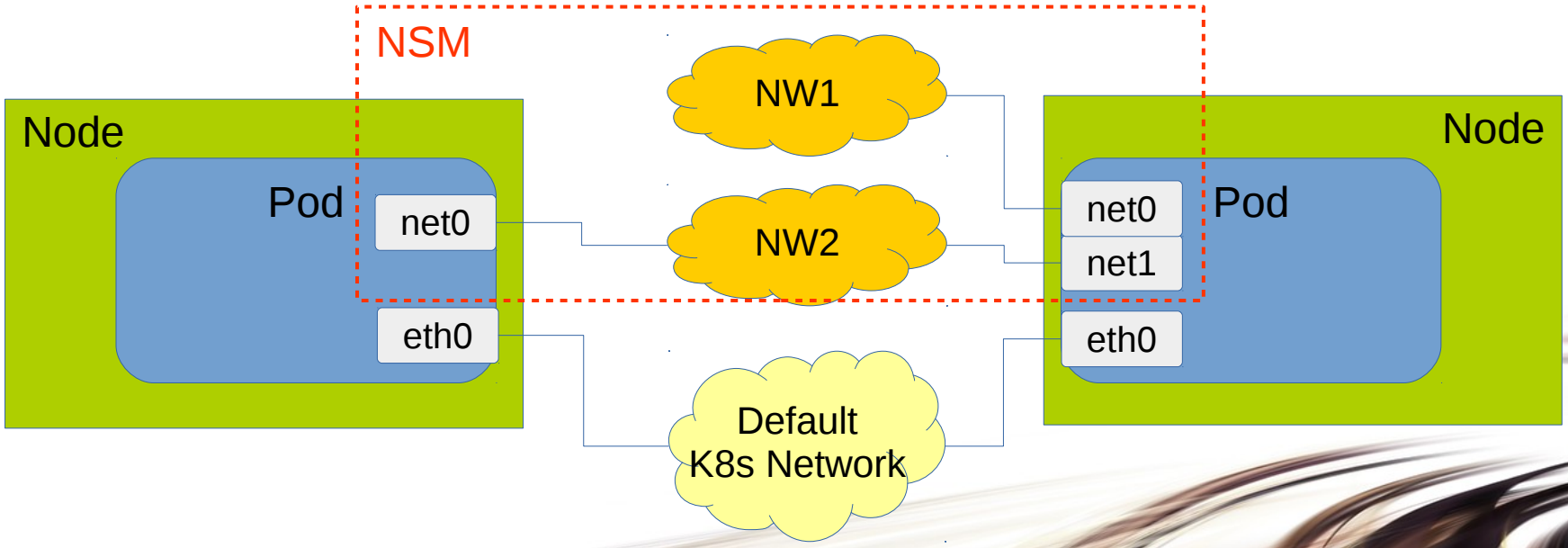
- Creates Userspace Interface in vSwitch on host.
- Ties interface into local network.
  - Current: L2 (North-South Traffic)
  - Future: MPLS/VxLAN/etc. (East-West Traffic)
- Publishes configuration data to Pod for consumption of interface in Pod.



Network Service Mesh (NSM)

What is Network Service Mesh (NSM)?

- NSM is a Service Abstraction that plugs containers into external networks (outside Kubernetes default network).
  - Pod to Pod
  - Pod to External Network



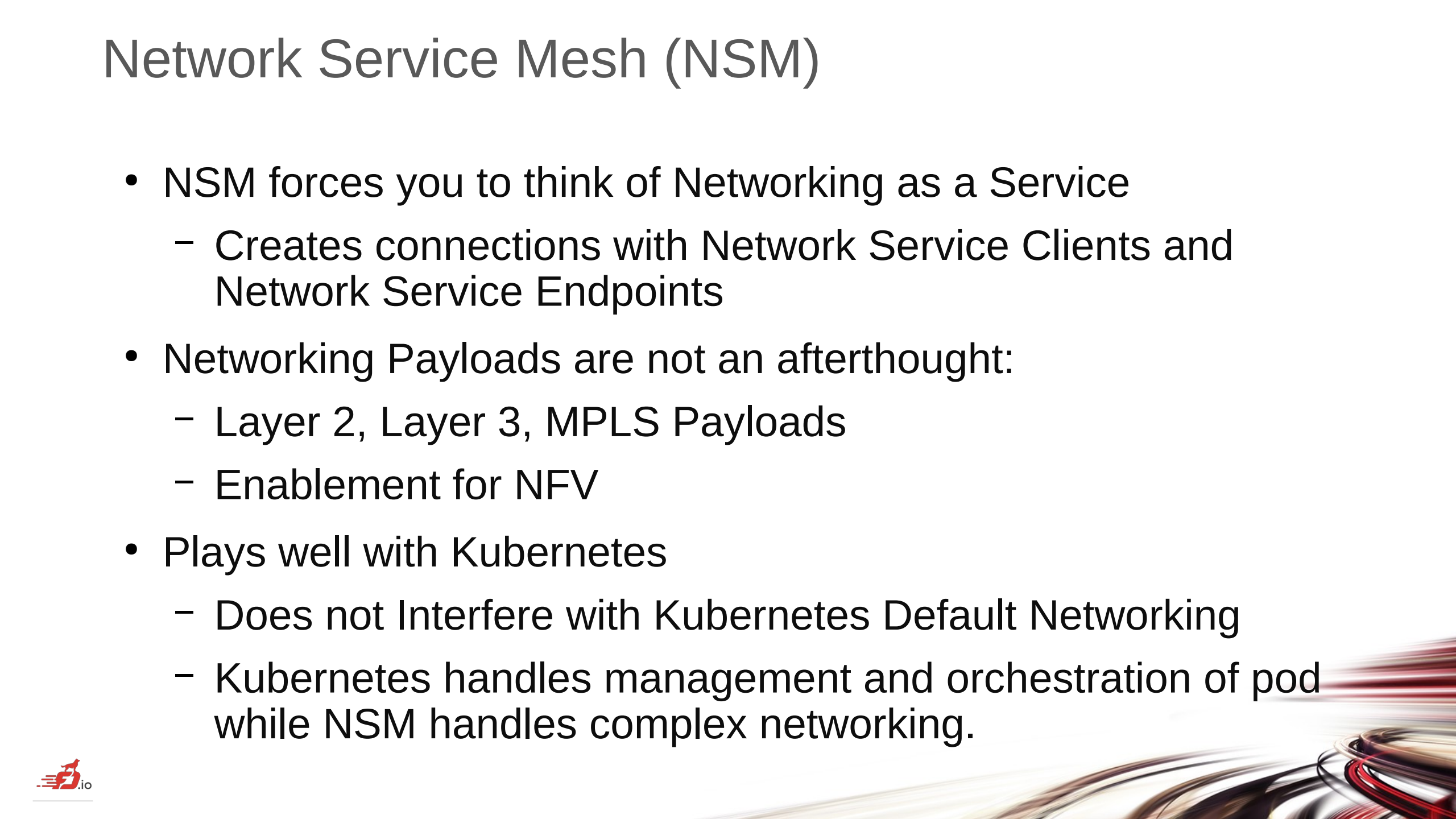
Network Service Mesh (NSM)

What is Network Service Mesh (NSM)?

- NSM enables:
  - Heterogeneous network configurations
  - Wide variety of tunneling protocols
  - On-Demand, dynamic, negotiated connections
  - Bringing multiple payload types into a container (Ethernet, IP, MPLS, L2TP, etc.)
- NSM facilitates apps specifically implement network functions.
- NSM allows traditional app developers to configure the networking elements they want while hiding the complexity and “networkiness”.

Network Service Mesh (NSM)

- NSM forces you to think of Networking as a Service
  - Creates connections with Network Service Clients and Network Service Endpoints
- Networking Payloads are not an afterthought:
  - Layer 2, Layer 3, MPLS Payloads
  - Enablement for NFV
- Plays well with Kubernetes
  - Does not Interfere with Kubernetes Default Networking
  - Kubernetes handles management and orchestration of pod while NSM handles complex networking.



Summary
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- Ligato inserts Userspace into the Kubernetes default network
- Large feature set

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- Early in development

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- Provides Service abstraction
- Inserts container networks outside the Kubernetes default network
- Could leverage Ligato or Multus if needed
- Early in development

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Depends on the use-case!
But all leverage the high speed and rich features of
VPP!

Summary

Call to Action!

All Projects Need Help:

- Coders
- Architects
- Valid Use Cases

How can you HELP?

THANK YOU !

References

- Ligato
  - https://ligato.io/
  - https://github.com/ligato
- Multus CNI
  - https://github.com/intel/multus-cni
  - Kubernetes Network Plumbing Working Group
- Userspace CNI
  - https://github.com/intel/userspace-cni-network-plugin
- NSM
  - https://networkservicemesh.io/
  - https://github.com/networkservicemesh/networkservicemesh