



OPEN SOURCE NETWORKING DAYS

Networking challenge in Container based NFV and our solution

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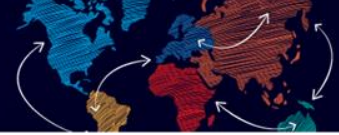
2018-10-12

Agenda



- Why container and Kubernetes
- what Challenges for NFV service
- Knitter solution

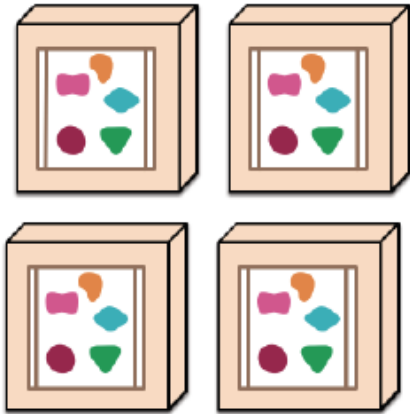
From Monolith to Microservice Architecture



A monolithic application puts all its functionality into a single process...



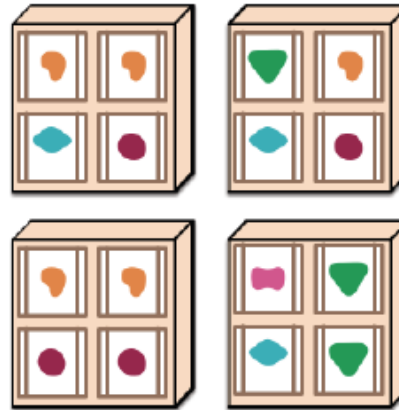
... and scales by replicating the monolith on multiple servers



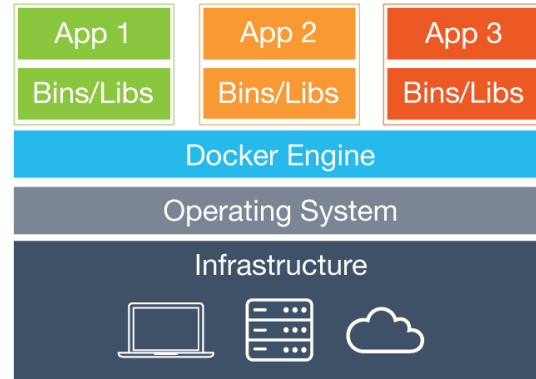
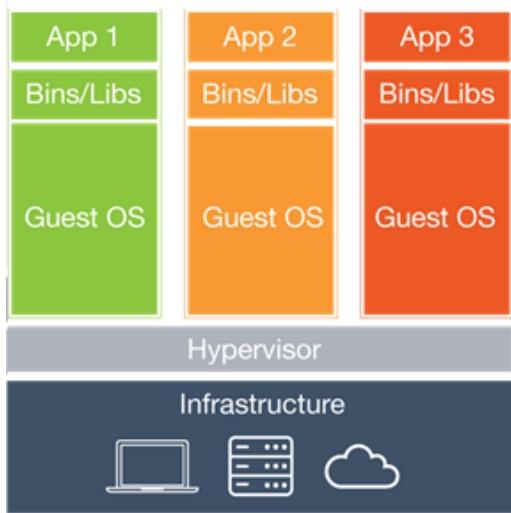
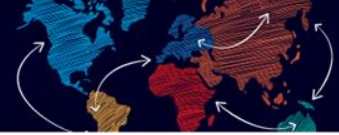
A microservices architecture puts each element of functionality into a separate service...



... and scales by distributing these services across servers, replicating as needed.

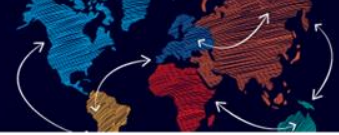


Container vs VM

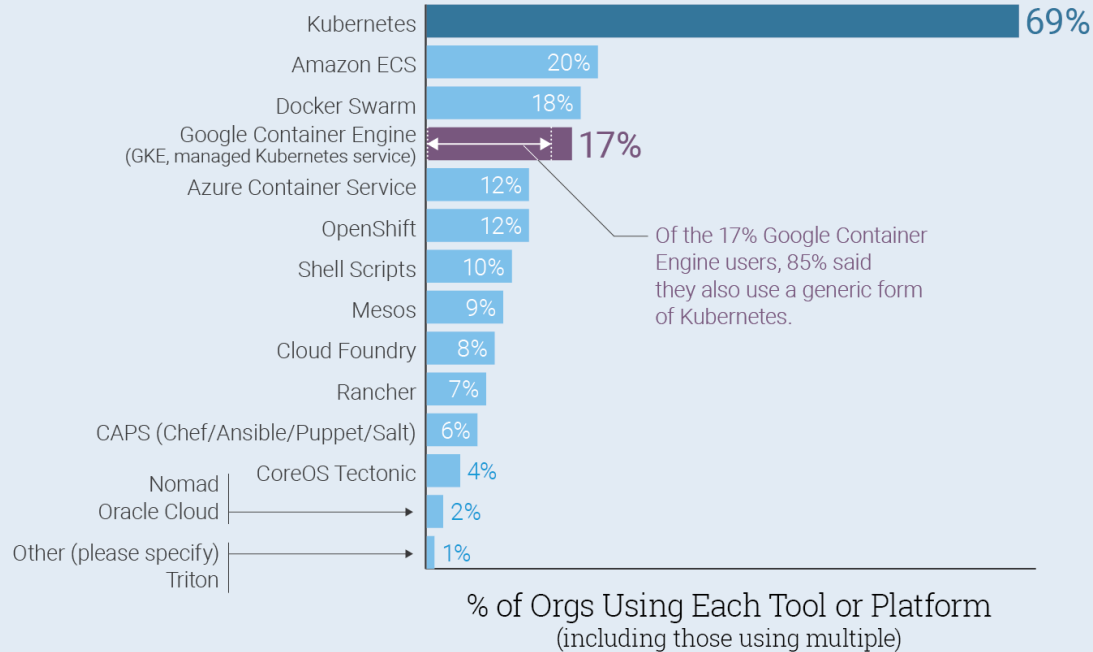


- **Lighter** : Smaller Image and memory consume
- **Faster** : Quick deployment and Startup
- **Agiler** : Easy Ship, install and migration

why Kubernetes?



Kubernetes Manages Containers at 69% of Organizations Surveyed

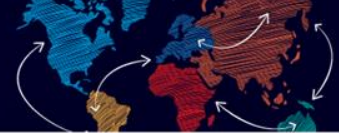


Source: The New Stack Analysis of Cloud Native Computing Foundation survey conducted in Fall 2017.
Q. Your organization manages containers with... (check all that apply)? n=763.

THE NEW STACK

source: <https://thenewstack.io/data-says-kubernetes-deployment-patterns/>

What Kubernetes offer?



service deploy and discovery



container scheduling base resource



Automated scaling and Failure self-heal



stateful service



container storage, PV/PVC

.....

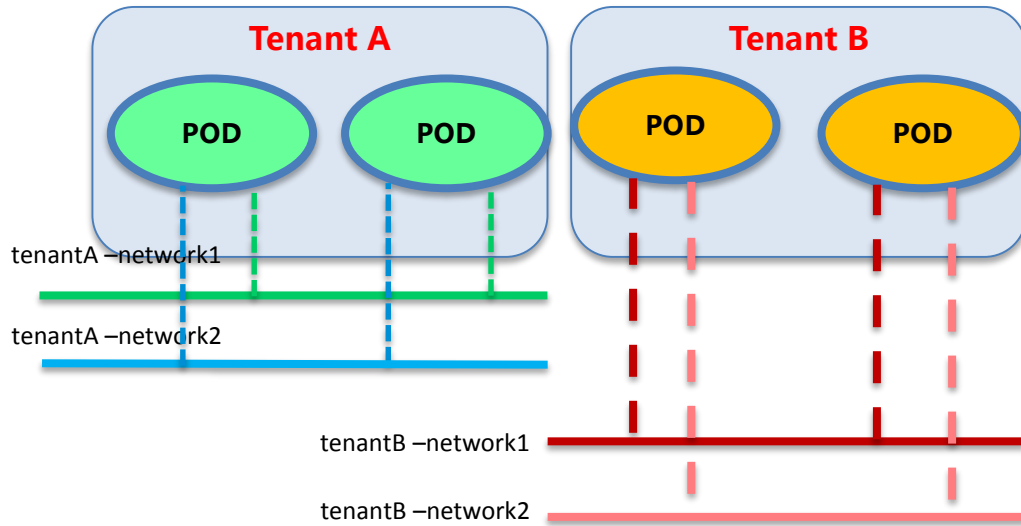
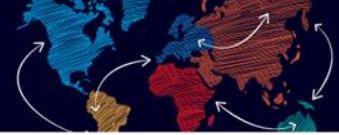


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Challenges : Network Isolation/SLA



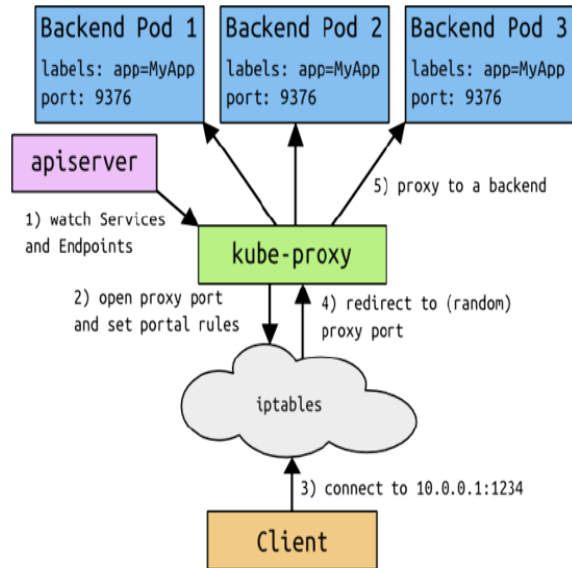
K8S network :

- Single network plane.

Challenge scenarios:

- NFV service needs multiple network
- multiple tenant
- Multiple Physical Networks:
 - Isolation
 - QoS

Challenges: Service Registration and Discovery



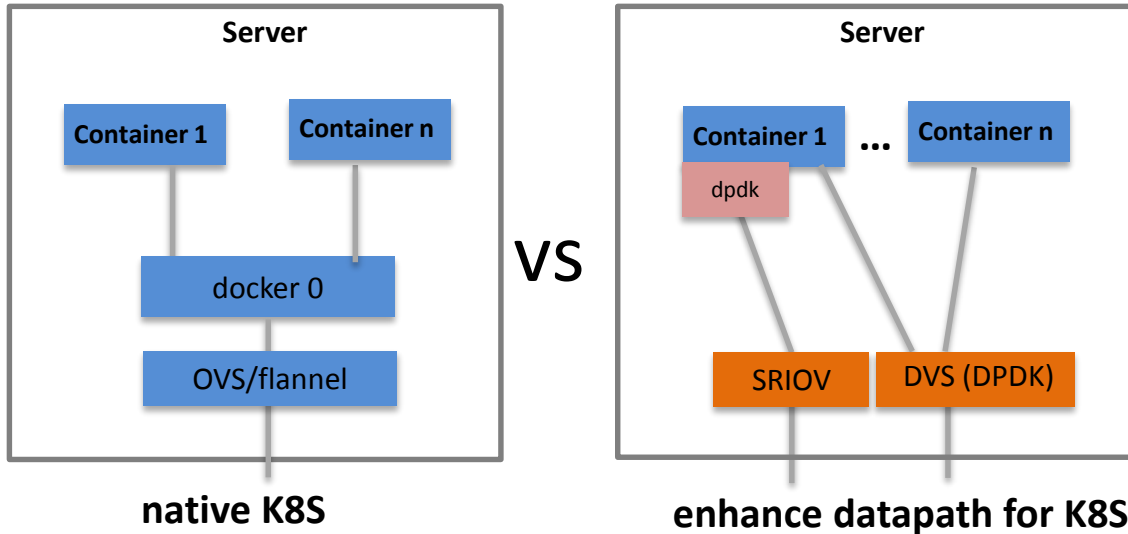
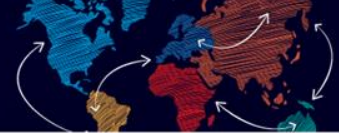
K8S service mechanism :

- kubeproxy can only balance the data flow of eth0.
- Kubeproxy route to backend POD by using iptables.

Challenge Scenarios:

- kubeproxy relay on kernel Iptables , NFV service need more High performance mechanism.

Challenges : enhanced datapath



K8S+flannel mechanism :

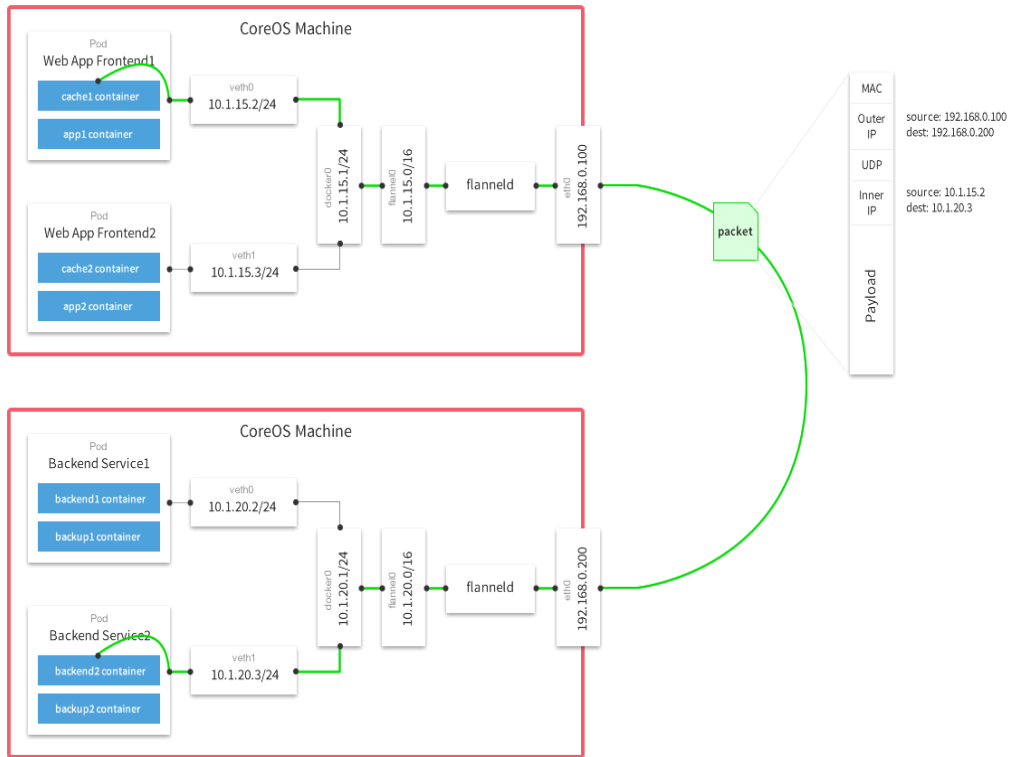
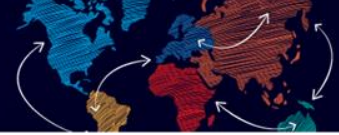
- use docker0 to transfer data.

Challenge Scenarios:

■ enhanced container datapath:

- DVS
- SRIOV
- DPDK

Challenges: fixed Container IP



K8S+flannel mechanism :

- each node has a subnet IP pool , different node has different pool.
- when each pod create, POD's IP is allocated Dynamically from node IP pools.

Challenge Scenarios:

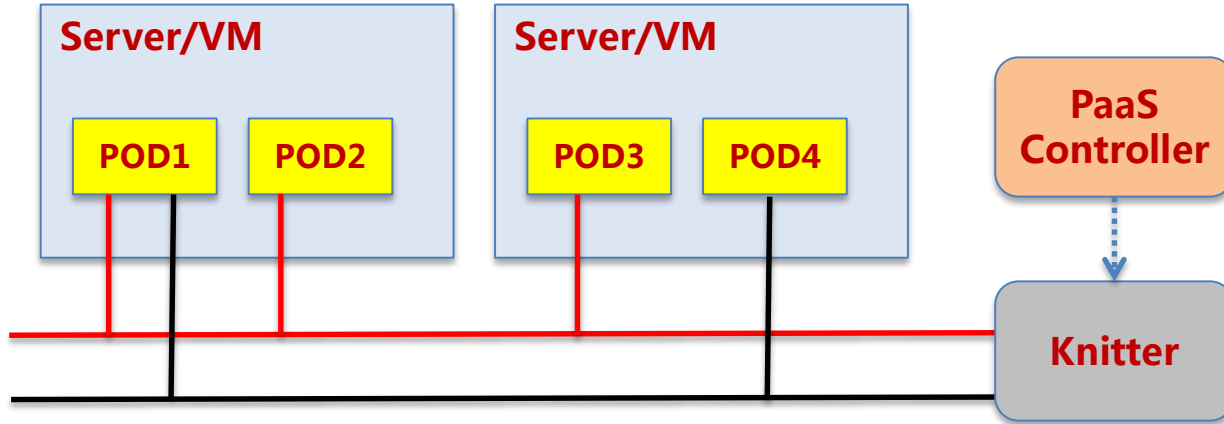
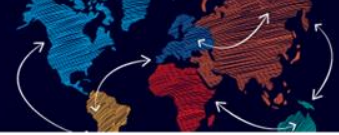
- stateful service (stateful POD) need stable pod name, storage, IP address. when stateful POD recreated in another node, it hard to keep IP unchanged.

Agenda



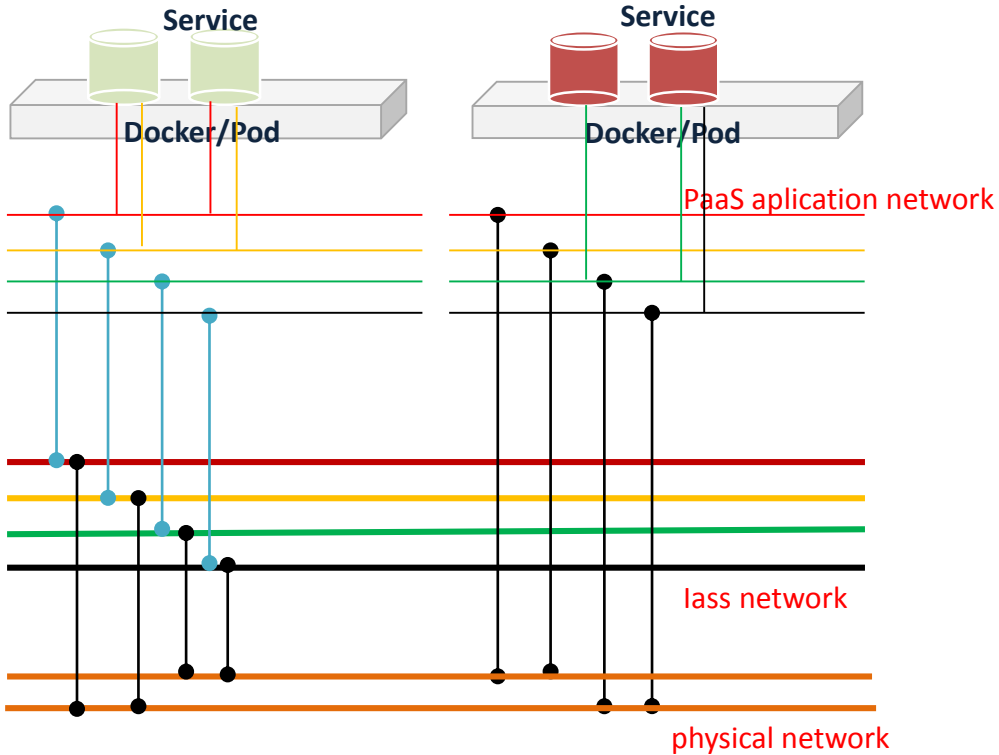
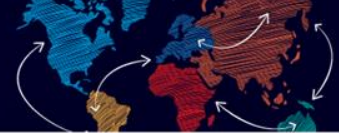
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multi-Network Solution



- PaaS over IaaS(underlay): based on Neutron Network of OpenStack
- PaaS over Baremetal: based on Knitter solution

Layered network structure

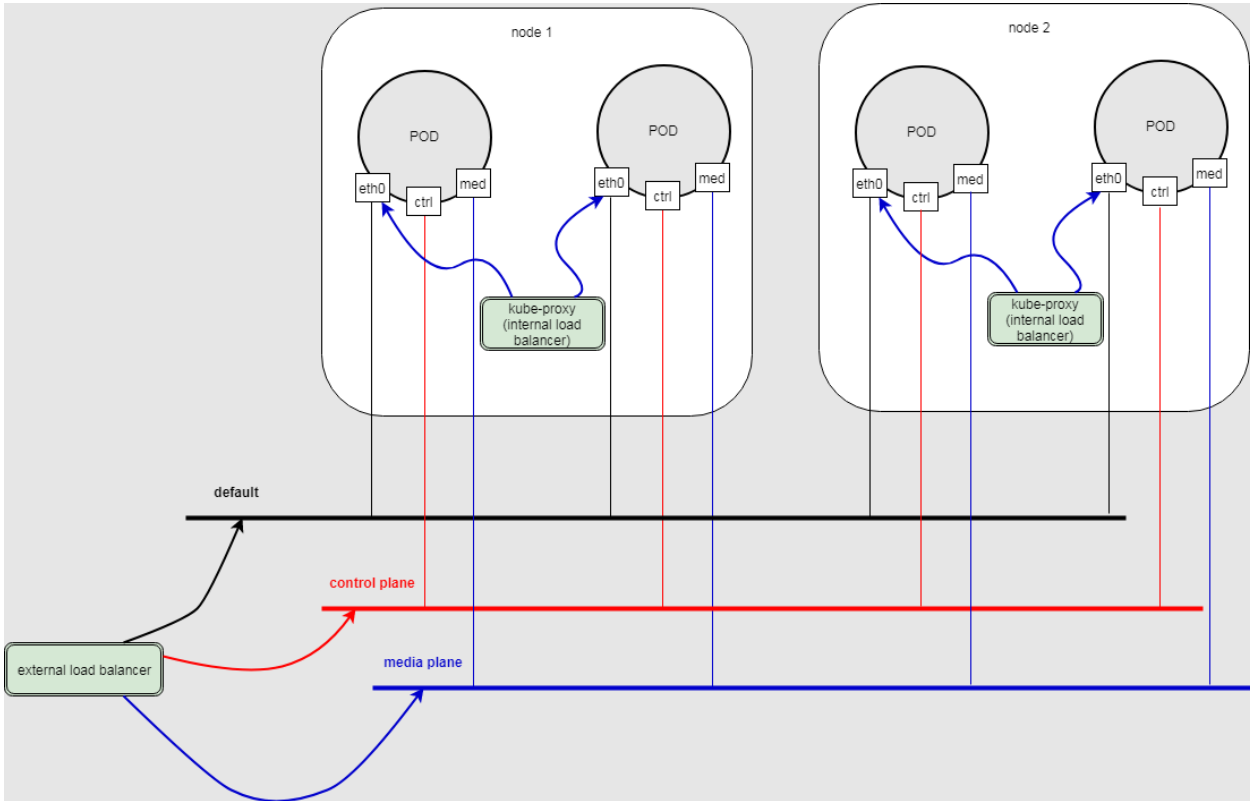
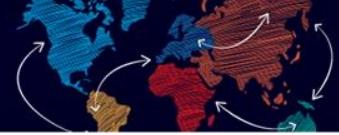


■ application network

■ IaaS network

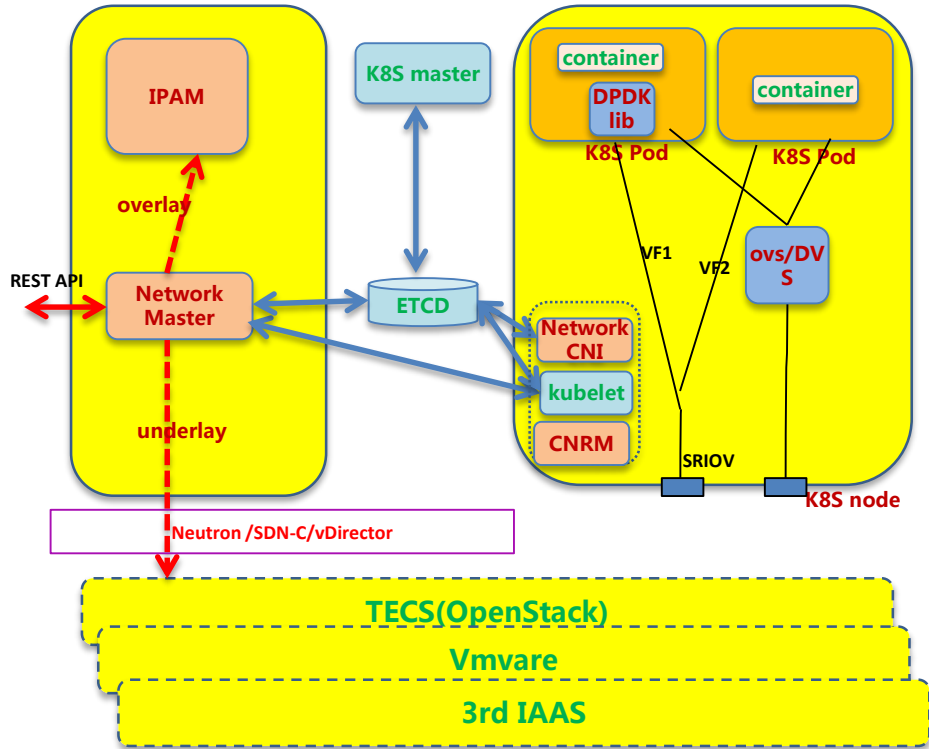
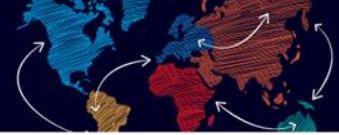
■ physical network

Service Solution



- default network use native K8S kube-proxy service Mechanism.
- additional network use self-defined load balance Mechanism.

Knitter network Component



- underlay network:
 - ZTE OpenStack(TECS)
 - 3rd IaaS
 - baremetal
- POD network interface
 - SRIOV
 - OVS/DVS
 - DPDK



Q&A

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

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