Container Networking Fundamentals - Part 2

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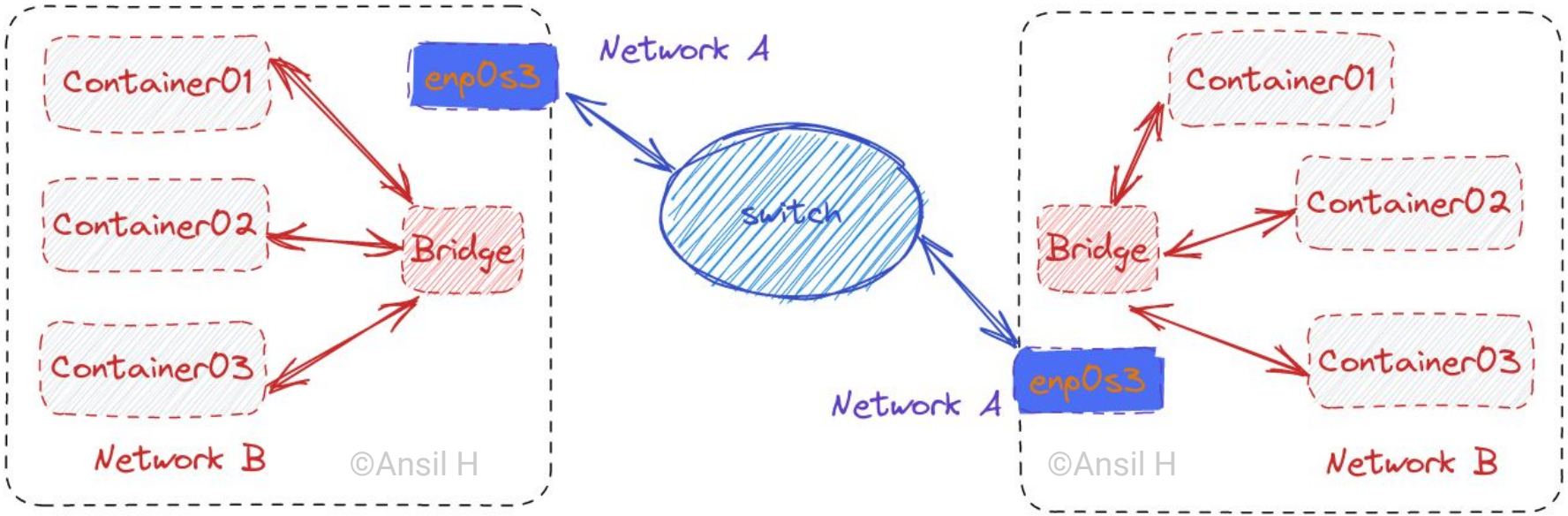
VXLAN

Virtual Extensible LAN - VXLAN



VXLAN

- Packet encapsulation
- TCP packet inside UDP
- Maximum Transfer Unit

MTU 1450

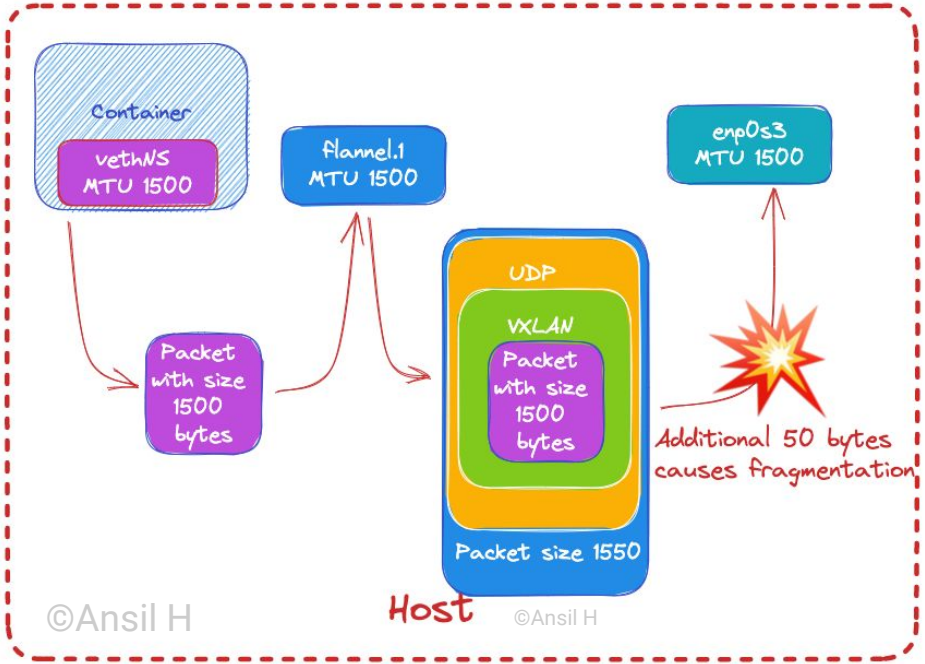
The default MTU is 1500 in network interfaces.
If we keep the default value inside the container, the MTU may exceed the limit after encapsulation

14 Outer Ethernet header (Mac header)
20 byte Outer IP header
8 byte UDP header
8 byte VXLAN header
1500 byte payload which includes the original IP header/s.

Total = 1550 bytes which exceeds the default MTU.

We need to set the MTU to 1450 for the Virtual Eth devices so that the MTU will not exceed after encapsulation,

VXLAN - MTU


Container
vethNS
MTU 1500
flannel.1
MTU 1500
enp0s3
MTU 1500
UDP
VXLAN
Packet
with size
1500
bytes
Packet
with size
1500
bytes
Additional 50 bytes
causes fragmentation
Packet size 1550
Host
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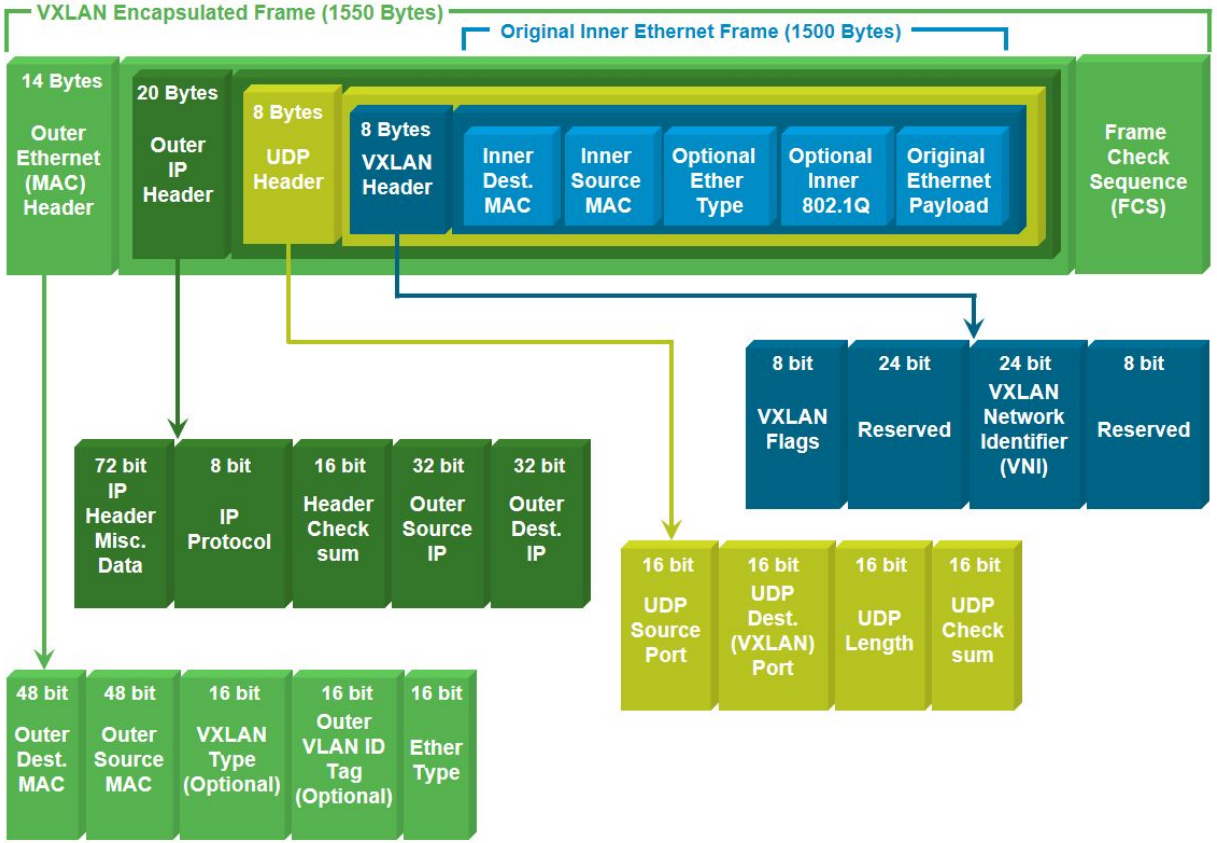
VXLAN Packet



Ref: https://www.oreilly.com/library/view/vmware-nsx-cookbook/9781782174257/7d2a65f0-fadc-4bb9-a507-b25db0886e51.xhtml

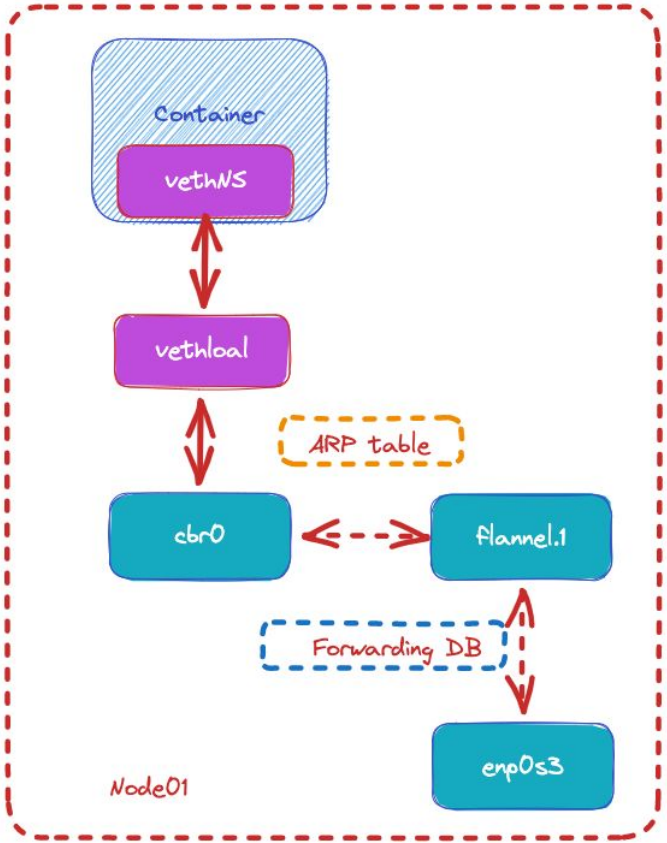
Flannel

CNI

Specifications and libraries for writing plugins that to configure network interfaces in Linux containers

Flannel - Flannel is a simple and easy way to configure a layer 3 network fabric designed for Kubernetes.

Flannel


Container
vethNS
vethloal
ARP table
cbr0
flannel.1
Forwarding DB
enp0s3
Node01

VXLAN - Demo

- Create two containers
- Add a veth pair
- Create bridge
- Add veth pair ends to bridge
- Setup etcd
- Start flannel
- Configure IPs and setup packet forwarding

Flannel

A network fabric for containers

- Assign subnet to each nodes
- Create flannel VXLAN interface
- Create and sync bridge forwarding database

Flannel in Kubernetes

The ARP entry

The Forwarding DB

Encapsulation

Decapsulation

VXLAN Packet tracing

Q&A