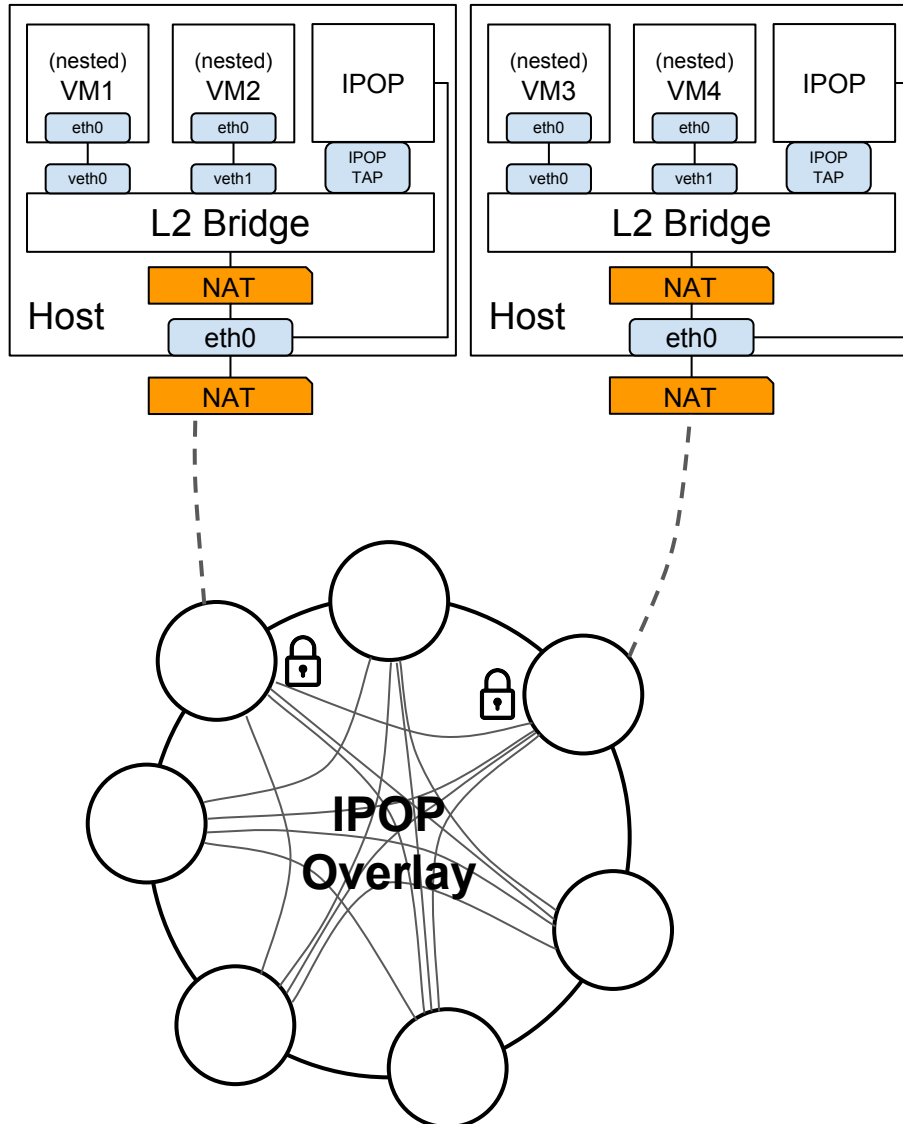


Overlay and SDN Hybrid for Seamless High Performance Virtual Network

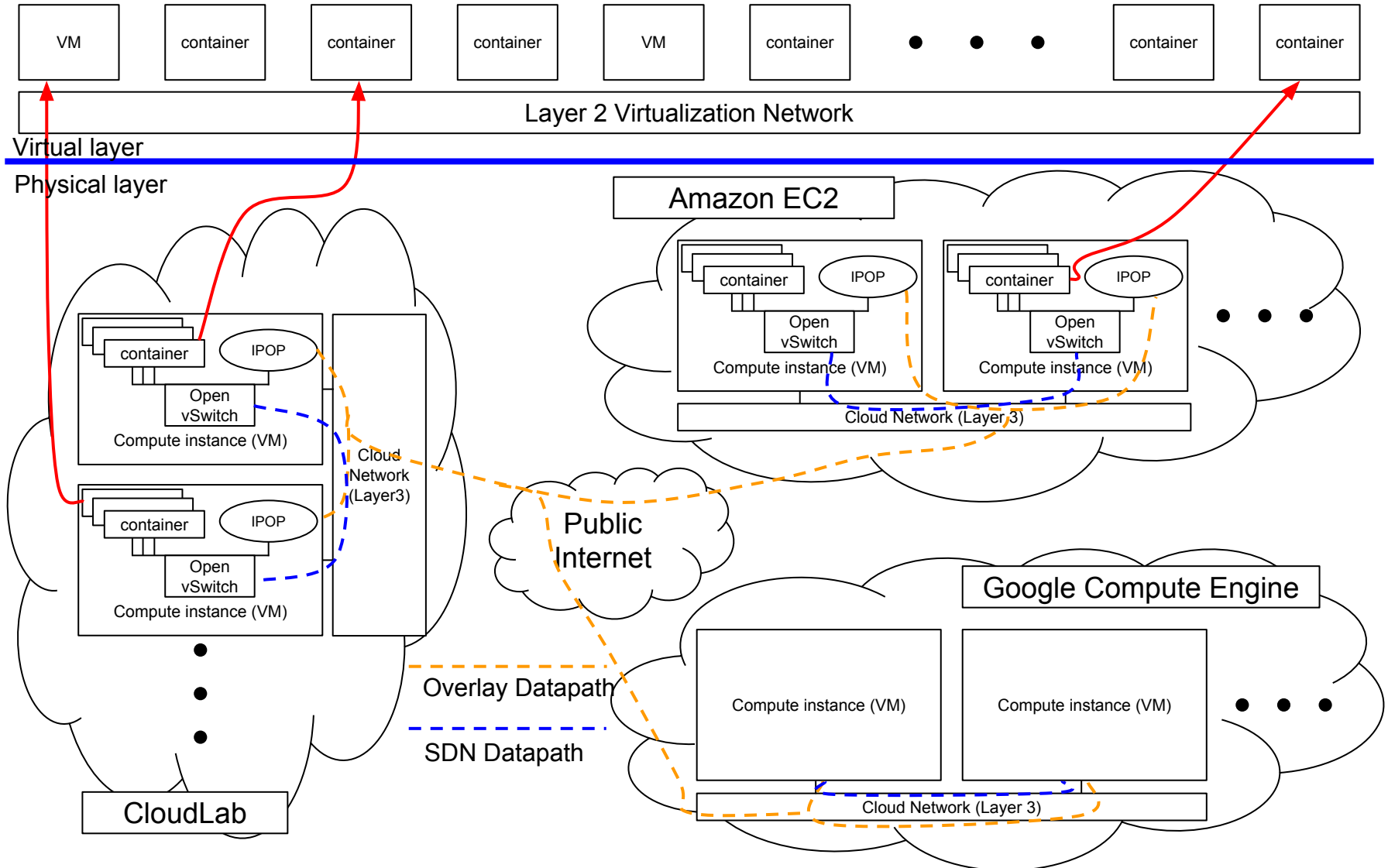
Kyuho Jeong (UF)
Kohei Ichikawa (NAIST)
Renato Figueiredo (UF)

IPOP Recap



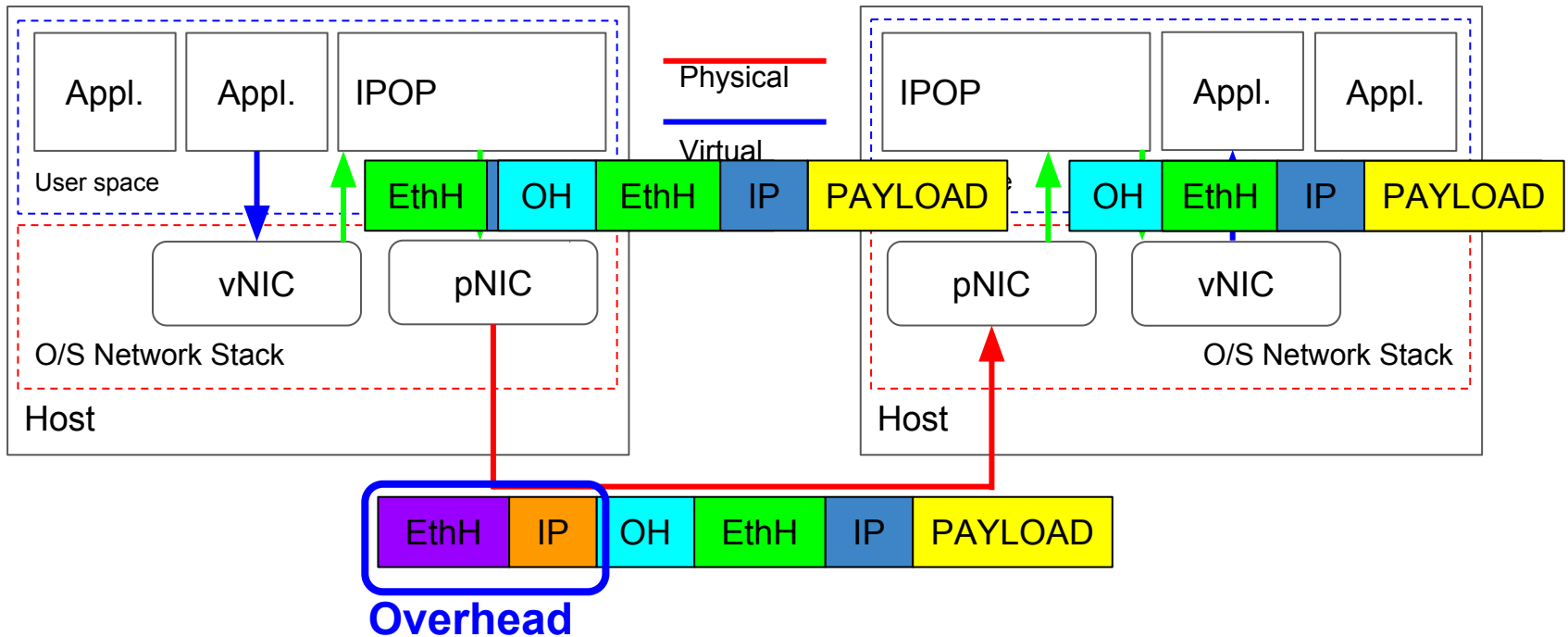
- Create direct P2P virtual tunnel across multiple NAT/Firewall using ICE protocol
- Each virtual tunnel is mapped to either MAC or IP address
- Tap device to interface with O/S network stack
- Packets are encapsulated by IP/UDP header.
- Runs in application layer
- N2N Encryption (DTLS)

IPOP Deployment across Internet



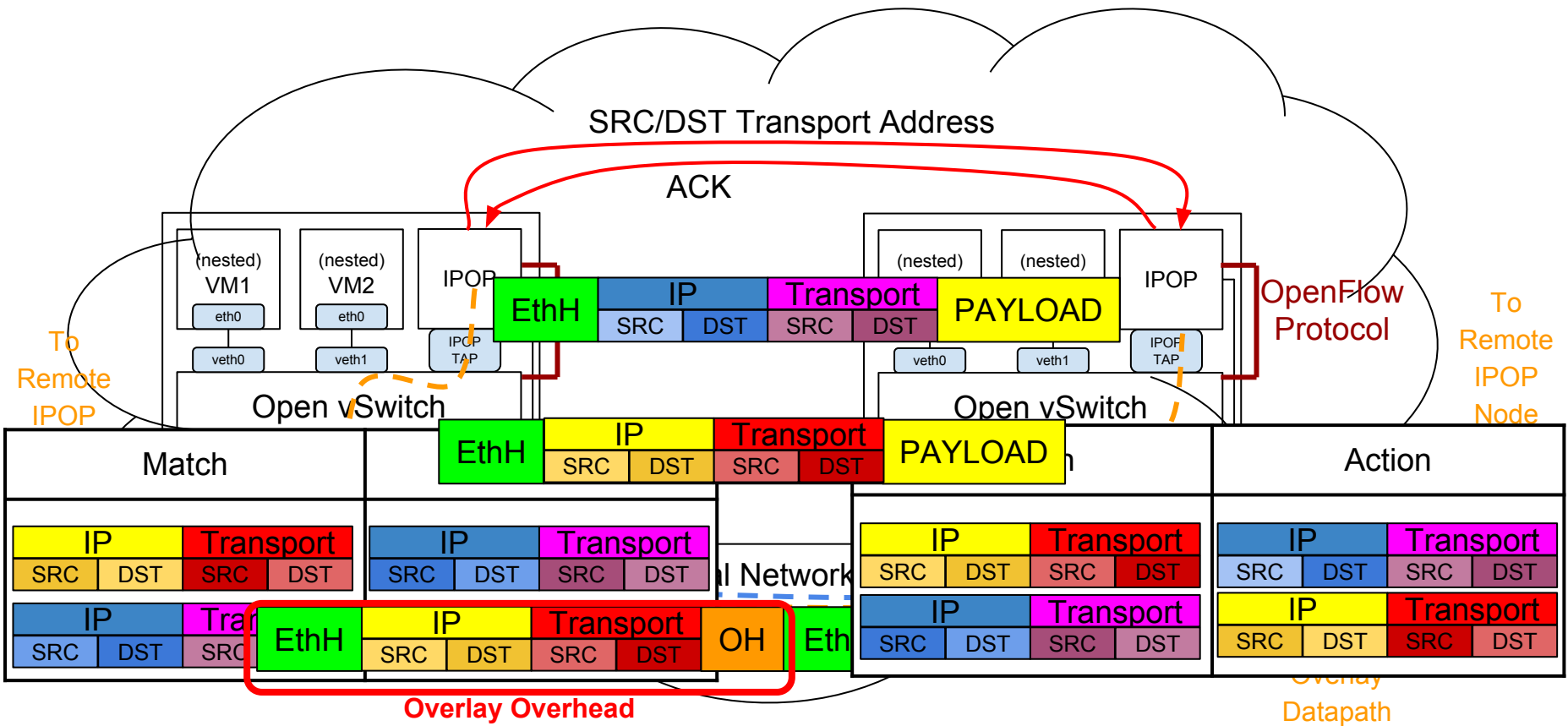
Conventional IPOP (Encapsulation)

- From the end-point encapsulation in application/kernel ([Overlay Network](#))



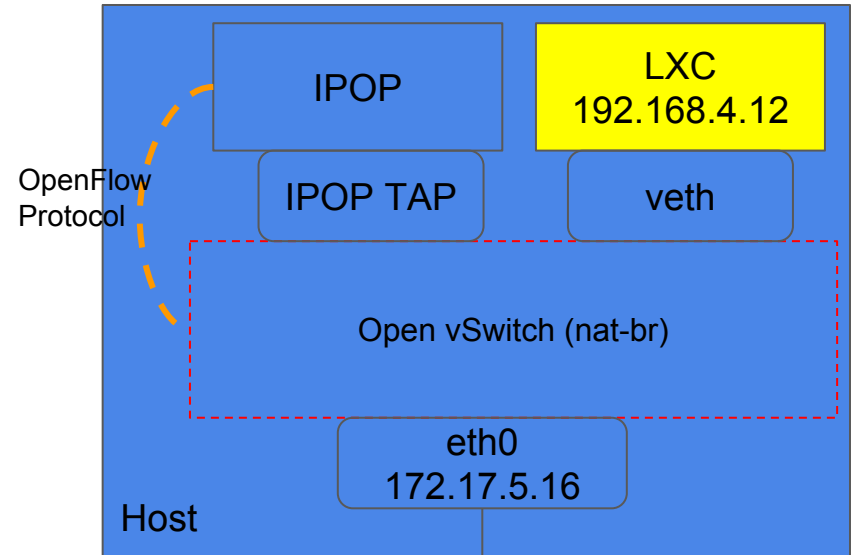
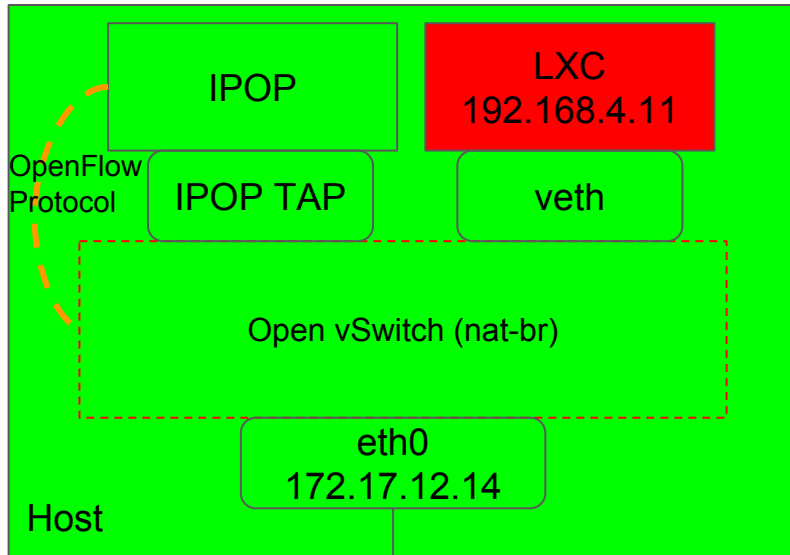
- Overheads
 - Increased header → Reduced MTU and payload
 - Encapsulation process
 - Possible Context Switching between kernel/userspace

Encapsulation bypass using SDN



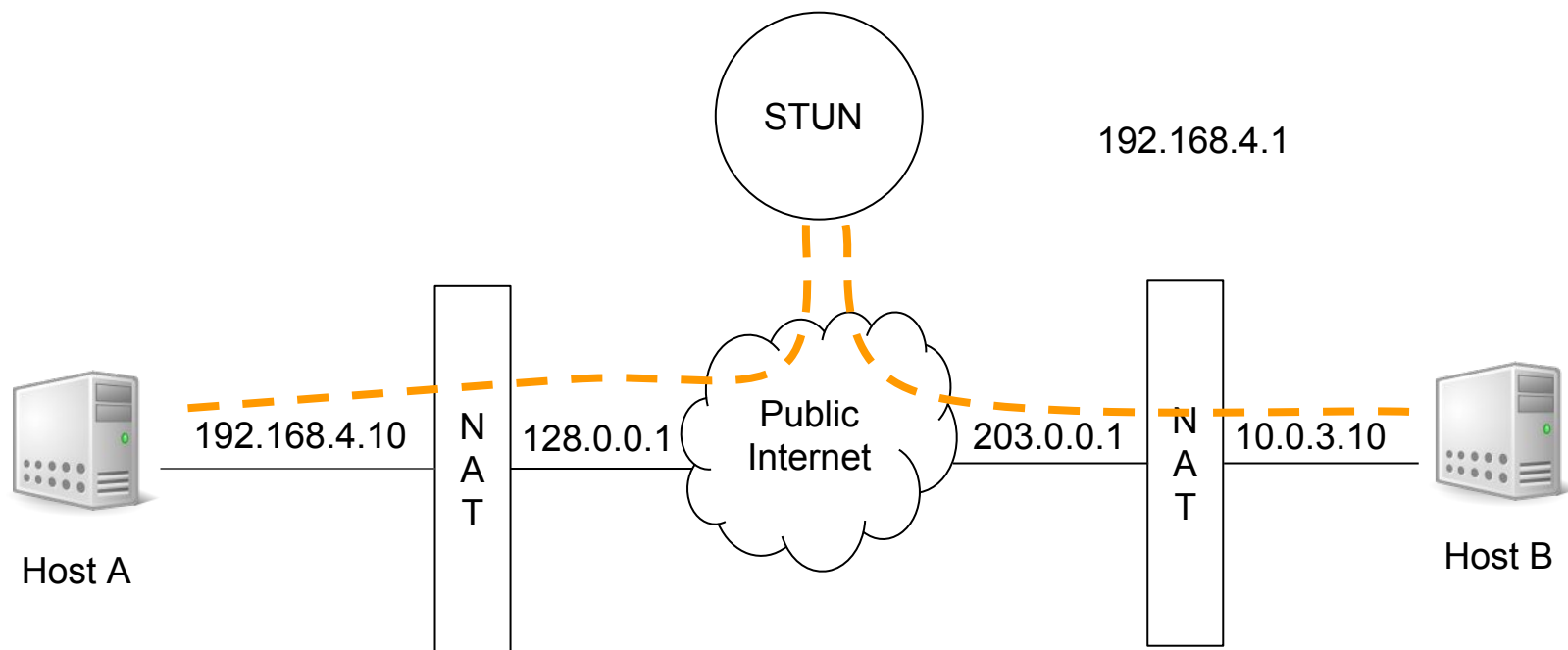
- VIAS detects traffic intensive traffic (TCP/UDP) on overlay datapath
- VIAS coordinates with remote node and program SDN devices
- ARP, ICMP, IP Multicast virtualizes on overlay datapath

Demonstration



Backup Slides

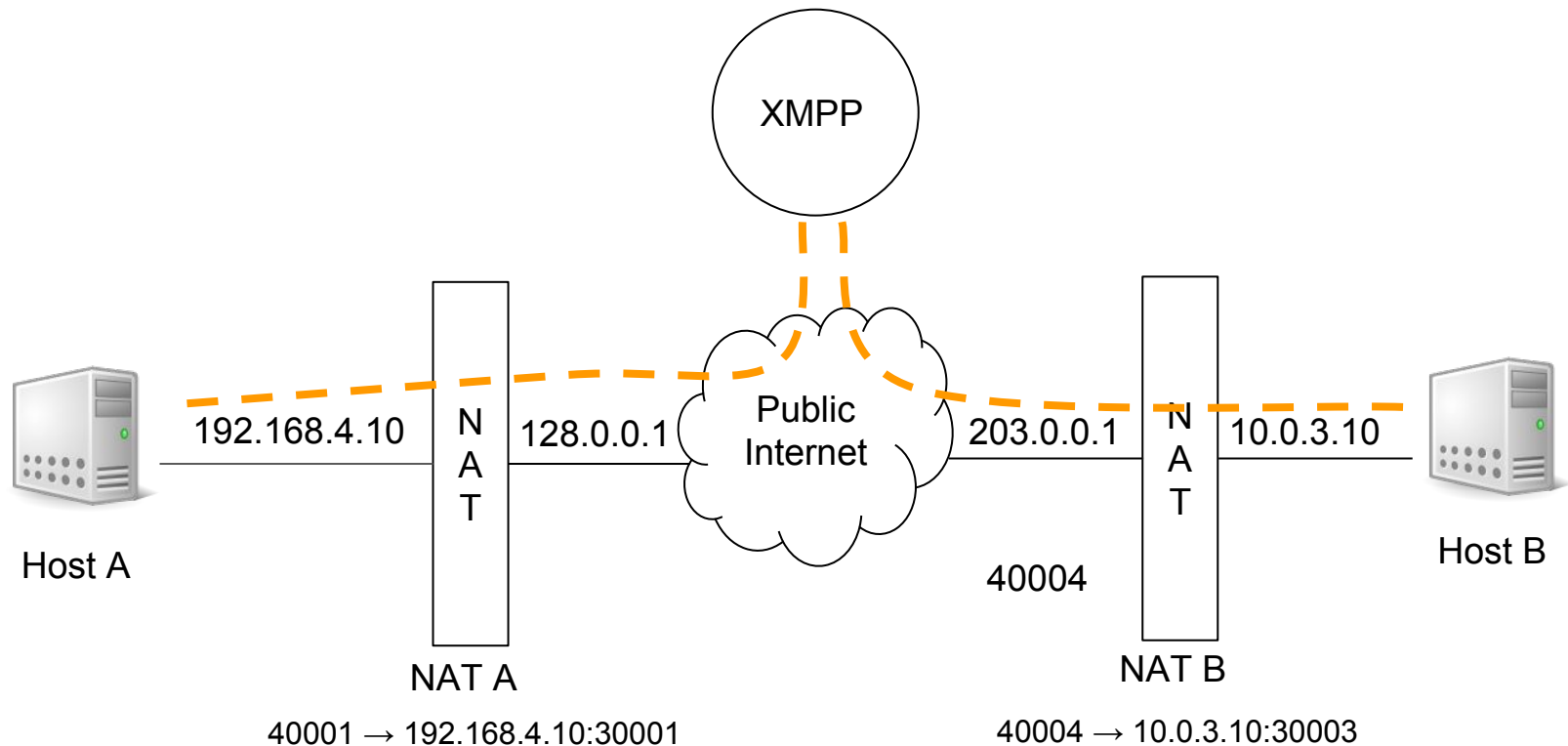
ICE(Interactive Connectivity Establishment) Protocol



Candidate strings of Host A
192.168.4.10:30001 128.0.0.1:40001

Candidate strings of Host B
10.0.3.10:30003 203.0.0.1:40004

ICE(Interactive Connectivity Establishment) Protocol



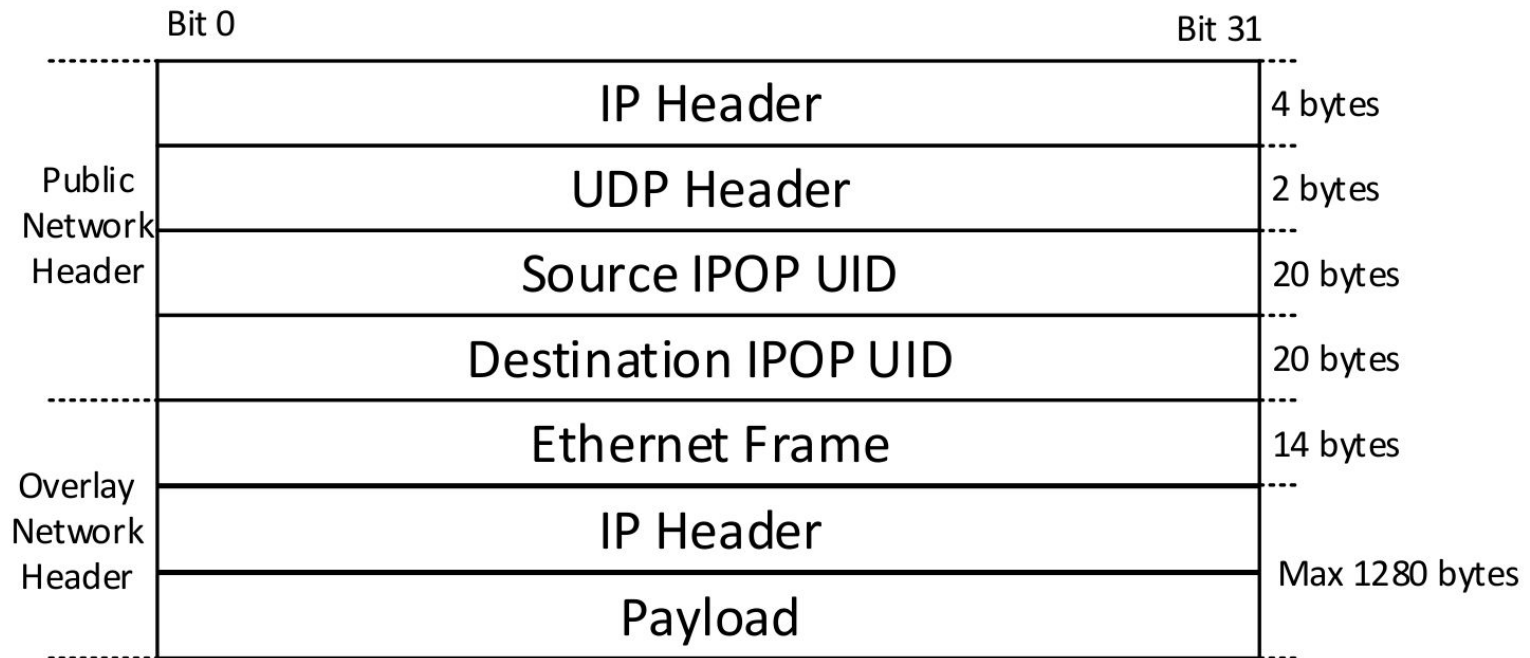
Exchange each other's candidate string through XMPP.
Create direct P2P link between Host A and Host B.

IPOP Overlay Network

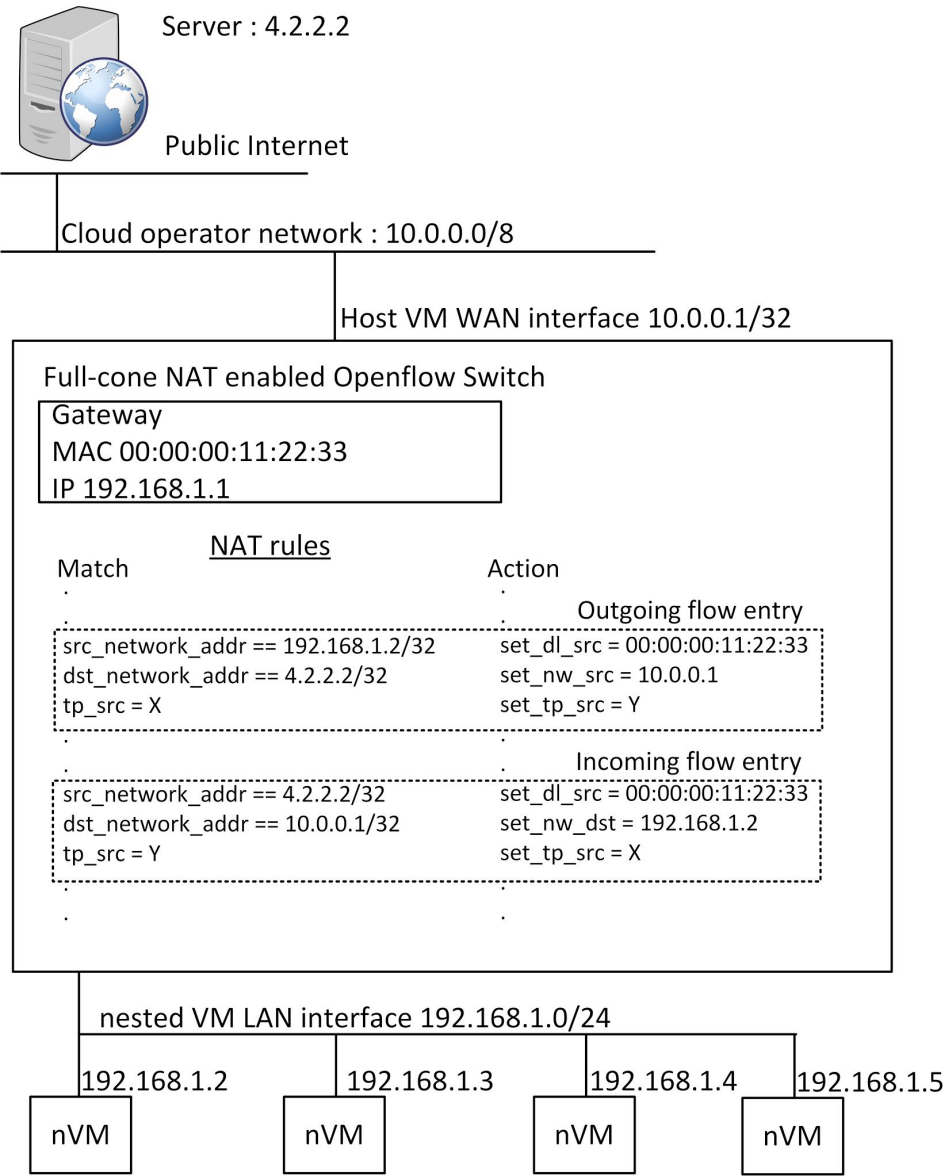
Use ICE protocol to create direct P2P link

Create overlay network topology upon direct P2P link

Encapsulate whole ethernet frame with IPOP and UDP header



Implementation of SDN NAT featured switch



- Full-cone NAT
- NAT has higher priority than switching
- ICMP packets not implementable

i.e.) nVM(192.168.1.2) starts TCP session with server with port number X.

VIAS picks up port number Y from available port number