

Introduction to Neutron

Network as a Service

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The Why

- The first slide is always a giant graph
- Forget graphs, why Neutron?
 - Tenant connectivity and isolation
 - Network virtualization – Tenant creates his own network(s), router(s), allowing complex network topologies for multi-tier applications
 - *aaS

Network Virtualization Example

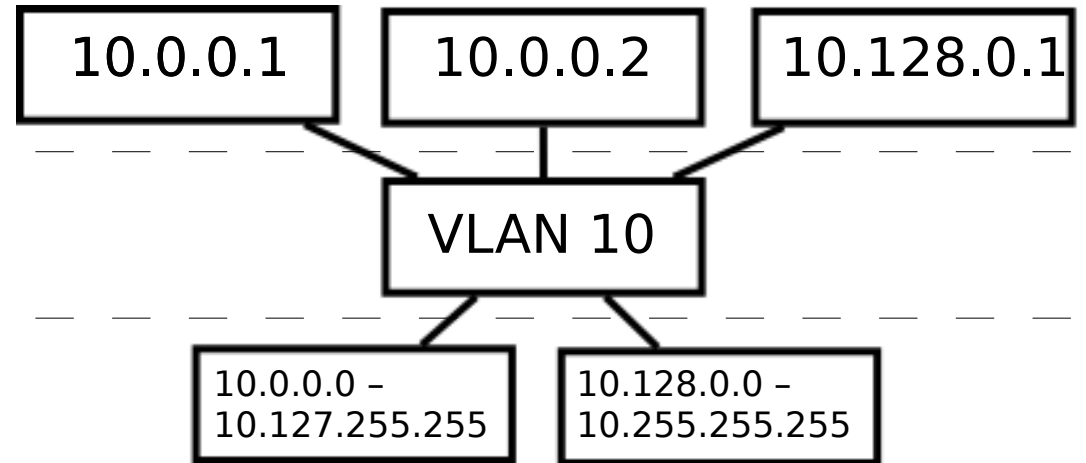
- Create a network
 - Connect the new private network to the public network
 - Create a DB instance
 - Create three web servers
 - Make DB accessible exclusively by web servers
 - Create a load balancer to the web servers
 - Attach a floating IP to the load balancer
 - Filter anything other than incoming HTTP(s) traffic
- All done logically, in software, via the GUI, API or CLI

Core Concepts

Ports

Network

Subnets

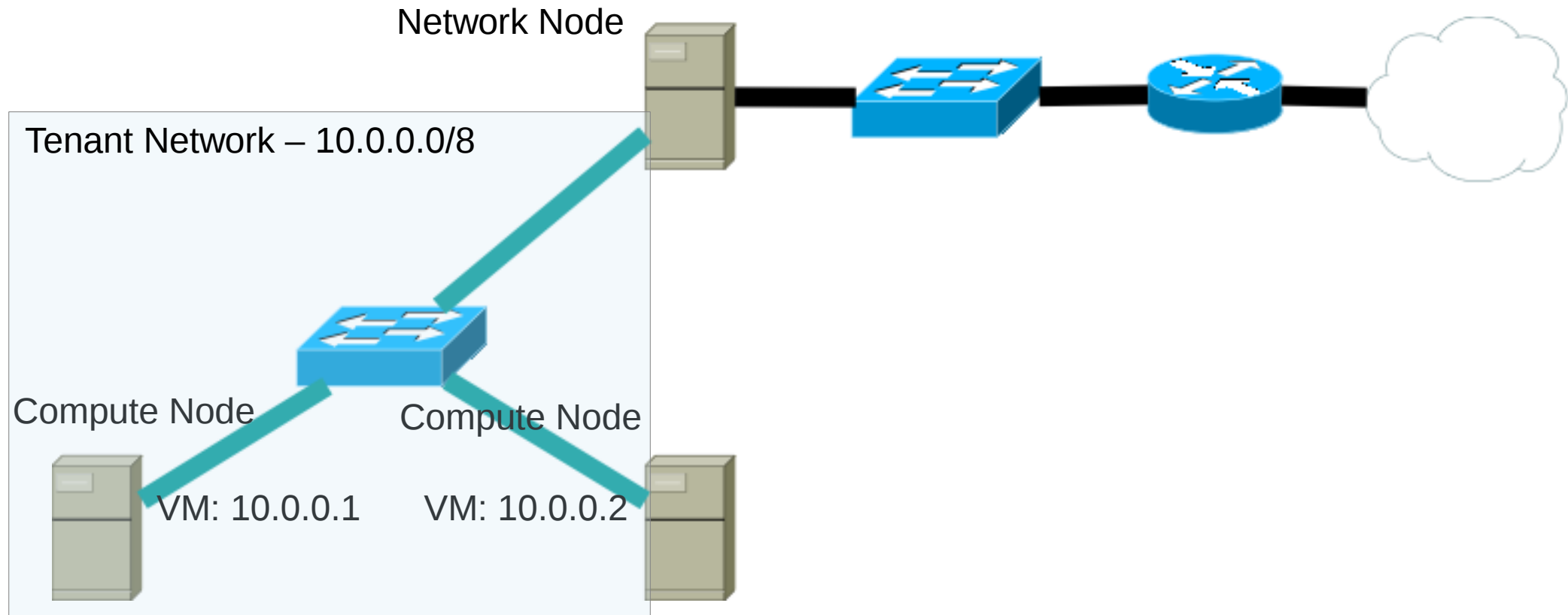


Network Types

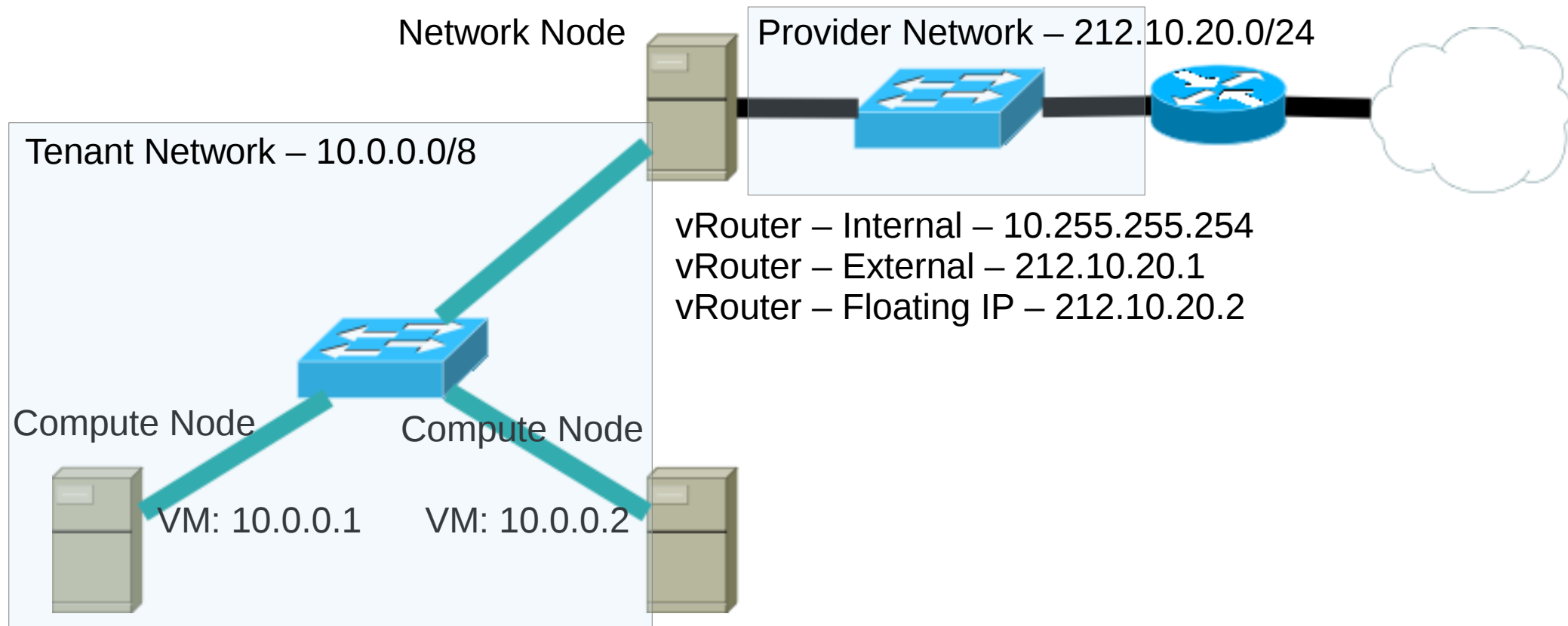
- External network - Internet routable network
- Provider network - Created by admin, mapped to pre-existing network in datacenter, used for external networks*
- Tenant network - Self provisioned network, isolated from other tenants, optionally connected to other tenant and external networks

* VMs may also be directly connected to provider networks

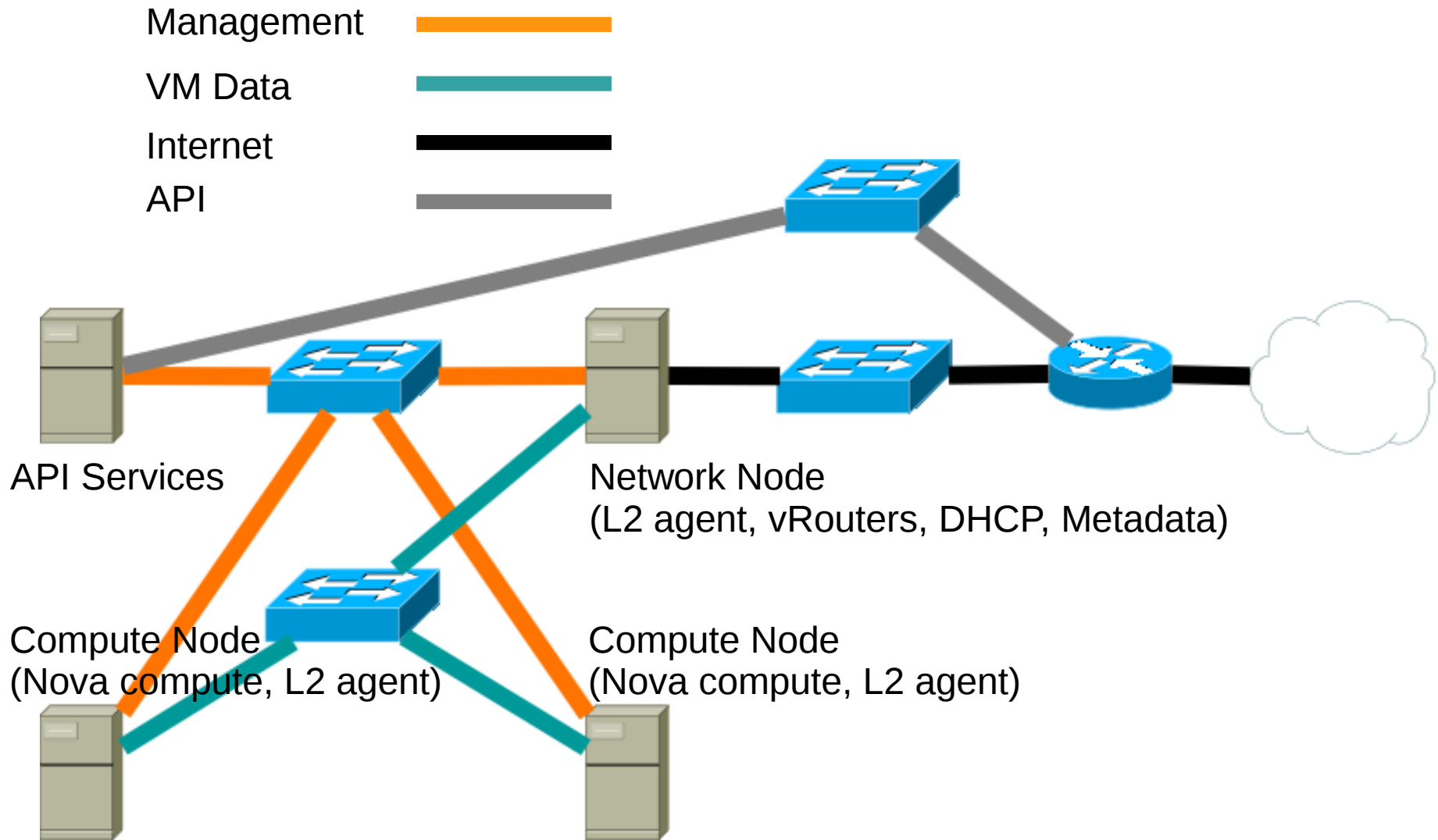
Routers, NAT, Floating IPs



Routers, NAT, Floating IPs



Components



Components

API Node:

Neutron

Nova

Keystone

Glance

Swift

Cinder

...

Optionally SQL Database

Optionally AMQP Broker



Network Node:

L2 Agent

L3 Agent

DHCP Agent

Metadata Agent

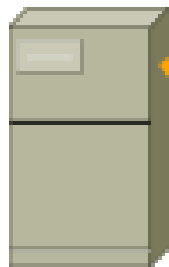
Optionally LB,
VPN and FW
agents



Compute Node:

L2 Agent

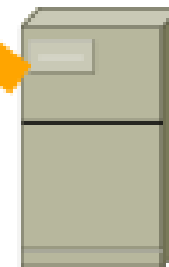
Nova Compute



Compute Node:

L2 Agent

Nova Compute



Components

API

- Neutron Service - Accepts API requests, handles DB

Network
Node

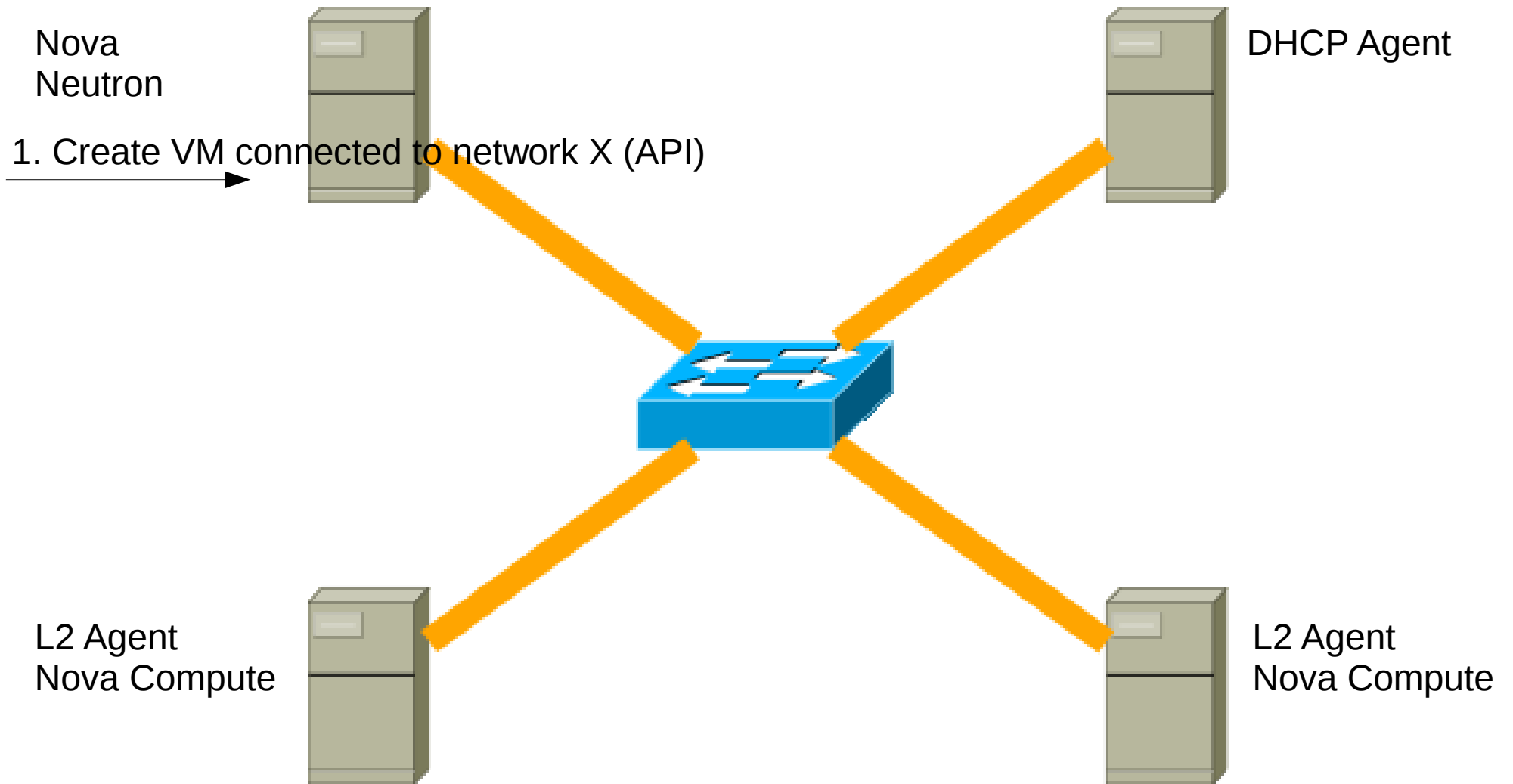
- L3 Agent - Manages virtual routers
- DHCP Agent - Manages dnsmasq instances
- Metadata Agent - Proxy to Nova metadata service

Compute

- L2 Agent - Manages networking on compute node - OVS flows / Linux bridges, VLAN tagging, security groups

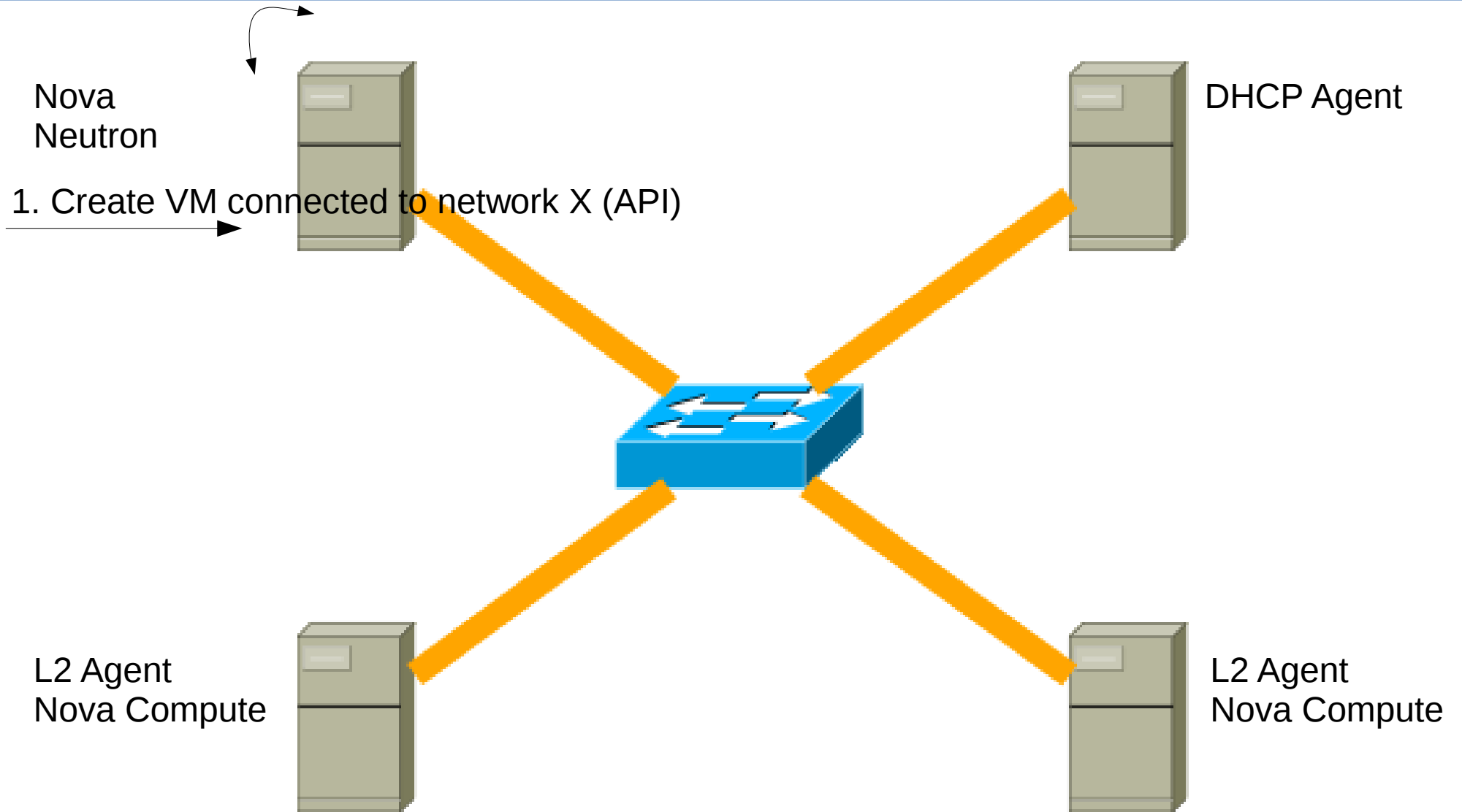
* Components talk via RPC

Nova <--> Neutron Interaction



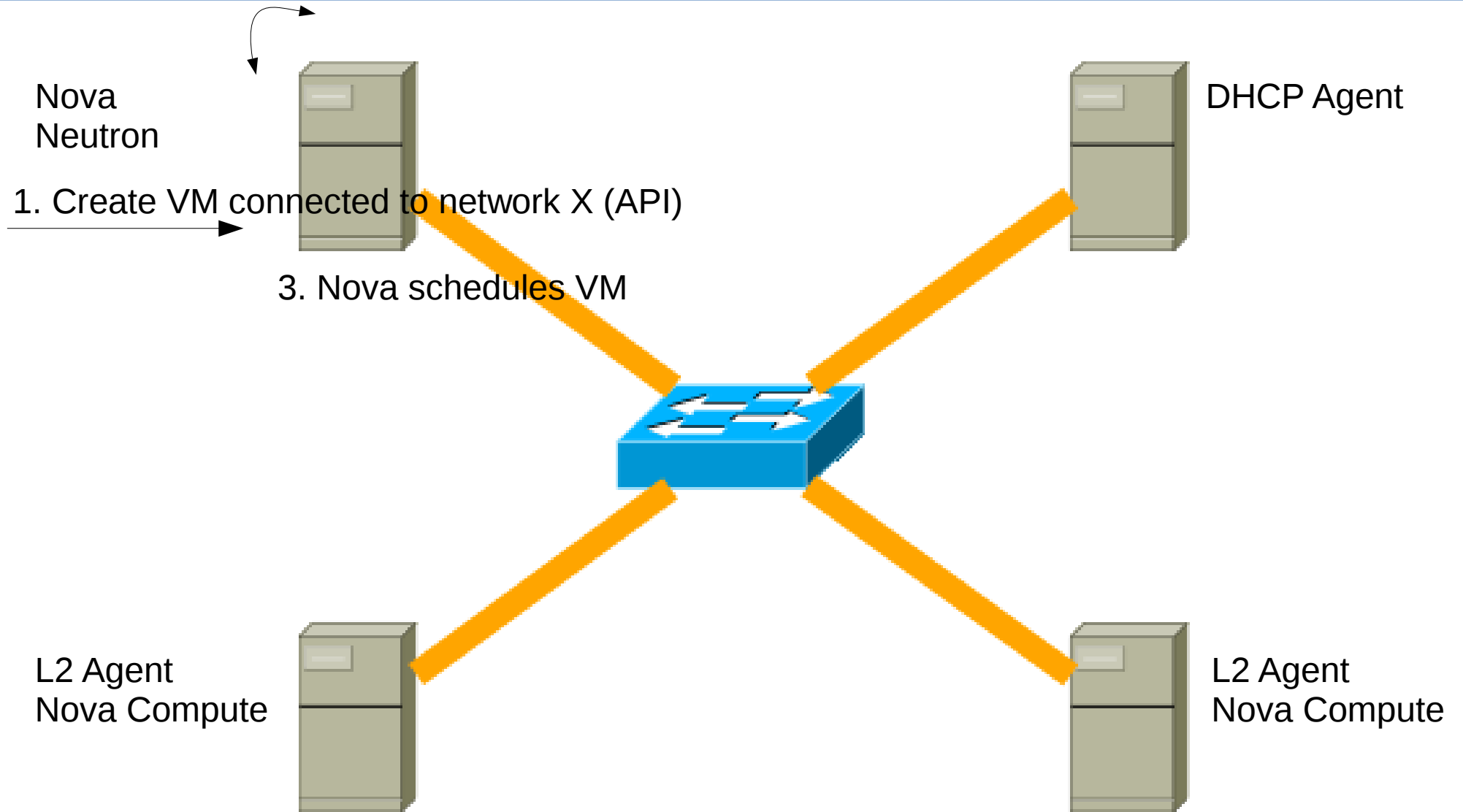
Nova <--> Neutron Interaction

2. Create VM (RPC: Nova API to Nova conductor)



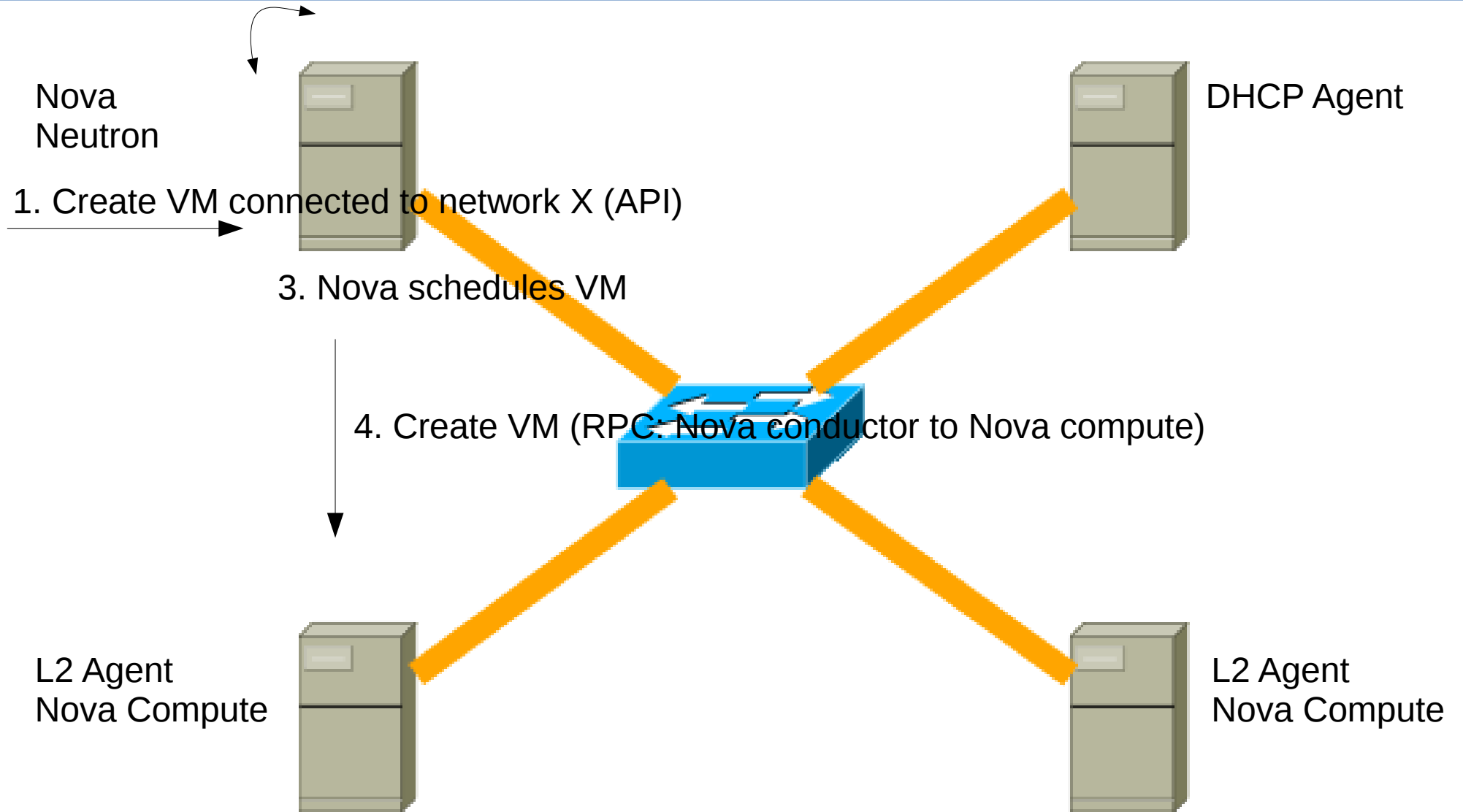
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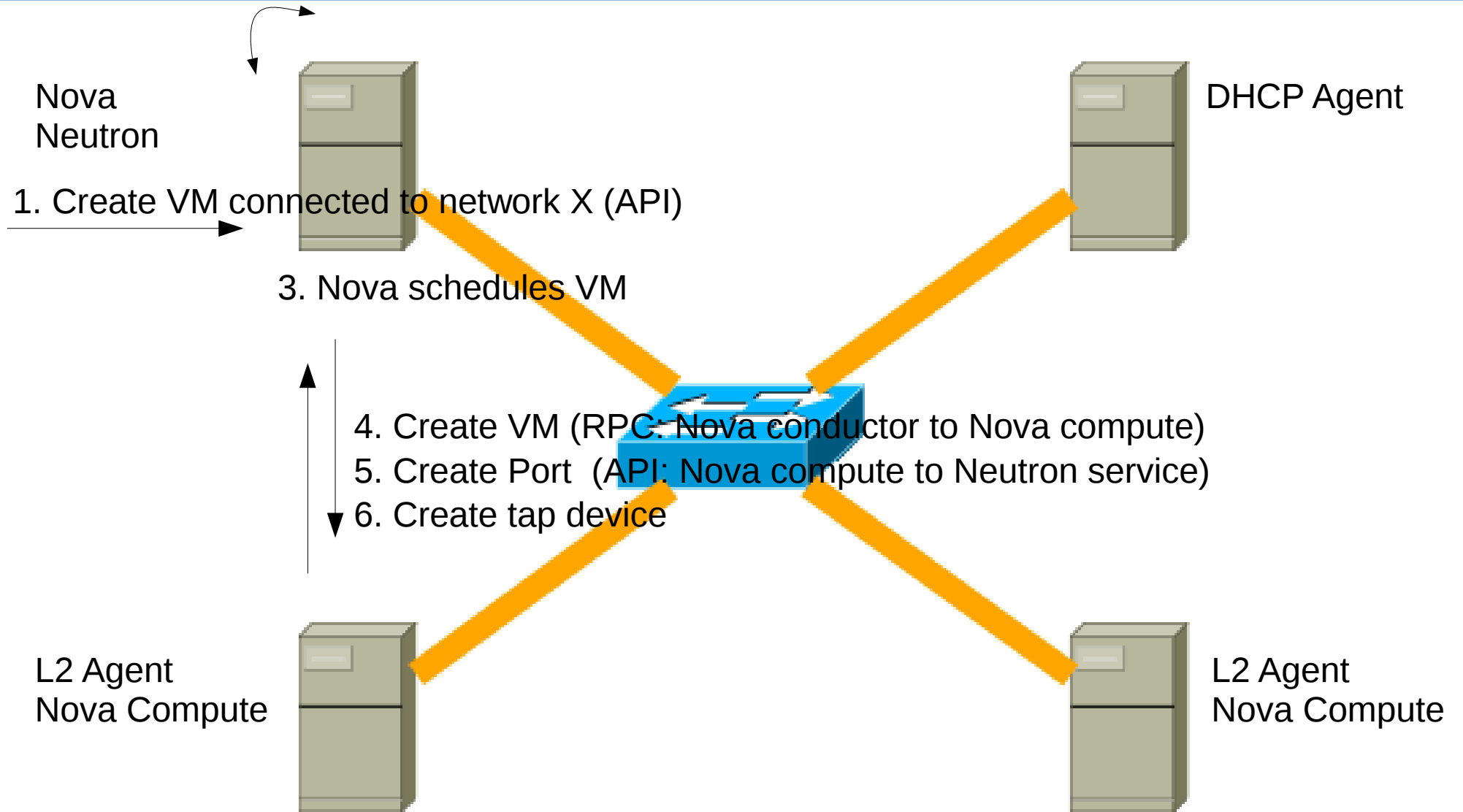
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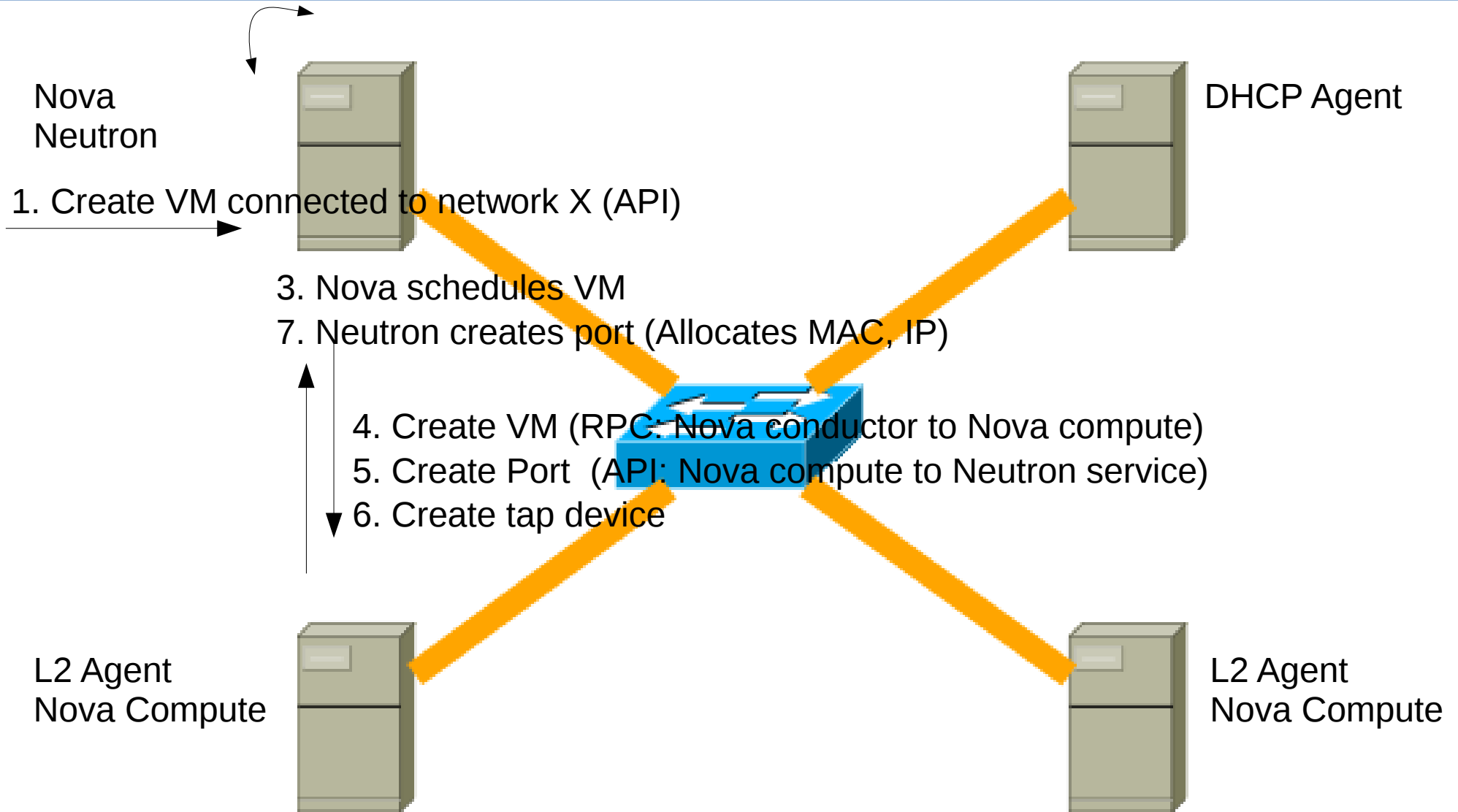
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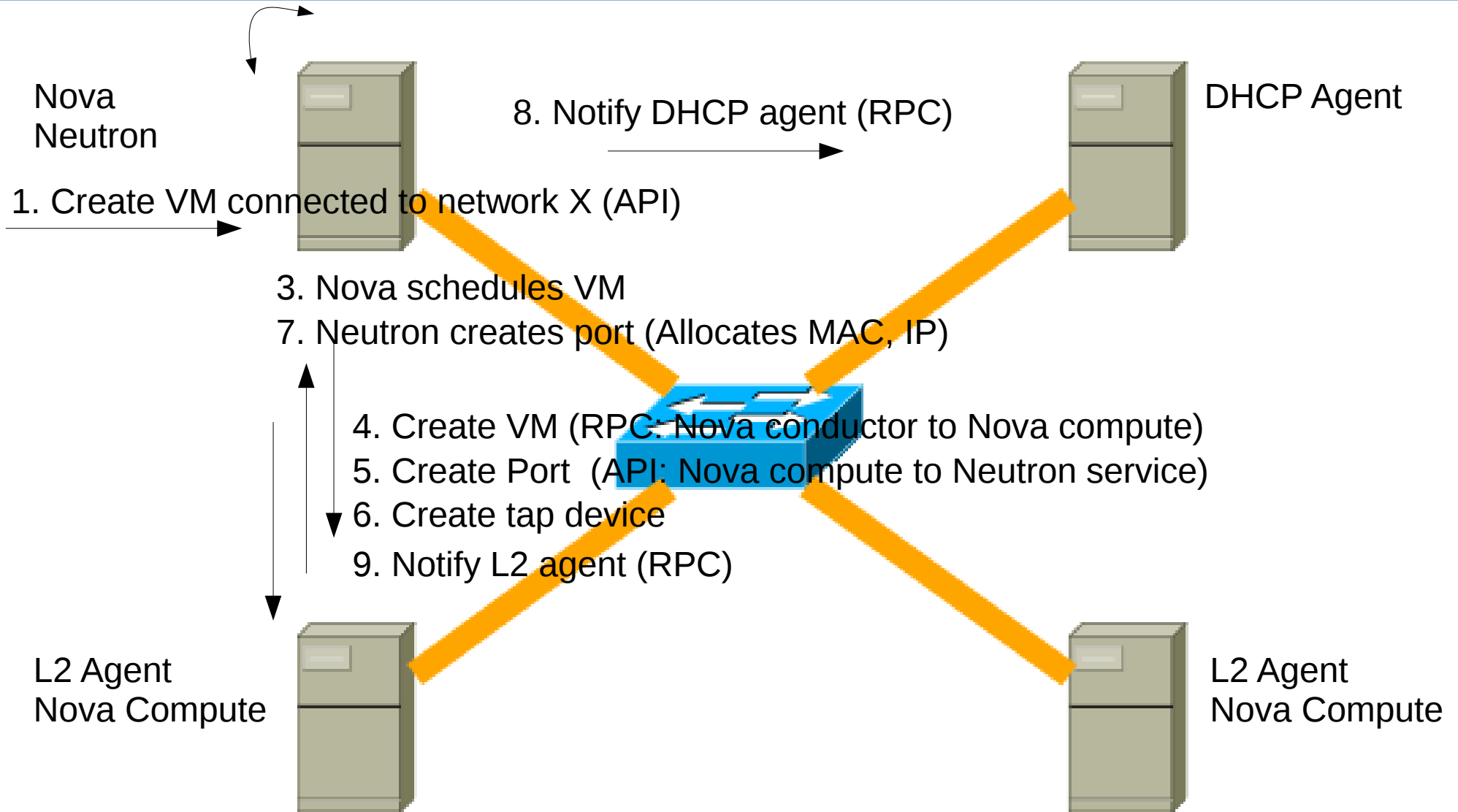
Nova <--> Neutron Interaction

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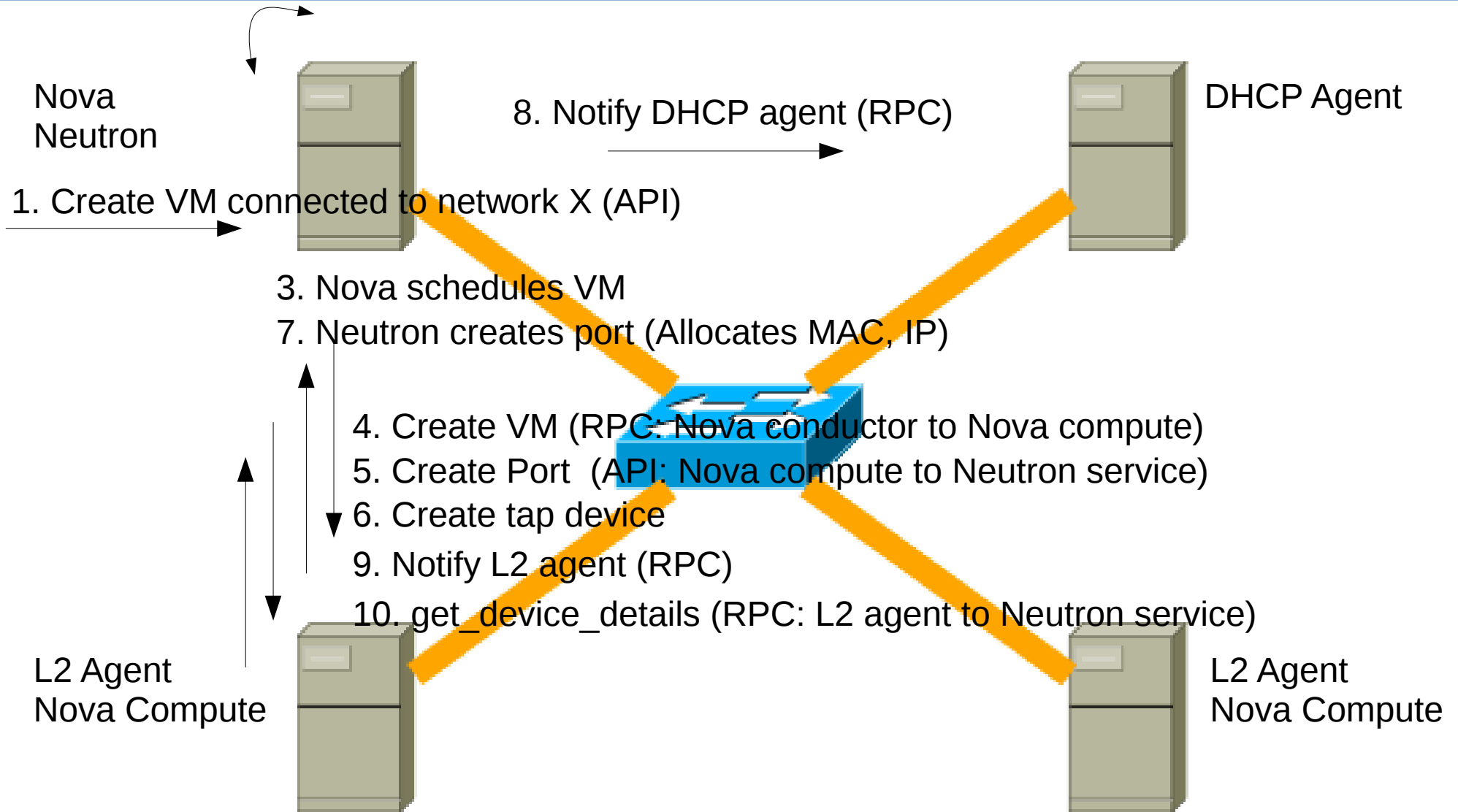
Nova <--> Neutron Interaction

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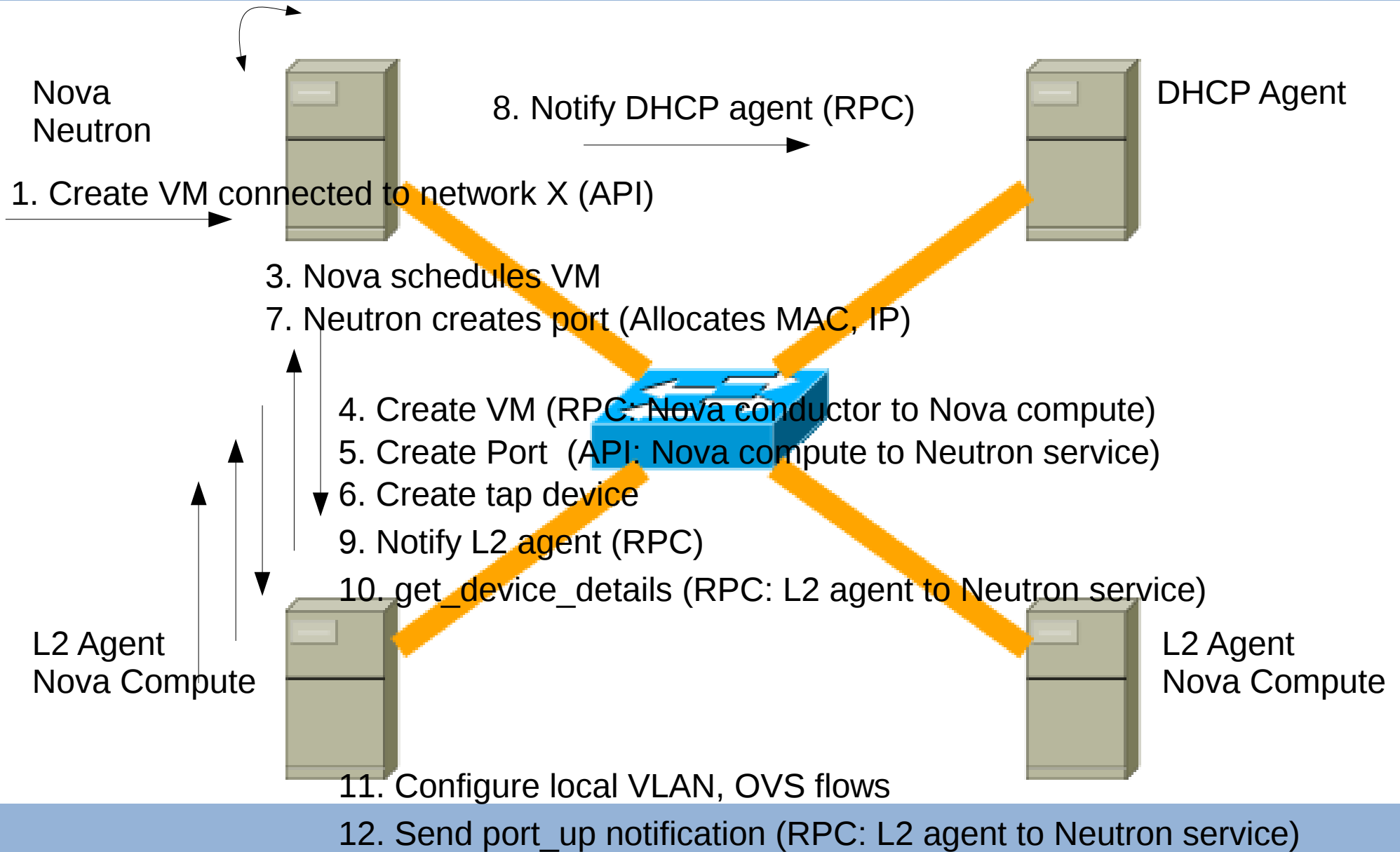
Nova <--> Neutron Interaction

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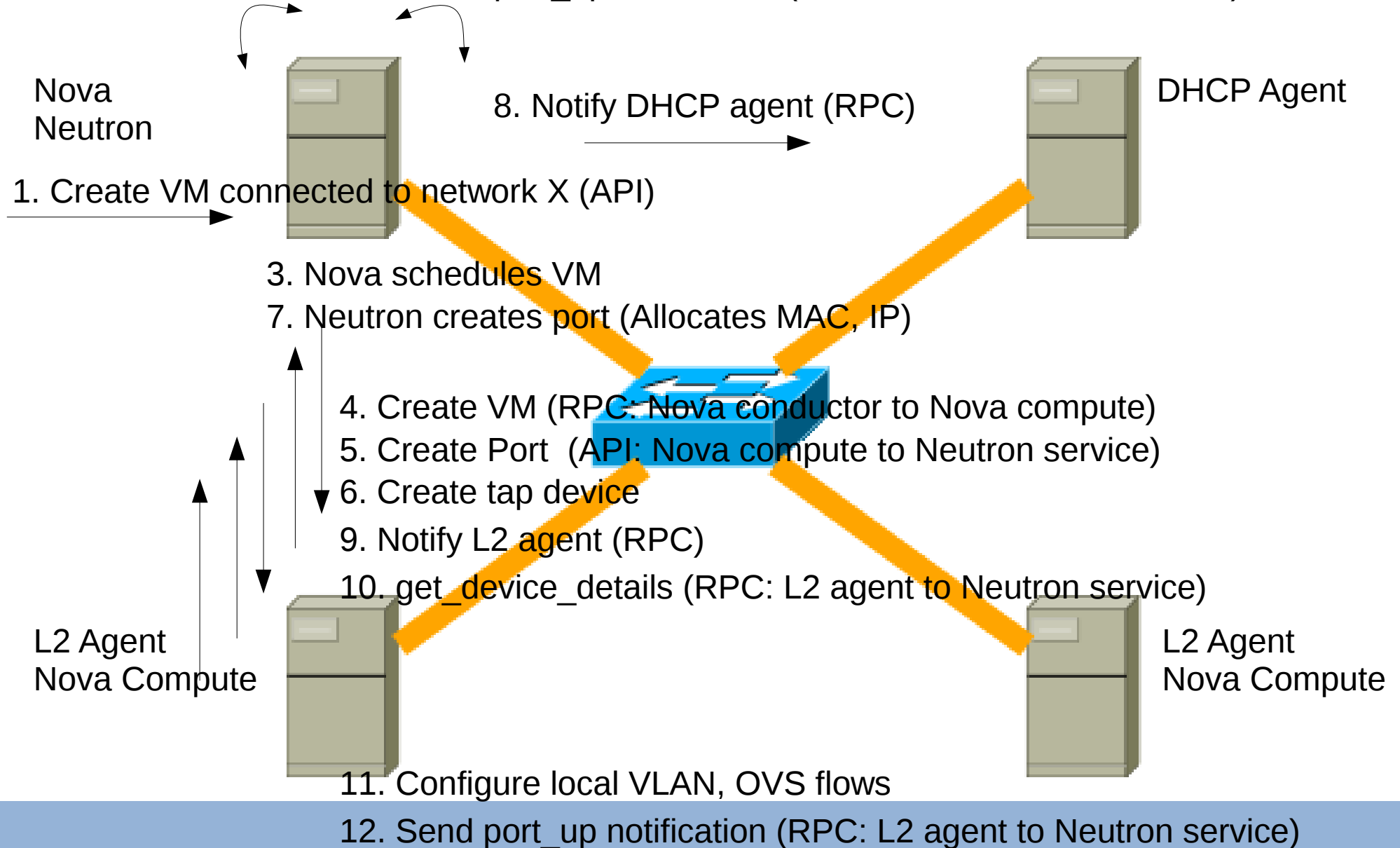
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Nova <--> Neutron Interaction

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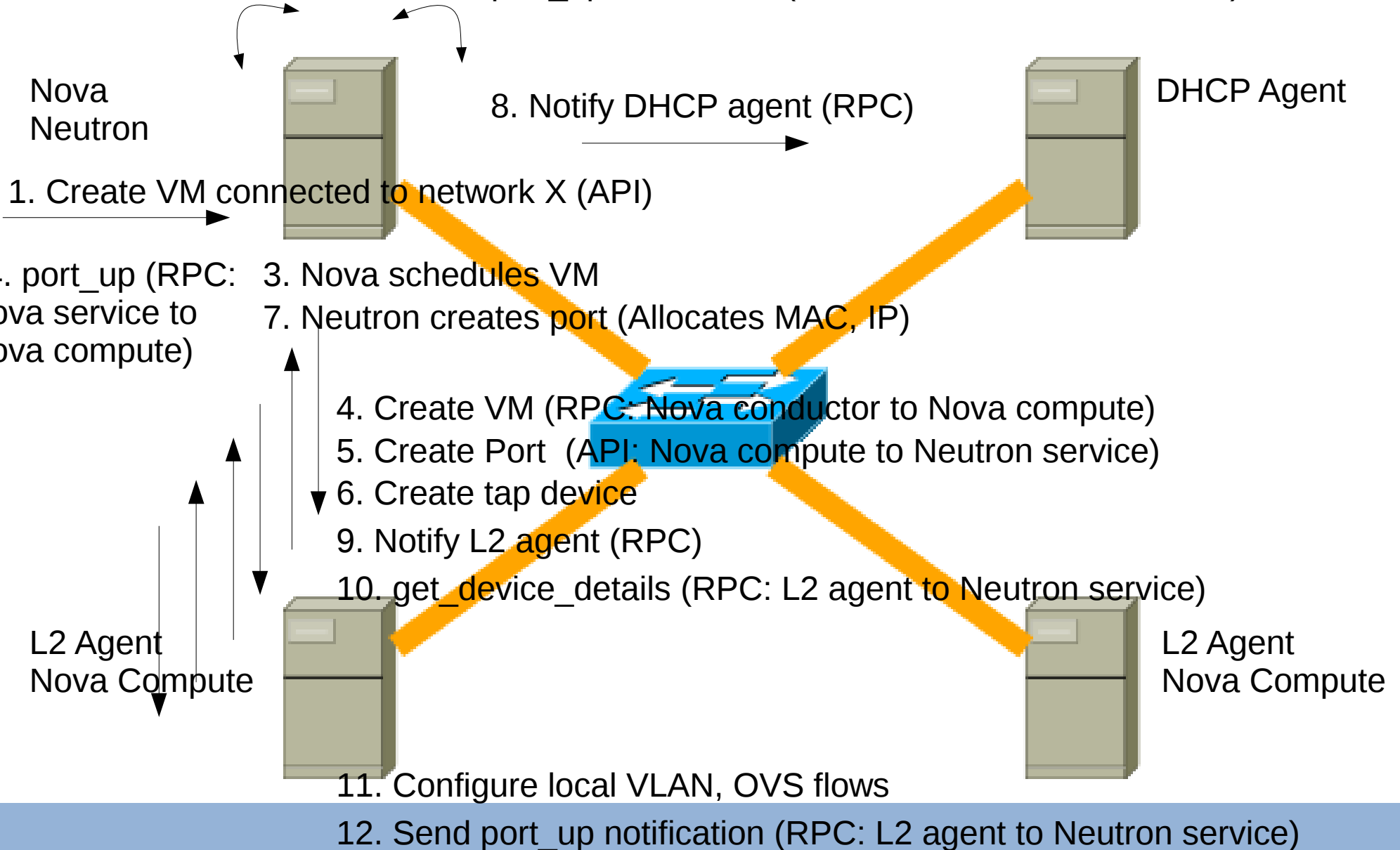
13. Send port_up notification (API: Neutron service to Nova)



Nova <--> Neutron Interaction

2. Create VM (RPC: Nova API to Nova conductor)

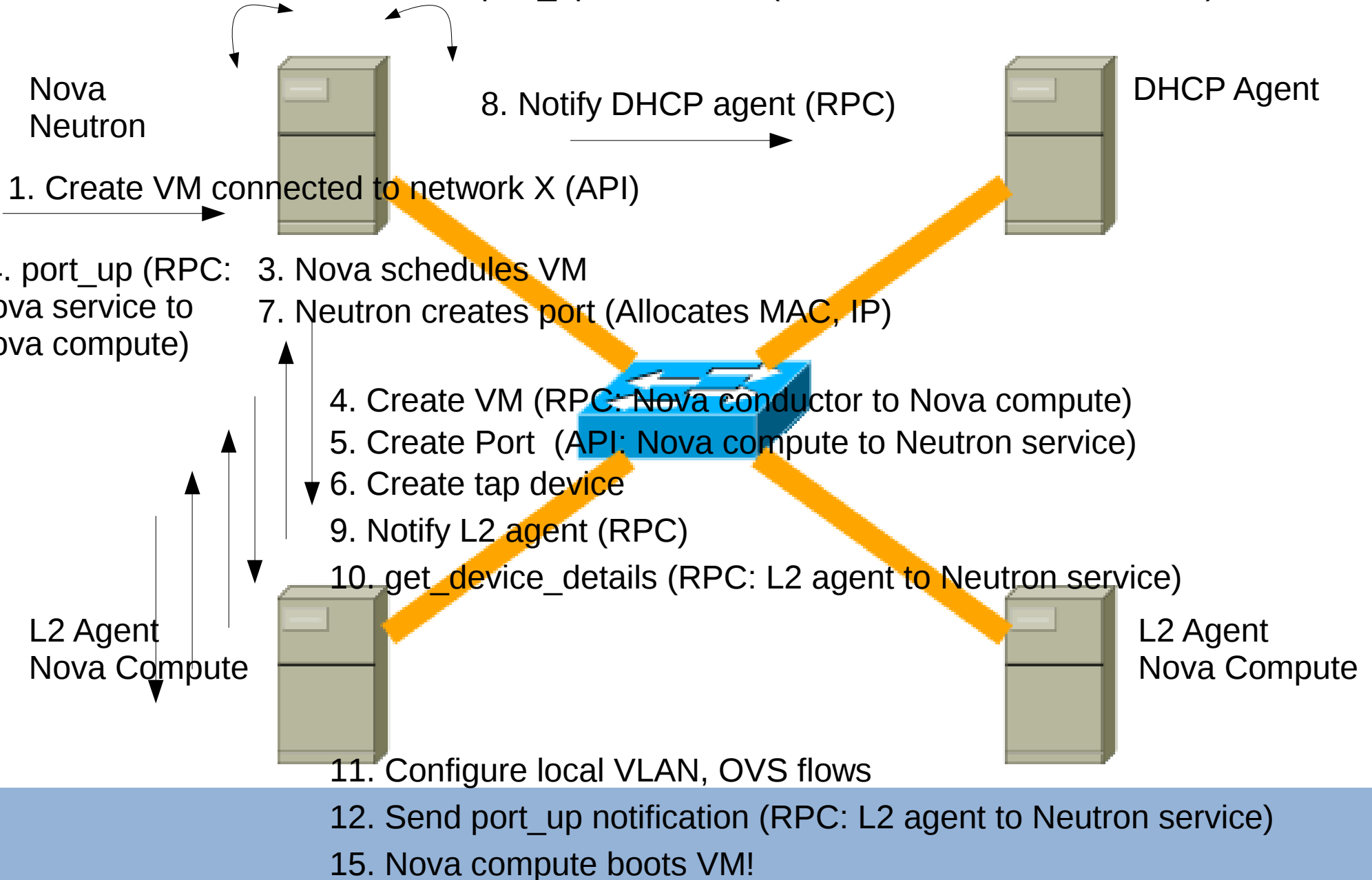
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Nova <--> Neutron Interaction

2. Create VM (RPC: Nova API to Nova conductor)

13. Send port_up notification (API: Neutron service to Nova)



Core Plugin

- Implementation of API is pluggable
- Many plugins exist:
 - ML2 (Open source, Red Hat blessed)
 - Vendor plugins (Proprietary, some are certified)
- Each plugin implements API differently. For example, 'create_port' may be proxied to some 3rd party server

Service Plugins

- Firewall as a Service – Filter traffic at the router level
 - VPN as a Service – Extend your tenant networks off-site
 - Load Balancer as a Service – Distribute incoming messages to a pool of VMs
- * Service plugins also have multiple implementations

Tenant Connectivity & Isolation

- How is tenant networks connectivity and isolation achieved, exactly?
 - Via VLANs or GRE / VXLAN tunnels
- More information at FOSDEM talk:
 - <http://assafmuller.wordpress.com/2014/02/03/fosdem-14/>
 - Includes video, slides and series of blog posts

Questions?

Network as a Service

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