Architecture of Quantum Folsom Release

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Quantum Core developer

Agenda

- OpenStack and Quantum
- Quantum Architecture
- Quantum models
- communications among quantum components

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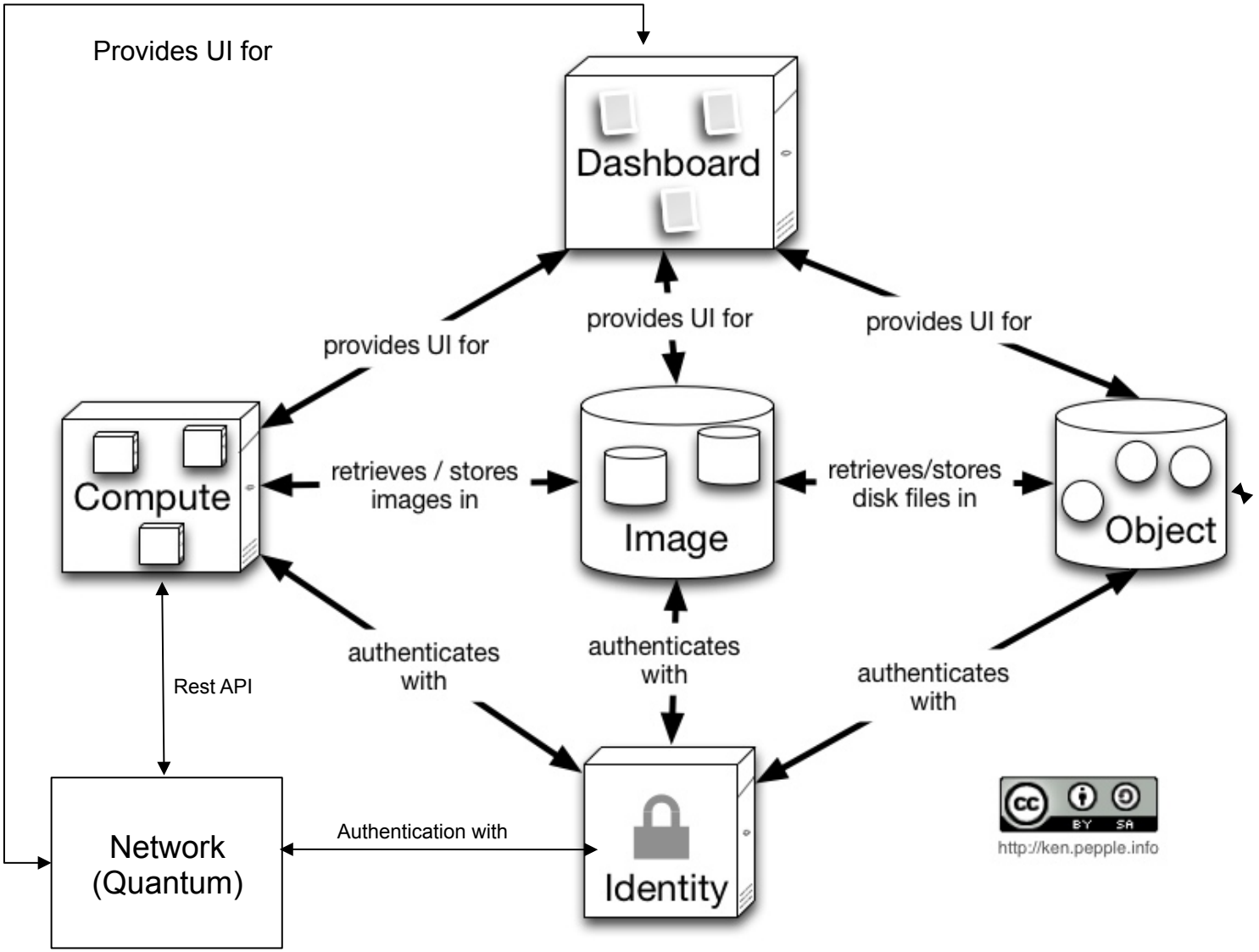
OpenStack: six core projects that form a complete IaaS solution



Compute (Nova)
Provision and manage virtual machines

Dashboard (Horizon)
Self-service portal

Image (Glance)
Catalog and manage server images

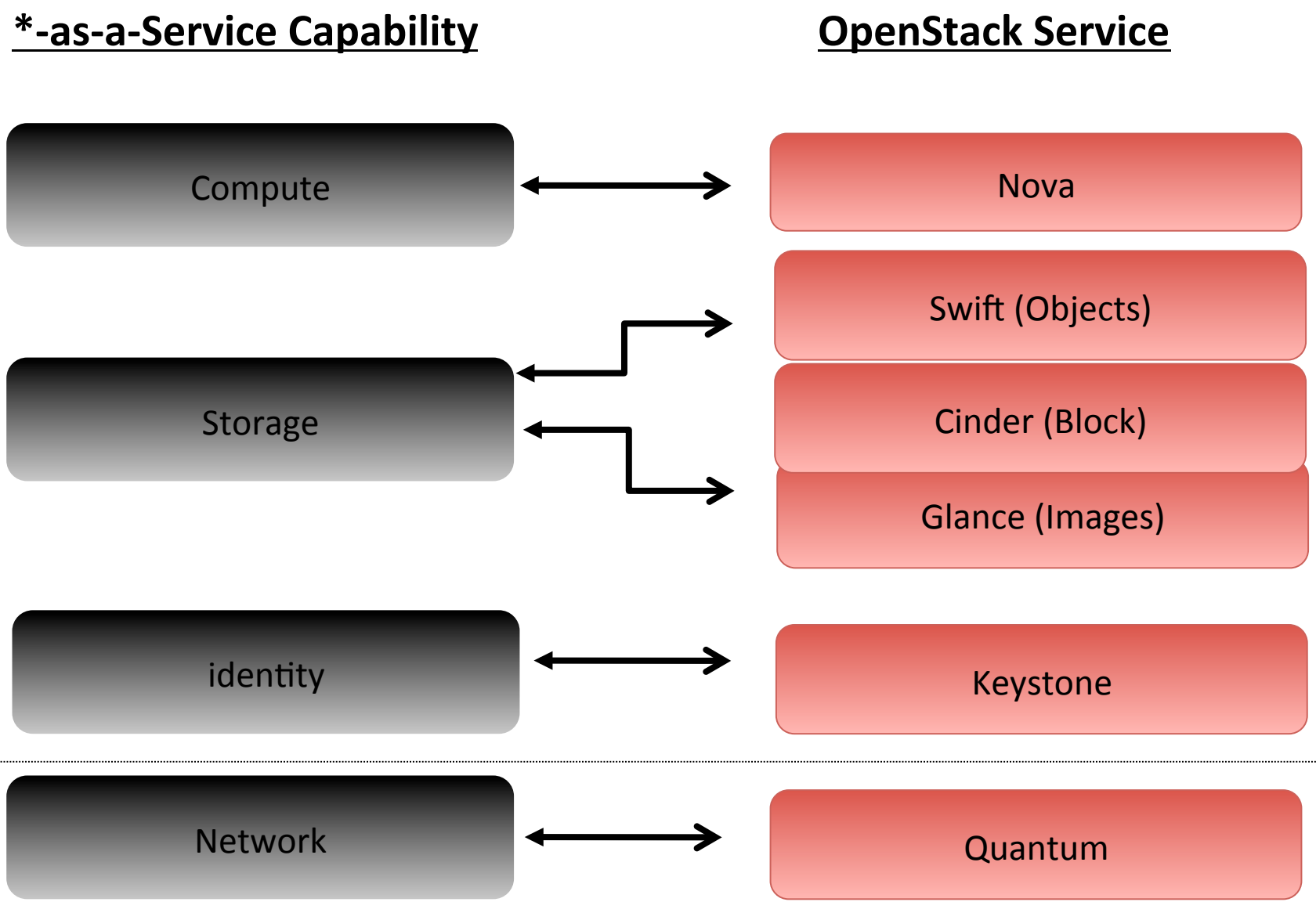
Identity (Keystone)
Unified authentication, integrates with existing systems

Network(Quantum)
provide "network connectivity as a service"

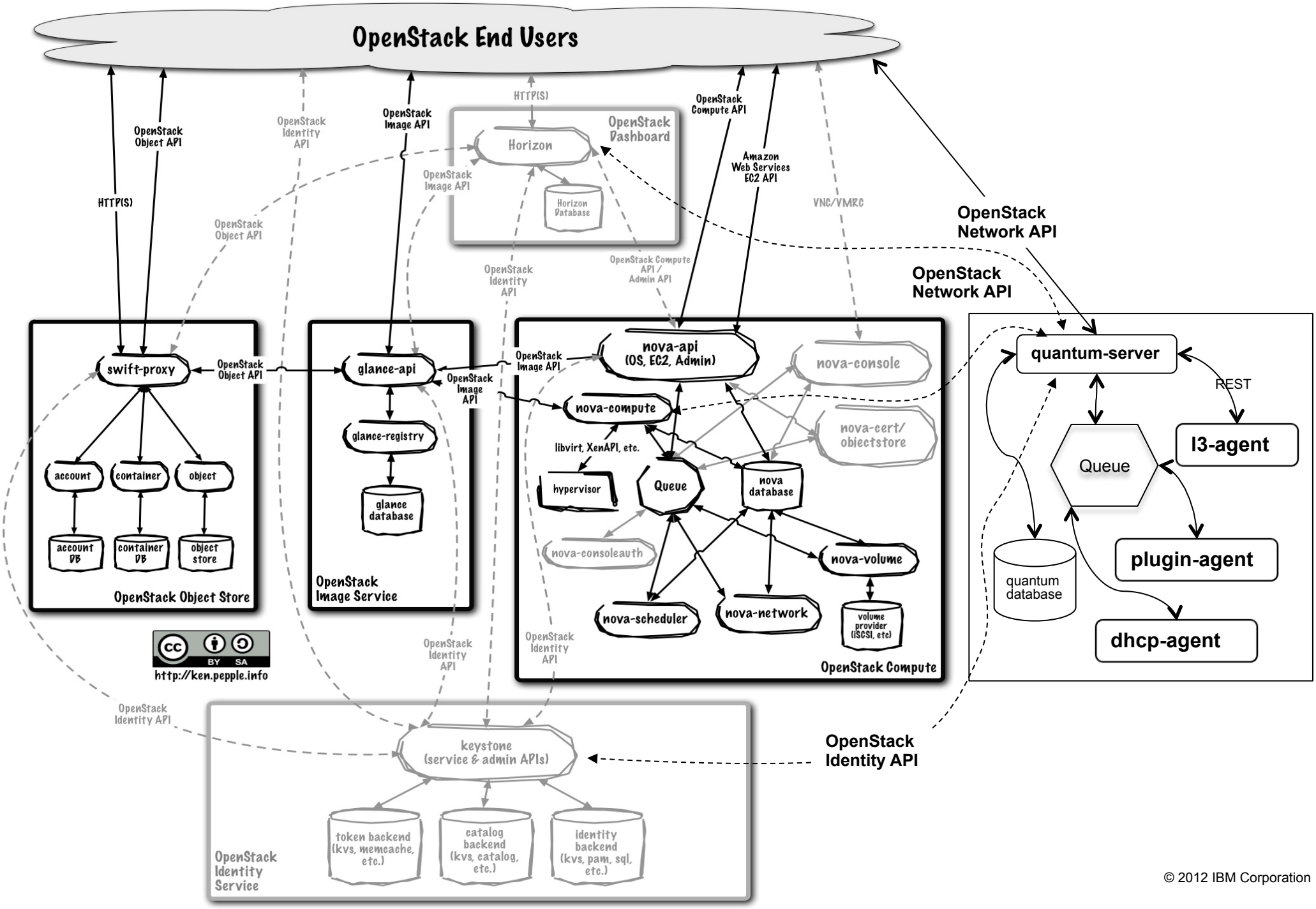
Object Storage (Swift)
petabytes of secure, reliable object storage

adapted from:
http://ken.pepple.info/openstack/2012/02/21/revisit-openstack-architecture-diablo/

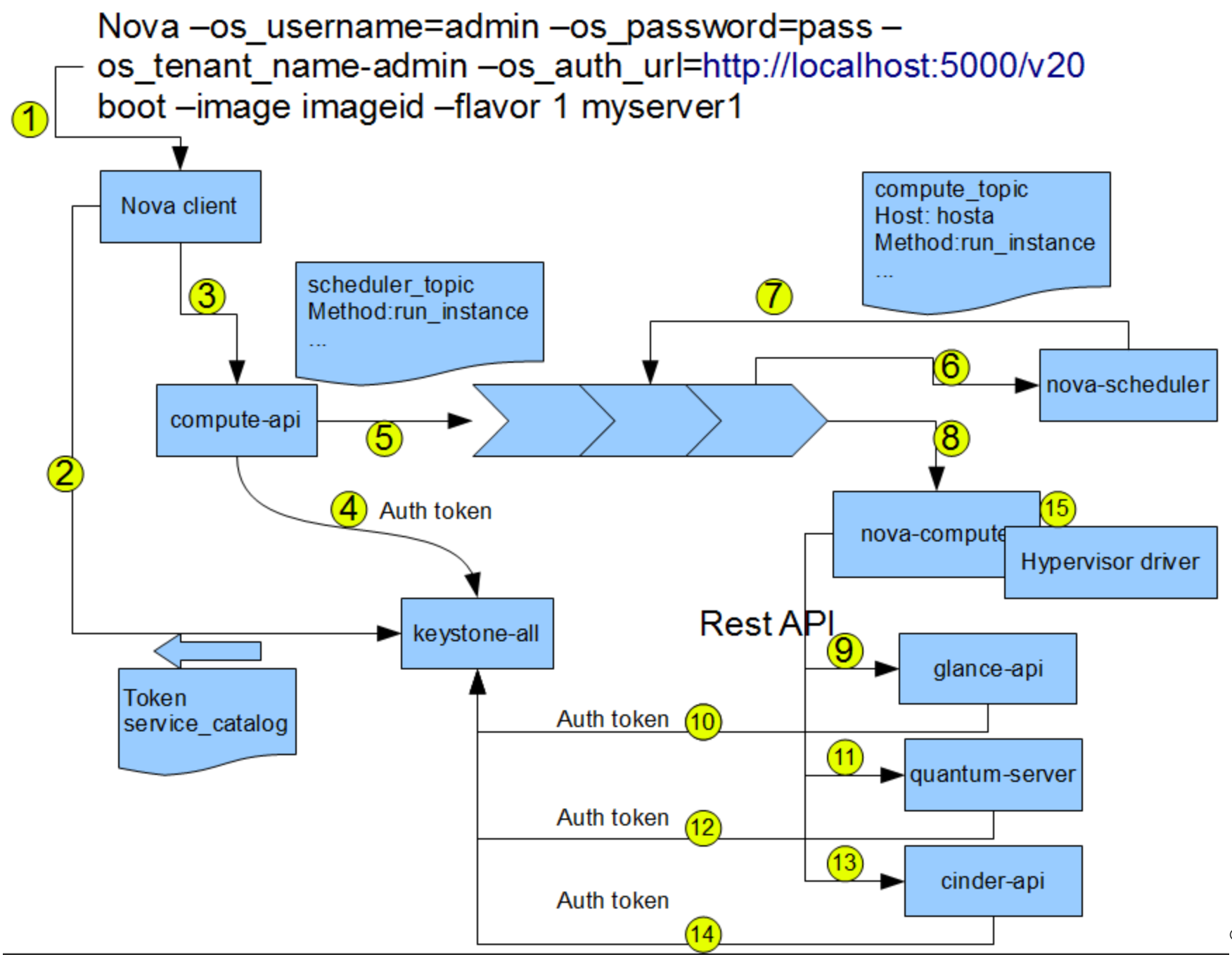
Quantum-NaaS



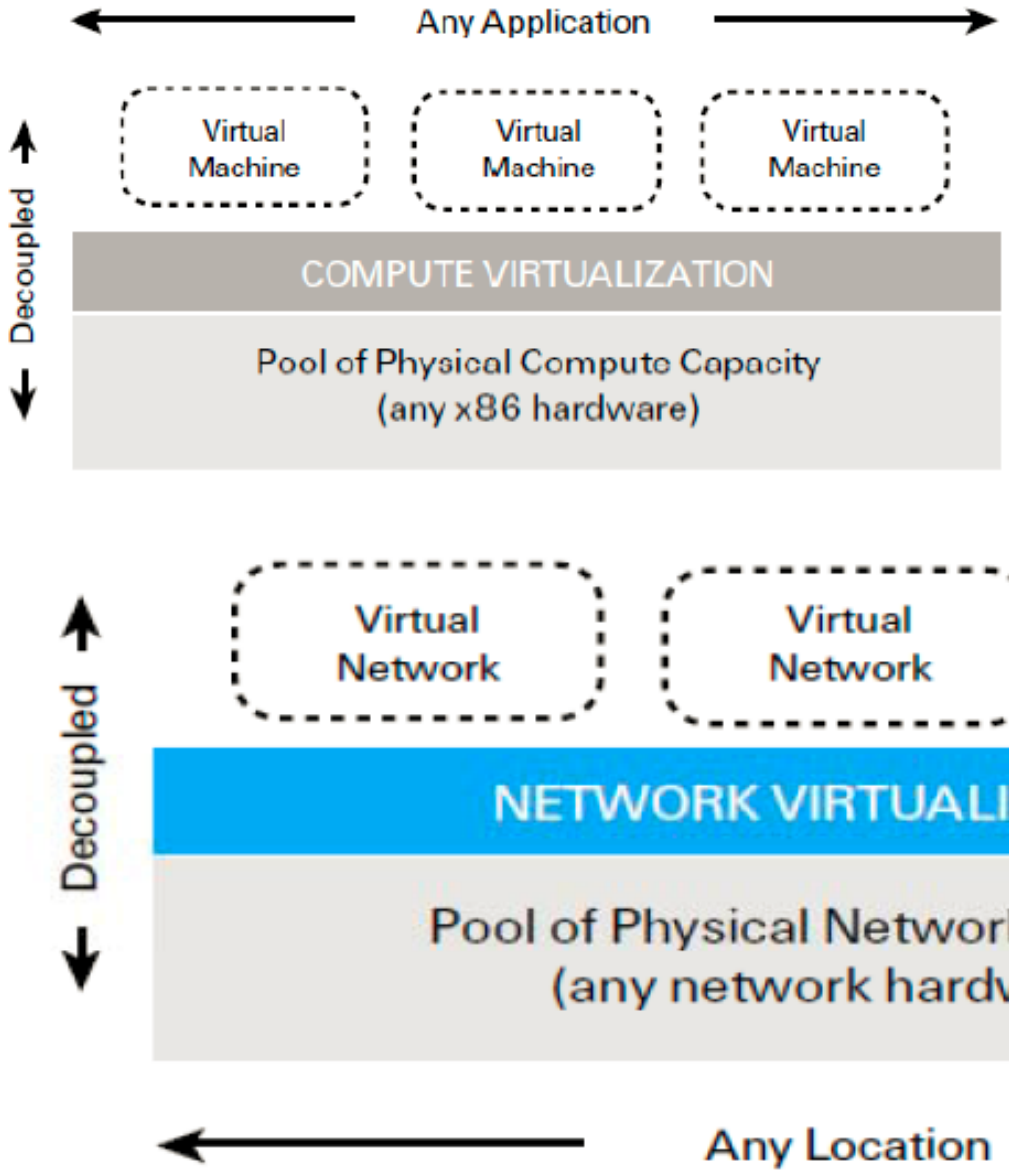
Openstack architecture



Flow of booting a virtual server



Quantum uses network virtualization



1. Hypervisor
2. nova-scheduler
3. nova-computes

1. quantum-server
2. plugin
3. agents

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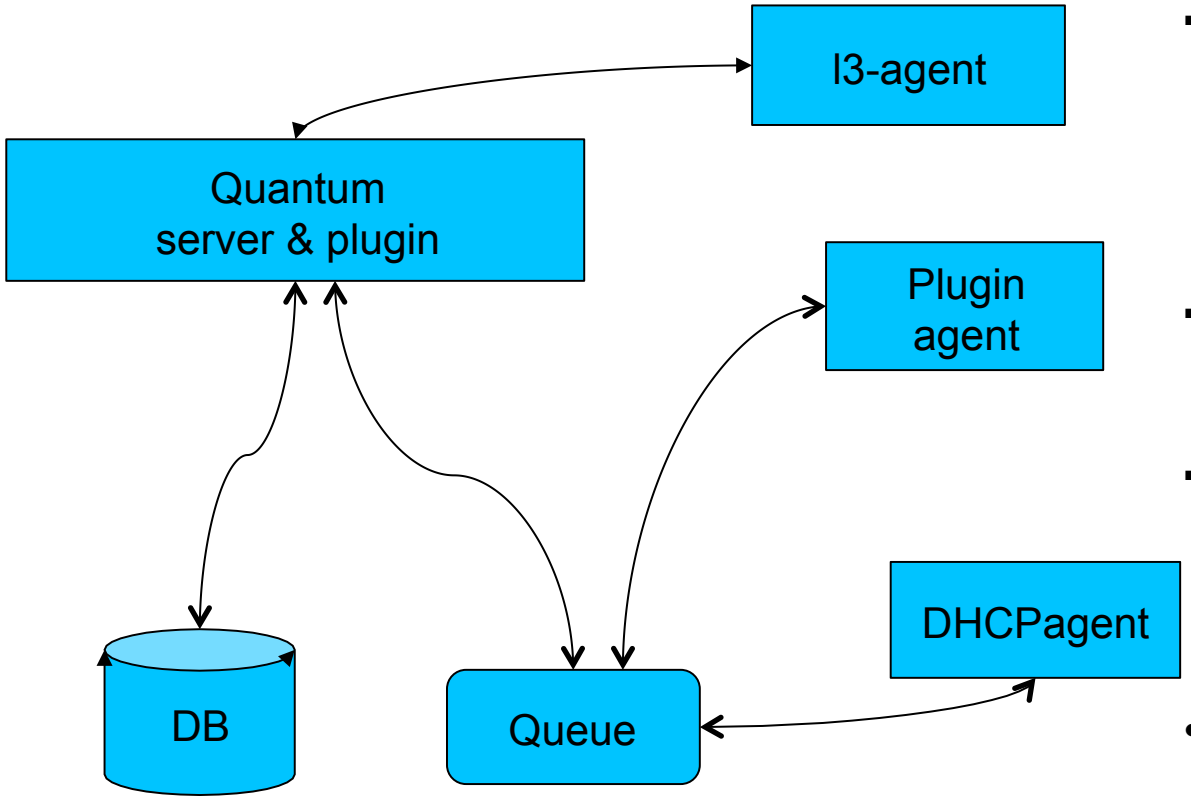
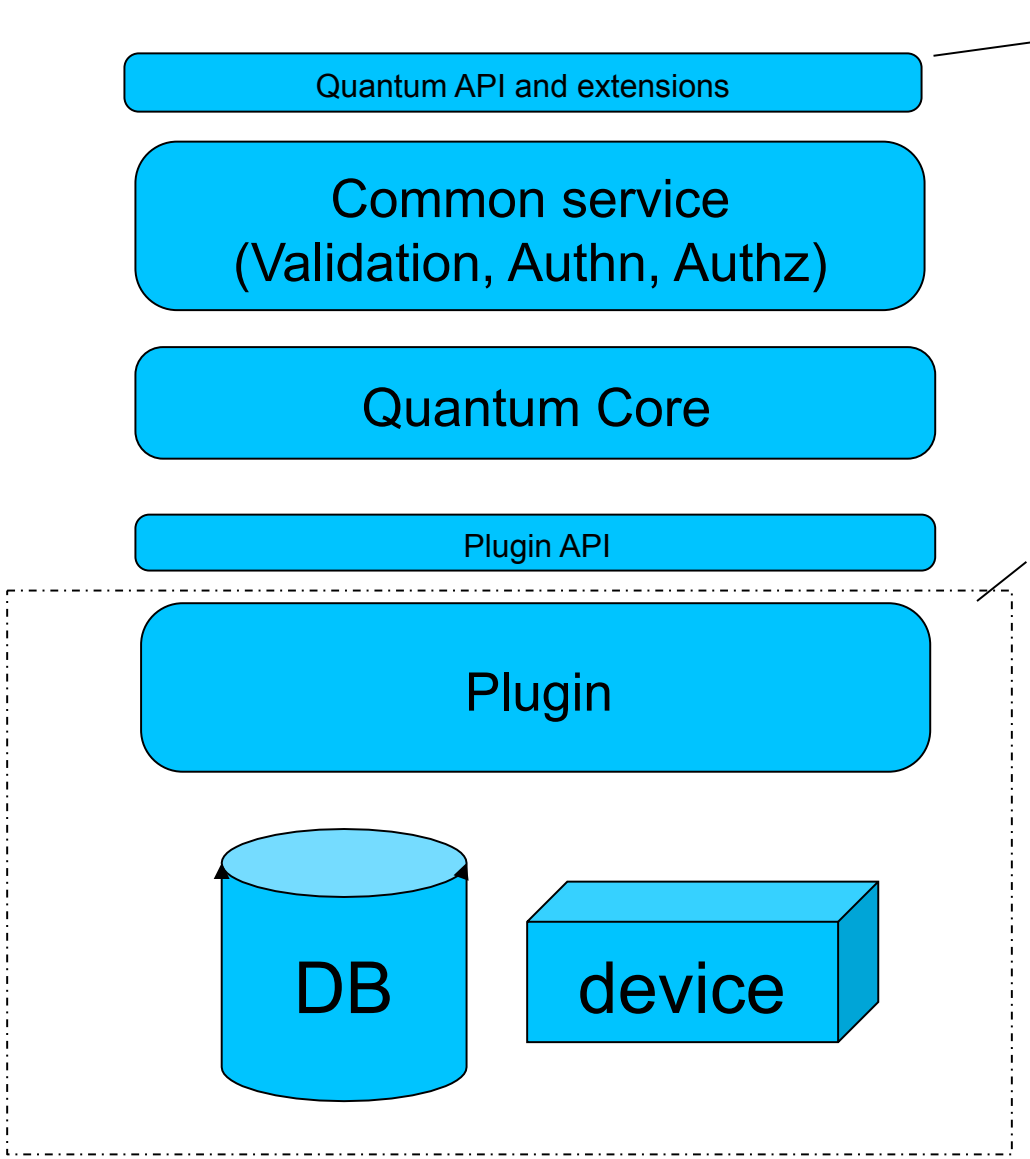
Components of quantum



- Quantum server
  - Implement Qauntum API and its extensions
  - Enforce network model
    - Network, subnet, and port
  - IP addressing to each port
- Plugin agent
  - Run on each compute node
  - Connect instances to network port
- DHCP agent
  - In multi-host mode, run on each compute node (deferred)
  - Start/stop dhcp server
  - Maintain dhcp configuration
- L3-agent
  - To implement floating Ips and other L3 features, such as NAT
  - One per network
- Queue
  - Enhance communication between each components of quantum
- DB – persistent network model

Note: we can share DB service and Queue with other OpenStack stack services

Layers in Quantum server



vendor can add extensions to provide more features

vendor specific plugin or open source plugin:

1. linux bridge plugin
2. openvswitch plugin
3. nicira
4. …

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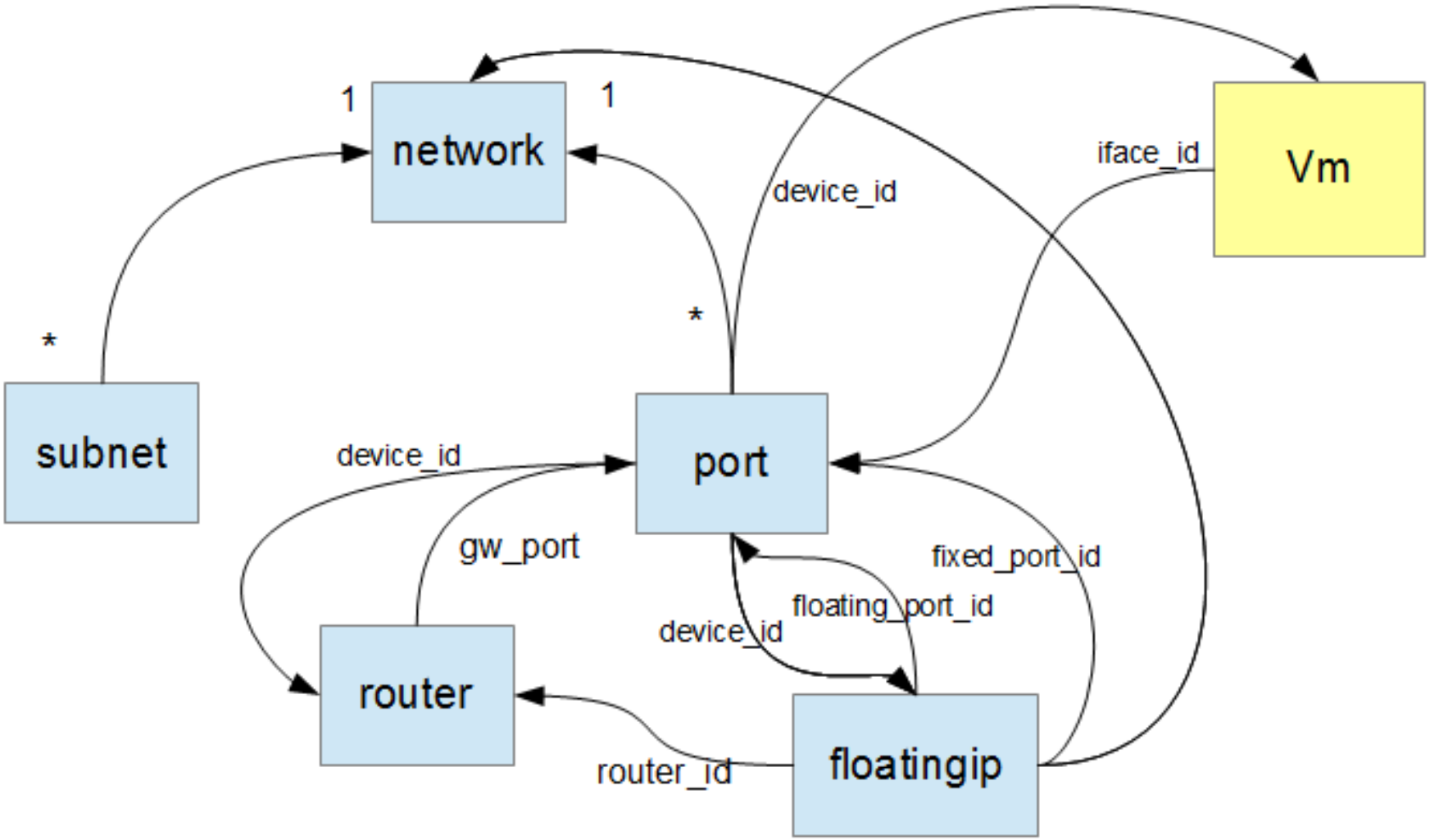
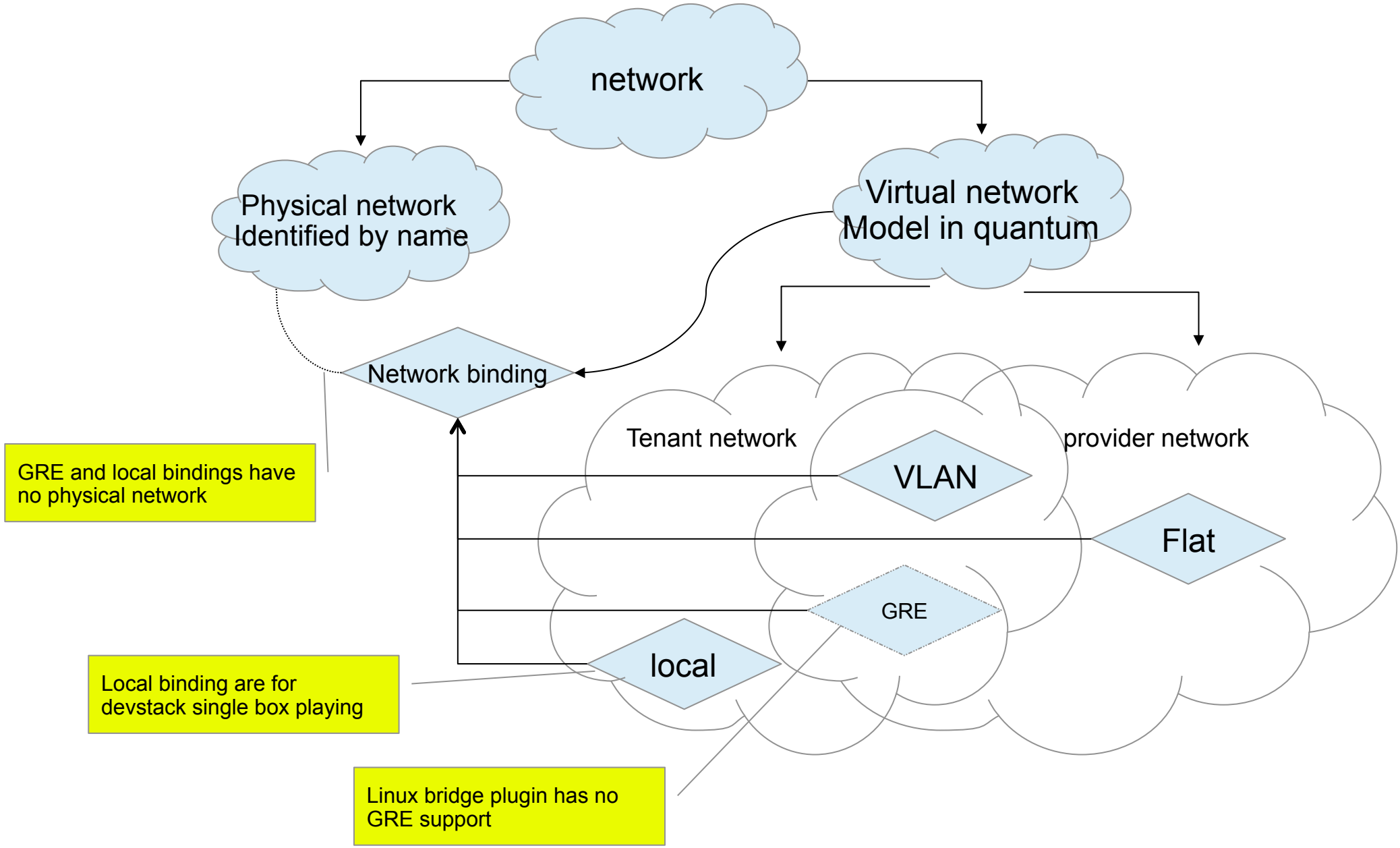
Quantum models

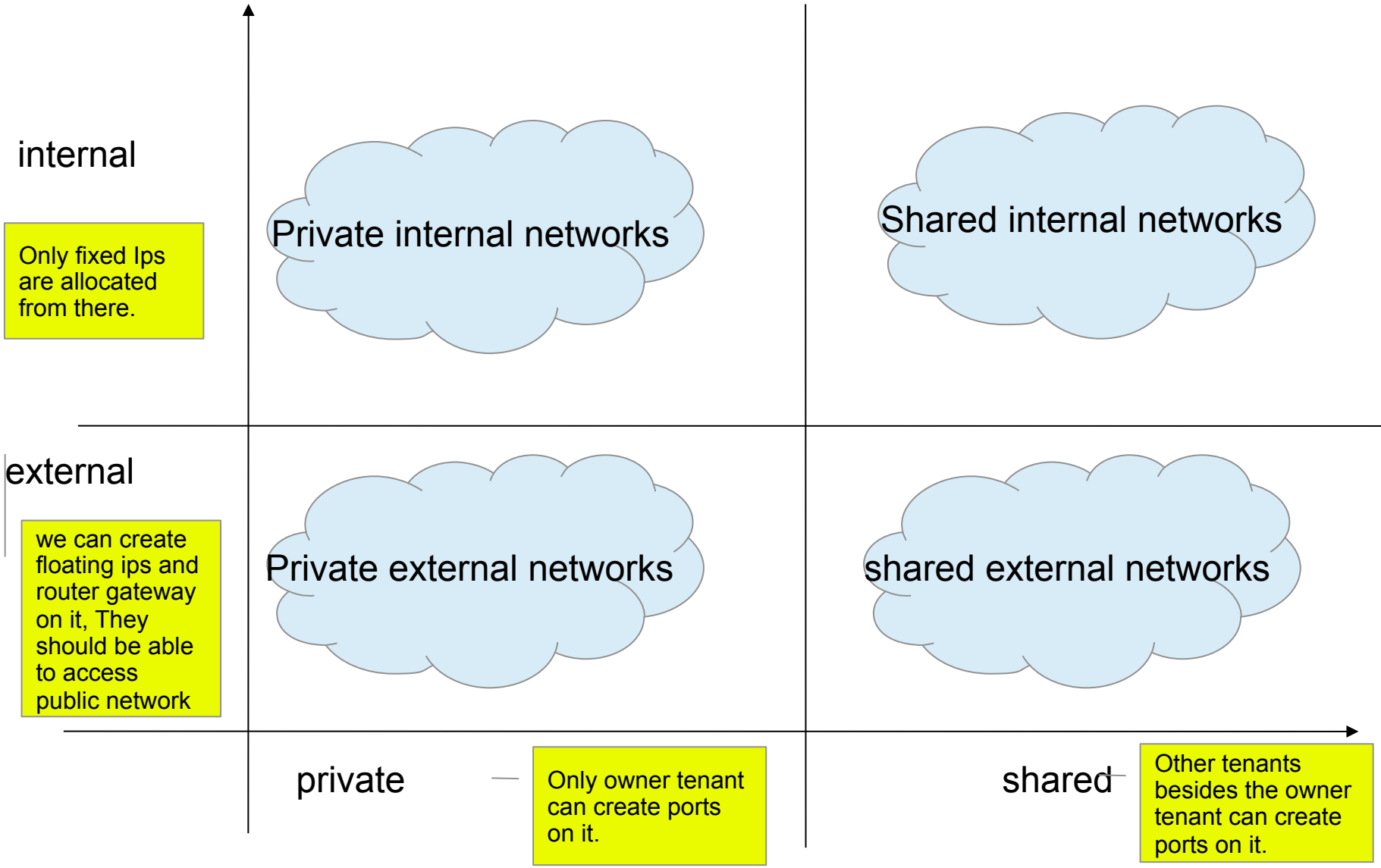


Network and physical bindings

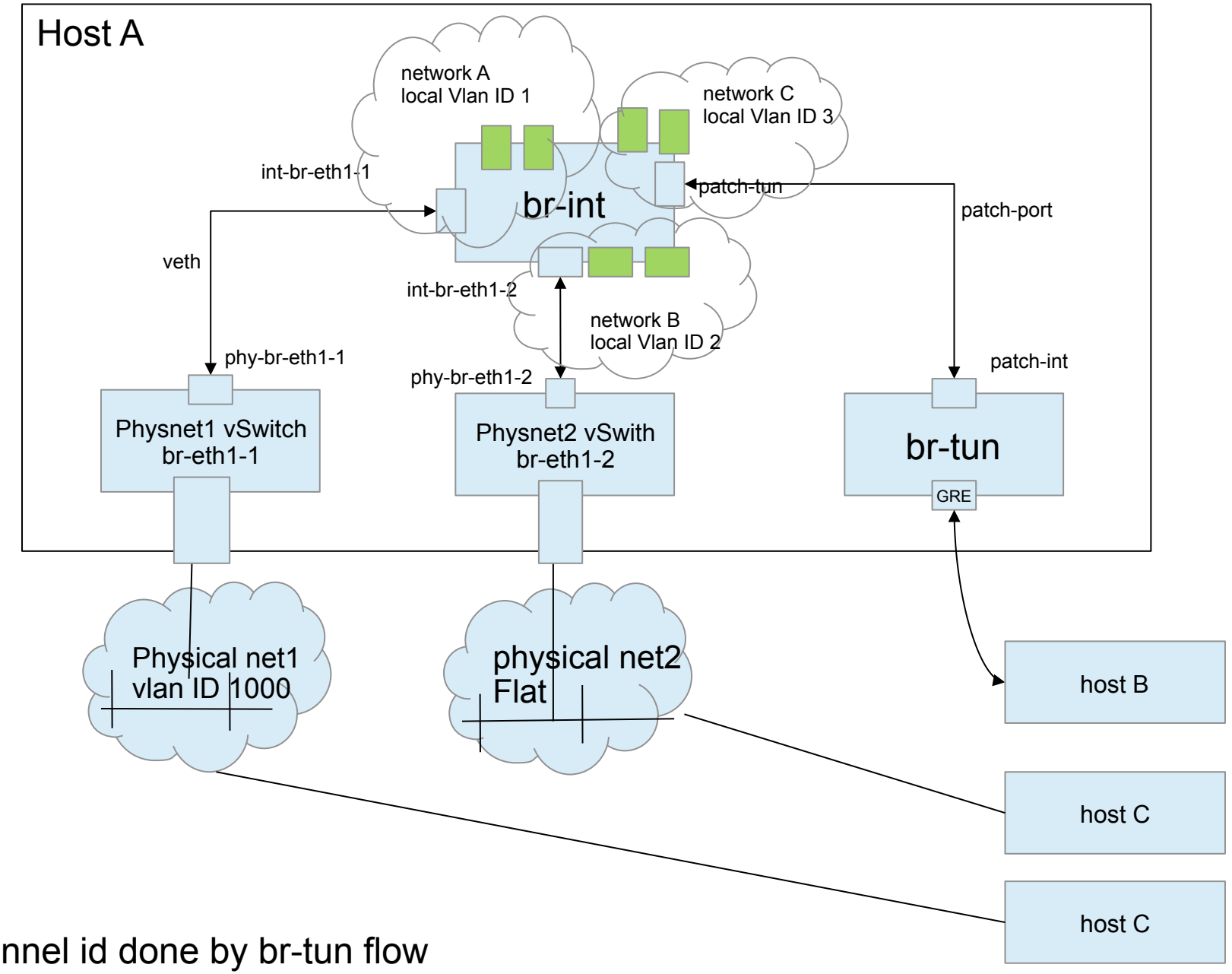


Difference between provider network and tenant network?

Other ways to view networks

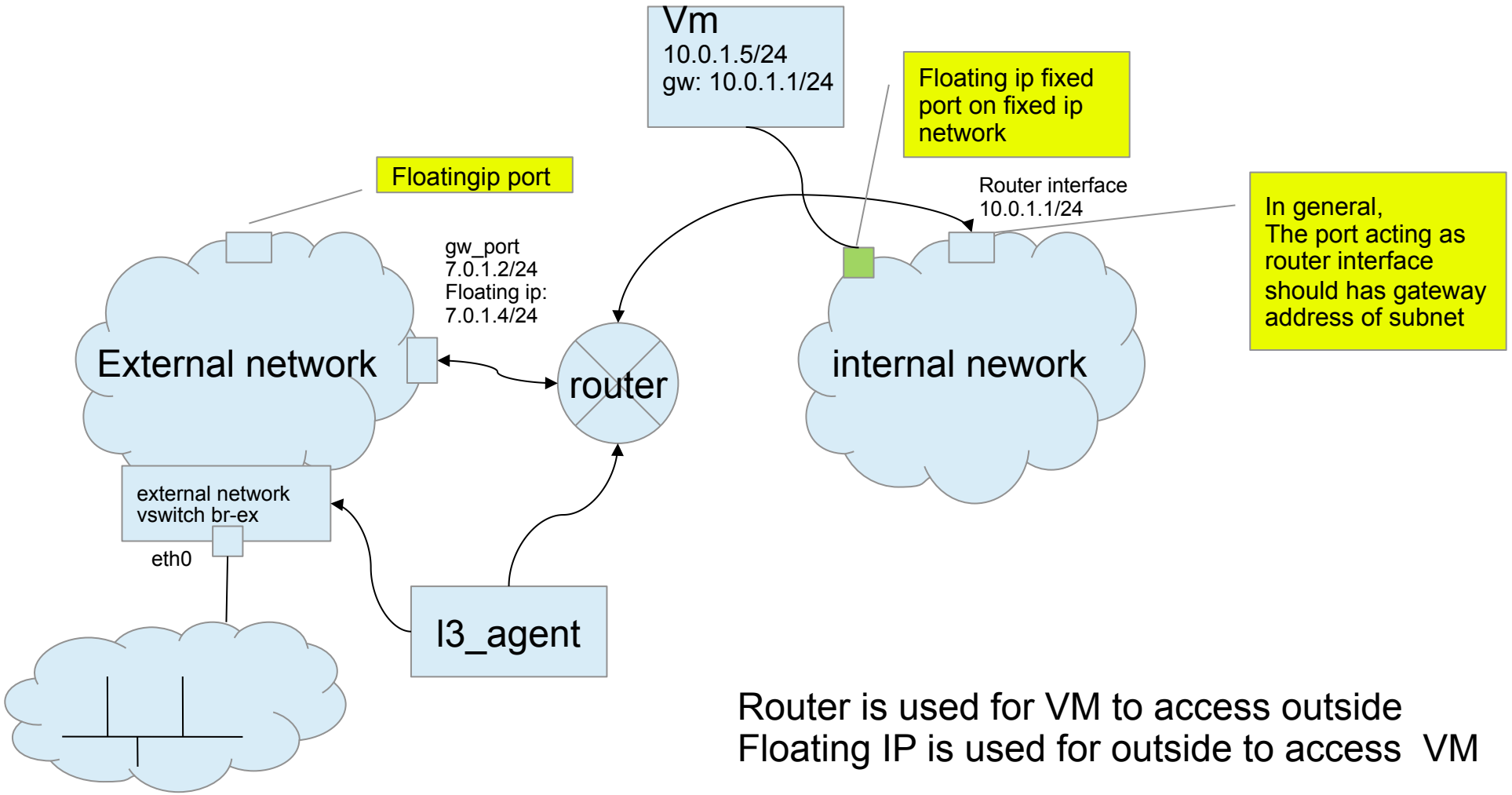


A networks sample for fixed ips



local vlan id <-> tunnel id done by br-tun flow
local vlan id <-> physical net vlan id done by physical net and br-int vSwitch

Floatingip and Router



Router is used for VM to access outside
Floating IP is used for outside to access VM

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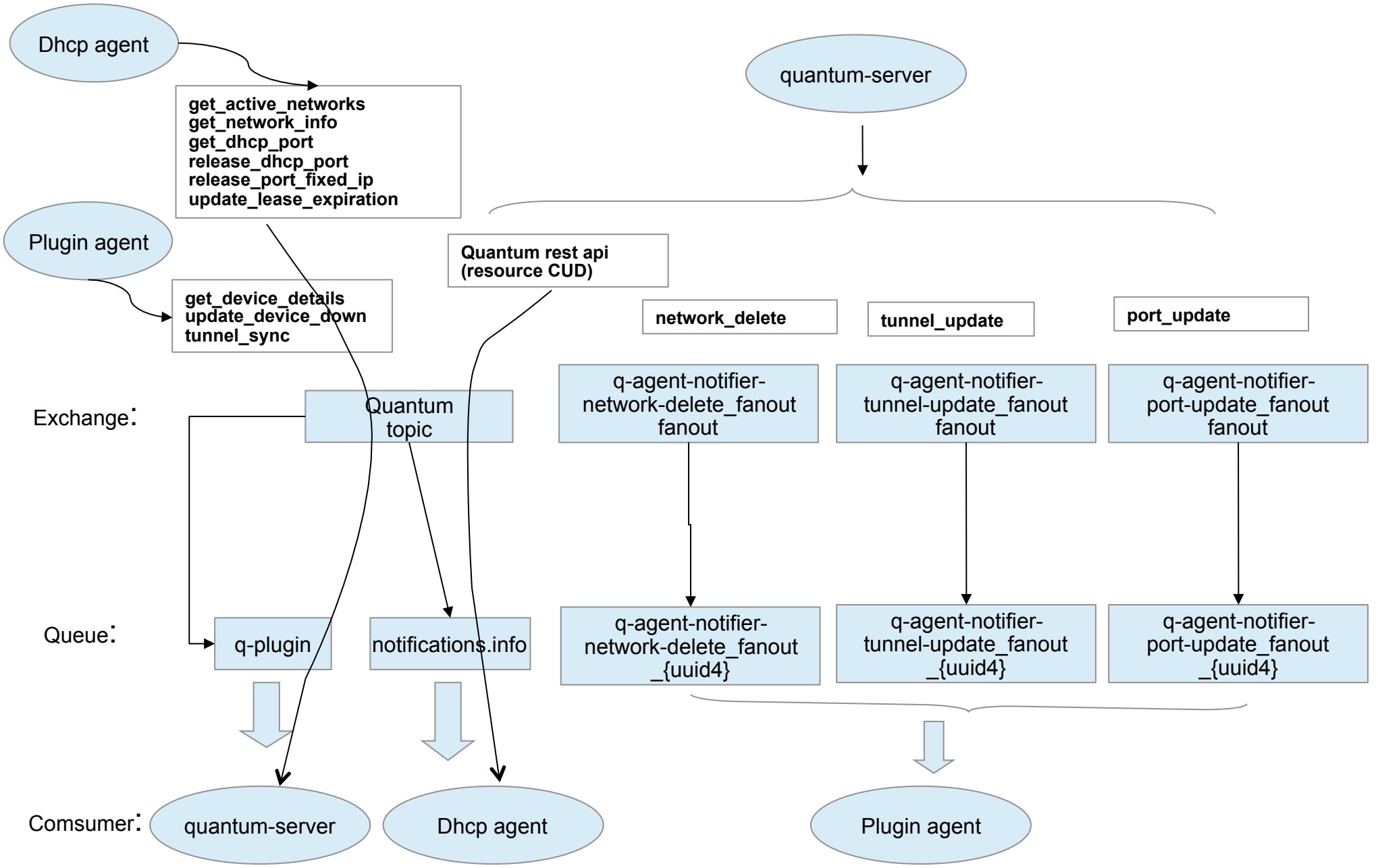
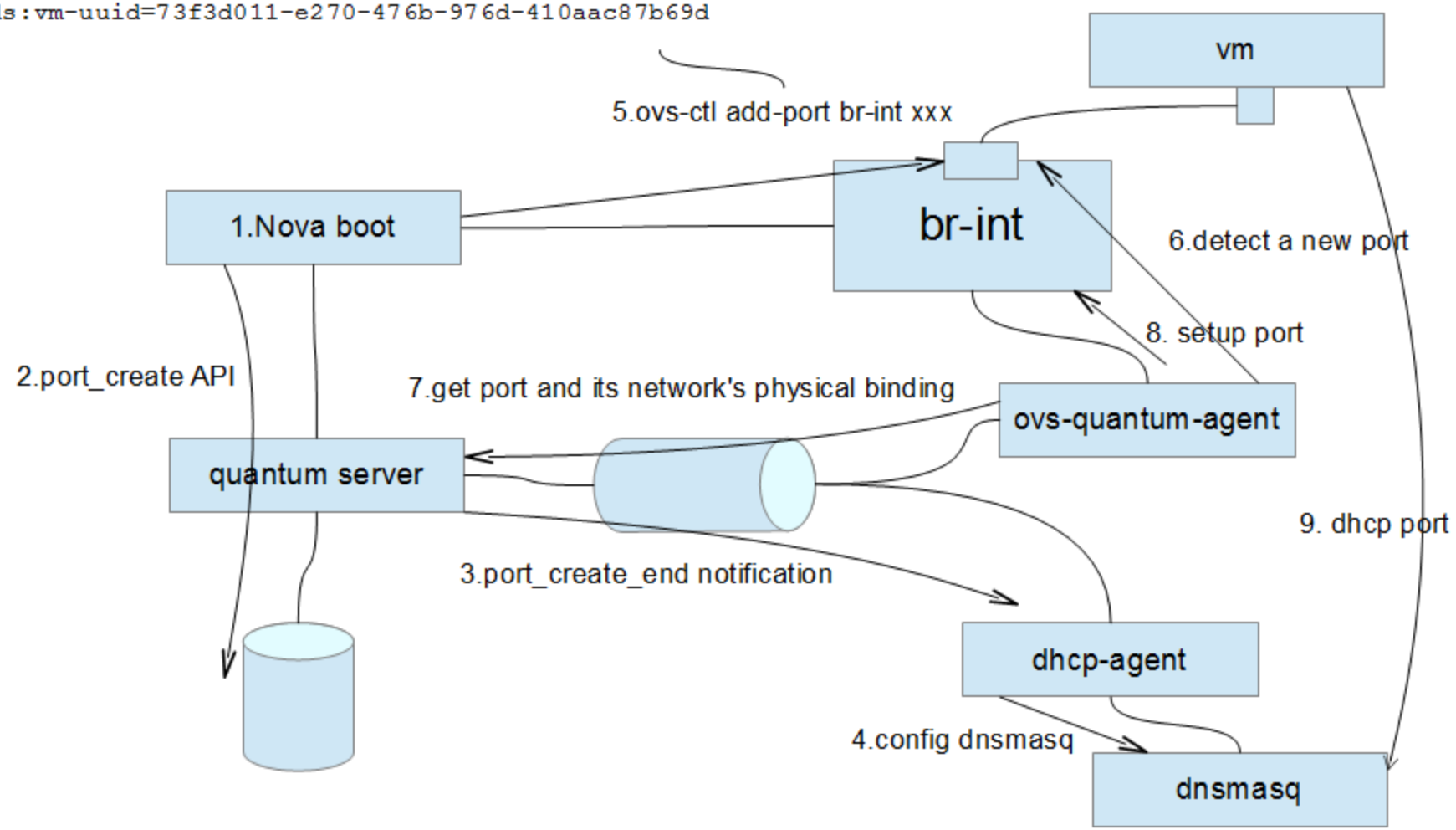
AMQP communication among quantum components



Data flow of booting a virtual server among quantum components

```
sudo ovs-vsctl -- --may-exist add-port br-int tapedc375d9-5e -- set Interface
tapedc375d9-5e external-ids:iface-id=edc375d9-5ebe-4117-95d3-9eb853a6dafa -- set
Interface tapedc375d9-5e external-ids:iface-status=active -- set Interface tapedc375d9-5e
external-ids:attached-mac=fa:16:3e:25:f4:e1 -- set Interface tapedc375d9-5e external-
ids:vm-uuid=73f3d011-e270-476b-976d-410aac87b69d
```



Enjoy hacking OpenStack?