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Network Node

Before really getting into it, lets answer a few questions

What is a Network Node?

A Network Node is one which runs the OpenStack networking services

Is a Network Node really necessary?

Technically, no. OpenStack does give the provision of running the networking services as well on the Controller node itself.

What services does Network Node run?

1. Quantum OVS plugin

2. DHCP Server (Quantum DHCP Agent)

3. Virtual Routing (Quantum L3 Agent)

Quantum OVS plugin

What is OVS plugin?

- OVS – Open-vSwitch. Open Virtual Switch
- It is a virtual switch for hypervisors providing network connectivity to virtual machines.

Why is it required?

- Communication among machines over a computer network happens via a Switch.
- The VMs that are created are just like physical machines, except for the fact that they are virtual.
- Physical machines require network Switch while VMs require Virtual Switches in order to communicate with one another.
- Open-vSwitch – **Open Virtual Switch**

DHCP Server (Quantum DHCP Agent)

What is DHCP?

- The **Dynamic Host Configuration Protocol** (**DHCP**) is a network protocol used to configure devices that are connected to a network so they can communicate on that network using the Internet Protocol (IP).

- The protocol is implemented in a client-server model, in which DHCP clients request configuration data, such as an IP address, a default route, and one or more DNS server addresses from a DHCP server.

- DHCP server maintains a database of available IP addresses and configuration information. When the server receives a request from a client, the DHCP server determines the network to which the DHCP client is connected, and then allocates an IP address or prefix that is appropriate for the client, and sends configuration information appropriate for that client.

Why do we need DHCP Server (Quantum DHCP Agent) ?

- DHCP server will allocate IP addresses to virtual machines running on the network.
- When new VMs are added, they must have IP addresses.
- While they can be specified explicitly, it's easier to have them automatically assigned, especially when the no. of VMs is high.
- It assigns fixed IP to the VMs. Thus Quantum DHCP agent is used.

Virtual Routing (Quantum L3 Agent)

What is L3?

- In the seven-layer OSI model of computer networking, the **network layer** is **layer 3** (or **L3**).
- The network layer is responsible for packet forwarding including routing through intermediate routers.
- OSI - **Open Systems Interconnection** (**OSI**). The Open Systems Interconnection (OSI) model is a conceptual model that characterizes and standardizes the internal functions of a **communication system** by partitioning it into **layers.**

Why do we need L3 agent?

- To provide L3-services such as routing and assigning of “floating” IPs, an L3-agent must be running as well.
- Thus the Quantum L3 agent is present

Putting everything together

1. The Network Node provides the networking services of an OpenStack cloud.
2. It provides connection b/w the Controller and Compute nodes
3. It takes care of networking for the VMs as well.
4. On a network, IP address, default route etc. are what identify a machine. Thus when a VM is created, in order to give it identity, an IP address, netmask etc. should be associated with it. This is done by **Quantum DHCP agent.**
5. To provide L3 services such as routing etc. for the VMs, **Quantum L3 agent** is used.
6. To facilitate the communication between VMs, a virtual switch is required. This switch is called the **Quantum Open-vSwitch** agent.