Every Virtual Machine is associated with to IPs :

- **Fixed IP** : This IP is used for internal communication between the VMs. Every VM is automatically (by default) associated with a fixed IP.

- **Floating IP** : This IP is used for external communication. In other words, it is required for remote login. By default, this IP is not automatically associated to the VM. Associating a floating IP should be done manually.

COMMON SERVICES :

Open SSH: Open Secure Shell Hosting. It is a set of programs to provide encrypted communication between computers on a network. It follows the SSH protocols.

NTP: Network Time Protocol: A method of keeping a machine's clock correct via communications with a trusted, accurate time source. By synchronizing with an accurate time source (mostly over the internet), the time of computer(s) can be kept accurate. Also, when there are a few machines on the network, it becomes important for the clocks on each machine to be synchronized so that communication may happen. This is achieved by NTP.

CONTROLLER NODE

The controller is the central management system in a multinode cloud installation. Its main services include authentication and authorization ,and message queuing.

COMPONENTS OF CONTROLLER :

- Databases(with MYSQL)
- Queues(with Rabbit MQ)
- Keystone
- Glance
- Nova(without nova-compute)
- Cinder
- Quantum Server(with OVS plugin)
- Dashboard(with horizon)

MySQL:

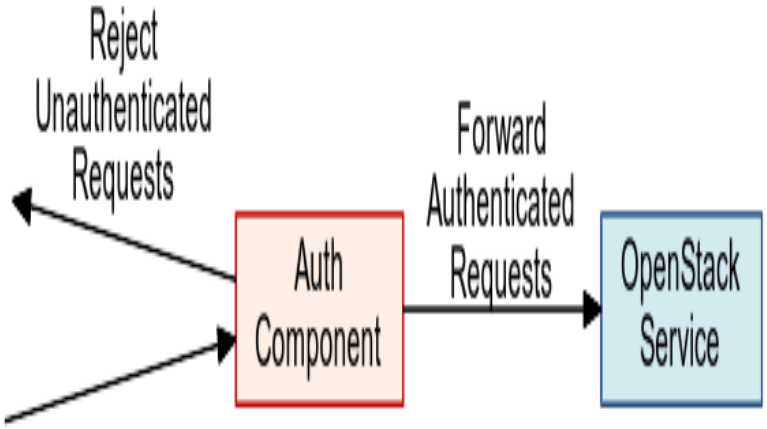
It is a Relational Database Management Software (RDBMS). It comes with no GUI but other software may be installed to give it a GUI. Command Line instructions are used to access and use the databases with this software

RabbitMQ:

It is the defauly message queue software used by OpenStack. It implements the AMQP (Advanced Message Queuing Protocol). When multiple applications need to work together and share data, messaging is necessary. In order to accomplish it, we use RabbitMQ.

Keystone (OpenStack Identity Service):

The OpenStack Identity Service provides the cloud environment with an authentication and authorization system. In this system, users are a part of one or more projects. In each of these projects, they hold a specific role. Users need to have identity and a particular level of access in the cloud. When a user logs into the cloud, Keystone authenticates that he is indeed a user and authorises his level of access within the cloud.

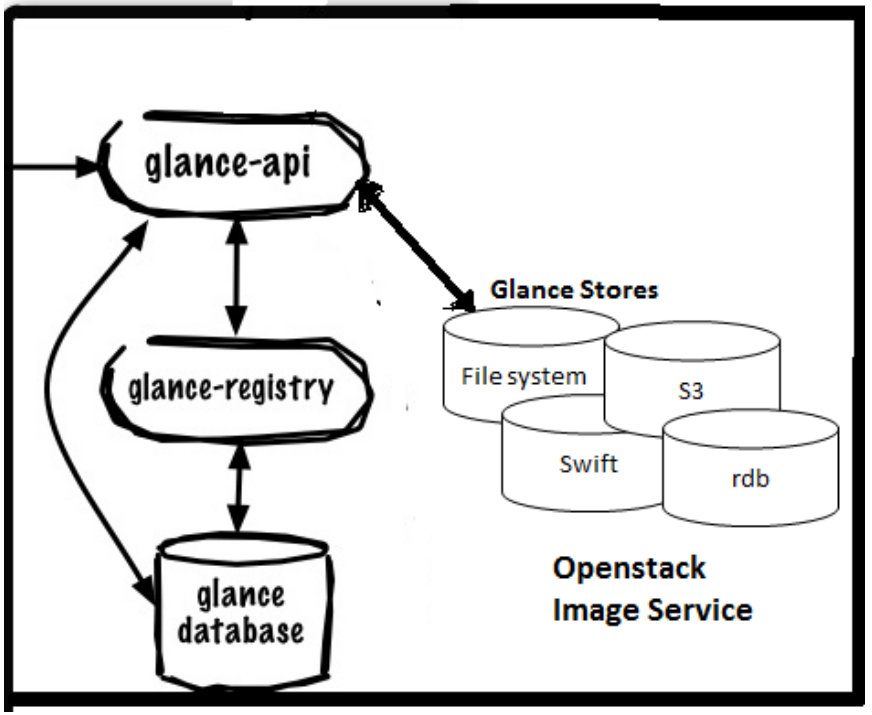


Glance (OpenStack Image Service):

The Image Service provides the cloud environment with a catalog of virtual machine "templates". These templates are used as the basis of instances. For example, if the catalog contains an image for an Ubuntu 12.04 distribution, the users of the cloud will be able to launch Ubuntu 12.04 instances. It has two components – Glance API and Glance Registry.

--> **Glance API** - Processes client requests for VMs, updates Glance metadata on the registry server, and communicates with the store adapter to upload VM images from the backend store.

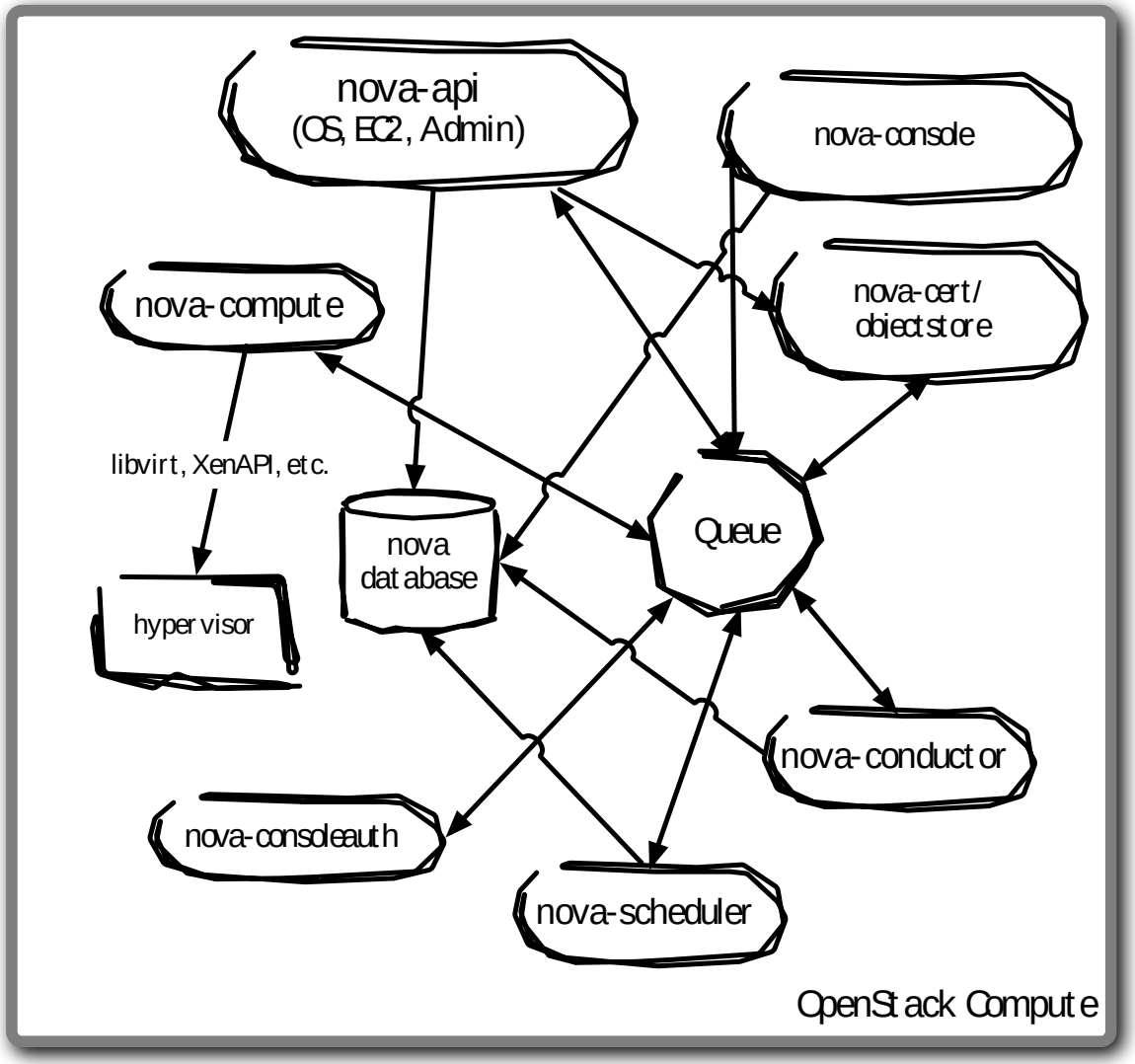
--> **Glance Registry** - Alternative term for Glance's image registry. It is just the registry of all the images present.



Nova

Nova is the most complicated and distributed component of OpenStack. A large number of processes cooperate to turn end user API requests into running virtual machines. Among Nova more prominent features are:

- Starting, resizing, stopping and querying virtual machines (“instances”)
- Assigning and removing public IP addresses
- Attaching and detaching block storage
- Adding, modifying and deleting security groups
- Show instance consoles
- Snapshot running instances



Looks
Complicated ?

Nova-api: is a family of daemons (nova-api, nova-api-os-compute, nova-api-ec2, nova-api-metadata or nova-api-all) that accept and respond to end user compute API calls. It supports OpenStack Compute API, Amazon's EC2 API and a special Admin API (for privileged users to perform administrative actions). It also initiates most of the orchestration activities (such as running an instance) as well as enforces some policy (mostly quota checks).

Nova-scheduler : is conceptually the simplest piece of code in OpenStack Nova : take a virtual machine instance request from the queue and determines where it should run (specifically, which compute server host it should run on). In practice, it is now one of the most complex.

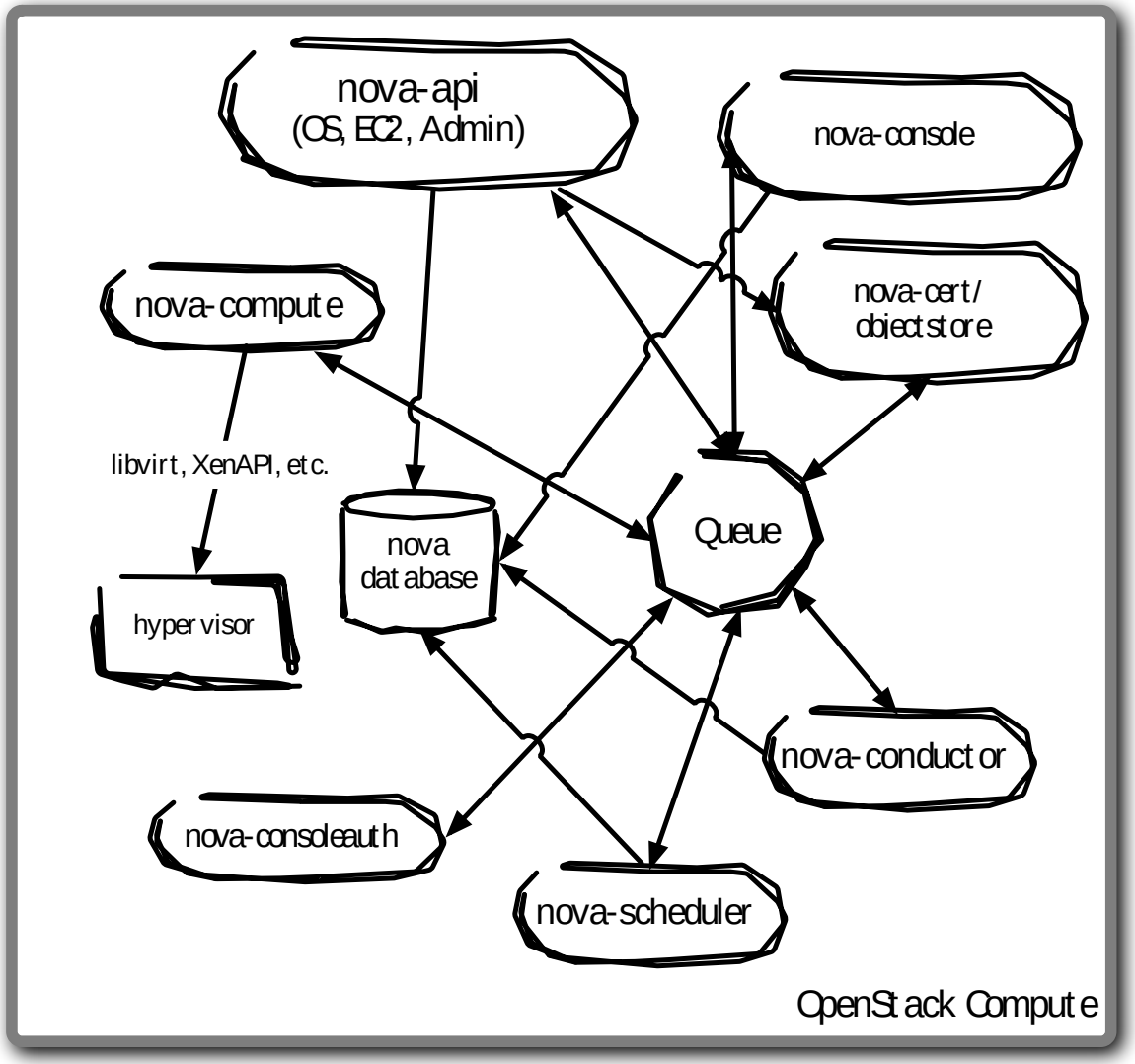
Nova Database: stores most of the build-time and run-time state for a cloud infrastructure. This includes the instance types that are available for use, instances in use, networks available and projects.

Nova-conductor : has been added to this release. It mediates access to the database for other daemons (only nova-compute in this release) to provide greater security.

Queue : provides a central hub for passing messages between daemons.

Nova-Console :also provides console services to allow end users to access their virtual instance's console through a proxy.

Nova Consoleauth (Console Authenticator) : This package provides the authentication service for nova-console. It grants user requests for console access based on tokens in the identity service and allows access to virtual consoles via a browser.



Looks

Simple now ?

Cinder : Block Storage

- **Cinder-api** :accepts API requests and routes them to cinder-volume for action.
- **Cinder-volume** acts upon the requests by reading or writing to the Cinder database to maintain state, interacting with other processes (like cinder-scheduler) through a message queue and directly upon block storage providing hardware or software. (linux iSCSI and other storage providers.)
- Much like nova-scheduler, the **cinder-scheduler** daemon picks the optimal block storage provider node to create the volume on.