Fault Tolerance

Packages used for this modules are:

- Rabbit MQ server : RabbitMQ is open source message broker software (sometimes called message-oriented middleware) that implements the Advanced Message Queuing Protocol (AMQP)
- pika (AMQP API for python) : Pika is a pure-Python implementation of the AMQP protocol. Pika was developed primarily for use with RabbitMQ.
- python-Mysqldb (mysql API for python) : MySQLdb is an interface for connecting to a MySQL database server from Python. It implements the Python Database API v2.0 and is built on top of the MySQL C API.

This module uses Advanced Message Queuing Protocol (AMQP). It is divided into sub modules, one resides in host machine and other resides in controller machine. These two modules talk to each other via messages with the help of Rabbit MQ server which is running on the controller machine.
Since baadal code is written in python language it requires an API to talk to rabbit mq server. Pika is the API.

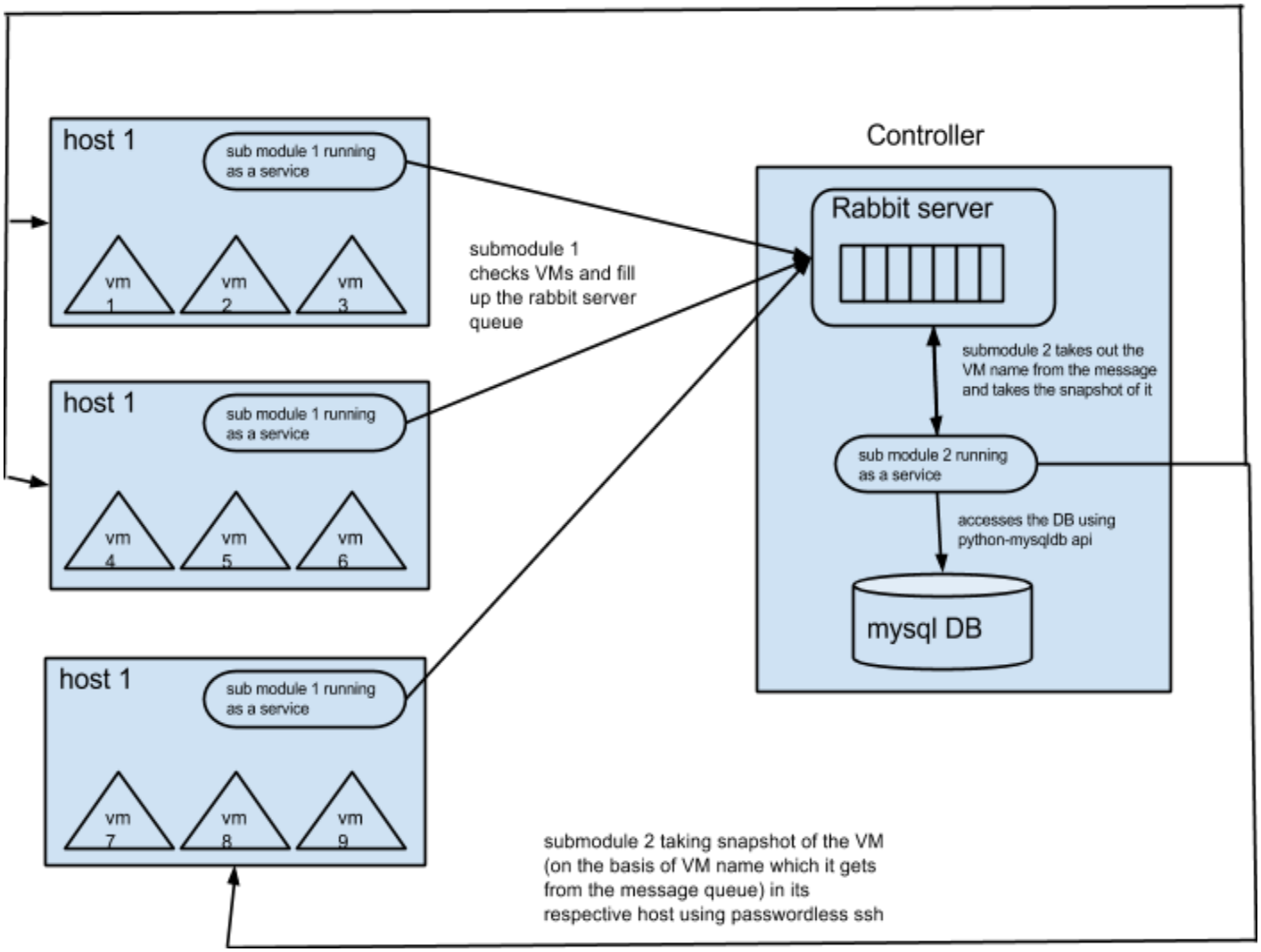
Sub Module 1 : This module runs in every host as a service. It checks all VMs running under that host. It checks the cpu usage and disk writes. A threshold is defined for both. If cpu usage is greater than 75% OR if the count of bytes written to the disk showing an increase with time then this module send the name of the VM as a message to the rabbit mq server which is running in controller machine.

Sub module 2 : This module runs in controller machine. This runs as an independent service so it is not a part of baadal package which is running under web2py framework. So in order to get access to the mysql database, this module requires an API for python which could be used to access mysql. python-Mysqldb is the API for this purpose. This module retrieves the messages from the rabbit mq server queue, checks the name of the VM in the database, gets all the information regarding that VM and takes the snapshot of that VM. This service keeps on doing this until it gets messages from the queue.
Note : The functionality of taking snapshot of this module is same as defined in baadal package.

1. Rabbit server installation : **sudo apt-get install rabbitmq-server.** Need to be installed in controller only

2. Pika installation : It should be installed in both host and controller. Download pika-0.9.8.tar.gz. Untar it.
#cd pika-0.9.8
#python setup.py build
#python setup.py install

3. python-mysqldb installation : **sudo apt-get install python-mysqldb.** Need to be installed in controller only



Functionality of sub module 1:

- It makes a connection to rabbit server (running in controller) and libvirt
- list all the VM ids and fetches their cpu usage. It also keeps previous cputime so as to calculate current cpu usage percentage
- If the cpu usage is above the threshold then it passes the message consisting of VM name to the rabbit server

Functionality of sub module 2:

It is divided into sub methods as follows:

1. is_pingable(ip) : Checks if the VM is pingable or not by using ip of the VM
2. get_datetime() : Returns the current date and time
3. delete_snapshot(parameters) : It has single parameter with name “parameters” which is a list containing vm id and snapshot id. It fetches the vm details using vm id, then fetches host

ip from host id of vm details. It fetches the snapshot name from db using snapshot id. Then deletes the snapshot in the host using libvirt api and updates the snapshot table of DB

4. snapshot(parameters) : It has single parameter with name “parameters” which is a list containing vm id and snapshot id. It fetches the vm details using vm id, then fetches host ip from host id of vm details. It fetches the snapshot name from db using snapshot id. Then creates the snapshot in the host using libvirt api and updates the snapshot table of DB

5. callback(ch, method, properties, message) : This is the function which is consumed by the pika api . this function is called continuously as a way to consume the messages of the queue