IAS Project

TEAM REPORT

Deployment Manager

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Contents

1 Introduction

- Deployment Manager is responsible for deployment of an algorithm on machine.

- So ,There are two sub-parts of the Module.
  1) Deployer
  2) Node Manager

1.1 Deployer Sub - Module

- Resposible for deploying algorithm instances stored in repository to run. Repository contains various configuration files which locate what packages to be deployed. It also take care of system where the algorithm need to be run.

1.2 Node Manager

- Responsible for initiating node instances as requested by deployment manager.Also reposible to run init.py which is Responsible for communication with scheduler,deployement manager and sensor manage

2 Deployer

2.1 Description

- Deployer will get an algorithm execution request from the scheduler. Deployer will apply a load balancing algorithm, if a node is available the algorithm will be executed on that node. Otherwise, the Deployer will request for a new node to Node manager and then run the algorithm on the newly allocated node. Deployer may ask for one or more nodes to Node Manager.

  Heartbeat Manager is one service of Deployer which keeps checking whether all nodes are alive or not and whether the algorithm inside node is running or not. If the algorithm inside the node is not working, the Deployer will re-execute the algorithm in that node. And if node is not working, the Deployer will run the algorithm at another node.

  Load balancing algorithm : It will store this in a map data structure mapping IP address to the cpu usage and RAM usage of node.
  Load of node = 1 / ((1 / cpu usage) + (1 / RAM usage))
  Deployer will calculate the load of each active node and execute the algorithm with minimum load.

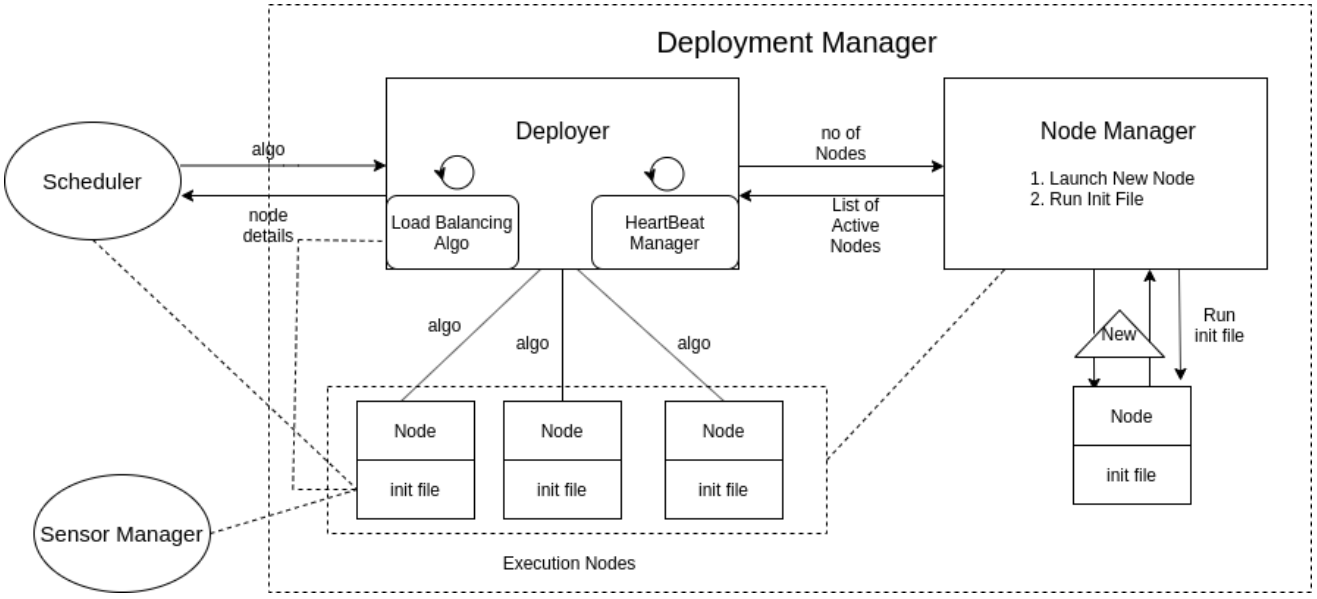
3 Node Manager design

3.1 Description

- **Sensor Manager** :

  Load balancer will request for nodes to Node Manager. Node Manager allocates new nodes to Load balancer for execution of an algorithm and sends a list of active nodes to load balancer. It will start the new node and load the init file to node. Init file is responsible for communication between node and scheduler, Load balancer and sensor manager. It can allocate one or more nodes based on requirements of load balancer.

4 Flow Details



5 Technology used

- MongoDB : For Database Registry

- Kafka : For communication among Scheduler, Deployer, Heart Beat Manager and Node manager

6 Data structure used

Map : Map is used to store mapping of socket address of node to cpu usage and RAM.

7 Uses/Test Cases

Deployment manager test cases

- Testing for new node creation
  Input : 10 algorithms
  Output : atleast 2 active nodes
  Initially one node will be given by node manager and following algorithms will run on one node until node load is less than some threshold. If node load is greater than threshold new node will be allocated by node manager and algorithm will be executed in the new node.

- Testing for heart beat manager
  Input : abort one node executing algorithm
  Output : New / other node execution algorithm
  Heartbeat manager keeps checking whether all nodes running algo are alive or not. If any node is not active it will inform the deployer now the deployer will run this algo in the existing / new node.