IAS Project

TEAM REPORT

Monitoring and Fault Tolerance

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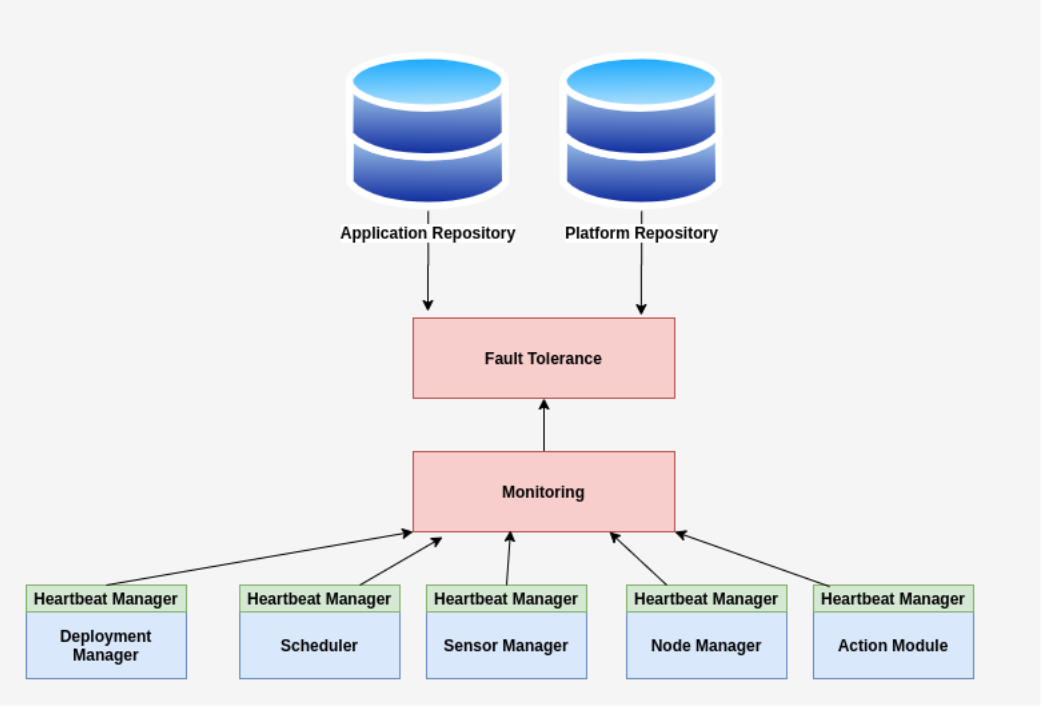
1 Monitoring and Fault Tolerance

1.1 Introduction

- The Monitoring and Fault Tolerance Module is responsible to continuously monitor status of all the modules viz scheduler,deployment manager , sensor manager, application manager, action manager and their corresponding nodes on which they are running.
  If monitoring system detects abnormal behaviour of any module, it finds out whether the nodes on which module is running is not working or the instance of module itself is not working.
- For the first case it will request fault tolerant manager to run same module on different node and reflect changes if needed everywhere and for the second case it will request the fault tolerant manager to run the instance of the module on the same node.

1.2 Design



1.3 Data Flow

For every node running module ,there will a background service which will continuously write on the communication topic (node and Monitoring Module) which lets the monitoring module know whether the node is live or not and also will write the state of the process(module) whether running or not.
If there is abnormality and the node is still writing on the topic it simply implies the node is fine but the module has stopped working and hence requests fault tolerant manager to run module on same node.
If the topic is not getting new message ,which implies node is not working hence will request fault tolerant manager to run module on different node and reflect all the changes in the system.

1.4 Technology used

KAFKA

Kafka is used for real-time streams of data, to collect big data, or to do real time analysis (or both). Kafka is used with in-memory microservices to provide durability and it can be used to feed events to CEP (complex event streaming systems) and IoT automation systems.Kafka is often used in real-time streaming data architectures to provide real-time analytics. Since Kafka is a fast, scalable, durable, and fault-tolerant publish-subscribe messaging system.

MongoDB

MongoDB is a cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with schema. MongoDB is developed by MongoDB Inc. and licensed under the Server Side Public License (SSPL).

Fluentd

Fluentd is an open source data collector for unified logging layer. Fluentd allowsyou to unify data collection and consumption for a better use and understanding ofdata.Fluentd treats logs as JSON, a popular machine-readable format.

1.5 Interaction with other Modules

- Each module will run a HM.py script responsible to share current state of machine and running process.
- This information will be stored in Heartbeat Manager, and actions will be taken in case machines gets down
- If monitoring system detects abnormal behaviour of any module, it finds out whether the nodes on which module is running is not working or the instance of module itself is not working.
- For the first case it will request fault tolerant manager to run same module on different node and reflect changes if needed everywhere
- For the second case it will request the fault tolerant manager to run the instance of the module on the same node.