Pros and Cons of Mobile Agent in Distributed Computing

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Abstract

As information and data amount is rising incessantly, and is stored in the remote locations, effective methods are used for facilitating retrieval of information. The client-server architecture helps moving data, but it has limited scalability and bandwidth. In this aspect, Mobile Agents (MA) are used, which is the programme used on the users' behalf and is also capable of moving from one location to the other. In this research context, the researcher aims to discuss about the pros and cons of MA in distributed computing system.

Keyword

Mobile Agents, Distributed Computing System, Pros and Cons, Information and Data

Introduction

With technological progression, distributed systems have gained quite popularity pertinent to access of large chunks of data. Due to handling of large quantities of data, client server model has both network bandwidth and scalability issues and to overcome this issue, mobile agent is used (Isaiah et al. 2019). Mobile Agents (MA) is problem-solving and autonomous computational entity that operates effectively in dynamically open environments. MA are data and computer software composition those autonomously move from one computing system to the other with continuing execution on destination computer. MA are classified into 2 types: MA with undefined paths and MA with pre-defined paths (JavaPoint, 2020). The research aim is discussing and evaluating the pros and cons of MA in distributed computing systems.

2. Mobile agent

A self-contained application that can travel from one host to another in a network and interact with resources and other agents is known as a mobile agent. There is little risk of data loss during this method since the state of the current application is saved and then transferred to the new host.

It allows the software to pick up where it left off before the migration. The capacity to transfer complex processing processes to sites where large volumes of data must be handled is the most significant advantage of mobile agents. To put it another way, it's referred to as transportable agents.
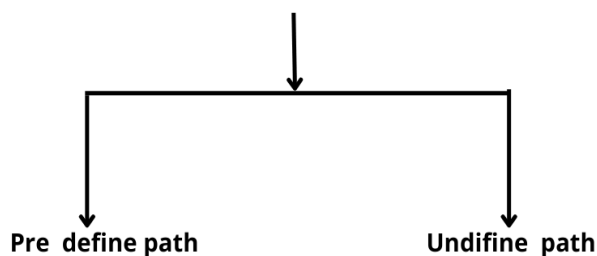

Figure 1: Types of MA

Mobile Agents with a Static Migration Path: They have a migration path that is pre-defined. The migration pathways of Roamer and other mobile agents with an unknown path are dynamic (JavaPoint, 2020).

Pros and Cons of Mobile Agent in Distributed Computing

The pros of MA in Distributed Computing system are as follows:

- **Intelligent Aspect:** The MA is capable in learning and searching for knowledge regarding the domain and are intelligent agents those help possessing degree to domain knowledge. It also helps in transporting the state from one environment to the other without providing any disturbance to previous holding data and is

also capable in performing relevantly in the new environment (Mobile Agent Computing, 2020).

- **Autonomous:** MA operation is motivated by the outside actions those are initiated by the system and users, and the internal events have been decided on the behavior and performances. Mobile agents are responsible in taking autonomous decisions at the time of node selection (JavaPoint, 2020).

- **Mobility Aspect:** MA helps comprising of degrees of mobility. The agent is not limited to the home nodes and are able to migrate from one node to the other regarding carrying-out tasks. It helps distribution of processing as well as balancing loads. Even if the user foes offline, MA are able to function themselves (Mobile Agent Computing, 2020).

- **Communication:** MA effectively communicate with the other agents such as systems and users (Isaiah et al. 2019). MA utilize communication language for conducting inter-agent communication.

- **High Quality, Performance and Effective Aspect:** MA utilize network for task accomplishment and also is completely advantageous in resource location and that helps allowing higher operational performance. It helps making best utilization of the resources and network for travelling (JavaPoint, 2020). MA is completely encrypted and they traverse across the network and that helps sacrificing functionality to the application.

The con of MA in Distributed Computing System is mainly security issue. The security issues related

to MA has been quite common in terms of communication and also with software downloading. The researchers have explored mechanisms for enhancing security with mobile agent systems. The 2 issues related to security of issue, permission of MA regarding restricting their behaviors are required and the 2nd issue is about authentication issue.

Proposed Work (Facts and Future Scope)

It is seen that MA in distributed networks makes the distributed applications run faster in an effective and easy way required for developing, managing and executing of distributed applications. MA facilitates retrieval of remote information. The information has been stored in relational database and is maintained in free files of texting on diverse computers, filtering and remote searching for providing ability in opening, reading and filtering files (Salkenov and Bagchi, 2019). The MA also help performing the tasks locally in the destination. The communication between the client and servers are minimized and MA also helps migrating multiple database servers required for gathering and retrieving interesting data from servers. MA helps providing solutions to flexible management of networking system and

MA are protecting hosts from diverse malicious MA and protecting MA from malicious hosts (Satoh, 2010). It is quite difficult in verification certainty in terms of incoming agent is malicious or not. In the 1st that helps observing and controlling equipment with migrating among the codes. Mobile agents help in easily accessing device functionality on the devices. Dynamic deployment as well as configuration of new network functionalities that helps allowing outdated systems to stay updated effectively (Salkenov and Bagchi, 2019). MA utilize the resources and capabilities of the remote servers in processing the tasks and also helps masking temporal disconnections within the networking system. MAIS also helps to distribute tasks dynamically, which helps to lightly load the system on those who are burdened with heavy loads.

Conclusion

The research aim is discussing and evaluating the pros and cons of MA in distributed computing systems. The pros of MA in Distributed Computing system are intelligent aspect, autonomous, mobility aspect, communication and high quality, performance and effective aspects. The con of MA in Distributed Computing System is mainly related to security issue.

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