

The Comparison of Mobile Agent Platforms Grasshopper and James Framework

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ABSTRACT

Mobile Agent is an alternate strategy to compose a dignified distributed system. Mobile agent is a program that can transform one host to another host at time in places of their choices (Jump and Go). The comparison between the Mobile Agent platforms Grasshopper and JAMES Framework as a suitable architecture for distributed system. A comparison is made and a categorization is made based on the performance of the James and Grasshopper mobile agents, with an emphasis on the James and Grasshopper framework as a viable architecture for distributed systems for multi-agent organizations. The purpose of this research is to compare and contrast mobile agent platforms.

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1. Introduction

1. Introduction

MAF (Mobile Agent Framework) is a research prototype with the following precise objectives. It attempts to meet the application demand from the distributed sensor sector, which is to provide a light-weight, self-organized, and secure agent platform; it intends to provide a set of primitives to simplify the building of distributed mobile agents.

A mobile agent is a programme entity that inherits a number of the attributes of software program marketers in a software program surroundings cell marketers are a shape of mobile object this is self-contained clever programmes that pass via a community searching out and offering offerings on behalf of customers they've behavior kingdom and vicinity and they are able to migrate from area to area bringing their states with them the gap is a server of a few kind and additionally an item wherein marketers journey to rather than cell marketers while an agent is popular right into a area it's miles loaded right into a area wherein it could execute agent execution is depending on aid availability and security this have a look at explored mobile marketers and their structures and the bounds that areas placed on them evaluate the mobile agent structures james and grasshopper on numerous factors the use of the literature evaluation this studies checked out mobile marketers their structures and the limitations that areas impose on them the use of the literature evaluation comparing numerous methods the mobile agent structures james and grasshopper[1]

2. Mobile Agent

A mobile agent is a self-contained programme that can move from one host to another in a network and interact with resources and other agents [15]. Because the state of the running programme is preserved and subsequently transferred to the new host, there is little possibility of data loss during this procedure.

It enables the programme to resume execution where it left off prior to migration. The most major advantage of mobile agents is the ability to relocate complicated processing operations to locations where massive amounts of data must be processed. In Other Words is known as transportable agents.

Mobile Agents with a Static Migration Path: They have a pre-defined migration path. Roamer and other mobile agents with an unknown path have dynamic migration paths.[2]

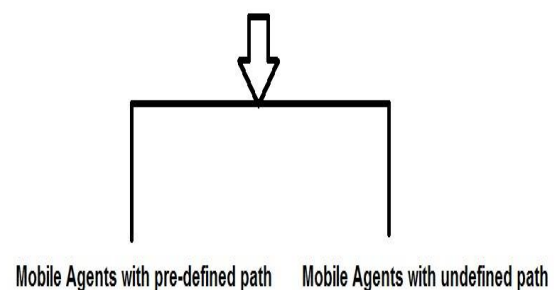


Figure 1. Types of MA

2.1 Features of Mobile Agents

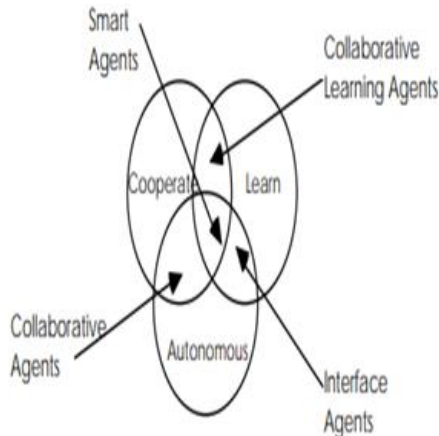
According to Nawana

Its purpose is to look into agent typologies. The study of different sorts of entities is known as typology. Existing software agents can be classified along numerous dimensions. On begin; agents can be categorized according to their mobility.

They can also be classified as deliberate or reactive. Finally, agents can be defined based on a set of ideal and primary characteristics that they should possess. At BT Labs, we've narrowed it down to three: autonomy, learning, and cooperation. [2]

Autonomy, cooperation, and learning are examples of ideal and primary characteristics. Nwana distinguishes four categories of agents based on these characteristics: collaborative, collaborative learning, interface, and smart.

Nwana describes ongoing research in seven areas after defining this typology. The mobile agents are intelligent, social, and learnable, and their mobility is their most important quality. They are self-contained, self-driven, and do not require a communication node to function. Even if the user is removed from the network, they can continue to operate effectively. [3]



“Figure 2. Typology based on Nwana’s.” [2]

Intelligence

Mobile Agents have the cap potential to investigate and look for data in their vicinity.

Because they have some vicinity expertise, they may be called smart agents.

Mobility

They can go from one node to another and perform activities while doing so.

Communicative

Mobile agents use a communication language to handle inter-agent communication.

2.2 Grasshopper Mobile Agent

The first Grasshopper version end up released within the summer season season of 1998. Since February 1999, Grasshopper Release 1.2 has been available.[4]

GMD FOKUS and IKV++ GmbH have evolved a cellular agent improvement and runtime platform primarily based totally on a disbursed processing environment. It is produced in Java (primarily based totally on Java JDK 1.1).that's a strong middleware for MA-primarily based totally communications services, consisting of energetic community applications. [4]

Apart from an extensive assessment of the Grasshopper platform, we can display the way to use it for the short-time period introduction of an Active Broadband Intelligent Network environment, that's now being carried out with inside the ACTS challenge MARINE (Mobile Agent-primarily based totally Intelligent Network Environment).The framework presents a method for speedy designing and deploying cellular dealers they could journey among subnets and carry out control obligations on every node they visit.

Advantage

1. User-friendly graphical interface
2. Advanced network management
3. Dynamic Proxy.

Disadvantage

1. Performance is not good
2. Slower

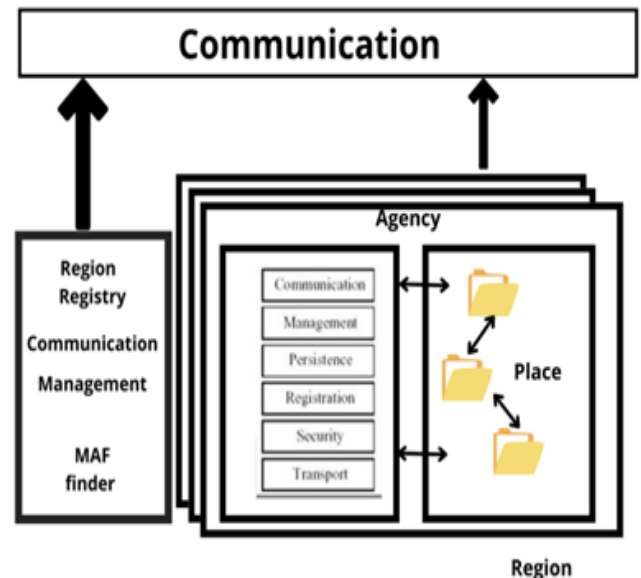


Figure3. The Grasshopper Distributed Agent Environment

2.3 JAMES

A Java-based framework for mobile agents with a focus on data and telecom Muncations network management.This platform was created in support of a Eureka Project (! 1921) [4].Our platform's primary focus is network management and telecommunications applications. JAMES was the platform with the best performance and the most stability [4]. Because JAMES is not yet a commercial platform [8], various programming capabilities need to be enhanced before it can be used in production programmes.

Advantage

1. Performance is good
2. Faster
3. Increase the stability of the system
4. fault-tolerance

Disadvantage

1. Not a commercial platform
2. The programming features should still be improved

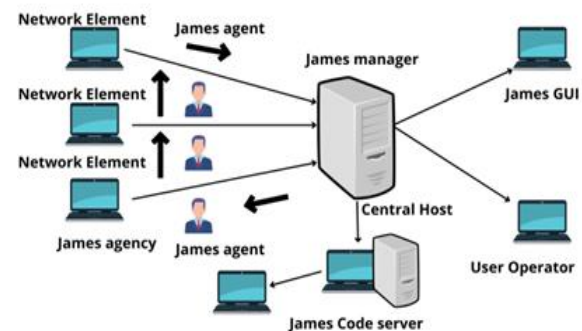


Figure 4. An Overview of the James Platform

Literature Survey

1. Abdelkader Outtagarts,et al,[9] A areas and implementation platforms have been presented. Gathering,filtering,sharing, monitoring, suggesting, evaluating information, directing Web surfers, e mail filtering, vehicle mobile responders, and negotiating are a number of the number one roles closer to which cell marketers are preferable.

2.The Shrouf,et.al.,[10] pattern of mobile agent design categorization has been broadened to include optimization patterns as well. The optimization patterns are included in the distribution of mobile agent architecture. These were proposed with the use of a mathematical computing model, and they facilitate the reuse of designs in the mobile

computing domain. A sample of four master mobile agents was utilised to construct three slave mobile agents.

3. S. Srivastava and colleague's et.al [11] Database search, distributed framework, and e-commerce are just a few domains where the mobile retailer paradigm might be useful. It can generate excellent results with limited resources or in bad environments when bandwidth and memory are major limits. However, because of its security concerns, it is not widely accepted. From the currently used strategy RPC (Remote Procedure Calling) and new method RP (Remote Programming) of the mobile network, we may differentiate quite a lot of utilised underused qualities of mobile marketers in currently used architecture and platform of mobile world.

4. Luís Moura Silva et.al,[8] Two software packages will leverage the JAMES platform: one for TMN and the other for data network management. We anticipate the following outcomes from this project: to illustrate those cellular sellers can resolve a number of the troubles that presently exist with Client/Server answers are common.

5. Kurt Rothermel Markus Schwehm et.al,[12] Although no significant real-world application uses this method, the relationship between this model and existing ones like client-server becomes obvious, and the strengths and shortcomings of a related infrastructure emerge. We went through some of the primary benefits of mobile agents, such as on-demand software delivery, lower communication costs, asynchronous activities, and scalability owing to dynamic deployment based on a mobility taxonomy [16].

6. Parul Ahuja, Vivek Sharma et.al,[13] reviewed a variety of current advancements, research, and suggestions in the field of agents and shed some light on the delicate areas that require greater attention in order to support growth in a positive way.

7. Maitanmi O. Stephen et.al,[14] Of course, the secret is to choose a thorough baseline of data. countermeasures that are consistent with the protective concept that guided the creation of the agent system consistent with the requirements of most applications and can be expanded to accommodate additional systems sophisticated methods that may be developed Obviously, this is a time when establishing a baseline is necessary more alternative experimentation and experience design decisions, particularly ones that involve compromises compatibility, scalability, and performance.

Table.1 Features of Grasshopper and James Mobile Agent [1]

Features	James	Grasshopper
Proxy	YES	YES
Dynamic Proxy	YES	YES
synchronous communication	YES	YES
asynchronous communication	YES	YES
robustness.	GOOD	WEAK
performance	Fast	Slow

Future works and Facts

One of the most important requirements for these applications is fast execution performance all been incorporated in the JAMES platform to give the best performance for agent-based applications. The concept of flexible agents is one we intend to investigate in the near future. These unique agents can either drop or include code when it is no longer required.

Grasshopper The framework provides a method for quickly coming up with and deploying mobile agents they'll travel between subnets and perform management tasks on every node they visit. The security of Grasshopper ought to be improved by doing the restructure of FIPA; its security is improved.

Table 2. Comparison of Mobile Agent Framework

Features		JAMES	GRASSHOPPER
Communication		Very Good: Agent Communication is compatible with CORBA Standard.[5]	Good: Agent Communication is compatible with (MASIF) and FIPA version 1.2 and 2.0 and still no updated versions are available as after 1999 Grasshopper has not been updated with latest version of FIPA[6]
Security	Authentication	Very Good: Mechanism of authentication in the JAMES Agencies to manipulate the execution of agents and to avoid the intrusion of non-official agents.[15]	Good: Mechanism of authentication in the GRASSHOPPER is essential.
	Permission	Good: Every agent must be authorized	Good: Every agent must be authorized
	Proxy	Yes	Yes
	Message Encryption	JAMES have the feature to encrypt the message	Grasshopper have the feature to encrypt the message
Robustness		Very Good: The use of java was motivated for reason of robustness it presented a very good level of robustness.	Weak: The platform's robustness is also not as strong as we had hoped: it has collapsed multiple times for large agents.
Performance		Very Good: JAMES was the platform that performed the best in the majority of the tests. Performance is excellent, since the execution time on 100 KB is only.70 ms.[8]	Weak: As its execution time on 100 KB is 1.17 ms so performance is slow.[8]

Conclusion

A comparison study between JAMES and Grasshopper has been presented, with the comparison based on four assessment elements. JAMES has hundreds of plug-ins and allows for automated selection from a list of available alternatives.

We utilized a framework for assessing the agent in the first section. The study was focused on executing the identical scenarios on both toolkits, and four criteria were chosen for evaluation: communication, security, robustness, and performance.

The findings revealed that JAMES' communication is superior to Grasshopper's communication. JAMES has better security criteria than Grasshopper. In terms of robustness and performance, JAMES outperforms Grasshopper.

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