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# Workflow management & task delegation using agent based loosely coupled architectures

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**Abstract**
The increase in the use of technology in almost every field has brought in the need to think more elaborately and it converge the multidimensional streamlines into one. One such technology is a mobile agent that deals with broader research areas in the areas of integrated coherent networks, automated learning, and artificial intelligence. The use of the mobile agent in the business workflow is a current new trend in modeling, and implementing information flows and various related processes in an organization. Work is often referred to as a task, or job that traverses various nodes in organization. This integration includes automation of various processes such as tasks, processed data and information, or rules for performing tasks. This automation within technology can be achieved through the integration of agent-based technologies that leverage the mobile agent paradigm.

**Keywords:** information flow, agent mobility, multidimensional traversing

## 1. Introduction
A mobile agent is a component of software architecture and data that enables it to migrate amongst sub-networks. For local and remote agents, the agent mobility scale specifies several attributes. One such orthogonal characteristic is mobility, which permits an agent to move within a predetermined route [1]. If an agent is moving and exhibits a travelling pattern, it is classified as a mobile agent. A static agent can only remain inside one location and converse with its implicit environment using customary means of communication such as various configurations of Remote Procedure Calling and other communication mechanisms, whereas a mobile agent can execute and work on any context. It may take its data state, execution state, and application logic to the next working environment within the route to resume/ prelaunch the tasks assigned for the purpose of evaluating resources or data gathering after being established in one working context [2]. When distributed application technology is combined with information-based systems, it enables coordination, simultaneous operation, teamwork, and tracking of diverse tasks, hosts, and capabilities inside the associated devices in the network. This is a rapidly emerging technology that satisfies the requirement for computer algorithms based on human-machine interactions [3]. This system highlights a crucial difficulty in achieving efficiency and competitiveness across different businesses. It also allows users to manage any workflow using algorithms.

## 2. Knowledgebase and Features
As a single multipurpose unified package, smart objects operate as a proper and effective operational unit. The knowledge of a client-side representative is passed on to the network operator or server node. This is capable of communicating with a server software running on the admin node independently. It returns to the home cluster with a completed conclusion or a suitable outcome after achieving the needed aim. Because the agents use the migrating node's local resources, this local method of interacting with nodes within the network dramatically decreases indirect network traffic.

### 2.1 Increased Reliability and Quality
Because the link between nodes does not have to be up and active all of the time, it improves the overall dependability of the system. In older architectures and paradigms we need a specialized channel designed to interact with internal components. This might be subject to numerous errors owing to congestion issues.

### 2.2 Homogeneous Implementation
The mobile agent network may be used to construct WDFAM (workflow & data

administration monitoring) tools, as well as organise client activities and provide activation services. Agents can also be utilised as a universal interface for launching essential programs and executing workflows. There are several approaches to planning and implementing WMS, each of which may provide different tools, strategies, and procedures for developing discrete components within a system [4].

### 2.3 Replicating of Agents

Even with the existing intricacies of its business processes operating with the base organization, the introduction of a stepwise process employing mobile agents can make it easier to grow [5]. This sort of situation simply necessitates the ability to participate of more agents. This might be accomplished without requiring any changes to the formerly supported system or requiring knowledge of non-participatory interconnected structures and components.

### 2.4 Goal & Task-Oriented

Mobile nodes are task-oriented entities that are unilaterally handed on or transferred to various nodes. The current version of the target-oriented network device is managed by the mobile agent server, which includes the execution state, data state, product lifecycle methodologies, and routing schedule. They are goal-oriented, meaning they are given a clear assignment to do it and must return to their home agency once the job is finished [6]. There are several ways that employ different techniques to pass on track of their present state.

## 3. System for Managing Workflow

This is the module that uses monitoring software to define, determine, and supervise process performance. The program is essentially running on one or more workflow engines at the same time. It is capable of deciphering the process specification and communicating with the participants in the workflow [7]. It can also call up the proper application tools as needed. The following workflow management may be used to set up analytical and cost-effective businesses. Nonetheless, there are flaws in this framework's handling and management of business processes:

## 4. Loosely Coupled Architecture & Issues

Many international and national organizations communicate as part of the e-commerce and m-commerce business processes. Businesses may not be as keen in tying up their commitment and attention for registrants as they are for partnerships working in the same firm when starting online communications. Any loosely cooperating architecture has the advantage that its routines may be changed to meet the aims and purposes of entities' commercial profit. Such a loose-cooperating framework is not configured in the aforementioned WFM (workflow management) architecture. This is an automated method for a business process with objectives [8]. Various processes, information tasks, or works, and so on must be transferred from one participating entity to another inside a preset sequence to operate according to predefined protocols and a sequence of action history across the workflow mechanism.

### 4.1 Workflow Management

Many international organizations communicate as part of the e-commerce and m-commerce business processes. Businesses may not be as keen in tying up their commitment and attention for registrants as they are for partnerships working in the same firm when starting online communications. Any loosely cooperating architecture has the advantage that its routines may be changed to meet the aims and purposes of entities' commercial profit. Such a loose-cooperating framework is not configured in the agent itinerary flow management architecture [9].

### 4.2 Security Issues

The malevolent host is defined in agent-based technology as a node that not only supports the execution of a mobile agent but actively seeks to assault the agent. When a mobile agent is run on a host, it makes use of the host's underlying resources. This allows the node to monitor the behavior of the agent, such as the instructions it executes, the amount of memory it consumes, the sort of job it carries, and so on, and attack if necessary [10]. The following are some of the most common attacks that a rogue host can launch against a mobile agent:

#### 4.2.1 Host Pretention

- The malevolent host pretending to be a non-malicious one.
- The host launched a denial-of-service attack on the agent.
- Agent operations are being eavesdropped on and tracked.
- The malicious network host forces modifications in mobile agent implementation.

#### 4.2.2 Detect the presence and proof of identity

- Detecting transformation of business logic, execution state, data state, and so on.
- Determining the path of an agent's operation as well as following the agent's schedule
- Using encryption algorithms like as digital signatures and hash functions, partial result encapsulation is used to gather information about the current execution environment [11].

#### 4.2.3 Prevent the occurrence

- Reversing illegal access to the mobile agent's code
- Encrypted functions are used, which encapsulate the original code within the encrypted function.
- On arrival, the mobile agent is subjected to a pre-execution check.
- Skimming over an agent's prior itinerary traces
- The authorized channel for agents navigation is being set up.

## 5. Application in Organization framework

### 5.1 Business-oriented process

These are bundles of related jobs or actions that work together to work towards a unique business goal [12]. Contextual factors in your organization's framework enable this process orientation. Basically, this orientation goal supports the definition of various functional and contextual roles. It also shows how the IDs in the sentence correlate and interact with each other.

### 5.2 Indexing using MA for information retrieval

One of the most popular applications for mobile agents is information retrieval. With the proliferation of data, information, and communication channels, processing and retrieving information is becoming more and more cumbersome. Mobile agents provide a compelling idea of sending agents to remote sources. The agent will generate a search index on the remote source you accessed. This goes

back to the home agent server. This greatly reduces the number of search results that go to search engines for indexing and ranking purposes only. Mobile agents can use deep learning techniques to perform advanced searches without restrictions when the home server is running. This allows the mobile agent's home server to handle other server-level activities.

### 5.3 Behavior and Information Monitoring

This has become a required property of common workflow applications to support data exchange between employees within an organization. In this case, mobile agents have an advantage because they provide some degree of autonomy with respect to workflow items in addition to mobility. An independent workflow element based on a mobile agent is an individual entity that embodies the information and behavior of a task. This encapsulated information guides you through the constrained environment of your organization, regardless of specific actions, inputs, and applications.

### 5.4 Virtual Platform Support

Mobile marketers are green in operating and managing the digital surroundings associated with activities. They can migrate over the device servicing unique requests. They may be used for load monitoring, load balancing and cargo sharing purposes. They also can be carried out with the diverse load scheduling algorithms to make sure the green managing of incoming and outgoing requests in conjunction with the migration of jobs/obligations in order that no device sits idle even as different is pipelined with several ready jobs/obligations inside the digital surroundings of linked machines.

## 6. Conclusion

Mobile agent systems can do everything that traditional methods can do equally. Mobile agents help reduce overall execution time and resource consumption on a single computer and simplify tasks through concurrent data processing. Mobile agents are efficient at processing real-time systems because they can prioritize dialogue and decisions with goals assigned while running in the current context. Mobile agents can migrate to nodes that need to perform time-sensitive tasks, eliminating the delay caused by sending messages between clients and servers.

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