### IMPLEMENTATION

Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus it can be considered to be the most critical stage in achieving a successful new system and in giving the user, confidence that the new system will work and be effective.

**Modules:**

In this Novel Model For Competition And Cooperation Among Cloud Providers four modules are there such as given below:

1. **Cloud Computing Module:**

Cloud Computing is the computing paradigm where the large pool of systems are connected in private or public networks to provide dynamically scalable infrastructure for application. Data and file storage with the advent of this technology. The cost of computation, application hosting, content storage and delivery is reduced significantly. Cloud computing is a practical approach to experience direct cost benefits. The two key advantages of this model are ease of use and cost effectiveness. The network of computers that make up the cloud handles them instead. Hardware and software demands on the user's side decrease.

**2. Dynamic Resource Pricing And Competition Among Cloud Providers module:**

A novel pricing demand scheme designed for a cloud cache that offers querying services and aims at the maximization of the cloud profit with predictive demand price solution on economic way of user profit The proposed solution allows: on one hand, long term profit maximization with price minimization on request of same demand, and, on the other, dynamic calibration to the actual behaviour of the cloud application, while the optimization process is in progress.

In the current cloud market, users can easily compare resource prices of all providers and calculate the obtained utility before deciding to be served by a certain provider. Understanding the user’s choice behavior can help providers to strengthen their competitive advantage.

**3. Cooperation Among The Cloud Providers Module.**

Increasing resource demands with different requirements from users raise new challenges which a single provider may not be able to satisfy, given that the resilience of cloud services and the availability of data stored in the cloud are the most important issues. Scaling up the infrastructure might be a solution for each provider, but it costs a lot to do so, and the infrastructure may be under-utilized when demand is low. The Cloud-of-Clouds system can facilitate expense reduction (i.e., savings on the operation cost), avoiding adverse business impacts and offering cooperative or portable cloud services to users. The architecture of a Cloud-of-Clouds system determines in which a dedicated broker is responsible for coordinating the cooperation among providers. The broker has all information about the resource capacities and price policies of all providers. Based on the user’s resource requests, the broker will run a cooperation decision algorithm to decide with whom a particular provider should cooperate.

**4. Markov Decision Process Module:**

The idea of reinforcement learning is to use the reward feedback to build up a value function that reflect the expected future payoff of visiting certain states and taking certain actions. We can use such a value function to make decisions of which action to take and thus which states to visit. This is called a policy To formalize these ideas we start with simple processes where the transitions to new states depend only on the current state. A process which such a characteristics is called a Markov process. MarkovDecisionProcess can satisfies Bellman’s Principle of Optimality which indicates that “an optimal policy has the property that whatever the initial state and initial action are, the remaining actions must constitute an optimal policy with regard to the state resulting from the first action”, it can be solved via dynamic programming.