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Survey Paper on LICIT: Administering Usage Licenses in Federated Environments

Vina Lomte, Nikhita N Nerkar
Asst. Professor
Computer Department,
RMDSSOE, Pune University , India

Abstract - Cloud Computing is known as dynamic service provider using very large scalable and virtualized resources over the Internet. Job scheduling is most important task in Cloud computing environments as user has to pay for resources used based upon time. Well, efficient usage of resources when it comes to sharing of resources for business and scientific reasons. The below architecture naturally accommodates a variety of site specific strategies for license administration. LICIT is implemented in a popular open source framework for virtual computing and increases the feasibility. In this paper we study various scheduling algorithms and issues related using them in cloud computing.

Index Terms—Cloud Computing, Resource allocation, Scheduling, LICIT

I. INTRODUCTION

Cloud Computing is biggest talk about structure in computer world. Cloud computing is a developing technology in IT world. It is everywhere and anywhere. You pick up a magazine and you find technology is discussed out. Cloud computing consists about applications served as service, hardware as service provided to the user and also system software's in the data centre provided as the service offered by this technology. The simplest form of Cloud computing is known as "*Web Applications*". Well, the Web applications are applications we use and which are created using HTML, JavaScript, XML, PHP and etc. These are form of the cloud computing because these are actual applications which are suited on another server. *Google Doc* is a web application example.

Even if our server fails, or say if our Operating System fails, we can also say that if get an issue related to hard disk we can actually switch to another machine and complete our pending work. This comes under Web Application. The *three layers* of Cloud Computing are:

A. Infrastructure as a Service:

This layer offers the user processing and storage which can be obtained as a service. Amazon web Services, Simple Storage Service are the services provided to the user. Instead of buying the hardware, IAAS providers provide virtual infrastructure as the service to the users.

B. *Platform as a Service:*

These Platforms are the abstraction layer between the software and virtualized infrastructure. It is a way to rent hardware and storage and network capacity over the internet. Geographically distributed teams can work together on software development project.

C. Software as a Service:

This is the service in which software is developed and maintained remotely some other machine and provided on the basis of pay as per use. It is a software distribution model in which application hosted by a vendor or service provider and made available to user over internet.

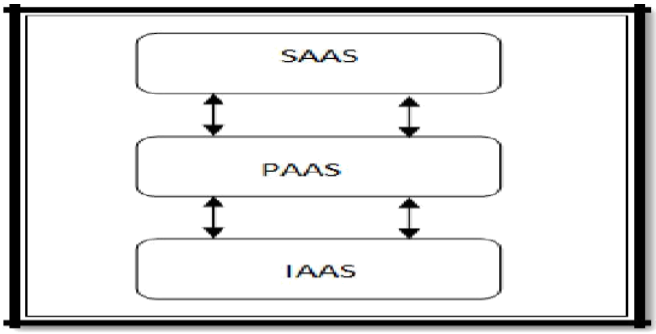

Figure 1: Three Layers of Cloud computing

II. RESOURCE ALLOCATION IN CLOUD COMPUTING

The RA (Resource allocation) is the process of assigning the available resources to the needed cloud computing applications over Internet.RAS(Resource Allocation Strategy) is all about getting all together service providers activities for allocating and utilizing resources so that the needs of cloud computing are met. The cloud users i.e. resource users estimate the resource completing job in estimated time. This estimation helps resource provider to allocate resources which may lead provisioning of resources. The Cloud resource consists of hardware as well as software or we can say it consists of physical as well as virtual resources.

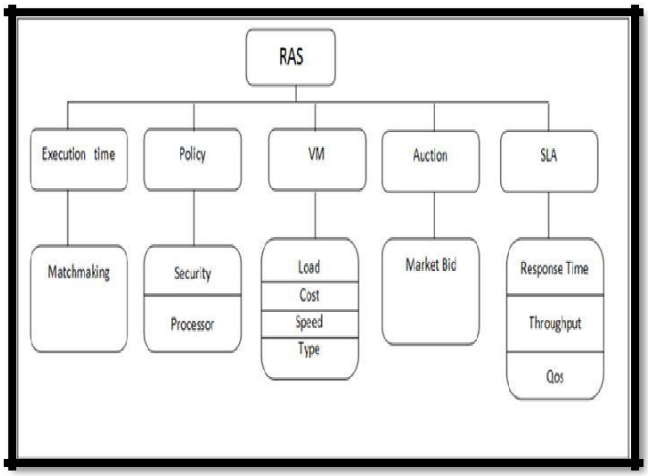

Figure 2: RAS in Cloud Computing

The complexity is finding optimum resource allocation in huge systems like big clusters and grids. As the resource demand will be dynamic in nature the resource allocation strategies are defined.

III. SCHEDULING

Job scheduling is one of the most important activity performed in all computing environments. To increase the performance and working of the cloud *Scheduling* is used. The scheduling algorithms spread the load on processors to improve and maximize their utilization while minimize the total task execution time. In On-Line mode heuristic scheduling algorithm, whenever the job arrives in the system.

A. Scheduling Process :

Scheduling Process in Cloud consists of 3 stages namely:

1) Resource discovering and filtering:

DataCenter Broker who discovers the resource present in the network system and also collects status information related to it.

2) Resource selection- Target resource is selected based on certain parameters of task and resource. Well this is the deciding stage.

3) Task submission- Task is submitted to resource selected out.

B. The On-line mode heuristic scheduling algorithm are :

i. First come first Serve

ii. Round robin algorithm

iii.

iv. Min-Min algorithm

v. Max-Min algorithm

vi. Most fit task scheduling algorithm

vii. Priority scheduling algorithm

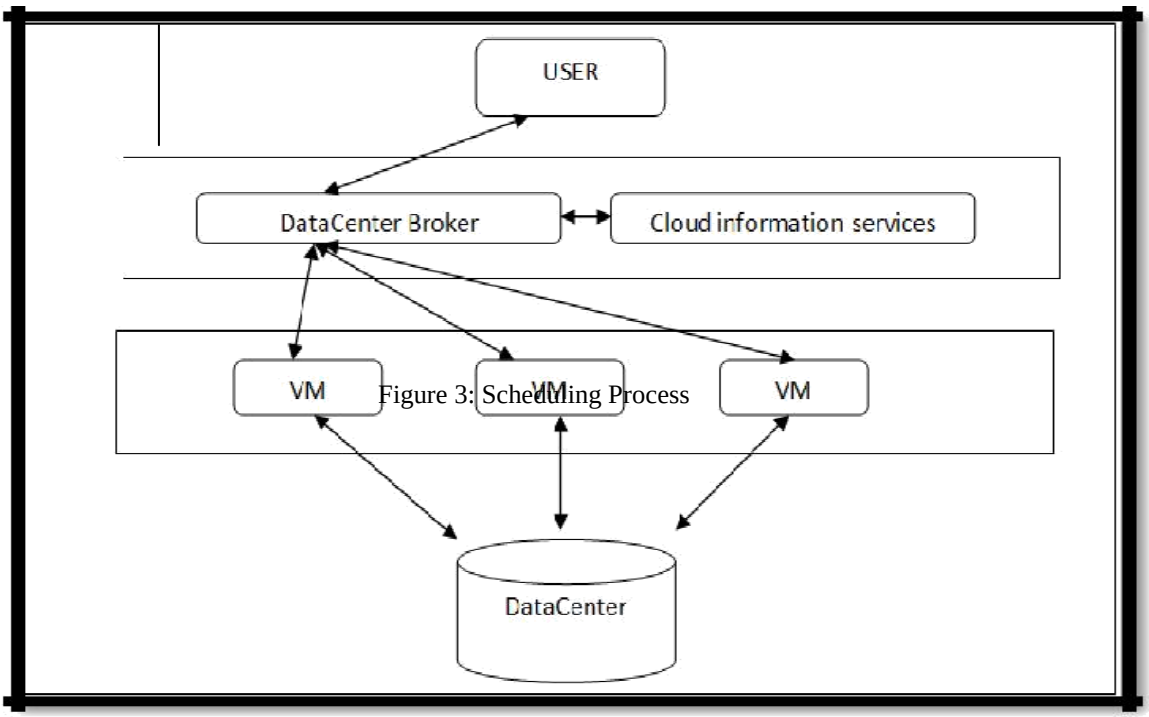

Figure 3: Scheduling Process

IV. SCHEDULING IN CLOUD COMPUTING

TABLE 1: SCHEDULING ALGORITHMS USED IN CLOUD COMPUTING

Scheduling Algorithm	Scheduling Method	Scheduling Parameter	Scheduling Factor	Task	Environment
Resource aware scheduling algorithm(RASA)	Batch mode	Make Span	Grouped Task	It is used to reduce makespan	Grid Environment
Reliable scheduling distributed in cloud computing (RSDC)	Batch mode	Processing Time	Grouped Task	It is used to reduce processing time. It is efficient for load balancing	Cloud Environment
An optimal model for priority based service scheduling policy for cloud computing	Batch mode	QoS, Service request time	An array of workflow instances	High QoS High throughput	Cloud Environment
A Priority based Job scheduling algorithm	Dependency mode	Priority to each queue	An array of job queue	Less finish time	Cloud Environment
Extended Max min scheduling using petri Net and Load balancing	Batch mode	Load balancing, finish time	Grouped Task	It is used for efficient load balancing Petri net is used to remove limitation of max min algorithm	Cloud Environment

V. LICIT

The first and foremost, LICIT supports federated settings. The federated environment is where all the settings from providers are aggregated in a single pool supporting three features:

i) Resource migration

ii) Resource redundancy

iii) Combination of complementary resources and services

It is more flexible than any other technique and it supports specifying licenses based on selected attributes of the subject , resource , action and environement.Well, in all the goal is to improve resource usage through federation.

A) Scheduling Strategies:

1. Suppose there are already 10 reserved licensed seats for faculty and only up to 90 students are allowed to access.
2. And all 100 seats are taken by students.
3. If a request arrives from another user, then :
   - *Deny* the request
   - *Preempt* one of the current users
   - *Suspend* one of the current users
   - *Delay* the request. This is the current practice done.

B) But in LICIT, the scheduling changes :

i. When a new request arrives that result is need for scheduling.

ii. Carry out a comparison of the request authorized by the same license.

iii. In a federated setting, however, sessions associated with various requests may be distributed over various hosts.

iv. In such a scenario, performing a federation-wide comparison or prioritization to determine the session associated with the lowest priority request.

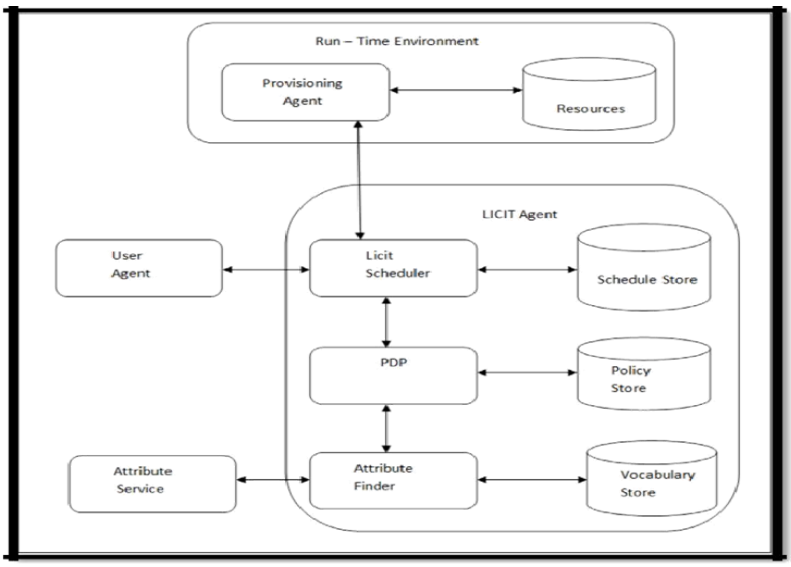

FIGURE 4: LICIT ARCHITECTURE

Each site is represented computationally by an agent who stores and applies the policies of the site. The agent of each site deals with local users as well as with a local runtime environment. The runtime environment at each site manages the resources in consideration under the control of the site's agent. The agent at each site also plays the role of a licensee that provides license and scheduling decisions. The Licit agent is the cornerstone of our approach as it acts as

the host or the licensee, depending on the context. The Licit agent comprises the *attribute finder* that uses the vocabulary to direct queries to the appropriate attribute service, the *PDP* that interprets licenses and site policies stated in *XACML*, and the scheduler that evaluates the scheduling policy. A scheduling policy contains information regarding the ranking criteria and the preemptive action to take after some time on the lowest priority request determined by the policy. We capture *priorities* among requests through a simplified representation of the *ranking criteria* based on the values of a *specified attribute*, for which we provide a huge list of values, which is sorted from *least* to *highest priority.*

Policy engine is adapted from an open-source *XACML* implementation provided by Oracle (previously Sun). First, the Policy Finder loads policies from a data store[data store is a directory in the file system]. Second, the Attribute Finder resolves the attributes that occur in a XACML policy. Third, the Scheduler maintains the index to the distributed instances and loads, interprets, and enforces scheduling policies. Upon receiving a request, the policy engine determines the applicable license. For each attribute that the license references, the policy engine indirectly contacts the attribute service via the agent who is supposed to resolve the attribute. The policy engine then computes a decision based on the attribute values it obtains.

VI. CONCLUSION

LICIT demonstrates a particularly important and immediate example of the problem of federated systems. Each relationship provides a basis for the policies of the interactive parties. An important future direction is to enhance Licit in two ways: First, and for most is system administrators, Licit should come ready with a small number of strategies, judged to be sound by us and validated with our target user community. Licit will include a simple dashboard by which a system administrator may specify:

i) which existing strategy to use for which specific license (depending on its license type); and

ii) Any parameters to be specified for that strategy.

Second, Licit should provide a simple *enactment tool* that supports simulating the usage of different resources as well as the messages sent and received based on specified strategies. In this manner, system administrators could determine if the strategies they choose are unstable or *imperfect* in other ways.

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