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Service Organization on Cloud Clusters Using Virtualization

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Abstract: Internet is having a significant impact on the business related industries which are using it as a medium to enable delivery of their content to end-users. Rich web pages, software downloads, interactive communications, and digital media require a new approach to content delivery. The rising number of internet services increases a new challenging in size, volume and search problem. For example, more than 40 billion pieces of content such as emails, e-shopping, web links, news stories, blog posts, notes, and photo albums are used on a month. This causes the lower searching efficiency and lower precision existing in the internet service discovery. At the same time to meet the high availability and quality of service expected by their end users. This paper forwards deploying the service organization on cloud clusters using Random algorithms and the Load Balancing Algorithms to improve the Quality of Service.

Keywords: Clustering, Virtualization, Random Algorithms, Schedulers.

I. INTRODUCTION

The cloud computing technology is a biggest milestone in booming up business and next generation technology. The technology mainly based on service oriented. The e-business using this media to enable creation, management, search and consumption of their content. The existing architectures has several limitations.

- Not harness multiple services
- Lack support for dynamic content distribution and access

With the increasing popularity of internet, service computing is becoming a challenging area. Service computing has emerged as a critical aspect service management in industry. Many existing popular web services are served using different techniques like Tagging, Subset , URL etc. But Such internet services exposes two heterogeneous challenges (1) multiple type of services existing within the same services (2) link between the services carry different meanings[2].

Typical applications on internet management includes Retrieval, Selection , Service clustering and discovery and service compositions. Service clustering has significant role in providing the services. Cluster is a group of servers providing the services to users in an transparent way.

Clusters have become the workhorse for engineering research to power up service discovery. These are the base building blocks for cloud infrastructures [11]. The clusters are used to partition the services into groups so that they have to provide similarity of services.

The challenges exiting on cluster are (1) scalability, manageability, overload, availability of services.(2) Most of existing clustering techniques focus on topological concepts.(3) Organizing and Grouping of services on clusters.

In this paper, we identify three requirement of clustering the services. First we need to classify the services. Second design probabilistic clustering methods for heterogeneous networks. Third designing virtualized service concept to enhance the QOS.

II. RELATED WORK

Clustering and virtualization are the booming area , where many Researchers working on this area and propose their work are as follows , Bin yen et.al develop a load balancing on stable cluster, he used transfer policy to shift the load on less loaded servers. He also used redundancy policy to full fill the request rates [2] but it avoids the bottleneck problem not the QOS improvements. Shipra Singh et.al [3] explains about how multiple processors are utilized to improve the task allocation. Clustering performed on highly processing tasks. They proposed a link based algorithms to schedule tasks.

Doddani probhuling et.al [4] carried a survey of load balancing on cloud computing. He stated the requirement of load balancing algorithms on cloud to provide good access control, migration, security, availability. He distinguishes between the static and dynamic load balancing techniques. Described about the usage of ant

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colony algorithms. These algorithms are might be useful in the research associated with cloud computing.

Ngoko *et al*.[5]A challenging task in Web service composition is the runtime binding of a set of interconnected abstract services to concrete ones.

This paper contributes to the service selection by proposing a new algorithm that, in polynomial time, generates a mixed linear integer program for optimizing service compositions based on the service response time and the energy consumption. The novelty in this works on multi-process composition and energy consumption.

Eddy Caron , Benjamin Depardon and Frédéric Desprez et.al[6] The paper explains hierarical middleware performance, as well as two algorithms for automatically finding a relevant hierarchy on different heterogeneous platforms .They used a linear program and genetic algorithms to enhance the performance of the middleware layer. They provided comparition of their results with real time middleware DIET.

III. CLUSTERING

Clustering is a exclusive classical problem, still need a efficient and Natural method to construct. A modified random algorithm [8] is a natural stochastic process on undirected graphs. Let G=(V,E) be a undirected graph, where V is set of nodes in Ci, i={1,2… n} and E=set of links connecting VxV in Cij. Set number of nodes as {1…..Sn}in each cluster. The size of the cluster can be measured by its conductance as ratio of number of its external connection to total connection. The neighbourhood Node is defined as Ni= {Ci Ɛ v| Cij Ɛ E}. A random walk on G starts at any node ci at a time stamp t=0. At t=t+1 it moves to Cij Ɛ Ni.

Lemma 1 (Random Visits). For any nodes x1, x2. . . xk, and $\ell = O(m^2)$, k

P (∃y ∑ Ni xi (y) ≥ 32 deg(x) √ kl+logn+k)≤ 1/n i=1

Lemma 2: ∏v = dv/2m is a stationary distribution for a random walk over G.

Proof: the distribution ∏ and take a single step in graph G. Then probability that we end up at node u is given by

$$(PT' \prod) u = \sum Pvu \prod_v$$
$$_{v=} \sum d_v/2m \ 1/d_v$$
$$V(u,v) Ɛ E = \sum 1/2m = \prod_4$$

Where P_{uv} = dv /2m if (v.u) Ɛ E & 0 otherwise. Random walks follow the sequence of edges, and then select one of its neighbours rather than the sequence of nodes that it visits. For example, if the randomly visits nodes v1; v2; v3; v4; v5 in that order, then it visits the edges (v1 → v2); (v2 → v3),(v3 → v4) (v4→v5). Let T be the transition probability of a heterogeneous service cluster G, L be the length. The nearest random distance d (u,v) from u to v in G defined as

$$D(u,v) = \sum_{\top: u-v} p(\top)\, C\, (1-C)^{\text{length}(\top)}$$

the nearest distance between the nodes are measured using a link analysis algorithm that works on graph G to measure similarity between two vertices u and v. it is denoted by

S(u,v)=(0,1), if u=v then S(u,v)=1.

S(u,v) = C / | | N(u) ||N(v)| ∑ |**N(u)**|∑ |N(v)| S (N(iu) N(iV))

Where C is constant C Ɛ (0, 1)

Lemma 3. Let b be the expected number of steps before a random walk visits more than half of the nodes, and let h be the maximum access time between any two nodes. Then b ≤ 2h.

Proof. Assume, for simplicity, that $n = 2k + 1$ is odd. Let α*v* be the time when node *v* is first visited. Then the time β when we reach more than half of the nodes is the (*k* + 1)-st largest of the α*v*. Hence

$$\sum_{v} \alpha v \geq (k+1)\beta$$

So

b=E(β)≤ 1/ (K+1)∑ E(αv)≤n/k+1h<2h

IV. REQUEST ALLOCATION ALGORITHM

Each cluster allows running virtual machines based on service demand. As shown in the figure 1 architecture, the top layer receives the client request, those are forwarded to under workflow engine layer. The workflow engine provides a web based GUI. The workflow engine is a central subsystem enabling workflow execution. It performs Workflow status collector: collecting all cluster load status information periodically. Request Identifier: identifying the request based its semantics Scheduler : scheduling task using HEFT with load balancing hybrid scheduler.

The scheduler algorithms works

Step 1: Finding the new task processing time

Processing time = dispatching time –arrival time

Step 2: Selecting earliest finish task of particular Service from list

Step 3: Selecting exiting processor with minimum Load in an cluster i

$$\text{Cluster } Cn(\text{ exit } Sj) = \overline{\text{wait}_{exit}}$$

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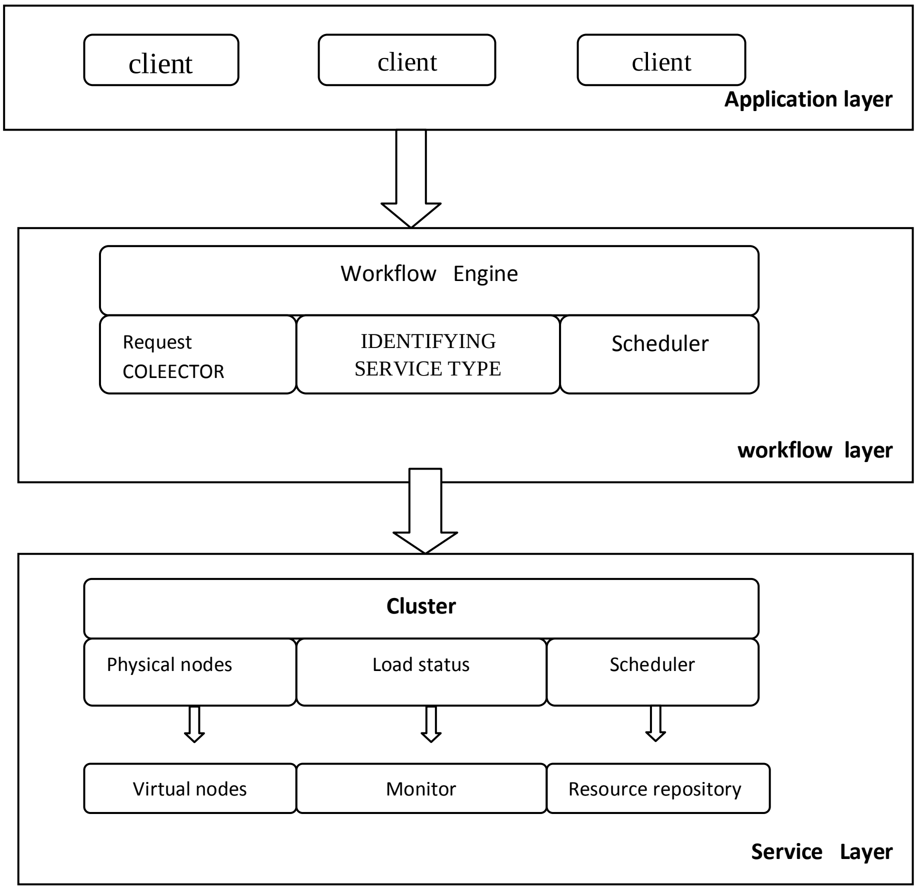

Figure 1: Service organization architecture on clusters

Step 4: Find available Vm in cluster i
if (Size(not used VMList)) then
Deploy Vm= vm
Else
Step 5: if (size (used VM list=available (size (VM List)) then
Clear the used VMlist
Step 6: Repeat step 1

V. VIRTUALIZATION

Virtualization has been proposed to overcome existing constraints present on future networks. In this regard, allocation of resource is to initiate generation of multiple virtual machines. The resource allocation on virtual machines will be in two ways first Static allocation and second is Dynamic allocation. In static allocation, resource allocations are dynamically controlled. But in dynamic allocation, optimal resource allocation is difficult. The cluster performs Vm management using load balancing method. The load balancer always checks the current status on physical server based on vm availability List, on this number of Virtual process need be to generate, or migration of the request will be performed.

VI. EXPERIMENTAL RESULT

The experiment conducted using jmeter software on various machines. We used Pentium IV and HCL Machines to create a heterogeneous cluster. First we used cluster with two nodes. Then we increases cluster with four nodes to organize more services etc. Our experimental result improves the response time, reduces delay and improves the throughput rates.

VII. CONCLUSION

There is a complexity of service allocation on a loud cluster are reduced using service based virtual machines. This can be performed using proper workflow management at the middleware layer. Virtualization on clusters increases the scalability, QOS and reduces energy consumption and cost.

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Number of cluster	Parameters	Number of Requests			
		200	300	500	800
2	Time	1213 msecs	1212msec	1260msec	1240 msec
	Response Time	1.2 msec	1.25 msec	1.29 msec	1.32 msec
	Latency	1239 msec	1241msec	1246msec	1249 msec
	Error Rate	0	.23 %	.28 %	.32 %
	Throughput	3 %	2.7 %	2.4 %	1.45 %
4	Response Time	0.9459 msec	0.9459 msec	0.9460 msec	0.9461 msec
	Latency	0 msec	12 msec	246 msec	1240 msec
	Error Rate	0	0%	.1%	.12%
	Throughput	1.4 %	2.7 %	2.5 %	3 %

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