# Linear Regression Analysis of Trust Computation in Grid Resource Broker

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## ABSTRACT

Now a days the power of distributed computing is explored the ventures of grid computing and cloud computing. Grid computing is used to solve any large scale scientific problems by integrating geographically distributed ideal resources. Cloud computing is the next generation of grid computing and also it is an on demand version of grid computing. Especially in grid computing, the research on identifying best resources is still on its way. In this paper, we are contributing a methodology to identify the best resources for computational grid. The proposed solution will focus and extract the trust on the resource with more accuracy. We have used linear regression for forecasting the status of trust when number of resources is increased.

**Key words**: cloud, grid, resource, trust, Regression

## 1. Introduction

High performance computing (HPC) is the only driving environment to yield solutions for large scale scientific problems such as Tsunami Engineering simulation, Earthquake Engineering simulation etc in those days. Initially cluster computing makes remarkable changes in the HPC field. Later the growth of computer network leads to the innovation of high speed networks which integrates its power with distributed computing. From 1960 onwards, the field of grid computing started to emerge. At the initial stage, grid computing solved the long running iterative tasks only. On its complete growth and enhanced infrastructures, itmarks its step on large scale simulations of scientific problems.

There are varieties of research challenges cumulate on this field. They are resource discovery, resource co-allocation, scheduling, rescheduling, reservation of resources, service level negotiation for agreement, Failure rate of resources and more that turned up for discovering the best resources which helps the resource provider as well as the resource broker as shown in Fig. 1. Now we have introduced a new parameter in this paper for identifying the trusted resource with concentrating more on accuracy of the resources. Rest of the paper is organized as follows: Section II illustrates the related work, Section III dictates the trust calculation, Section IV compares the existing literature with the proposed solution and Section V concludes the paper with future research directions. Section VI moving on future research direction indentified more accurate Trust computation.

## 2. Related Work

Buyya et al [1] had used availability as the parameter for the prediction of load in enterprise grids. Sathish and Sanjay [2] used the parameter as communication characteristics and also later [3] they used CPU utilization, bandwidth, availability for scheduling tightly coupled parallel applications on clusters. Marcos [4] used load as the parameter for intergrid resource provisioning. Jay & team [5] used availability and bandwidth as parameters for performance prediction. Keshav& Liang [6], [10] used network load and bandwidth as parameters for MPI processing. ThamaraiSelvi [7] used bamdwidth, availability, latency and job execution rate as parameters for trusted resource identification. Gupta & team [9] used time and machine availability as parameters for mapping parallel applications. Ashok et al [11] moved with more accuracy on Trust computations using failure rate and hack rate of the resources.

## 3. Trust Computation

From the literature survey, we have collected five parameters such as bandwidth of the network, availability of the systems, job execution rate of the resource and latency of the resource and failure rate of the resources. Here we are introducing a new parameter termed to be Hack rate of the resource. Hack rate is defined as the ratio between number of jobs submitted to a resources that has been hacked to the total number of jobs allocated to the resource. The reason to introduce 'hack rate' is whenever a resource has been has been exposed on internet there are much more possibilities to be hacked by the hackers through worms or other hacking techniques. This will surely lead to steal the information that is being running on the resources. Hence when more number of jobs has been hacked that leads the trust on the resources to fall down.

Now the real trust on the resource is calculated by subtracting the sum of failure rate and hack rate from the original trust computation value. The individual parameter calculation of bandwidth, availability, job execution rate, latency and failure rate are illustrated in the work ok Ashok et al.

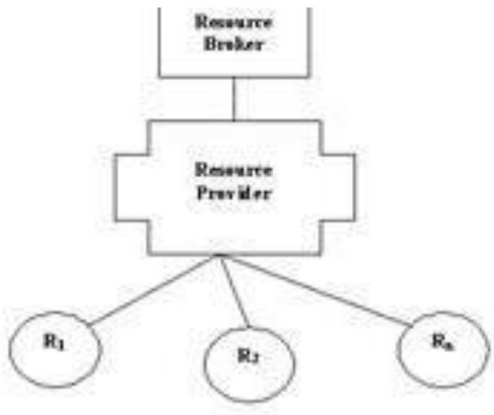


**Fig. 1: Depicts the basic infrastructure of Grid Computing environment**

# 4. Algorithm

Trust Compute ( )

{ Identify the bandwidth (B), availability (A), job execution rate (J), latency (L) , failure rate (F) and hack rate (H) of resources.

for each resource do

trust= (B * A * J * L) – (F+H);

end for

}

# 5. Performance Comparison

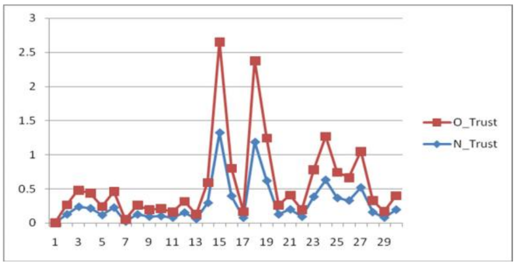


**Fig. 2: Trust Comparison**

From the proposed work the accuracy of the resource is still more molded to have more trust on computation compared to the existing work of Ashok et al. As our research is on initial stage, we have restricted the number of resources up to 100.Here we have illustrated for 30 resources mentioned in Fig. 2.

# 6. Trust Forecasting

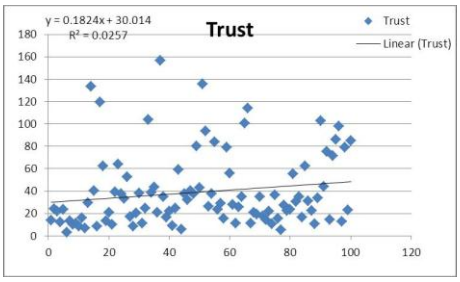


**Fig. 3: Linear Regression Analysis**

From the Fig. 3, we have analyzed that on increasing the number of resources computing the trust will not be the bottle neck for Grid resources broker. Since the equation retrived through linear regression is supporting our research proposal

# 7. Conclusion & Future directions

Our work entirely concentrating on the identification of best resource for job execution by holding the strategy on resource hacking management.The newly introduced parameter which helps the trust computation from a different dimension. The task of job scheduling comprises of two tasks viz allocation of resource and scheduling and by keeping this as outline the proposed work will initiate more research directions. On the future extension of our work will use the parameters trust, failure rate and hack rate to predict the job schedule in a computational grid.

# 8. References

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