Contribution ID: **23** Type: **Oral Presentation**

Relevance of Grid Computing for India in the era of Cloud Computing (remote presentation)

Friday, 5 April 2019 10:50 (30 minutes)

Abstract: Grid Computing is quite often implemented by relying on the concept of sharing of available resources in order to improve economies of scale and utilization. However, after the advent of Cloud Computing, the adoption of Grid Computing has been rather slow, and people wonder if it is still relevant, and whether Grid Computing truly matters. In this abstract, the authors explain that, Grid Computing provides services that are complementary to Cloud Computing, rather than competing with Cloud Computing. In a country like India where computer, smart phone and internet penetration is still low when compared to developed countries, Grid Computing can make a huge difference in the adoption of scientific computing by making niche resources available for free or nominal charges to the relevant community of researchers.
Both Grid Computing and Cloud Computing aim to give users access to third-party systems that they do not own. Here the users can be independent users or institutions. A public cloud gives users access to third-party systems that are generally commercially operated. So the user will typically be charged on a pay-per-use model. An example is Amazon Elastic Compute Cloud (Amazon EC2). In contrast, the underlying resources in a private cloud are owned by the users. So, in a private cloud, better utilization of the available resources is the goal, possibly by employing virtualization. However, the pay-per-use model may still remain valid in a private cloud, depending on company policies. For example, one department may lease its resources to another one using the pay-per-use model.
For our discussion, the main difference between Grid Computing and Cloud Computing is that, in the case of a Grid institutions come together to share resources, so that they can work on solving larger problems together, or can have access to more systems. This model can be said to be somewhere between public cloud and private cloud. In fact, this has some resemblance to a community cloud, where users from related usage communities come together to share resources. But in contrast to a community cloud, a Grid is more likely to have high-end parallel systems, whereas systems making up the community cloud need not necessarily be parallel systems. The workload in a typical Grid environment is heavily skewed towards the scientific community. Moreover, supporting a particular community is just one aspect of Grid Computing, and is typically achieved by using the concept of virtual organizations (VOs). Providing access to users from different administrative domains, but without charging them, while at the same time properly verifying their credentials, is an important requirement in Compute Grids.
India's representation in the list of top 500 supercomputers of the world is still minimal. In spite of being the second largest country in terms of population, the fastest of supercomputer in India ranks a dismal 39th in the 51st edition of top 500 list that was released on June 2018. In such a scenario, it is imperative that the available resources be utilized properly. Grid Computing provides such a framework. While projects like the National Supercomputing Mission aims to bridge the gap between what the researchers want and what they currently have, it is important to have mechanisms that can leverage the currently available resources for solving grand challenge problems, and Grid Computing provides the proper mechanism for achieving this goal, through efficient security mechanisms, metascheduling capabilities, file transfer mthodologies, among others. The authors feel that Grid Computing is here to stay, though it may not become as common as Cloud Computing, since it targets a comparatively niche set of users.

Summary

Abstract: Grid Computing is quite often implemented by relying on the concept of sharing of available resources in order to improve economies of scale and utilization. However, after the advent of Cloud Computing, the adoption of Grid Computing has been rather slow, and people wonder if it is still relevant, and whether Grid Computing truly matters. In this abstract, the authors explain that, Grid Computing provides services that are complementary to Cloud Computing, rather than competing with Cloud Computing. In a country like India where computer, smart phone and internet penetration is still low when compared to developed countries, Grid Computing can make a huge difference in the adoption of scientific computing by making niche resources available for free or nominal charges to the relevant community of researchers.
Both Grid Computing and Cloud Computing aim to give users access to third-party systems that they do not

own. Here the users can be independent users or institutions. A public cloud gives users access to third-party systems that are generally commercially operated. So the user will typically be charged on a pay-per-use model. An example is Amazon Elastic Compute Cloud (Amazon EC2). In contrast, the underlying resources in a private cloud are owned by the users. So, in a private cloud, better utilization of the available resources is the goal, possibly by employing virtualization. However, the pay-per-use model may still remain valid in a private cloud, depending on company policies. For example, one department may lease its resources to another one using the pay-per-use model.

For our discussion, the main difference between Grid Computing and Cloud Computing is that, in the case of a Grid institutions come together to share resources, so that they can work on solving larger problems together, or can have access to more systems. This model can be said to be somewhere between public cloud and private cloud. In fact, this has some resemblance to a community cloud, where users from related usage communities come together to share resources. But in contrast to a community cloud, a Grid is more likely to have high-end parallel systems, whereas systems making up the community cloud need not necessarily be parallel systems. The workload in a typical Grid environment is heavily skewed towards the scientific community. Moreover, supporting a particular community is just one aspect of Grid Computing, and is typically achieved by using the concept of virtual organizations (VOs). Providing access to users from different administrative domains, but without charging them, while at the same time properly verifying their credentials, is an important requirement in Compute Grids.

India's representation in the list of top 500 supercomputers of the world is still minimal. In spite of being the second largest country in terms of population, the fastest of supercomputer in India ranks a dismal 39th in the 51st edition of top 500 list that was released on June 2018. In such a scenario, it is imperative that the available resources be utilized properly. Grid Computing provides such a framework. While projects like the National Supercomputing Mission aims to bridge the gap between what the researchers want and what they currently have, it is important to have mechanisms that can leverage the currently available resources for solving grand challenge problems, and Grid Computing provides the proper mechanism for achieving this goal, through efficient security mechanisms, metascheduling capabilities, file transfer mthodologies, among others. The authors feel that Grid Computing is here to stay, though it may not become as common as Cloud Computing, since it targets a comparatively niche set of users.

Primary author: Mr ARACKAL, Vineeth (Centre for Development of Advanced Computing)

Co-author: Ms N, Mangala (Centre for Development of Advanced Computing)

Presenter: Mr ARACKAL, Vineeth (Centre for Development of Advanced Computing)

Session Classification: Supercomputing, High Throughput Computing, Accelerator Technologies, and their Integration

Track Classification: Supercomputing, High Throughput Computing, Accelerator Technologies, and their Integration