Department Research

Intercloud WAN Delivery Platform for distributed Business Applications

Abstract: Internet service providers (ISPs) and mobile telecommunication companies are moving towards network function virtualization or NFV. This new technology will allow them to use virtual function modules on standard computing hardware for all specialized functions such as Serving GPRS Support Node (SGSN), Radio Network Controller (RNC), etc. In effect, they plan to use cloud computing to reduce their capital expenditure and operational expenditure by using virtualization, programmability, dynamic scaling, automation, and easy management of resources. Each mobile tower may have a micro-cloud to support real-time applications on smart phones. Other businesses, such as Banking, Financial sector, retail, Government, and education can also benefit from a cloud based deployment and will need to use a distributed multi-cloud computation infrastructure. The key problem with such deployments is that the inter-cloud wide area network (WAN) links are expensive and have limited capacity as well as high-cost bandwidth, which affect the performance of the application. Unlike a single-cloud deployment, proper placement of the virtual application modules among geographically disparate clouds is important to ensure acceptable latency and throughput. Two key challenges in such inter-cloud deployments are: Heterogeneity and the impact of networking delays on the performance of real-time applications. We propose to develop a platform that will allow ASPs to specify their deployment policies. The policies will then be automatically enforced by the platform as the state of the system and traffic changes. The platform will find the optimal locations of new VMs based on these policies and communicate with the cloud management system of that cloud. The platform will have drivers for 3 or 4 most popular cloud management systems, such as, OpenStack, Amazon's EC2, Google Cloud and network management systems, such as OpenDaylight. The architecture will be extensible so that new managements systems can be easily added. The final outcome will be a multi-cloud test bed with demonstration of the results.

Team: Lead PI: Raj Jain,
Co-Lead PI: Dr. Aiman Erbad
PI: Dr. Mohammed Samaka