

MC²: Peer to Peer Based Network Masquerading for Mission Critical Clouds.

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Abstract:

Virtualization is an increasingly popular approach to manage rising information technology costs and complexity in every sector of the economy. Cloud computing allows organizations of any size to provision infrastructure resources as needed and flexibly scale technology resources to meet changing demands. Cloud providers pool hardware resources and allocate them based on the requests of their users. In order to efficiently allocate these resources providers must aggregate users of different requirements and workloads onto the same physical infrastructure. However, this approach increases the likelihood that a malicious user can collocate a VM alongside a target VM in order to extract information or disrupt its functioning in some way.

We propose a solution that can deliver mission assurance to mission-critical applications in cloud

computing systems. We will do so by leveraging the unique capabilities of virtualization technology and develop a dynamic and distributed approach to route messages among co-operative virtual machines in typical cloud computing systems.

This project will deliver mission assurance to mission-critical applications in cloud computing systems. Our approach relies on developing a complete network graph on a virtual private network of peer to peer connections. With the purpose of masquerading the messages created by co-operative virtual machines in a typical cloud computing system. Our network graph consists of a peer to peer overlay network that interconnect OpenStack virtual machines and is based on the IP-over-P2P (IPOP) framework. The project will focus on developing an extension to IPOP that will allow for the communications among the VMs to be routed by an overlay network in an OpenStack-based cloud system.