

# 2018 Research Interest/Project Ideas

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## **DCnet: A Secure, Data Center Network To Support Live Migration**

Most large companies have adopted private cloud for some or all of their corporate computing. A private cloud system uses VMs, and the manager can migrate VMs to balance load or conserve power by shutting down some of the servers. A traditional cloud network is designed to support traffic between servers in the cloud and external users who access the servers, especially web traffic. However, a corporate private cloud tends to generate much more "east-west" traffic (i.e., traffic between one server in the data center and another server in the same data center).

We have devised an interesting network architecture that supports both east-west traffic and live VM migration. The architecture offers the exciting property is that a VM can maintain a globally-valid IP address during migration without depending on NAT. Furthermore, our architecture uses standard Ethernet switches and standard Internet protocol software. Therefore, neither operating systems or applications need to change. Instead, the system uses SDN to install address rewriting and forwarding rules in switches.

The project will develop and test a prototype, and will add security to ensure that the routing and forwarding mechanisms remain impervious to attack. The project will be relevant to any company that uses a private (or hybrid) cloud.