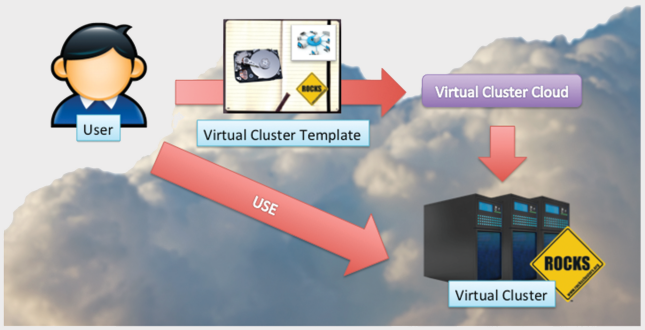
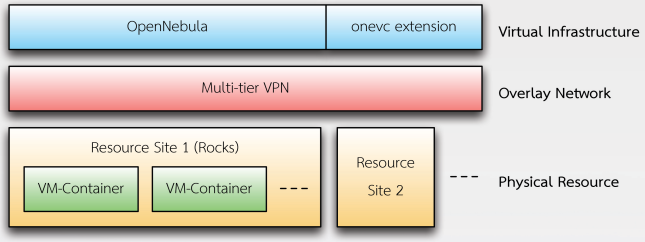
An Implementation of Virtual Cluster on a Cloud

Introduction

Virtual Cluster combines the flexibility of Virtualization technology with the power of Cluster Computing. Virtual Cluster Cloud enable user to use virtual cluster without the hassle of setting up one manually by providing cloud infrastructure tailored specifically for virtual cluster deployment along with related utilities. The infrastructure is designed to spread across multiple sites while still providing a single ubiquitous resource pool.



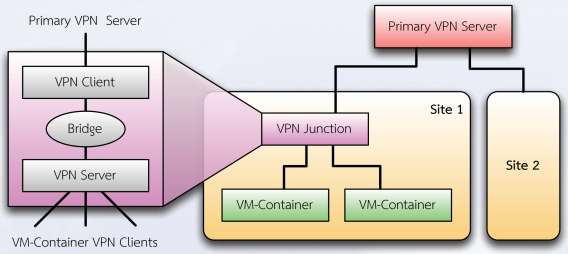
Design and Architecture



Virtual Infrastructure: provides cloud interfaces to user while maintaining an illusion of a single ubiquitous resource pool.

Overlay Network: connects multiple physical sites into a single virtual network under the same broadcast domain.

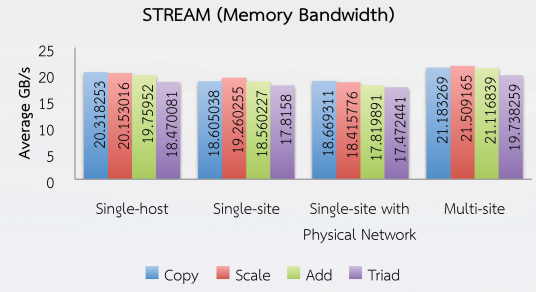
Physical Resource: is the actual physical infrastructure providing resources for virtual clusters. It can be spread into multiple resource sites.

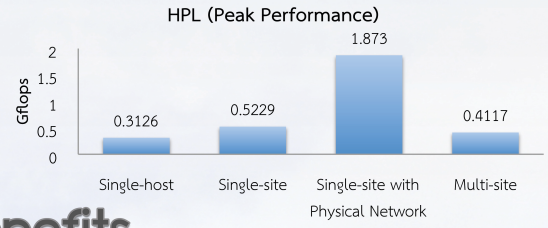


Multi-tier VPN network topology is introduced to improve performance of a large virtual private network. By using VPN Junction, network traffics destined to an appliance in local site will not be encrypted and forwarded to the primary VPN server.

Performance

Overall infrastructure performance was evaluated with HPC Challenge benchmark by comparing benchmark results of 4 virtual clusters with identical configuration under different network interconnections.





Benefits

Convineint: Virtual infrastructure provides cluster computing without the hassle of setting up one manually.

Flexible: Complicated virtual cluster configuration can be deployed on demand.

Highly Scalable: Resources from multiple sites are merged into a single ubiquitous resource pool.

Efficient: Resource allocation and distribution are managed automatically.

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