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Network technology research on IhepCloud platform

Traditionally, physical computer is used to run high-performance computing jobs. There are many problems such as job interference with each other, operation system crash because of abnormal operation and low computing resource utilization. IhepCloud expects to solve the job isolation, operating system fault isolation and to improve resource utilization by computing resource virtualization. IhepCloud builds virtual infrastructure platform and provides virtual machine to high-performance computing system.

In this report, we introduce our network architecture of high-performance computing system which contained virtual computing resource. We discuss dynamic synchronization between Openstack virtual environment and physic environment such as virtual machine DNS register, virtual machine network monitor, synchronization between virtual machine and some application systems. A service is deployed to collect virtual machine's information such as virtual machine name, IP, MAC and so on. The information will be stored to a network database and be synchronized to each service. These help to transparently integrate virtual system into physical computing environment.

We describe a virtual network topology based on Openstack neutron component in IhepCloud. In this topology, OVS plugin and vlan mode is deployed to achieve L2 interconnection between virtual network and physical network. Each computing node connects to physical switch through trunk links and virtual machine directly access physic network through 802.1Q supported by OVS plugin. Openstack neutron component is only responsible for distributing addresses and supporting 802.1Q. L3 is configured in physical switch. This topology avoids the performance insufficient of pure virtual network and achieves an easy interconnection with physical network. Thus, virtual system integration will not result in large changes in computing environment.

Finally we report operation and maintenance experience in our test-bed. Performance testing about glance and ceph will be given. Testing report shows image copy to each computing node is inefficient and nova with ceph is not ready. We also introduce and analyze vxlan performance testing with physical switch.

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