



# Lenovo ThinkCloud OpenStack 30分钟入门宝典 (一)

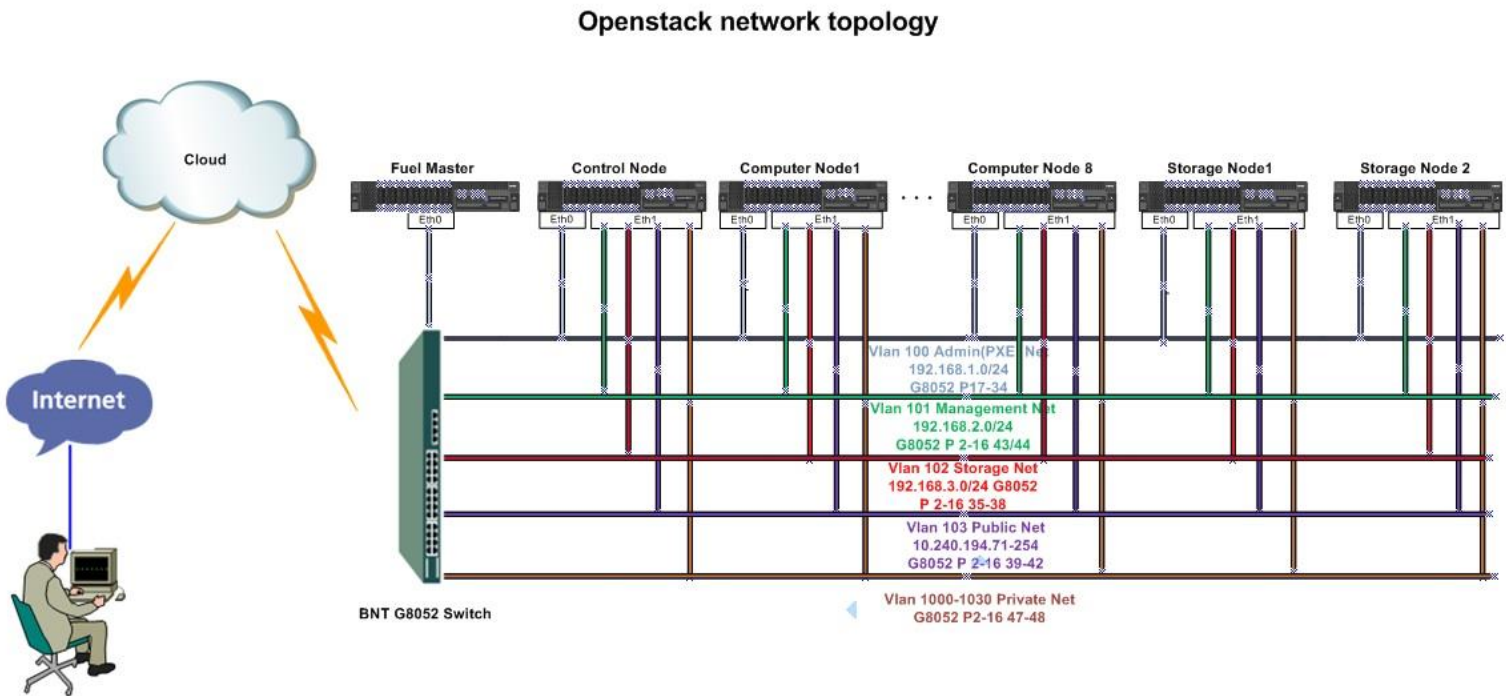
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# 主要内容

- Openstack实验环境搭建
  - Openstack实验环境网络拓扑
  - 安装Fuel master
  - 创建Openstack应用环境
  - 配置Openstack应用环境
- Openstack主要界面介绍
- 故障排查Tips

# Openstack 安装步骤 1 -- 网络设计

## Openstack实验环境网络拓扑



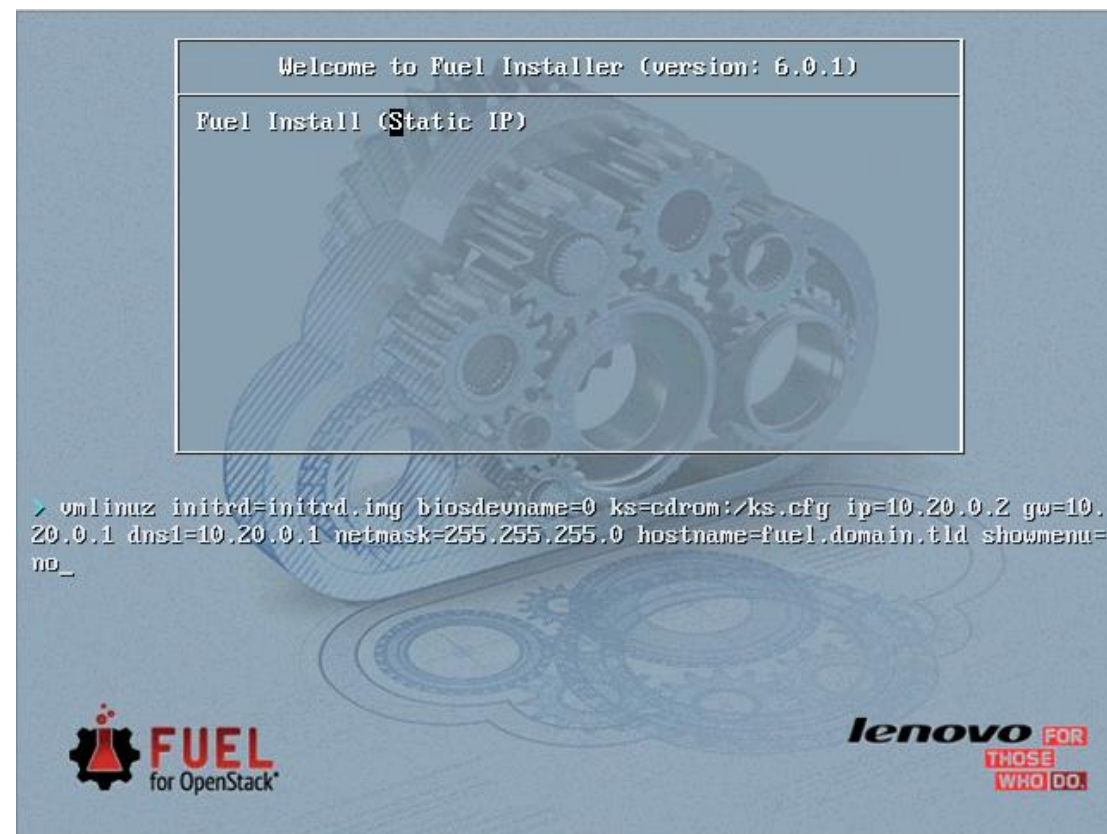
## 选用设备

Code Name	TypeModel	Release	Role	Quantity
Kong IVP	8752	X3750 M4	Fuel master	1
Kong	8722	X3750 M4	Control Node	1
Kong	8722	X3750 M4	Computer Node	8
Kong	8722	X3750 M4	Computer Node	
Kong	8722	X3750 M4	Computer Node	
Wuling	7160	X3530 M4	Computer Node	
Wuling	7160	X3530 M4	Computer Node	
Wuling	7160	X3530 M4	Computer Node	
Wuling	7160	X3530 M4	Computer Node	
Ghidorah	7145	X3850 M4	Computer Node	
Maokong	4251	X3250 M3	Computer Node	2
Kong	8722	X3750 M4	Storage Node	
Vali+	5460	X3650 M4	Storage Node	2
Total				12

## 交换机 : BNT G8052

# Openstack 安装步骤 2 -- Fuel Master 安装

- 安装 **Fuel master** 节点
  - 服务器通过 ISO 引导启动
  - 按Tab键设置Fuel master网络



# Openstack 安装步骤 3 -- Fuel Master 安装

## ■ Fuel master 安装成功界面

```
Default administrator password: r00tme

Default Fuel UI login: admin
Default Fuel UI password: admin

Please change root password on first login.

fuel login:

#####
#           Welcome to the Fuel server           #
#####
Server is running on x86_64 platform

Fuel UI is available on: http://10.20.0.2:8000

Default administrator login:    root
Default administrator password: r00tme

Default Fuel UI login: admin
Default Fuel UI password: admin

Please change root password on first login.

fuel login: _
```

# Openstack 安装步骤 4 -- Fuel Master 登录

- **Web登录Fuel master**

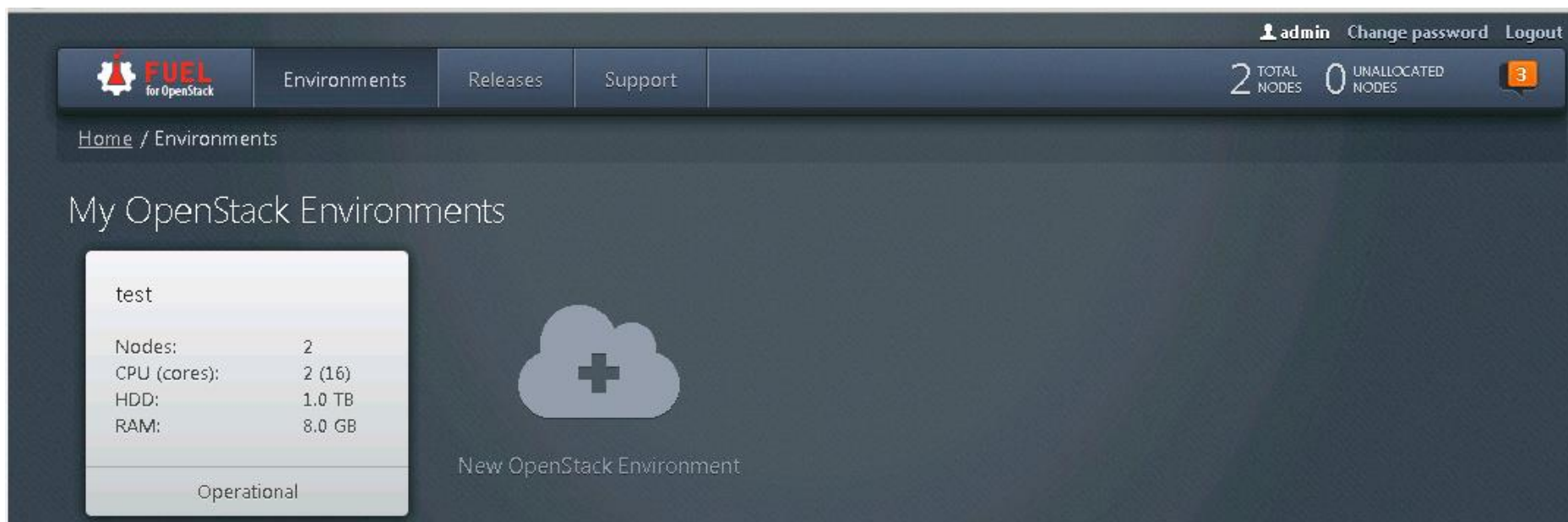
<http://192.168.1.10:8000>



# Openstack 安装步骤 5 -- 新建Openstack环境

## ■ 新建Openstack环境

点击 “New Openstack Environment”按钮，开始新建Openstack 环境





# Openstack 安装步骤 6 -- Openstack 6.0支持版本

## ■ Openstack 6.0支持版本

- Juno on Unbutu 12.04.4(2014.2-6.0)(default)
- Juno on CentOS 6.5(2014.2-6.0)

Create a new OpenStack environment ×

Name and Release	
Name	<input type="text" value="openstackcloud"/>
OpenStack Release	<div><div>Juno on Ubuntu 12.04.4 (2014.2-6.0) (default)</div><div>Juno on CentOS 6.5 (2014.2-6.0)</div><div>Juno on Ubuntu 12.04.4 (2014.2-6.0) (default)</div><div>Juno on CentOS 6.5 (2014.2-6.0)</div></div>

Deployment Mode

Compute

Networking Setup

Storage Backends

Additional Services

Finish



# Openstack 安装步骤 7 -- 部署模式

## ■ 部署模式

### Mutl-node with HA

- 该模式下**Controller services**支持HA
- 环境中同时支持3个以上的**Controller Node**

### Multi-node

- 该模式下**Controller** 节点独立于**Computer**和**Cinder** 节点
- 环境中只允许存在1个**controller** 节点

点

Create a new OpenStack environment

✓ Name and Release

Deployment Mode

Compute

Networking Setup

Storage Backends

Additional Services

Finish

☐ Multi-node with HA

☒ Multi-node

In this configuration the OpenStack controller is deployed separately from the compute and cinder nodes. This mode assumes the presence of 1 controller node and 1 or more compute/cinder nodes. You can add more nodes to scale your cloud later.

Cancel

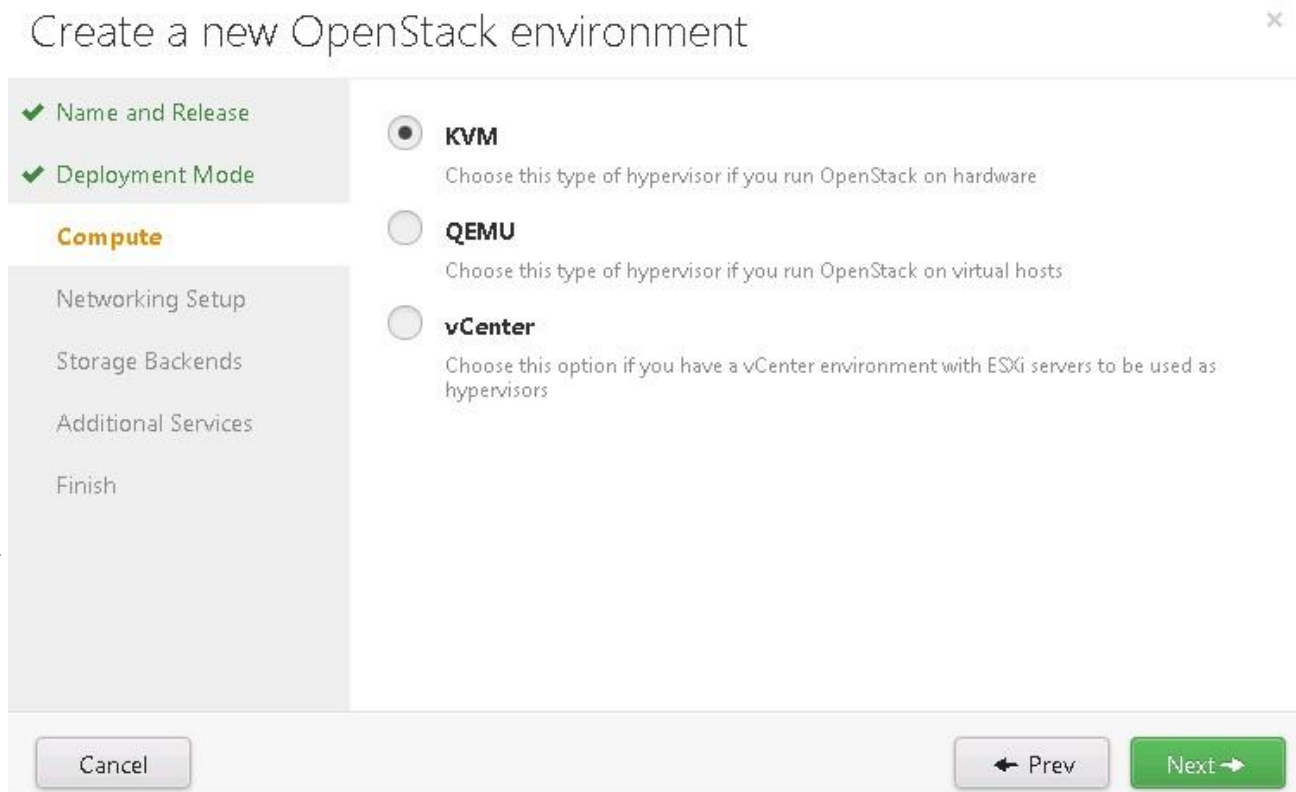
← Prev

Next →

# Openstack 安装步骤 8 -- Hypervisor类型

## ■ Hypervisor类型

- KVM:Openstack运行在硬件环境下，Hypervisor选择该类型
- QEMU:Openstack运行在虚拟环境下，Hypervisor选择该类型
- Vcenter:最新的Openstack 6.0版本中支持在ESXi server上创建Hypervisor



Create a new OpenStack environment

✓ Name and Release  
✓ Deployment Mode

**Compute**

Networking Setup  
Storage Backends  
Additional Services  
Finish

☒ **KVM**  
Choose this type of hypervisor if you run OpenStack on hardware

☐ **QEMU**  
Choose this type of hypervisor if you run OpenStack on virtual hosts

☐ **vCenter**  
Choose this option if you have a vCenter environment with ESXi servers to be used as hypervisors

Cancel

← Prev

Next →

# Openstack 安装步骤 9 -- 选择网络类型

## ■ 网络类型

### Neutron with Vlan segmentation

- 网络设备必须配置成Vlan 模式
- 最多支持4095个Vlan

### Neutron with GRE segmentation

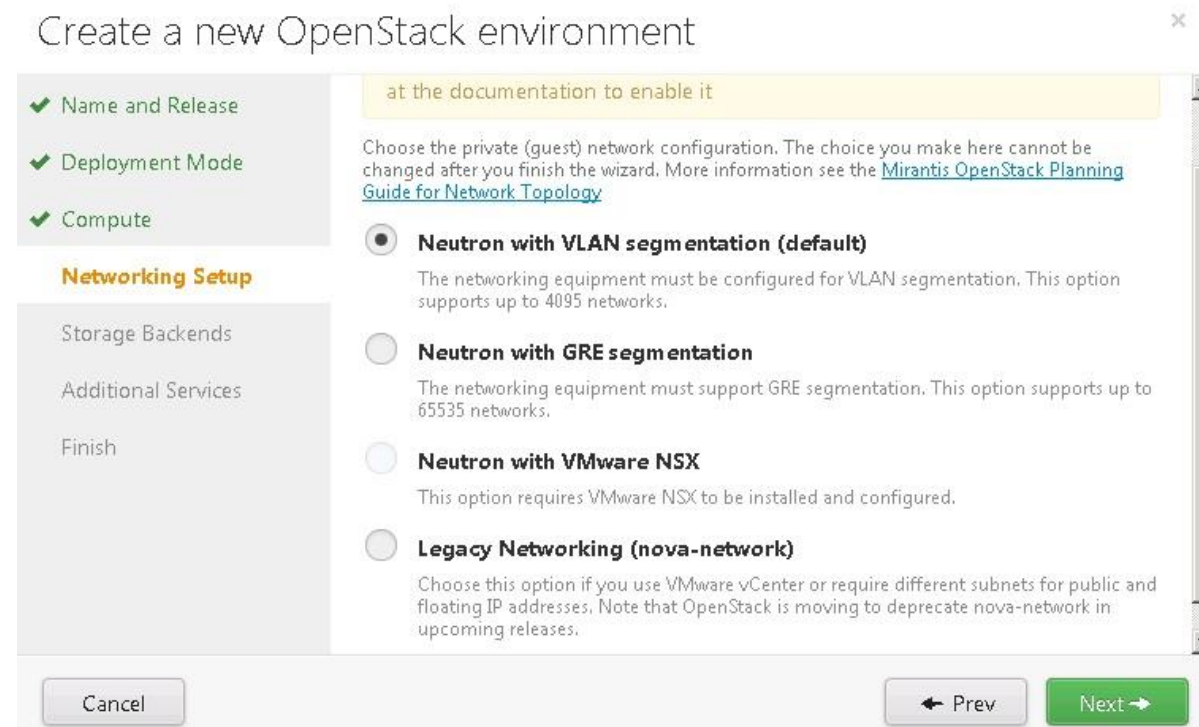
- 网络设备必须支持GRE模式
- 最多支持65535个网络

### Neutron with VMware NSX

- 前提VMware NSX必须已经安装配置

### Legacy networking (nova-network)

- 适用于VMware vCenter环境下，  
public和floating IP需要多个不同子网的情况



The screenshot shows the 'Create a new OpenStack environment' wizard. On the left, a sidebar lists the steps: 'Name and Release' (checked), 'Deployment Mode' (checked), 'Compute' (checked), 'Networking Setup' (active), 'Storage Backends', 'Additional Services', and 'Finish'. The main panel is titled 'Networking Setup' and contains a yellow warning box at the top that says 'at the documentation to enable it'. Below this, a text block explains: 'Choose the private (guest) network configuration. The choice you make here cannot be changed after you finish the wizard. More information see the [Mirantis OpenStack Planning Guide for Network Topology](#)'. There are four radio button options: 1. 'Neutron with VLAN segmentation (default)' (selected), with a description: 'The networking equipment must be configured for VLAN segmentation. This option supports up to 4095 networks.' 2. 'Neutron with GRE segmentation', with a description: 'The networking equipment must support GRE segmentation. This option supports up to 65535 networks.' 3. 'Neutron with VMware NSX', with a description: 'This option requires VMware NSX to be installed and configured.' 4. 'Legacy Networking (nova-network)', with a description: 'Choose this option if you use VMware vCenter or require different subnets for public and floating IP addresses. Note that OpenStack is moving to deprecate nova-network in upcoming releases.' At the bottom, there are three buttons: 'Cancel', 'Prev', and 'Next'.

# Openstack 安装步骤 10 -- 选择存储类型

## ■ 存储类型

### Cinder

- Default: iSCSI LVM volumes
- Ceph:
  - 环境中必须存在2个以上的Ceph-OSD 节点
- Hypervisor类型必须是KVM类型
- VMWare vCenter/ESXi

### Glance

- Default: Glance image service采用Swift对象存储HA模式部署。Controller 节点上的本地存储采用multi-node模式部署。
- Ceph: 要求2个以上Ceph-OSD 节点
- VMWare vCenter/ESXi

Create a new OpenStack environment

✓ Name and Release  
✓ Deployment Mode  
✓ Compute  
✓ Networking Setup

**Storage Backends**

Additional Services  
Finish

**Cinder**

☒ Default  
☐ Ceph  
☐ VMWare vCenter/ESXi

By default, Cinder block storage uses LVM volumes shared over iSCSI. Ceph backend requires two or more Ceph-OSD nodes and the KVM hypervisor.

**Glance**

☒ Default  
☐ Ceph  
☐ VMWare vCenter/ESXi

By default, Glance image service uses Swift object storage in HA deployment mode, and local storage on the Controller node in simple multi-node mode. Ceph backend requires two or more Ceph-OSD nodes.

Cancel Prev Next

# Openstack 安装步骤 11 -- 额外服务

## ■ 额外服务

- Install Sahara: 在不同厂商的 Openstack 版本上支持 Hadoop clusters 部署
- Install Murano: 应用目录  
支持开发者或者云管理员通过浏览器发布与云相关的应用或者服务
- Install Ceilometer (OpenStack Telemetry)  
支持度量和监控 Openstack cloud

Lenovo openstack 是否可以推出自己的额外服务？

The screenshot shows a web-based wizard titled "Create a new OpenStack environment". On the left, a progress bar lists five steps: "Name and Release", "Deployment Mode", "Compute", "Networking Setup", and "Storage Backends", all of which are marked with green checkmarks. Below these is the "Additional Services" section, which includes a "Finish" button. On the right, there are three checkboxes for optional services: "Install Sahara" (unchecked), "Install Murano" (unchecked), and "Install Ceilometer (OpenStack Telemetry)" (unchecked). Each checkbox has a brief description of the service. At the bottom of the wizard, there are three buttons: "Cancel", "Prev" (with a left arrow), and "Next" (with a right arrow).

Create a new OpenStack environment

- ✓ Name and Release
- ✓ Deployment Mode
- ✓ Compute
- ✓ Networking Setup
- ✓ Storage Backends

**Additional Services**

Finish

☐ **Install Sahara**  
Sahara enables on demand provisioning of Hadoop clusters to be deployed on OpenStack utilizing a variety of vendor distributions.

☐ **Install Murano**  
Murano is an application catalog, which allows application developers and cloud administrators to publish various cloud-ready applications in a browsable categorized catalog, which may be used by the cloud users (including the inexperienced ones) to pick-up the needed applications and services and composes the reliable environments out of them in a "push-the-button" manner.

☐ **Install Ceilometer (OpenStack Telemetry)**  
Ceilometer provides metering and monitoring of an OpenStack cloud.

Cancel Prev Next

# Openstack 安装步骤 12 -- 环境创建完成

## ■ 环境创建完成

点击Create，完成Openstack 新环境的创建

Create a new OpenStack environment

✓ Name and Release

✓ Deployment Mode

✓ Compute

✓ Networking Setup

✓ Storage Backends

✓ Additional Services

Finish

Your environment is now ready for deployment! After clicking on the Create button, you can select **Deploy Changes** or make additional configuration choices in the Fuel **Environments** console.

Cancel

← Prev

Create

# Openstack 安装步骤 13 -- 配置Openstack环境

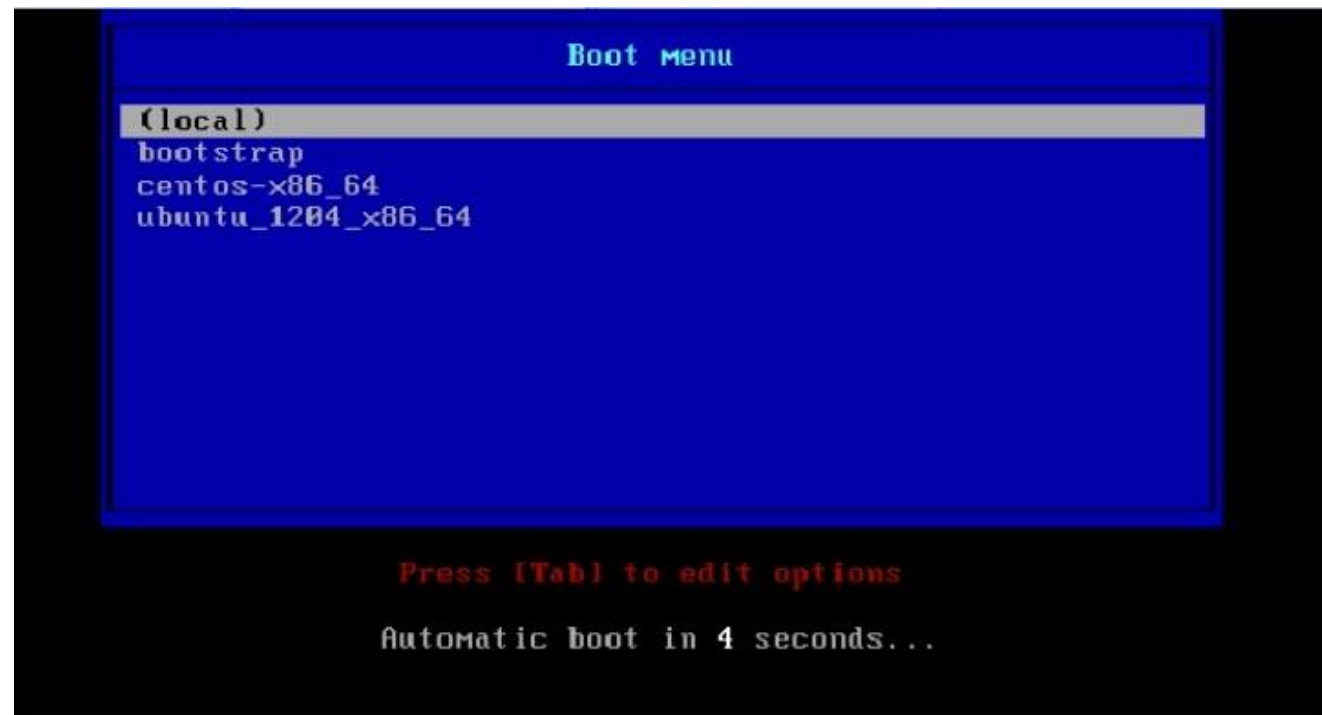
- **配置Openstack环境**
  - 所有待加入Openstack环境节点从PXE boot 到bootstrap界面
  - 将所有节点加入Openstack环境
  - 给每一个节点分配功能角色(Controller/Computer/Storage-cinder/Storage-Ceph OSD/Telemetry MongoDB)
  - Neutron 网络设置及验证
  - 映射Openstack功能网络至服务器物理网口
  - 部署Openstack至所有节点



# Openstack 安装步骤 14 -- 节点从PXE启动至bootstrap

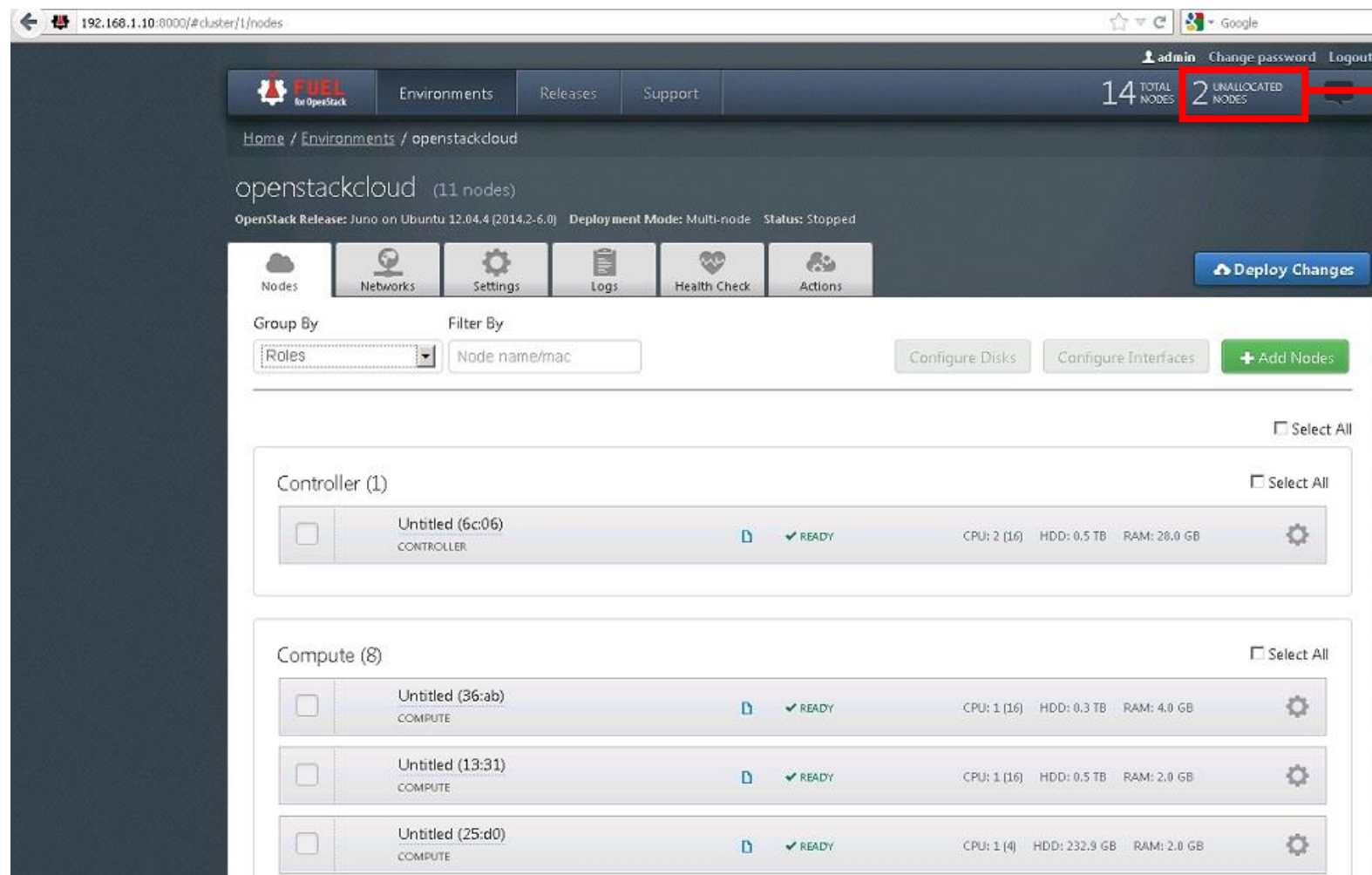
- 所有待加入**Openstack**环境的节点从**PXE**启动至**bootstrap**界面

bootstrap :Linux kernel, fuel master通过bootstrap收集节点CPU/内存/硬盘等参数



# Openstack 安装步骤 15 -- 添加节点

- 添加节点至Openstack环境,点击Add Nodes 按钮,开始添加功能节点



# Openstack 安装步骤 16 -- 分配角色给节点

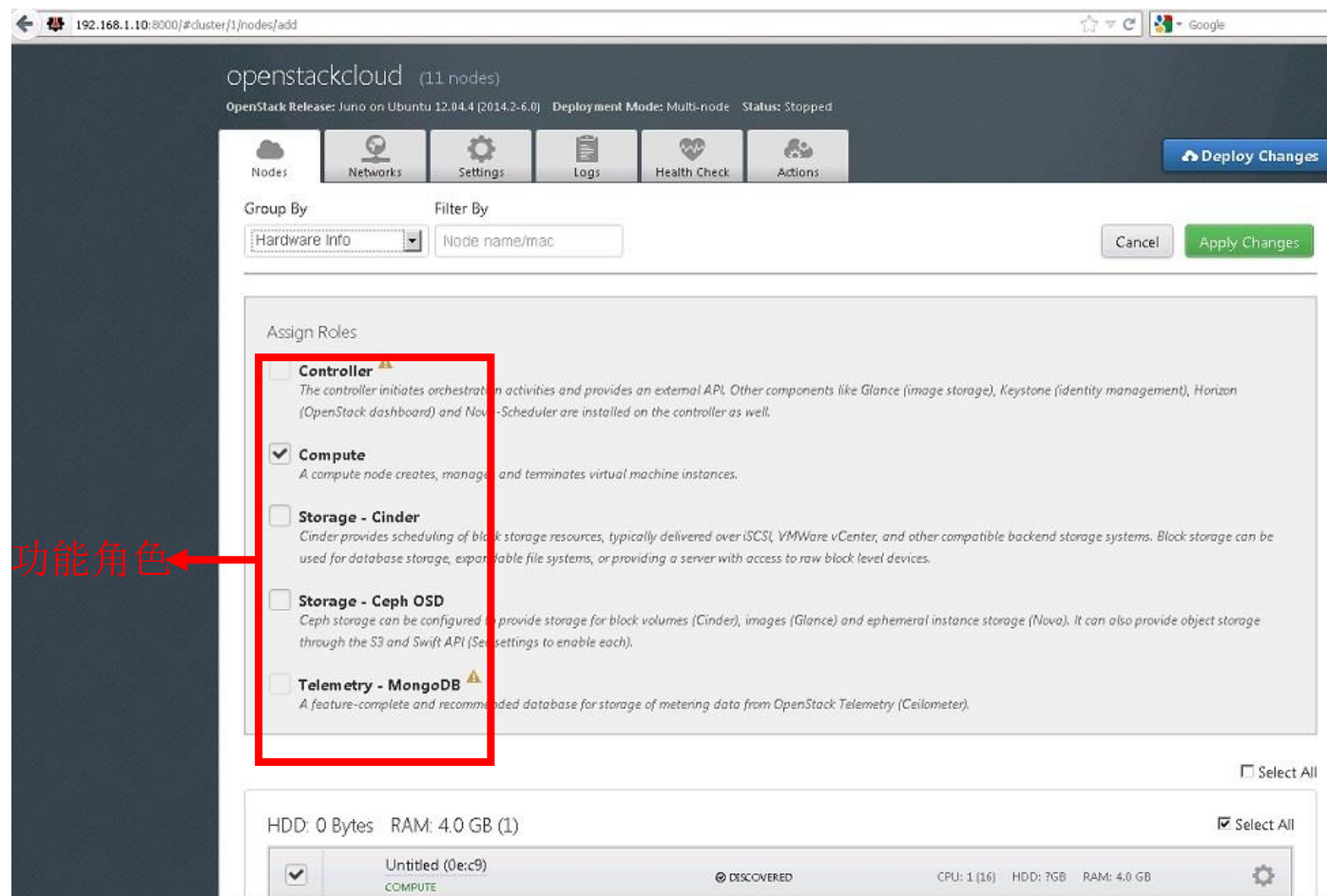
## ■ 分配角色给节点

选择下列角色(可以多选)

- Controller: 控制节点
- Computer: 计算节点
- Storage- Cinder: 块存储节点
- Storage- Ceph OSD: 镜像存储节点
- Telemetry- MongoDB: 计费节点

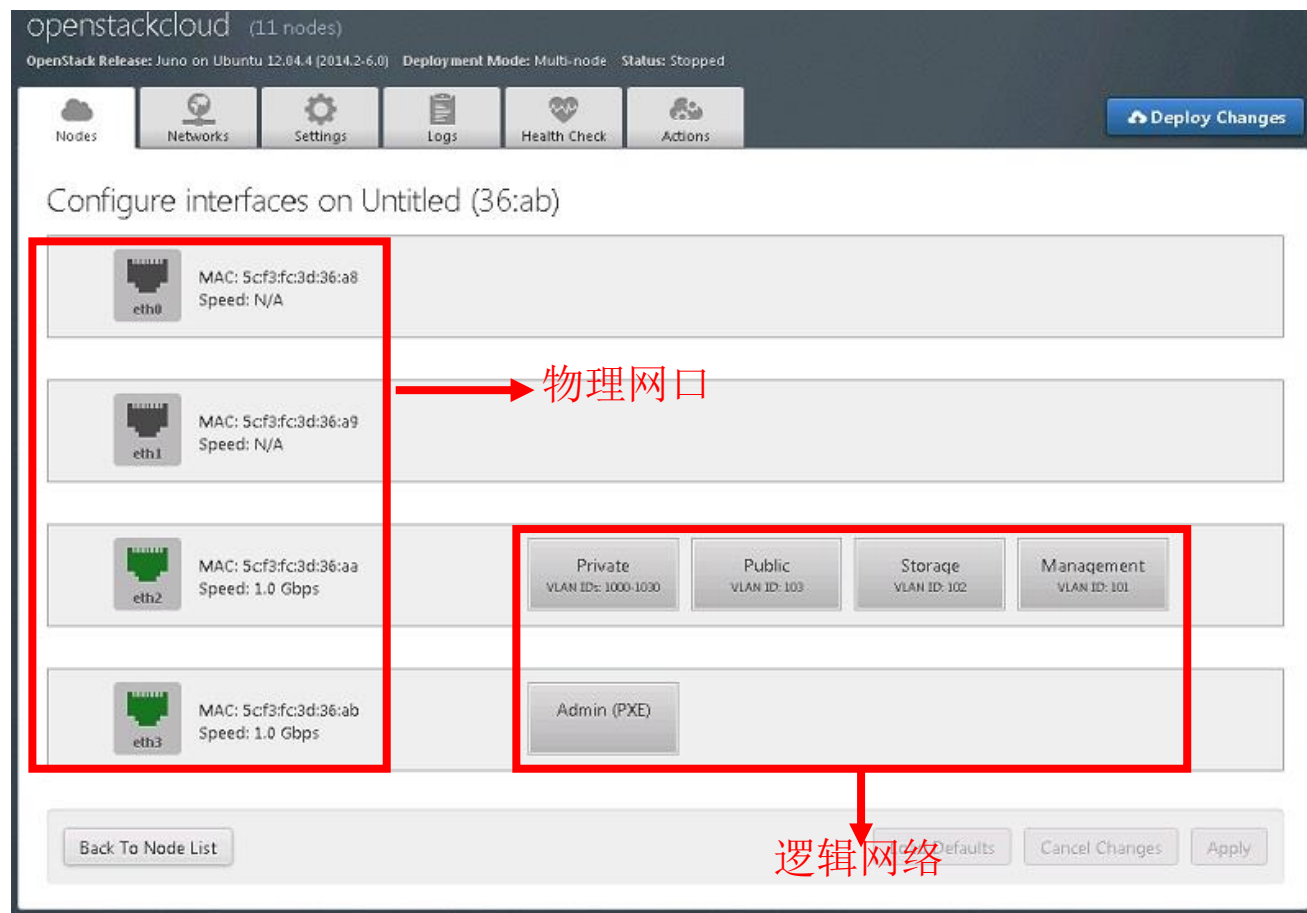
选择unlocated 节点

点击Apply Changes 按钮



# Openstack 安装步骤 17 -- 映射逻辑网络

- 映射逻辑网络到节点服务器物理网口
  - 拖动逻辑网络Private/Public/Storage/Management/Admin(PXE)到相应的物理网口，建立映射关系。
  - 点击Apply 按钮



# Openstack 安装步骤 18 -- Neutron 网络设置及验证

## ■ Neutron 网络设置

### Network Settings

Neutron with VLAN segmentation

#### Management

CIDR 192.168.2.0/24

Use VLAN tagging ☒ 101

#### Storage

CIDR 192.168.3.0/24

Use VLAN tagging ☒ 102

#### Public

IP Range Start End  
10.240.194.73 10.240.194.125

CIDR 10.240.194.0/23

Use VLAN tagging ☒ 103

Gateway 10.240.194.1

#### Neutron L2 Configuration

VLAN ID range Start End  
1000 1030

# Openstack 安装步骤 18 -- Neutron 网络设置及验证

- 点击**Verify Networks**按钮，验证**Neutron**网络

Base MAC address

Neutron L3 Configuration

Internal network CIDR

Internal network gateway

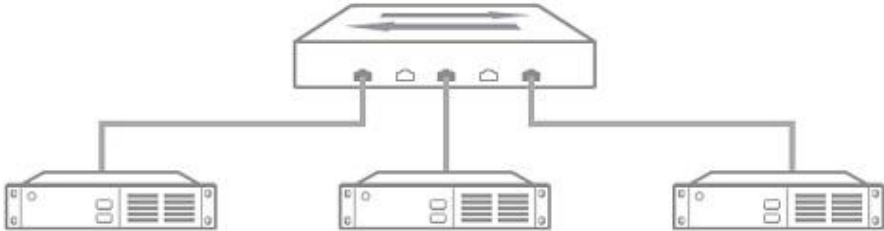
Floating IP ranges

Start	End
<input type="text" value="10.240.194.126"/>	<input type="text" value="10.240.194.254"/>

DNS Servers

<input type="text" value="8.8.4.4"/>	<input type="text" value="8.8.8.8"/>
--------------------------------------	--------------------------------------

---

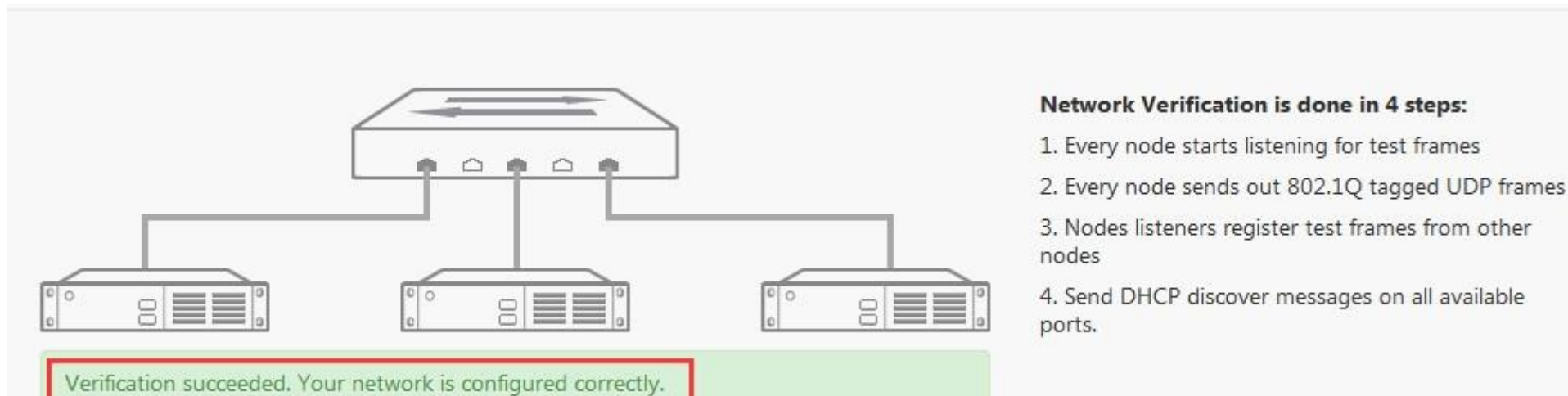


**Network Verification is done in 4 steps:**

1. Every node starts listening for test frames
2. Every node sends out 802.1Q tagged UDP frames
3. Nodes listeners register test frames from other nodes
4. Send DHCP discover messages on all available ports.

# Openstack 安装步骤 18 -- Neutron网络设置及验证

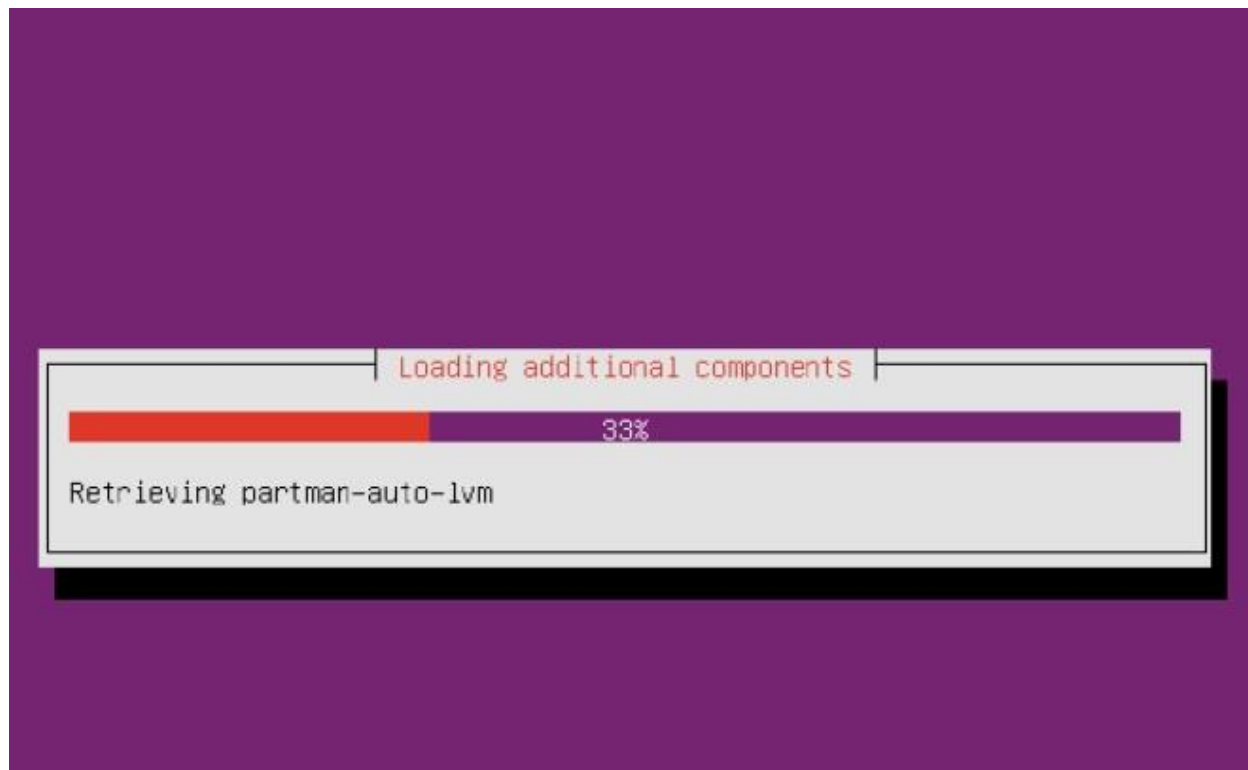
## ■ Neutron网络验证结果





# Openstack 安装步骤 19 -- 部署Openstack至节点

- 部署Openstack至节点：点击Deploy changes 按钮，节点自动重启后开始部署Openstack



# Openstack 安装步骤 20 -- 节点部署成功

- 节点部署成功后进入Ubuntu 12.04.4系统

```
Ubuntu 12.04.4 LTS node-1 tty1  
node-1 login:
```

# Openstack 安装步骤 21 -- Openstack部署成功

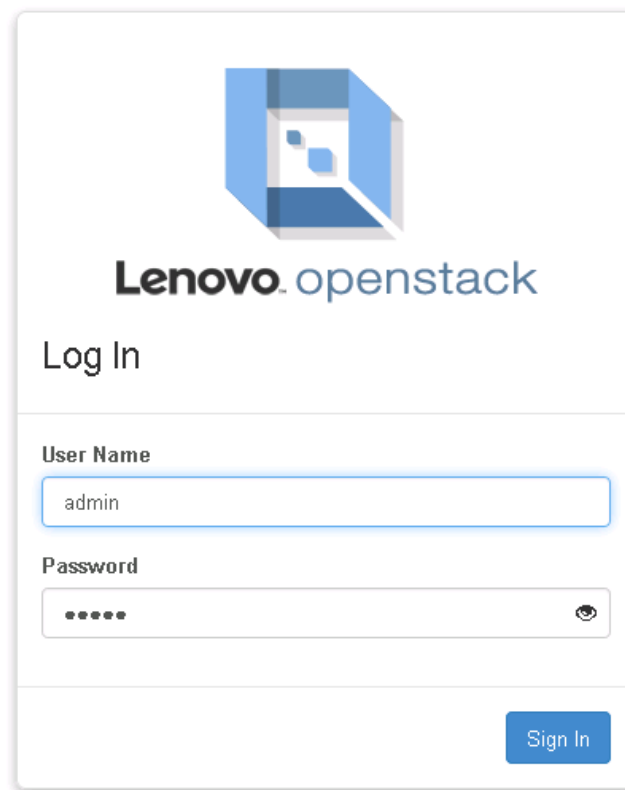
## ■ Openstack部署成功

The screenshot displays the OpenStack FUEL dashboard interface. At the top, the navigation bar includes 'Environments', 'Releases', and 'Support'. The main header shows '2 TOTAL NODES' and '0 UNALLOCATED NODES'. The breadcrumb path is 'Home / Environments / myopenstack'. The environment name 'myopenstack' is followed by '(2 nodes)'. Below this, it states 'OpenStack Release: Juno on Ubuntu 12.04.4 (2014.2-6.0)' and 'Deployment Mode: Multi-node'. The status is 'Operational'. A green success message box is highlighted with a red border, stating: 'Success Deployment of environment 'myopenstack' is done. Access the OpenStack dashboard (Horizon) at <http://172.16.0.2/> or via internal network at <http://192.168.1.6/>'. Below the message, there are tabs for 'Nodes', 'Networks', 'Settings', 'Logs', 'Health Check', and 'Actions'. A 'Deploy Changes' button is on the right. The main content area shows a list of nodes grouped by 'Roles'. The 'Controller, Storage - Cinder (1)' group contains one node 'Untitled (12:ba)' with a status of 'READY'. The 'Compute (1)' group contains one node 'Untitled (6c:02)' also with a status of 'READY'. Both 'READY' status indicators are highlighted with red boxes. The dashboard also includes filters for 'Group By' (Roles) and 'Filter By' (Node name/mac), and buttons for 'Configure Disks', 'Configure Interfaces', and '+ Add Nodes'.

# Openstack 主要页面介绍 -- 登录页面

- 登录openstack Web页面

http://x.x.x.x, 用户名: admin 密码: admin



The image shows a login form for the Lenovo OpenStack interface. At the top is the OpenStack logo, followed by the text "Lenovo openstack". Below this is the "Log In" heading. The form contains two input fields: "User Name" with the value "admin" and "Password" with masked characters "\*\*\*\*\*". A "Sign In" button is located at the bottom right of the form.

Lenovo openstack

Log In

User Name

admin

Password

\*\*\*\*\*

Sign In

# Openstack 主要页面介绍 -- 可用节点主机

- 可用节点主机：点击Admin->Host Aggregates

The screenshot shows the OpenStack Admin dashboard. The left sidebar contains a navigation menu with the following items: Project, Admin, System, Overview, Hypervisors, Host Aggregates (highlighted), Instances, Volumes, Flavors, Images, Networks, Routers, Defaults, System Information, and Physical Resource. The main content area is titled 'Host Aggregates' and contains two sections: 'Host Aggregates' and 'Availability Zones'.

**Host Aggregates Section:**

Name	Availability Zone	Hosts	Metadata	Actions
Host1	AZ1	node-34.domain.tld	availability_zone = AZ1	Edit Host Aggregate
Host2	AZ2	node-39.domain.tld	availability_zone = AZ2	Edit Host Aggregate

Displaying 2 items

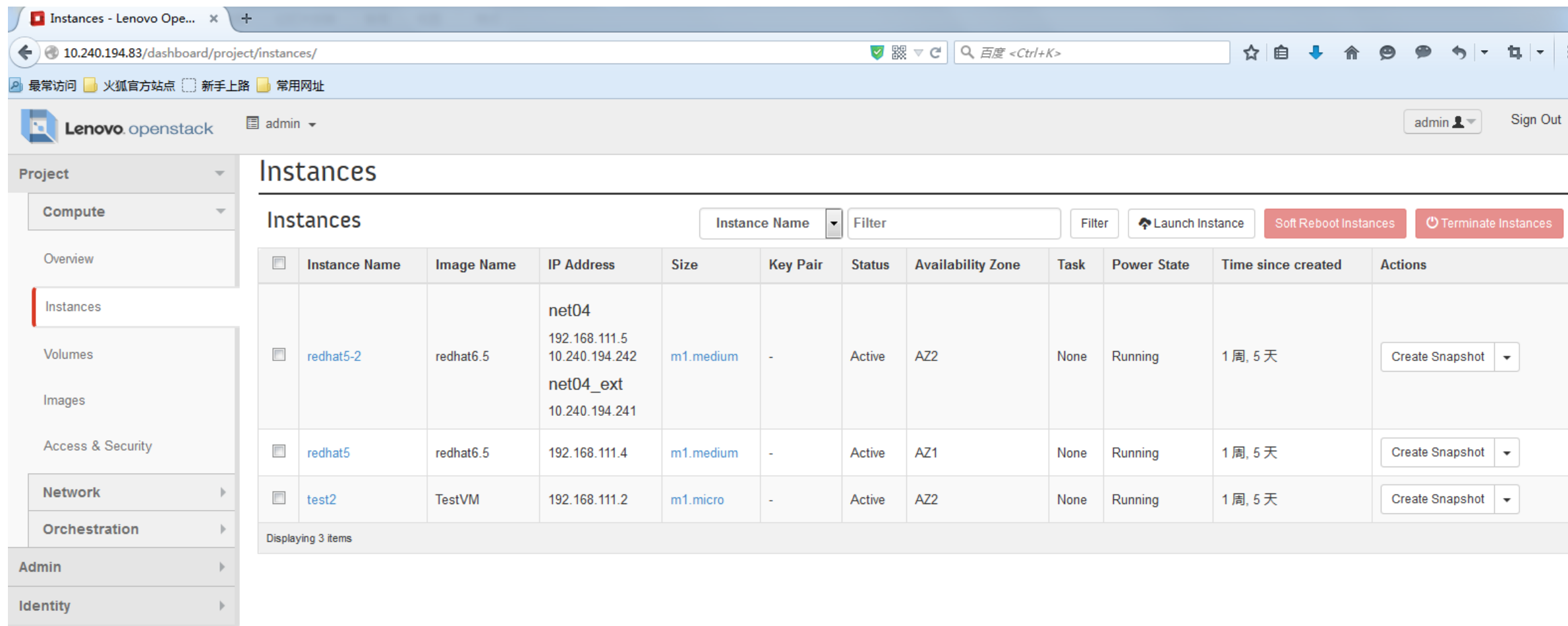
**Availability Zones Section:**

Availability Zone Name	Hosts	Available
AZ1	node-34.domain.tld (Services Up)	True
AZ2	node-39.domain.tld (Services Up)	True
internal	node-36.domain.tld (Services Up)	True

Displaying 3 items

# Openstack 主要页面介绍 -- 创建 instance

- 创建 instance: 点击“Launch Instance”，开始创建Instance(Virtual Machine)

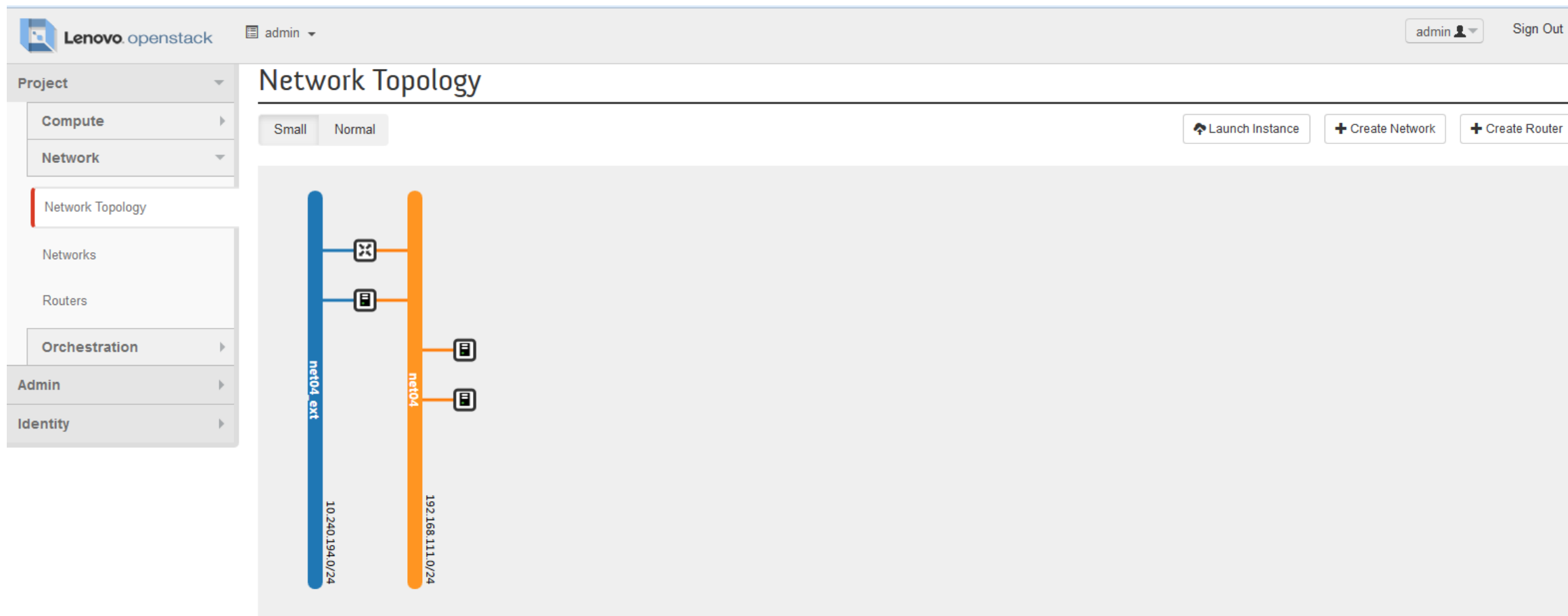


The screenshot shows the OpenStack dashboard interface. The left sidebar contains a navigation menu with the following items: Project, Compute, Overview, Instances (highlighted), Volumes, Images, Access & Security, Network, Orchestration, Admin, and Identity. The main content area is titled 'Instances' and features a table of active instances. Above the table, there are buttons for 'Launch Instance', 'Soft Reboot Instances', and 'Terminate Instances'. The table has columns for Instance Name, Image Name, IP Address, Size, Key Pair, Status, Availability Zone, Task, Power State, Time since created, and Actions. Three instances are listed: redhat5-2, redhat5, and test2. Each instance has a 'Create Snapshot' button in the Actions column.

Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
redhat5-2	redhat6.5	192.168.111.5 10.240.194.242	m1.medium	-	Active	AZ2	None	Running	1周, 5天	Create Snapshot
redhat5	redhat6.5	192.168.111.4	m1.medium	-	Active	AZ1	None	Running	1周, 5天	Create Snapshot
test2	TestVM	192.168.111.2	m1.micro	-	Active	AZ2	None	Running	1周, 5天	Create Snapshot

# Openstack 主要页面介绍 -- Instance网络拓扑

- Instance网络拓扑：点击Project->Network Topology





# Openstack 主要页面介绍 -- SSH 远程连接虚拟主机

- 通过SSH远程连接Openstack虚拟主机

The screenshot displays the OpenStack Horizon web interface. The left sidebar shows the navigation menu with 'Instances' selected. The main content area shows a table of instances. Two instances are listed: 'demo' and 'test'. The 'test' instance is highlighted with a red box. Below the table, a terminal window titled '10.240.194.127 - PuTTY' is open, showing the SSH login process and network configuration details.

Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
demo	TestVM	192.168.111.7 10.240.194.128	m1.micro	-	Active	nova	None	Running	2 周, 5 日	Create Snapshot
test	TestVM	192.168.111.6 10.240.194.127	m1.micro	-	Active	nova	None	Running	2 周, 5 日	Create Snapshot

```
10.240.194.127 - PuTTY
login as: cirros
cirros@10.240.194.127's password:
$ ls
$ ifconfig
eth0      Link encap:Ethernet  HWaddr FA:16:3E:2A:24:EA
          inet addr:192.168.111.6  Bcast:192.168.111.255  Mask:255.255.255.0
          inet6 addr: fe80::f816:3eff:fe2a:24ea/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:40352 errors:0 dropped:0 overruns:0 frame:0
          TX packets:67173 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:8609564 (8.2 MiB)  TX bytes:17530440 (16.7 MiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

$
```

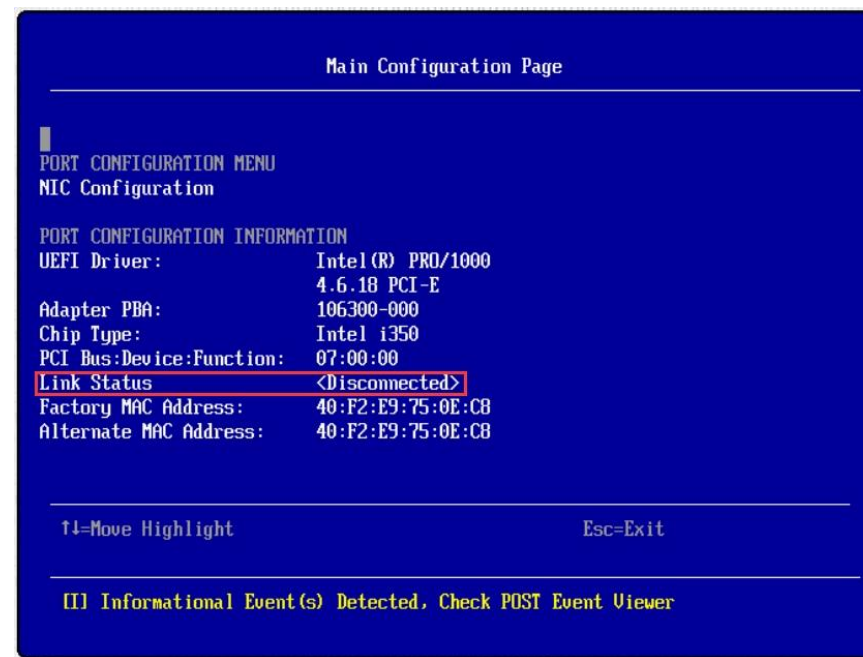
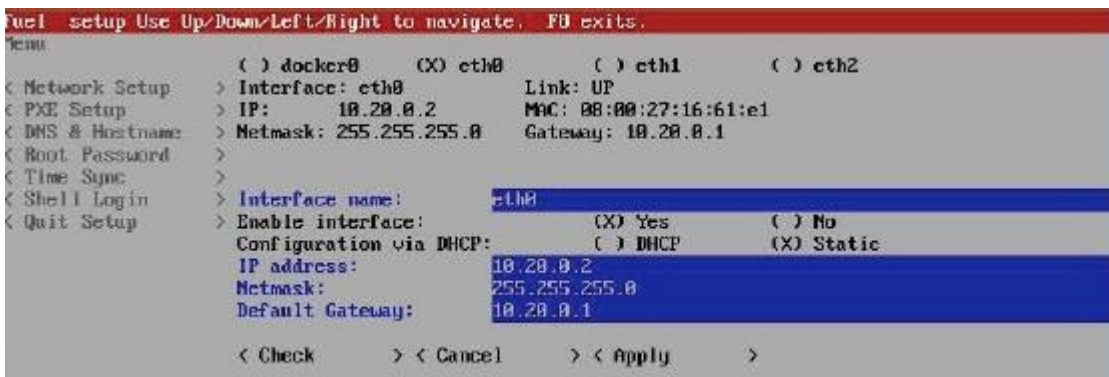
- 故障1:通过Web无法访问Fuel master管理页面
- 故障2:Fuel master节点无法识别功能节点硬盘
- 故障3:映射逻辑网络到节点服务器物理网口不合理，导致Neutron网络验证失败
- 故障4: 节点服务器内存小于2GB导致openstack部署失败
- 故障5: 为避免其余功能网络对admin(PXE)网络的影响，admin(PXE)需设成独立网络
- 备注1:如何通过公网访问Openstack
- 备注2:为避免Fuel master的PXE dhcp 服务对用户网络产生影响，禁止Fuel master接入用户已有dhcp server的网络

# Openstack 故障排查记录

- 故障1:通过Web无法访问Fuel master管理页面

描述: 通过by [http://\\*.\\*.\\*.\\*:8000](http://*.*.*.*:8000),无法访问Fuel master管理页面

原因: Fuel master的网卡在UEFI和OS内的状态为Down/Disconnected



- 解决办法

- Brcm: 不存在该故障

- Intel: 1) 网卡固件升级至最新版本

- 2) 在OS内通过命令enable 网卡端口: BOOTUTILW64E.EXE -all -Flashenable -file=BootIMG.FLB

```
C:\63731_other\intc_dd_nic_v19.3-340534_anyos_32-64\intc_dd_nic_v19.3-340534_anyos_32-64\CUSTOM\BootUtil\Win64e>BOOTUTILW64E.EXE -all -FLASHENABLE -file=BootIMG.FLB
```

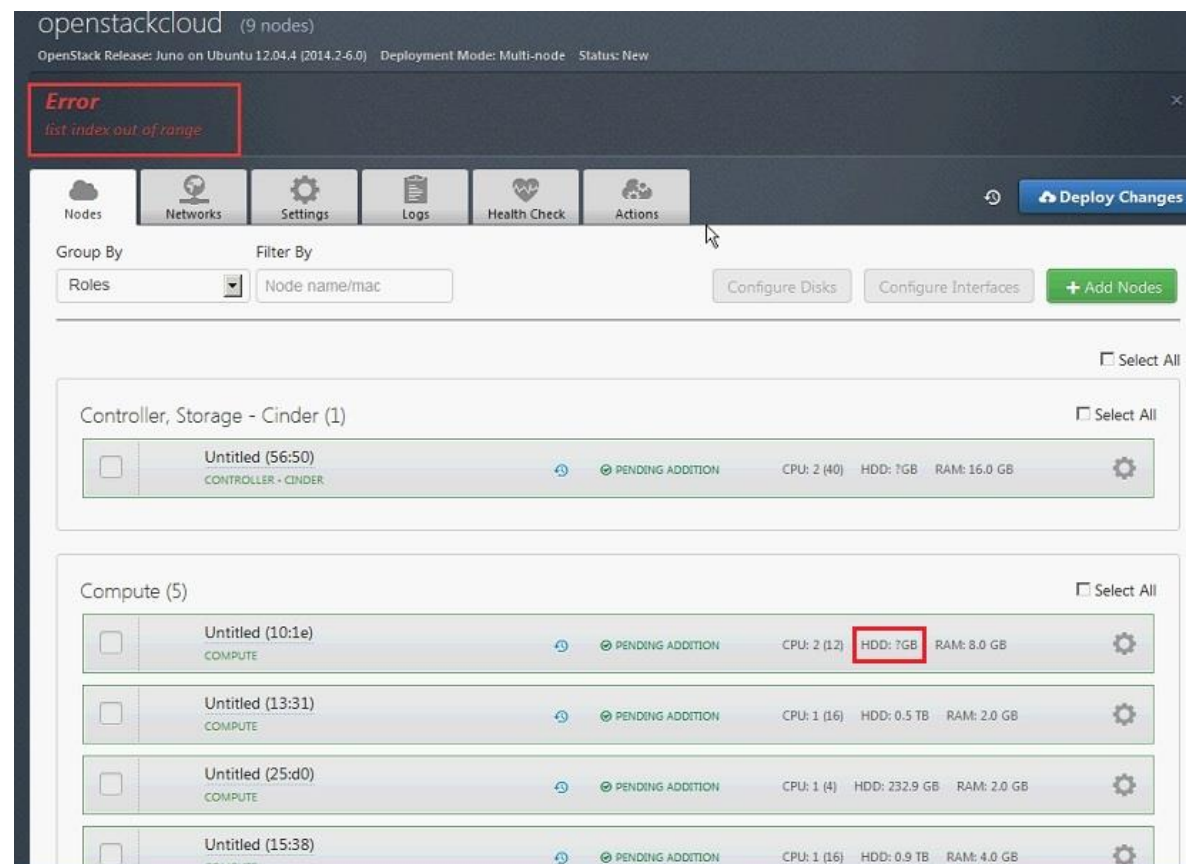
- Emulex: 网卡固件升级至最新版本

# Openstack 故障排查记录

## ■ 故障2:Fuel master节点无法识别功能节点硬盘

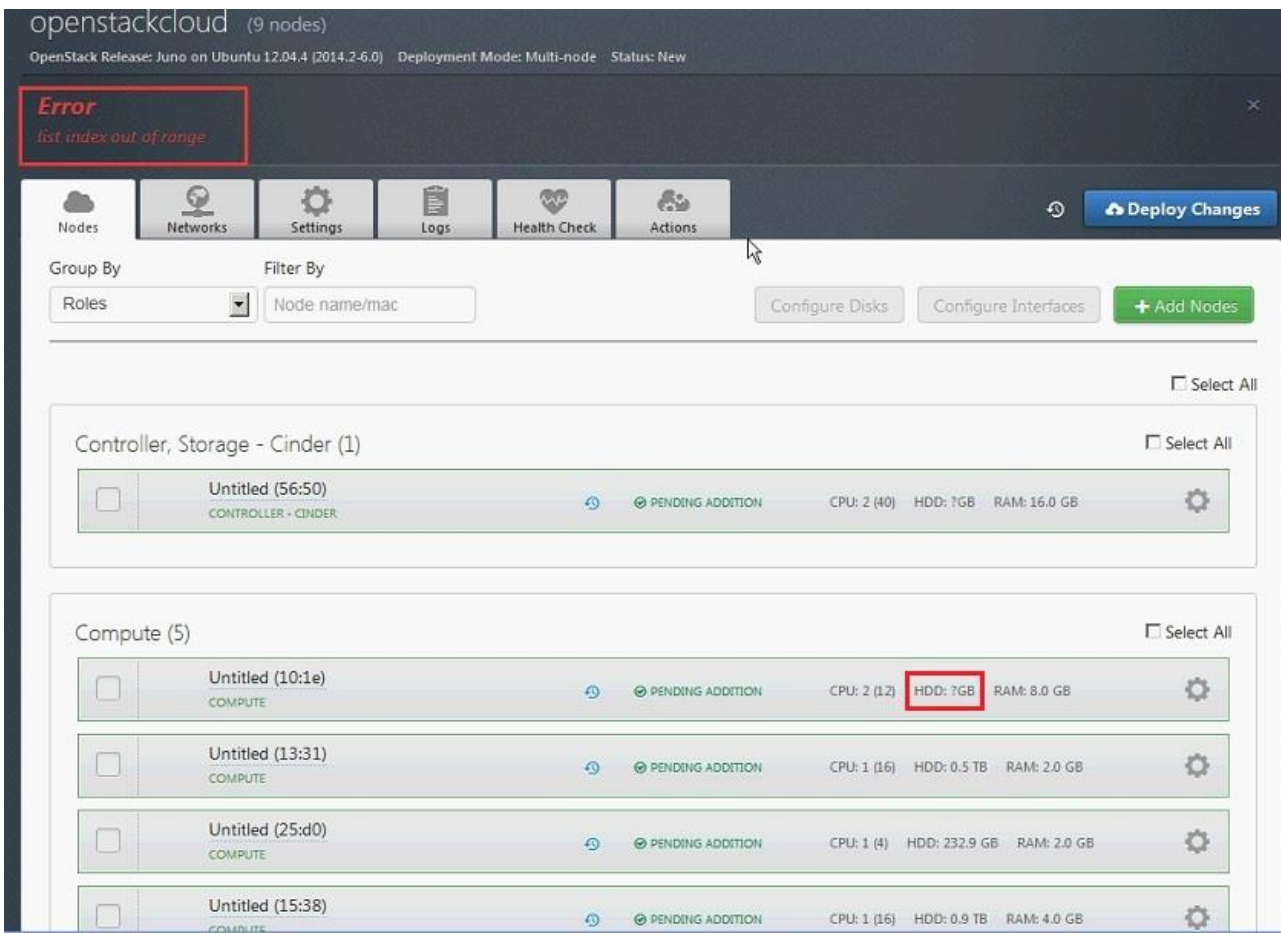
描述：部署openstack的过程中报错:list index out of range

原因：Hard disk 被fuel master正确识别



# Openstack 故障排查记录

- 解决办法: 检查故障节点的阵列卡是否配置正确



- **故障3：**映射逻辑网络到节点服务器物理网口不合理，导致Neutron网络验证失败

**解决办法:**1)检查逻辑网络映射至物理网卡节点是否正确

2)检查交换机的Vlan配置

**备注：**由于节点服务器的自带物理网卡数量有限，如果有2个以上的功能网络被分配到一个物理网口上，需要将交换机上与该网口连接的端口设置成trunk模式。



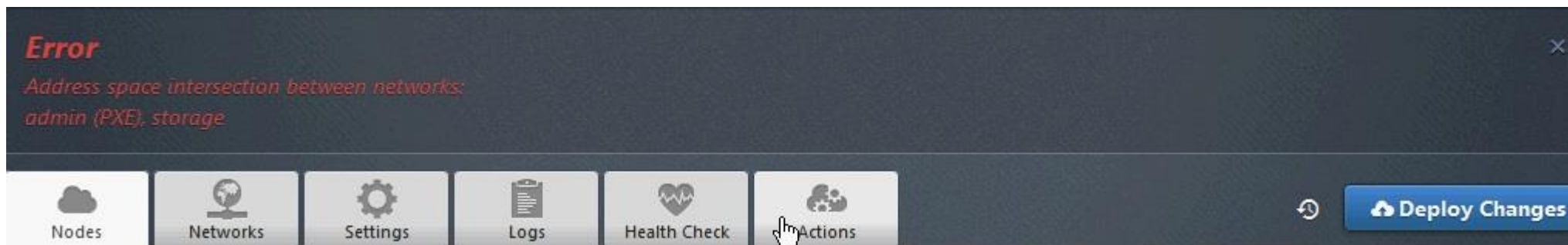
- **故障4:**节点服务器内存小于2GB导致openstack部署失败

**解决办法:** 避免该故障，需要确保每个节点服务器的内存不小于2GB

# Openstack 故障排查记录

- **故障5:**为避免其余功能网络对admin(PXE)网络的影响， admin(PXE)需设成独立网络

**描述:**Openstack部署过程中报错E:Address space intersection between networks :admin(PXE) and storage



- **解决办法:** 为避免该故障，需要确保admin(PXE)设成独立网络.

- 备注1:如何通过Public网络访问Openstack

步骤1: 在Neutron网络设置页面配置Public IP



The screenshot shows the 'Public' configuration form in the Neutron network management interface. It includes fields for 'IP Range' with 'Start' (10.240.194.73) and 'End' (10.240.194.125) sub-fields, a 'CIDR' field (10.240.194.0/23), a 'Use VLAN tagging' checkbox (checked) with a 'VLAN ID' field (103), and a 'Gateway' field (10.240.194.1).

	Start	End
IP Range	10.240.194.73	10.240.194.125
CIDR	10.240.194.0/23	
Use VLAN tagging	<input checked="" type="checkbox"/> 103	
Gateway	10.240.194.1	

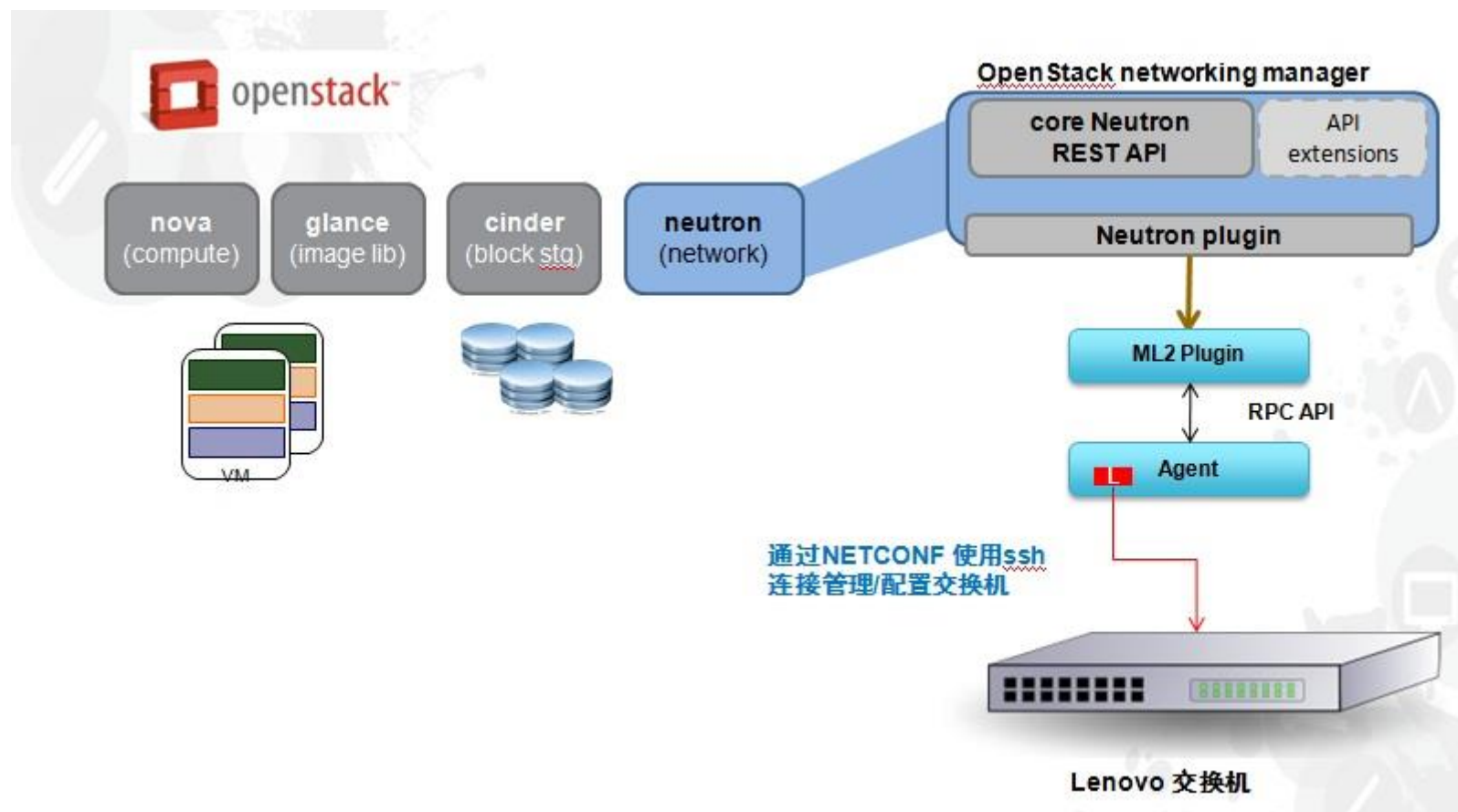
步骤2: 将交换机对应端口划分至Public Vlan

步骤3: 将划分至Public Vlan的交换机端口连接到Public网络

# Backup

# Lenovo Network Modular L2 Drivers工作示意图

## ■ Modular L2 Drivers工作示意图



谢谢!