DEPLOY OPENSTACK CLOUD

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Inter-Relationship among the OpenStack Components

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Relationship among OpenStack Components
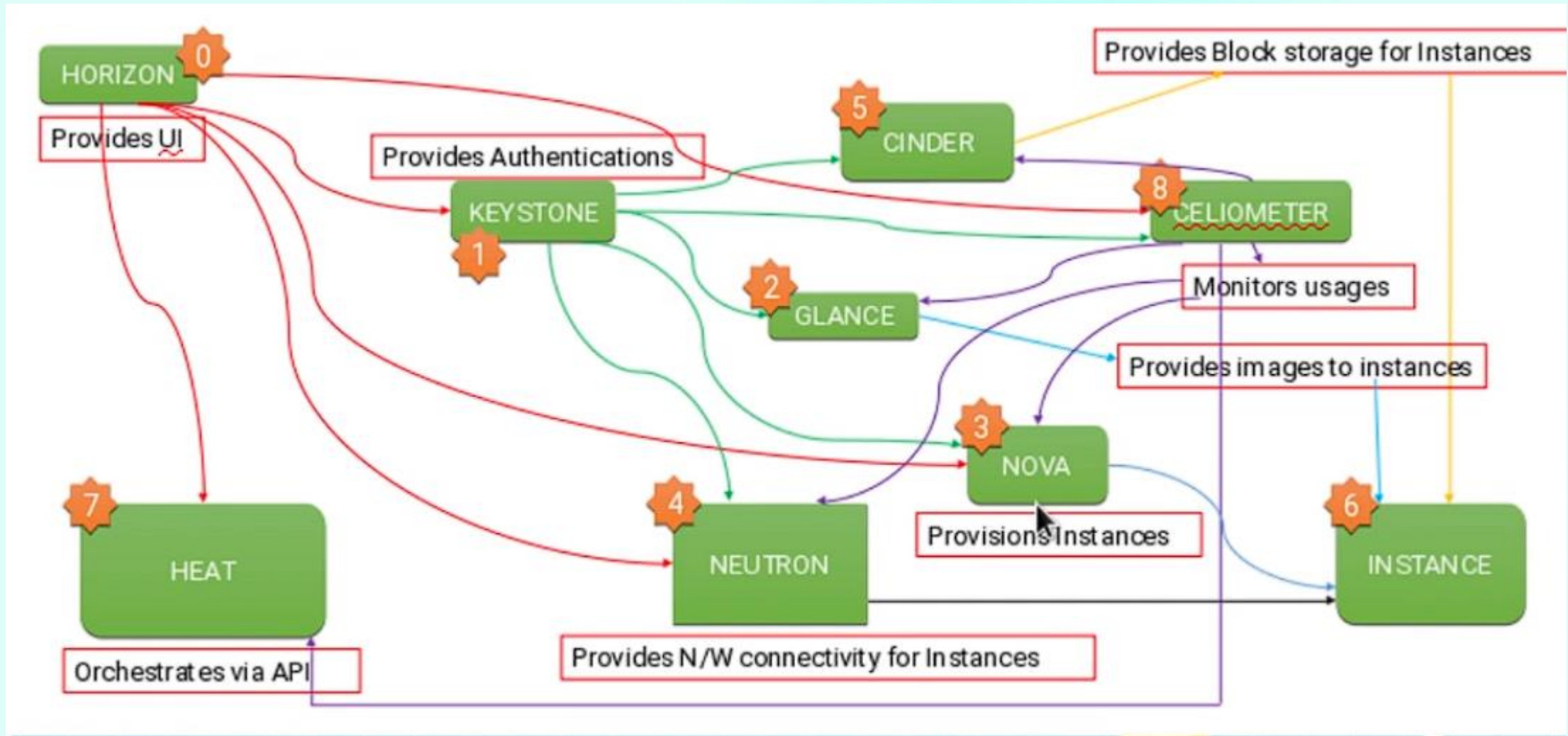
Familiarizing with the terminologies of OpenStack

Openstack Terminologies

Cloud Controller: The coordinating manager. All machines in Openstack cloud communicate with the cloud controller using the Advanced Message Queuing Protocol (AMQP). Apache Qpid messaging daemon (qpidd) and RabbitMQ are commonly used.

Tenant: The term tenant is used in keystone, and is equivalent to a project in Horizon. A tenant or project is a group of items (users, images, instances, networks, volumes etc)

Compute node: A hypervisor, machine running the Nova compute service.

Volume (block storage): A persistent disk presented and attached to a single instance. Volumes are persistent and can be attached or detached from running instances. The Cinder services uses LVM by default.

Openstack Terminologies

Ephemeral disk: A temporary disk used by an instance. When the instance is created, it is created as a QC0W2 image named disk.local on the compute node. When the instance is terminated, the disk is removed after being erased with ad.

Server or instance: A virtual machine

Flavor: The hardware associated with a instance. This includes RAM, CPUs and disks

Stack: A group of instances built from a template. Template files are written in JavaScript Object Notation (JSON), simpler alternative to XML document encoding. Stacks and templates are used in Heat orchestration service.

Openstack Terminologies

Openstack Networking (Neutron): A software-defined networking service. Includes many plug-ins (e.g. OpenvSwitch, Cisco UCS/Nexus) and allows software-defined networks (SDN) and quality of service (QoS).

Network: An isolated L2 segment, analogous to vlan in the physical networking world.

Subnet: A block of V4 or V6 IP address and associated configuration state.

Port: A connection point for attaching a single device, such as NIC of a VM to a virtual network.

Open vSwitch: Software that provides a virtual switch. It provides traffic queuing and shaping and automated flow control. It is the widely used in most of the Openstack deployment as a default SDN plug-in.

Preparing the Environment for OpenStack Deployment

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Hardware Requirements (Controller Node):

Hardware	Requirements
Processor	➜ 64-bit x86 processor with support for Intel 64 or AMD64 CPU ➜ AMD-V or Intel VT hardware virtualization support enabled
Memory	➜ Minimum of 2 GB RAM is recommended
Network	➜ Minimum 2x1 Gbps NICs, ideally 3 NICs
Disk Space	➜ 100 GB, 1TB of disk space is recommended

Hardware Requirements (Compute Node):

Hardware	Requirement
Processor	64-bit x86 processor AMD-V or Intel VT hardware virtualization enabled
Memory	2 GB minimum
Disk space	50 GB minimum 1 TB recommended
Network	Minimum 2x1 Gbps NICs, ideally 3 NICs

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Hardware Requirements (Network/Storage Node):

Hardware	Requirement
Processor	64-bit x86 processor AMD-V or Intel VT hardware virtualization enabled
Memory	Depends on the amount of storage space 1 GB of memory per 1 TB storage
Disk space	50 GB minimum 1 TB recommended
Network	Minimum 2x1 Gbps NICs, ideally 3 NICs

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Configuring Network Time Protocol (NTP)

- **Must configure NTP service to synchronize Red Hat Openstack platform services among nodes**

- **Configure controller node as NTP server and reference it to more accurate Internet/internal NTP server**

- **Configure other nodes to refer controller node for time synchronization**

- **To install NTP on controller and other nodes, run below command:**
  #yum install ntp
  Or
  #yum install chrony

NTP Server Configuration

- **Edit below lines in "/etc/ntp. conf" or "/etc/chrony.conf" :**

  server NTP_SERVER iburst
  restrict 4 default kod notrap nomodify
  restrict 4 default kod notrap nomodify

- **Enable the ntp service**

- **Start the ntp service**

NTP Client Configuration

- **Edit below lines in "/etc/ntp. conf" or "/etc/chrony.conf" :**

  server <Controller Node IP> iburst

- **Enable the ntp service**

- **Start the ntp service**

Network Manager

- **CentOS/Redhat Openstack platform doesn't work with Network Manager**

- **Disable it on each node that handles Openstack network traffic:**
  - **Servers that host Openstack networking**
  - **All network nodes**
  - **All compute nodes**

- **Run these commands as root:**
  - **#systemctl disable NetworkManager**
  - **#systemctl stop NetworkManager**
  - **#systemctl mask NetworkManager**
  - **#systemctl enable network**
  - **#systemctl start network**

Network Configuration

- **In "/etc/sysconfig/network-scripts" directory, confirm that below keys are added for each interface configuration:**
  NM_CONTROLLED=no
  ONBOOT=yes

- **If these keys are not present, then add them**

- **Ensures on boot the network service takes control of the network interfaces and activates them**

- **Restart network service to apply the configuration change**
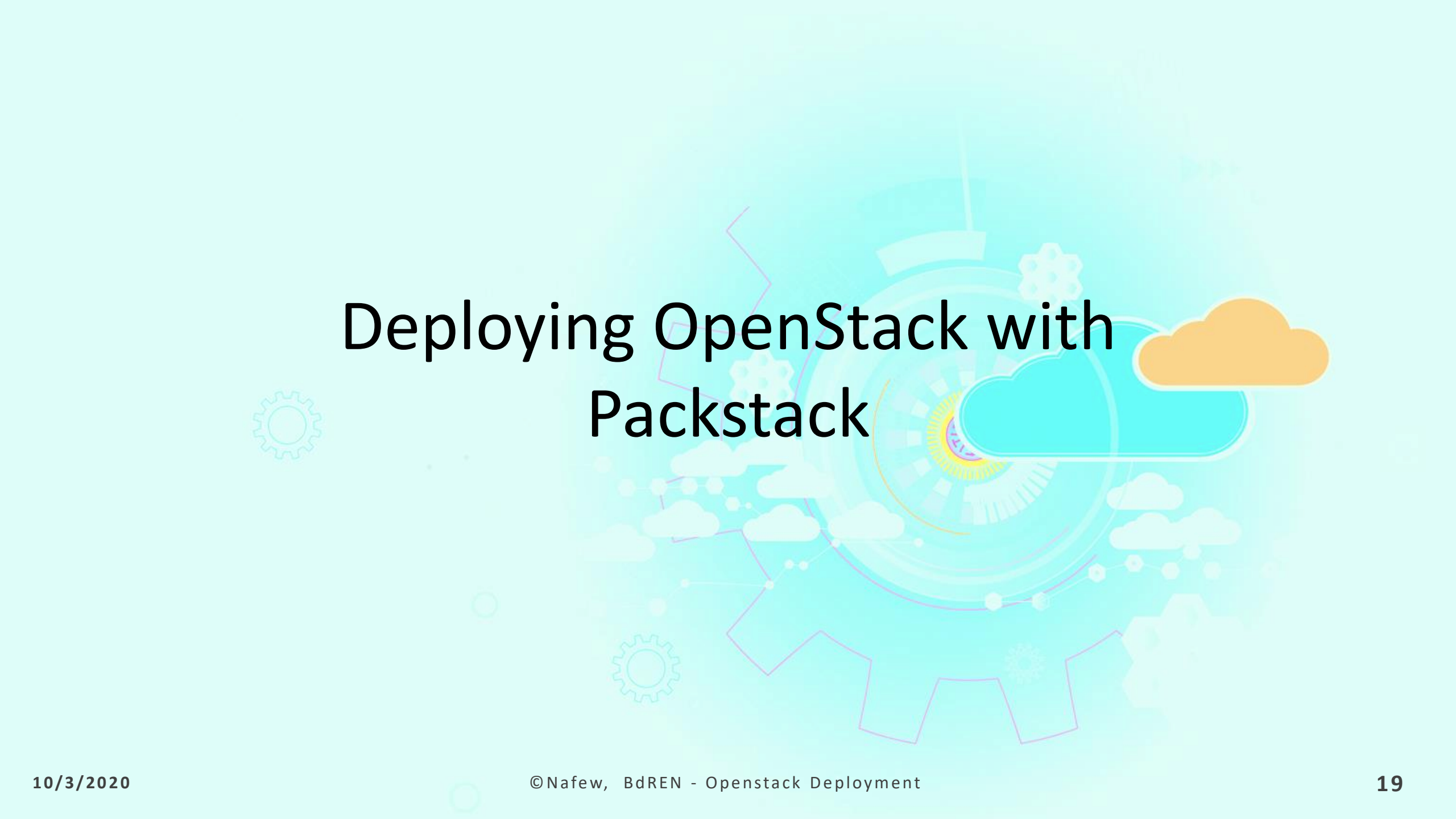
Package Update & Utilities Installation

- ## Package Updates
  - After servers are registered with correct channels, run yum update to ensure that they are using latest packages. If there is any kernel update applied, reboot the server to boot up with the latest kernel.

- ## Utilities and SELinux
  - To manage security policies, install packages for Red Hat OpenStack Platform utilities and SELinux:

    # yum -y install openstack-utils
    # yum -y install openstack-selinux

Firewall Recommendations

- **Don't use firewalld service. Openstack works with traditional iptables service.**

- **Use "/etc/sysconfig/iptables" as authoritative source file for OS services.**

- **Don't use iptables-save directly on "/etc/sysconfig/iptables". Because save includes Openstack firewall rules. Backup files before making changes.**

- **Let the Openstack perform its own iptables rules, don't mix with OS iptables rules.**

Deploying OpenStack with Packstack

What is Packstack?

- **Packstack is a utility that uses Puppet modules to deploy an Openstack environment in a convenient way.**

- **Supported on:**
  - **Red Hat**
  - **Fedora**
  - **Centos**

- **Configure interactively or by passing an answer file to installer**
  - **Answer file contains the variables used by installer**
  - **Variables provide high degree of configuration control**

Packstack Installation

- **Before installing packstack, enable the repositories.**

- **On CentOS 7, the Extras repository provides the RPM that enables the OpenStack repository.**
  #yum install -y centos-release-openstack-train

- **To install packstack, run this command:**
  #yum install openstack-packstack-y

Configuring with Packstack

- **To install everything on a single node:**
    #packstack -allinone
- **Alternatively use answer file to pass variables to the installer to configure environment. To create answer file:**
    #packstack -gen-answer-file=/path/to/answer/file.txt
- **To install using modified answer file:**
    #packstack -answer-file=/path/to/answer/file.txt
- **Packstack installs many packages, in case of any problem, re-run the packstack again.**
    - **Use -d option with packstack to debug**
    - **View log files stored in "/var/tmp/packstack/*", also try to follow "/var/log/messages" and "/var/log/yum.log"**

Packstack Answer File Options

Settings	Purpose
CONFIG_HEAT_INSTALL=y	Enables the Heat orchestration service. It will also be necessary to set password and enable other services
CONFIG_NTP_SERVERS=X.X.X.X	Configure the NTP servers for time sync
CONFIG_KEYSTONE_ADMIN_PW=	Configure the keystone admin password
CONFIG_CINDER_VOLUMES_CREATE=n	Packstack will fail to run if can't create the volume
CONFIG_LBAAS_INSTALL=y	Configure load-balancer as a service
CONFIG_NEUTRON_METERING_AGENT_INSTALL=y	Configure the neutron metering agent so Neutron information is passed to ceilometer telemetry service
CONFIG_NEUTRON_FWAAS=y	Configure firewall as a service
CONFIG_NEUTRON_ML2_TYPE_DRIVERS=vlan	Configure the neutron ML2 plug-in drivers, multiple entries can be used in a comma-separated list

Packstack Answer File Options

Settings	Purpose
C0NFIG_NEUTR0N_ML2_TENANT_NETWORK_TYPES=vlan	Configure the Neutron ML2 tenant network type.
C0NFIG_NEUTR0N_ML2_VLAN_RANGES=physnet1:1:1000	Configure the vlan range the neutron will use. Specify a physical network name and the start and end vlan IDs (VIDs). The physical network name is an arbitrary name used to tie the VIDs with the CVS bridge and physical Ethernet device
C0NFIG_NEUTR0N_0VS_BRIDGE_MAPPINGS=physnet1 :br-eth1	Map the physical network name (and VIDs) to the Neutron OVS bridge
C0NFIG_NEUTR0N_0VS_BRIDGE_IFACES=br-eth1:eth1	Map the Neutron OVS bridge to the physical device it will use
CONFIG_HEAT_CFN_INSTALL=y	Configure the heat CloudFormation API. This provides capabilities to use AWS CloudFormation template format APIs and launch them inside Openstack
CONFIG_HORIZON_SSL=y	Enable use of SSL for Horizon.
CONFIG_PROVISION_DEMO=n	Whether to provision the Openstack platform for demo usage and testing.

Thank You.

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