OPNFV Installation instructions for the Arno release of OPNFV when using Fuel as a deployment tool

Table of Contents

Abstract

This document describes how to install the Arno SR1 release of OPNFV when using Fuel as a deployment tool covering it's limitations, dependencies and required system resources.

License

Version history

Date	Ver.	Author	Comment
2015-06-03 2015-09-08	1.0.0 1.0.1	Jonas Bjurel (Ericsson AB) **Daniel Smith** (Ericsson AB)	Installation instructions for the Arno release First Draft Update for OPNFV SR1 release

IN DEVELOPMENT TODOs

> TODO - Fix link in Retriving ISO Section <insert link> TODO - Fix git tag to match ARNO SR1 release tag/branch name TODO - Fix Link to PHAROS SR1 Specification <insert link> TODO - Fix link for ARNO SR1 ISO in Install Steps TODO - Determine Proxy / Remote Repo Supprt and add steps for "create mirror"

DEVELOPER NOTE!! - this II is currently using steps when FUEL is connected to the internet - these will change when SR1 comes out as the repo will be included in the ISO - however at the time / date of this writing the build system is not yet available to reference.

Introduction

This document describes providing guidelines on how to install and configure the Arno SR1 release of OPNFV when using Fuel as a deployment tool including required software and hardware configurations.

Although the available installation options gives a high degree of freedom in how the system is set-up including architecture, services and features, etc. said permutations may not provide an OPNFV compliant reference architecture. This instruction provides a step-by-step guide that results in an OPNFV Arno SR1 compliant deployment.

The audience of this document is assumed to have good knowledge in networking and Unix/Linux administration.

Preface

Before starting the installation of the Arno SR1 release of OPNFV when using Fuel as a deployment tool, some planning must be done.

Retrieving the ISO image

First of all, the Fuel deployment ISO image needs to be retrieved, the .iso image of the Arno SR1 release of OPNFV when using Fuel as a deployment tool can be found at <insert link to ARNO SR1 FUEL Release ISO>

Building the ISO image

Alternatively, you may build the .iso from source by cloning the opnfv/genesis git repository. To retrieve the repository for the Arno release use the following command:

<git clone https://<linux foundation uid>@gerrit.opnf.org/gerrit/genesis>

Check-out the Arno SR1 release tag to set the branch to the baseline required to replicate the Arno SR1 release:

<cd genesis; git checkout <insert arno_sr1_tag here>>

Go to the fuel directory and build the .iso:

<cd fuel/build; make all>

For more information on how to build, please see "OPNFV Build instructions for - Arno SR1 release of OPNFV when using Fuel as a deployment tool which you retrieved with the repository at </genesis/fuel/docs/src/build-instructions.rst>

Next, familiarize yourself with the Fuel 6.1 version by reading the following documents:

- Fuel planning guide <https://docs.mirantis.com/openstack/fuel/fuel-6.1/planning-guide.html>
- Fuel user guide <http://docs.mirantis.com/openstack/fuel/fuel-6.1/user-guide.html#user-guide>
- Fuel operations guide <http://docs.mirantis.com/openstack/fuel/fuel-6.1/operations.html#operations-guide>
- Fuel Plugin Developers Guide <https://wiki.openstack.org/wiki/Fuel/Plugins>

A number of deployment specific parameters must be collected, those are:

1. Provider sub-net and gateway information
2. Provider VLAN information
3. Provider DNS addresses
4. Provider NTP addresses
5. Network Topology you plan to Deploy (VLAN, GRE(VXLAN), FLAT)
6. Linux Distro you intend to deploy.
7. How many nodes and what roles you want to deploy (Controllers, Storage, Computes)
8. Monitoring Options you want to deploy (Ceilometer, MongoDB).
9. HADOOP Option with Sahara Deployment

This information will be needed for the configuration procedures provided in this document.

Hardware requirements

The following minimum hardware requirements must be met for the installation of Arno SR1 using Fuel:

HW Aspect	Requirement
# of nodes	Minimum 5 (3 for non redundant deployment): • 1 Fuel deployment master (may be virtualized) • 3(1) Controllers • 1 Compute
CPU	**Minimum 1 socket x86_AMD64 with Virtualization** support

RAM	Minimum 16GB/server (Depending on VNF work load)
Disk	Minimum 256GB 10kRPM spinning disks
Networks	4 Tagged VLANs (PUBLIC, MGMT, STORAGE, PRIVATE) 1 Un-Tagged VLAN for PXE Boot - ADMIN Network **note: These can be run on single NIC - or spread out** over other nics as your hardware supports

Help with Hardware Requirements

Calculate hardware requirements:

You can use the Fuel Hardware Calculator <https://www.mirantis.com/openstack-services/bom-calculator/> to calculate the hardware required for your OpenStack environment.

When choosing the hardware on which you will deploy your OpenStack environment, you should think about:

> **CPU -- Consider the number of virtual machines that you plan to deploy in your cloud environment and the CPU per virtual machine.**
>
> > -- Also consider how the environment will be used: environments used for heavy computational work may require more powerful CPUs than environments used primarily for storage, for example.
>
> Memory -- Depends on the amount of RAM assigned per virtual machine and the controller node. Storage -- Depends on the local drive space per virtual machine, remote volumes that can be attached to a virtual machine, and object storage. Networking -- Depends on the Choose Network Topology, the network bandwidth per virtual machine, and network storage.

Top of the rack (TOR) Configuration requirements

The switching infrastructure provides connectivity for the OPNFV infrastructure operations, tenant networks (East/West) and provider connectivity (North/South bound connectivity); it also provides needed connectivity for the storage Area Network (SAN). To avoid traffic congestion, it is strongly suggested that three physically separated networks are used, that is: 1 physical network for administration and control, one physical network for tenant private and public networks, and one physical network for SAN. The switching connectivity can (but does not need to) be fully redundant, in such case it and comprises a redundant 10GE switch pair for each of the three physically separated networks.

The physical TOR switches are **not** automatically configured from the OPNFV reference platform. All the networks involved in the OPNFV infrastructure as well as the provider networks and the private tenant VLANs needs to be manually configured.

Manual configuration of the Arno SR1 hardware platform should be carried out according to the Pharos specification <insert link to Pharos ARNO SR1 Specification>

OPNFV Software installation and deployment

This section describes the installation of the OPNFV installation server (Fuel master) as well as the deployment of the full OPNFV reference platform stack across a server cluster.

Install Fuel master

1. Mount the <insert arno sr1 ISO filename> file as a boot device to the jump host server.
2. Reboot the jump host to establish the Fuel server.

- The system now boots from the ISO image.
- Select 'DVD Fuel Install (Static IP)'
- Press [Enter].

4. Wait until screen Fuel setup is shown (Note: This can take up to 30 minutes).
5. Configure DHCP/Static IP information for your FUEL node - For example, ETH0 is 10.20.0.2/24 for FUEL booting and ETH1 is DHCP in your corporate/lab network.

    - Configure eth1 or other network interfaces here as well (if you have them present on your FUEL server).

6. Select PXE Setup and change the following fields to appropriate values (example below):

    - DHCP Pool Start 10.20.0.3
    - DHCP Pool End 10.20.0.254
    - DHCP Pool Gateway 10.20.0.2 (ip of Fuel node)
    - Hostname <OPNFV Region name>-fuel
    - Domain <Domain Name>
    - Search Domain <Search Domain Name>
    - Hostname to test DNS <Hostname to test DNS>

8. Select Time Sync and change the following fields to appropriate values:

    - NTP Server 1 <Customer NTP server 1>
    - NTP Server 2 <Customer NTP server 2>
    - NTP Server 3 <Customer NTP server 3>

8. Start the installation.

    - Select Quit Setup and press Save and Quit.
    - Installation starts, wait until a screen with logon credentials is shown.

Boot the Node Servers

After the Fuel Master node has rebooted from the above step and is at the login prompt, you should boot the Node Servers (Your Compute/Control/Storage blades (nested or real)) with a PXE Booting Scheme so that the FUEL Master can pick them up for control.

9. Enable PXE booting

    - For every controller and compute server: enable PXE Booting as the first boot device in the BIOS boot order menu and hard disk as the second boot device in the same menu.

10. Reboot all the control and compute blades.
11. Wait for the availability of nodes showing up in the Fuel GUI.

    - Wait until all nodes are displayed in top right corner of the Fuel GUI: <total number of server> TOTAL NODES and <total number of servers> UNALLOCATED NODES.

Install Plugin on FUEL node

TODO - INCLUDE PATH TO .RPM on FUEL ISO (or on FUEL node if sent that way)

12. SSH to your FUEL node (e.g. root@10.20.0.2 pwd: r00tme)
13. Verify the plugin exists at /opt/opnfv/opendaylight-0.6-0.6.1-1.noarch.rpm

14. Install the plugin with the command

    - "fuel plugins --install opendaylight-0.6-0.6.1-1.noarch.rpm"
    - Expected output: "Plugin opendaylight-0.6-0.6.1-1.noarch.rpm was successfully installed."

Install Fuel Plugins

12.
    - Verify that the plugin is available on the FUEL Master at <path to plugin file on FUEL master>

13.
    - cd to <directory holding plugin>

14.
    - Run the command "fuel plugins --install <fuel-plugin-file>"

Once your environment is created (in the next step) you can open the Settings Tab on the Fuel Web UI, scroll down the page and select the plugin checkbox, finish environment definition and click deploy.

Create an OPNFV Environment

15. Connect to Fuel with a browser towards port 8000

16. Create and name a new OpenStack environment, to be installed.

17. Select <Juno on Ubuntu> or <Juno on CentOS> as per your which in the "OpenStack Release" field.

16. Select compute virtulization method.

    - Select KVM as hypervisor (or one of your choosing)

17. Select network mode.

    - Select Neutron with GRE segmentation

    Note: this is the supportted method when using the ODL installation, other options will not work with the plugin and this Instruction Set.

18. Select Storage Back-ends.

    - Select "Yes, use Ceph" if you intend to deploy Ceph Backends.

19. Select additional services you wish to install.

    - Check option <Install Celiometer (OpenStack Telemetry)>.

20. Create the new environment.

    - Click "Create" Button

Configure the OPNFV environment

21. Enable PXE booting (if you havent done this already)

    - For every controller and compute server: enable PXE Booting as the first boot device in the BIOS boot order menu and hard disk as the second boot device in the same menu.

20. Wait for the availability of nodes showing up in the Fuel GUI.

    - Wait until all nodes are displayed in top right corner of the Fuel GUI: <total number of server> TOTAL NODES and <total number of servers> UNALLOCATED NODES.

21. Open the environment you previously created.

22. Open the networks tab.

23. Update the Public network configuration.

Change the following fields to appropriate values:

- IP Range Start to <Public IP Address start>
- IP Range End to <Public IP Address end>
- CIDR to <CIDR for Public IP Addresses>
- Check VLAN tagging.
- Set appropriate VLAN id.
- Gateway to <Gateway for Public IP Addresses>
- Set floating ip ranges

24. Update the Storage Network Configuration

    - Set CIDR to appropriate value (default 192.168.1.0/24)
    - Set vlan to appropriate value (default 102)

24. Update the Management network configuration.

    - Set CIDR to appropriate value (default 192.168.0.0/24)
    - Check VLAN tagging.
    - Set appropriate VLAN id. (default 101)

25. Update the Private Network Information

    - Set CIDR to appropriate value (default 192.168.2.0/24
    - Check and set VLAN tag appropriately (default 103)

27. Update the Neutron L3 configuration.

    - Set Internal network CIDR to an appropriate value
    - Set Internal network gateway to an appropriate value
    - Set Guest OS DNS Server values appropriately

27. Save Settings.

30. Click on the "Nodes" Tab in the FUEL WEB UI.

31. Assign roles.

    - Click on "+Add Nodes" button
    - Check "Controller" and the "Storage-Ceph OSD" in the Assign Roles Section
    - Check the 3 Nodes you want to act as Controllers from the bottom half of the screen
    - Click <Apply Changes>.
    - Click on "+Add Nodes" button
    - Check "Compute" in the Assign Roles Section
    - Check the Nodes that you want to act as Computes from the bottom half of the screen
    - Click <Apply Changes>.

32. Configure interfaces.

  - Check Select <All> to select all nodes with Control, Telemetry, MongoDB and Compute node roles.
  - Click <Configure Interfaces>
  - Screen Configure interfaces on number of <number of nodes> nodes is shown.
  - Assign interfaces (bonded) for mgmt-, admin-, private-, public- and storage networks

Enable ODL

33. In the FUEL UI of your Enviornment, click the "Settings" Tab

  - Enable OpenStack debug logging (in the Common Section) - optional
  - Check the OpenDaylight Lithium Plugin Section
  - Check to enable VXLAN
  - Modify VNI and Port Range if desired
  - Click "Save Settings" at the bottom to Save.

OPTIONAL - Set Local Mirror Repos

The following steps can be executed if you are in an environment with no connection to the internet. The Fuel server delivers a local repo that can be used for installation / deployment of openstack.

TODO - Insert information here with repos on next pass of installation.

Verify Networks

Its is important that Verify Networks be done as it will ensure that you can not only communicate on the networks you have setup, but can fetch the packages needed for a succesful deployment.

34. From the FUEL UI in your Environment, Select the Networks Tab

  - At the bottom of the page, Select "Verify Networks"
  - Continue to fix your topology (physical switch, etc) until the "Verification Succeeded - Your network is configured correctly" message is shown

Deploy Your Environment

37. Deploy the environment. In the Fuel GUI, click Deploy Changes.

Installation health-check

38. Perform system health-check The activation of ODL within a deployed Fuel system is a two part process.

The first part involves staging the ODL container, i.e. starting the ODL container itself. The second part involves a reconfiguration of the underlying networking components to enable VXLAN tunneling. The staging of the ODL container works without manual intervention except for editing with a valid DNS IP for your system

For the second part - the reconfiguration of the networking, the script <config_net_odl.sh> is provided as a baseline example to show what needs to be configured for your system system setup. Since there are many variants of valid networking topologies, this script will not be 100% correct in all deployment cases and some manual script modifications maybe required.

39. Enable the ODL controller ssh to any of the OpenStack controllers and issue the following command as root user: </opt/opnfv/odl/stage_odl.sh> This script will start ODL, load modules and make the Controller ready for use. ** Note: - The script should only be ran on a single controller (even if the system is setup in a High Availability OpenStack mode). **

40. Verify that the OpenDaylight GUI is accessible Point your browser to the following URL: <http://{ODL-CONTROLLER-IP}:8181/dlux/index.html> and login: Username: Admin Password: Admin

41. Reconfiguring the networking and switch to VXLAN network segmentation ssh to all of the nodes and issue the following command </opt/opnfv/odl/config_net_odl.sh> in the order specified below: a. All compute nodes b. All OpenStack controller nodes except the one running the ODL-controller c. The OpenStack controller also running the ODL controller

This script will reconfigure the networking from VLAN Segregation to VXLAN mode.

References

OPNFV

OPNFV Home Page

OPNFV Genesis project page

OpenStack

OpenStack Juno Release artifacts

OpenStack documentation

OpenDaylight

OpenDaylight artifacts

Fuel

Fuel documentation

Authors: Jonas Bjurel (Ericsson AB)

Version: 1.0.0

Documentation tracking

Revision: c28f7b46cf0f098c6c9e981aa7867cf681c0dfcd

Build date: Sun Sep 27 19:33:21 UTC 2015