HPE Synergy Image Streamer RHEL 7.3 Artifact Bundle Documentation

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Table of contents

1 HPE Synergy Image Streamer Artifact Bundle of RHEL 7.3

The HPE Synergy Image Streamer Artifact Bundle of RHEL 7.3 includes artifact which is helpful to personalize the RHEL 7.3 OS.

1.1.1 Artifact Bundle: HPE-RHEL-7.3-artifacts

1.2 Prerequisite:

1.2.1 Filesystem:

The filesystem of RHEL 7.3 image should be ext3 or ext4.

We assume that root partition (/) is mounted on /dev/sda3 or /dev/rhel/root. If the root partition is not on the mentioned device the user has to edit RHEL-7.3-mount-and-validate Plan Script.

1.2.2 LogicalVolumeMangement (LVM):

User has to add a local drive for LVM type partitioning, while creating the server profile user should edit "Integrated storage controller mode" option of local storage to add a local drive for the server. There will be only two partitions done. Ensure that the disk is in a clean state before you start using it.

1.2.3 NIC Teaming:

For NIC teaming the user should add two network connection with same VLAN ID for teaming in the add network section of server profile. And while selecting the **Team0NIC1** and **Team0NIC2** the network should be of same VLAN ID.

1.2.4 Adding Multiple NIC's:

While selecting the **MgmtNIC1**, **MgmtNIC2**, **MgmtNIC3** and **MgmtNIC4** the user should select the different network. User should not use the same network for selecting the MgmtNIC's.

1.2.5 Adding the user:

The user can add one or more users. User can add more users either with comma separated or semicolon separated or space separated and the password will be same for all the user. User can change password on their first login, though it is not enforced.

1.3 Build Plans

1.3.1 Build Plan: RHEL-7.3-personalize-and-configure-NICs-LVM-BP

Build Plan personalizes the RHEL 7.3 server by creating a new users, applying multiple nic configuration, allowing the network to access from outside world, updating the hostname, creating partition on the disk, enabling SELINUX service, server hardening and changing the root password as per user parameters.

Steps: Plan Script Names	Attributes
RHEL-7.3-mount-and-validate	
RHEL-7.3-configure-multiple-NICs	MgmtNIC1(NIC) MgmtNIC2(NIC) MgmtNIC3(NIC) MgmtNIC4(NIC) TotalMgmtNICs(Option)
RHEL-7.3-configure-hostname	DomainName(FQDN)
RHEL-7.3-configure-users	NewRootPassword(Password) NewUserName(String) NewUserPassword(Password)
RHEL-7.3-configure-partition-using-LVM	DiskName(String) FirstPartitionSize(Number) LogicalVolumeGroupName(String) LogicalVolumeName(String) LogicalVolumeSize(Number) SecondPartitionSize(Number)
RHEL-7.3-manage-services	SSH(Option)

RHEL-7.3-unmount	

1.3.2 Build Plan: RHEL-7.3-personalize-and-NIC-teamings-LVM-BP

Build Plan personalizes the RHEL 7.3 server by creating a new users, creating multiple nic teaming, allowing the network to access from outside world, updating the hostname, creating partition on the disk, enabling SELINUX service, server hardening and changing the root password as per user parameters.

Steps: Plan Script Names	Attributes
RHEL-7.3-mount-and-validate	
RHEL-7.3-configure-multiple-NIC-teaming	FirstNicTeamName(String) SecondNicTeamName(String) Team0NIC1(NIC) Team0NIC2(NIC) Team1NIC1(NIC) Team1NIC2(NIC) TotalNicTeamings(Option)
RHEL-7.3-configure-hostname	DomainName(FQDN)
RHEL-7.3-configure-users	NewRootPassword(Password) NewUserName(String) NewUserPassword(Password)

RHEL-7.3-configure-partition-using-LVM	DiskName(String)
	FirstPartitionSize(Number)
	LogicalVolumeGroupName(String)
	LogicalVolumeName(String)
	LogicalVolumeSize(Number)
	SecondPartitionSize(Number)
RHEL-7.3-manage-services	SSH(Option)
RHEL-7.3-unmount	

1.4 Plan Scripts

1.4.1 Plan Script: RHEL-7.3-mount-and-validate

This Plan Script lists all mount partitions and mounts the root partition of the image.

After the mount script validates golden image to check whether it is appropriate image to use. And verifies whether the image was captured by the HPE Synergy Image Streamer or not.

1.4.2 Plan Script: RHEL-7.3-configure-multiple-NICs

This script gives the user an option of configuring four NICs and user as to select the total number of NICs to configure as DHCP or Static as per their requirement. User has to add public network while creating server profile.

Attributes:

MgmtNIC1 (NIC)

This attribute is of type NIC and has the following four sub-attributes:
- MgmtNIC1.dhcp
- MgmtNIC1.gateway
- MgmtNIC1.ipaddress
- MgmtNIC1.mac
- MgmtNIC1.netmask

These sub-attributes are used to edit the network file of the first NIC in RHEL 7.3.

MgmtNIC2 (NIC)

This attribute is of type NIC and has the following four sub-attributes:
- MgmtNIC2.dhcp
- MgmtNIC2.gateway
- MgmtNIC2.ipaddress

- MgmtNIC2.mac
- MgmtNIC2.netmask

These sub-attributes are used to edit the network file of the second NIC in RHEL 7.3.

MgmtNIC3 (NIC)

This attribute is of type NIC and has the following four sub-attributes:
- MgmtNIC3.dhcp
- MgmtNIC3.gateway
- MgmtNIC3.ipaddress
- MgmtNIC3.mac
- MgmtNIC3.netmask

These sub-attributes are used to edit the network file of the third NIC in RHEL 7.3.

MgmtNIC4 (NIC)

This attribute is of type NIC and has the following four sub-attributes:
- MgmtNIC4.dhcp
- MgmtNIC4.gateway
- MgmtNIC4.ipaddress
- MgmtNIC4.mac
- MgmtNIC4.netmask

These sub-attributes are used to edit the network file of the fourth NIC in RHEL 7.3.

TotalMgmtNICs (Option)

This attribute is of type option where user must select the number of NICs to configure the server.

1.4.3 Plan Script: RHEL-7.3-configure-multiple-NIC-teaming

1.4.4

This script gives the user an option of configure two NIC teaming and user as to select the total number of NICs for teaming as DHCP or Static as per their requirement. User has to add public network while creating server profile and can also specify the name for teaming the NICs.

Attributes:

FirstNicTeamName (String)

User can specify the name for first NIC teaming.

SecondNicTeamName (String)

It is of type string and can specify the name for second NIC teaming.

Team0NIC1 (NIC)

This attribute is of type NIC which has three sub attribute
- Team0NIC1.gateway,
- Team0NIC1.ipaddress
- Team0NIC1.mac

- Team0NIC1.netmask

All these attributes are used for network teaming Team0NIC1 and Team0NIC2 as static or dhcp.

Team0NIC2 (NIC)

This attribute is of type NIC which has three sub attribute
- Team0NIC2.gateway,
- Team0NIC2.ipaddress
- Team0NIC2.mac
- Team0NIC2.netmask

All these attributes are used for network teaming Team0NIC1 and Team0NIC2 as static or dhcp.

Team1NIC1

This attribute is of type NIC which has three sub attribute
- Team1NIC3.gateway,
- Team1NIC3.ipaddress
- Team1NIC3.mac
- Team1NIC3.netmask

All these attributes are used for network teaming Team1NIC1 and Team1NIC2 as static or dhcp.

Team1NIC2

This attribute is of type NIC which has three sub attribute
- Team1NIC3.gateway,
- Team1NIC3.ipaddress
- Team1NIC3.mac
- Team1NIC3.netmask

All these attributes are used for network teaming Team1NIC1 and Team1NIC2 as static or dhcp.

TotalNicTeamings (Option)

Gives option to select either one or two NIC teaming for the server.

1.4.4.1 **Sample test screenshot:**

(Note: The screenshot has been captured through SSH console)

```
[root@myhost ~]# nmcli connection show
NAME          UUID                                    TYPE          DEVICE
team0         699cce37-da3e-4e53-937f-e89858ea7d81    team          team0
ibft0         72d8c878-e0ad-475a-bace-5b5b968c6460    802-3-ethernet ibft0
iBFT ibft0    c4764f86-d025-3d0e-8ec4-fd2d98246ade    802-3-ethernet --
virbr0-nic    d9080ba0-3e1b-4319-88dd-e0f332bb40a7    generic       virbr0-nic
virbr0        3dbdeed6-099f-4491-b6be-06121a6cae1d    bridge        virbr0
team0-port2   a6204f55-4cc4-4309-9dc6-7bb0f827d7da    802-3-ethernet ens3f4
team0-port1   2ce887a5-7b88-479a-aa2c-dae38c1f3180    802-3-ethernet ens3f1
[root@myhost ~]# teamdctl team0 state
setup:
  runner: roundrobin
ports:
  ens3f1
    link watches:
      link summary: up
      instance[link_watch_0]:
        name: ethtool
        link: up
        down count: 0
  ens3f4
    link watches:
      link summary: up
      instance[link_watch_0]:
        name: ethtool
        link: up
        down count: 0
[root@myhost ~]# nmcli connection down team0-port1
Connection 'team0-port1' successfully deactivated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/2)
[root@myhost ~]# teamdctl team0 state
setup:
  runner: roundrobin
ports:
  ens3f4
    link watches:
      link summary: up
      instance[link_watch_0]:
        name: ethtool
        link: up
        down count: 0
[root@myhost ~]# nmcli connection show
NAME          UUID                                    TYPE          DEVICE
team0         699cce37-da3e-4e53-937f-e89858ea7d81    team          team0
ibft0         72d8c878-e0ad-475a-bace-5b5b968c6460    802-3-ethernet ibft0
iBFT ibft0    c4764f86-d025-3d0e-8ec4-fd2d98246ade    802-3-ethernet --
virbr0-nic    d9080ba0-3e1b-4319-88dd-e0f332bb40a7    generic       virbr0-nic
virbr0        3dbdeed6-099f-4491-b6be-06121a6cae1d    bridge        virbr0
team0-port2   a6204f55-4cc4-4309-9dc6-7bb0f827d7da    802-3-ethernet ens3f4
team0-port1   2ce887a5-7b88-479a-aa2c-dae38c1f3180    802-3-ethernet --
```

1.4.5 Plan Script: RHEL-7.3-configure-hostname

This scripts assigns the hostname given by user, adds the alias in /etc/hosts file with respective to the interface name present in the /tmp/interface name file and also delete the default gateway so that the network can be accessible from the outside world.

The hostname assignment is done in HPE Synergy Image Streamer only, but updating /etc/hosts should be done when the host is up. So the script for updating hosts is added in **rc.local** file which is present in /etc/rc.d folder. And this script has to be added next either to the Plan Script RHEL-7.3-configure-multiple-NIC-teaming or RHEL-7.3-configure-multiple-NICs.

Attributes:

DomainName (FQDN)

This attribute is of type FQDN the user must specify the full domain name to which the network should belong.

1.4.6 Plan Script: RHEL-7.3-configure-users

Changes the root password and adds new users with data given by the user while creating the server profile. This scripts are executed in the **rc.local** file to do the operations. Script takes new root password and new user details as parameters.

Attributes:

NewRootPassword (Password)

Attribute is used to change the root password of the server based on user input.

NewUserName (String)

String used to create a new users to the server. And multiple user name can also give by either comma separated or semicolon separated.

NewUserPassword (Password)

This attribute is of type Password and used to set for the newly created user. Same password is assigned to the multiple users given by the users.

1.4.7 Plan Script: RHEL-7.3-configure-partition-using-LVM

Script partitions the newly added disk (example /dev/sda) into to two partitions (example /dev/sda1 /dev/sda2) of given size. Creates a logical volume group and logical volume and create ext4 file system and mounts the given directory to the new logical volume and adds the entry to /etc/fstab. User have to add local disk while creating server profile.

Attributes:

DiskName (String)

It is a string which takes the name of the disk to partition.

FirstPartitionSize (Number)

This attribute take the size of the first partition to be in GiB. This is a special attribute which is recognized by the HPE Synergy Image Streamer.

LogicalVolumeGroupName (String)

This attribute is of type string it takes the name of logical volume group to create in the disk.

LogicalVolumeName (String)

The new logical volume to be create in the disk. It is of the type string.

LogicalVolumeSize (Number)

Size of the logical volume to be create will be in GiB unit.

SecondPartitionSize (Number)

This attribute take the size of the second partition to be in GiB. This is a special attribute which is recognized by the HPE Synergy Image Streamer.

1.4.7.1 **Sample test screenshot:**

(Note: The screenshot has been captured through SSH console)

```
[root@host ~]# lsblk
NAME                         MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda                            8:0    0 279.4G  0 disk
├─sda1                         8:1    0   10G  0 part
│ └─new_vol_group-new_vol 253:2    0   15G  0 lvm  /root/LVM-Data1
└─sda2                         8:2    0   10G  0 part
  └─new_vol_group-new_vol 253:2    0   15G  0 lvm  /root/LVM-Data1
sdb                            8:16   0   20G  0 disk
├─sdb1                         8:17   0  200M  0 part /boot/efi
├─sdb2                         8:18   0  500M  0 part /boot
└─sdb3                         8:19   0 19.3G  0 part
  ├─rhel-swap                253:0    0    2G  0 lvm  [SWAP]
  └─rhel-root                253:1    0 17.3G  0 lvm  /
[root@host ~]# clear
[root@host ~]# lsblk
NAME                         MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda                            8:0    0 279.4G  0 disk
├─sda1                         8:1    0   10G  0 part
│ └─new_vol_group-new_vol 253:2    0   15G  0 lvm  /root/LVM-Data1
└─sda2                         8:2    0   10G  0 part
  └─new_vol_group-new_vol 253:2    0   15G  0 lvm  /root/LVM-Data1
sdb                            8:16   0   20G  0 disk
├─sdb1                         8:17   0  200M  0 part /boot/efi
├─sdb2                         8:18   0  500M  0 part /boot
└─sdb3                         8:19   0 19.3G  0 part
  ├─rhel-swap                253:0    0    2G  0 lvm  [SWAP]
  └─rhel-root                253:1    0 17.3G  0 lvm  /
[root@host ~]# df -h
Filesystem                         Size  Used Avail Use% Mounted on
/dev/mapper/rhel-root               18G  3.2G   15G  19% /
devtmpfs                            16G     0   16G   0% /dev
tmpfs                               16G   96K   16G   1% /dev/shm
tmpfs                               16G  9.7M   16G   1% /run
tmpfs                               16G     0   16G   0% /sys/fs/cgroup
/dev/sdb2                          497M  154M  343M  31% /boot
/dev/sdb1                          200M  9.5M  191M   5% /boot/efi
/dev/mapper/new_vol_group-new_vol   15G   41M   14G   1% /root/LVM-Data1
tmpfs                              3.2G   20K  3.2G   1% /run/user/1002
tmpfs                              3.2G     0  3.2G   0% /run/user/0
[root@host ~]# vgs
  VG            #PV #LV #SN Attr   VSize   VFree
  new_vol_group   2   1   0 wz--n- 19.99g   4.99g
  rhel            1   2   0 wz--n- 19.31g  40.00m
[root@host ~]# lvs
  LV      VG            Attr       LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  new_vol new_vol_group -wi-ao---- 15.00g
  root    rhel          -wi-ao---- 17.27g
  swap    rhel          -wi-ao----  2.00g
[root@host ~]# pvdisplay
  --- Physical volume ---
  PV Name               /dev/sda1
  VG Name               new_vol_group
  PV Size               10.00 GiB / not usable 4.00 MiB
  Allocatable           yes (but full)
  PE Size               4.00 MiB
  Total PE              2559
  Free PE               0
  Allocated PE          2559
  PV UUID               qPpFOy-xQwM-ptbX-2qvj-mwwT-GrXI-Cjtwyv

  --- Physical volume ---
  PV Name               /dev/sda2
  VG Name               new_vol_group
  PV Size               10.00 GiB / not usable 4.00 MiB
  Allocatable           yes
  PE Size               4.00 MiB
  Total PE              2559
  Free PE               1278
  Allocated PE          1281
  PV UUID               d0q15u-yrow-iBUL-ceZ6-51wT-DWXs-6hfrwt

  --- Physical volume ---
  PV Name               /dev/sdb3
  VG Name               rhel
  PV Size               19.31 GiB / not usable 2.00 MiB
  Allocatable           yes
  PE Size               4.00 MiB
  Total PE              4944
  Free PE               10
  Allocated PE          4934
  PV UUID               IGTRZY-eGWA-Pidb-TI4K-UOtF-BZ40-42Ahr9

[root@host ~]# 
```

1.4.8 Plan Script: RHEL-7.3-manage-services

This script enable the SELINUX service which supports access control security policies and also does the server hardening like enabling the ssh service and disabling the firewall service so, that the network can be access through the external network. It also gives option to user either to enable or disable the SSH.

Attributes:

SSH (Option)

> This attribute is an option either to enable or disable the SSH service of the server.

1.4.9 Plan Script: RHEL-7.3-unmount

Script sets up **rc.local** file and removes the temporary directory created during mount.

Unmounts the root partition.

1.5 Procedure for creating a Linux Golden Image

The following process explains how to create an RHEL 7.3 golden image using HPE Synergy Image Streamer.

1. Ensure that you have access to RHEL 7.3 ISO installation file containing iSCSI device drivers.

2. Create a server profile with "HPE - Foundation 1.0 - create empty OS Volume" as OS Deployment plan and any available server hardware. Set an appropriate value for volume size in MiB units. The HPE Synergy Server will be configured for access to this empty OS Volume.

3. Launch iLO Integrated Remote Console of this server and set RHEL 7.3 ISO file as virtual CD-ROM/DVD image file. Power on the server.

4. RHEL installation starts and RHEL installer detects the configured empty OS Volume as an iSCSI disk device. Select this iSCSI disk device as the target for RHEL installation.

5. Follow onscreen instructions and complete the RHEL installation.

6. Power off the server.

7. Navigate to HPE Synergy Image Streamer -> Golden Images and Click 'Create Golden image'

8. Select the OS volume corresponding to the server profile created for empty OS volume and choose "RHEL-7.3-generalize" as the capture build plan.

9. HPE Synergy Image Streamer generalizes and captures RHEL image and adds it as a golden image.