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Technical Documentation

# **HPE Synergy Image Streamer Artifact Bundle for SLES 15**

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# Table of contents

<b>1 HPE Synergy Image Streamer Artifact Bundle for SLES 15 .....</b>	<b>4</b>
1.1 Introduction .....	4
1.2 Prerequisite .....	4
1.2.1 Filesystem.....	4
1.2.2 Logical Volume Management (LVM).....	4
1.2.3 Adding Multiple NIC's.....	4
1.2.4 Adding the user.....	4
1.2.5 Build Plan: HPE-SLES15-EFI-MultiNIC .....	5
1.2.6 Build Plan: HPE-SLES15-EFI-BONDING .....	6
1.3 Plan Scripts .....	7
1.3.1 Plan Script: HPE-SLES15-EFI-mount.....	7
1.3.2 Plan Script: HPE-SLES15-EFI-configure-multiple-NICs.....	7
1.3.3 Plan Script: HPE-SLES15-EFI-configure-bonding .....	8
1.3.4 Plan Script: HPE-SLES15-EFI-ibftBonding.....	9
1.3.5 Plan Script: HPE-SLES15-EFI-configure-hostname .....	10
1.3.6 Plan Script: HPE-SLES15-EFI-configure-users .....	10
1.3.7 Plan Script: HPE-SLES15-EFI-LVM .....	11
1.3.8 Plan Script: HPE-SLES15-EFI-manage-ssh-service.....	13
1.3.9 Plan Script: HPE-SLES15-EFI-unmount .....	13
1.4 Procedure for creating a SLES 15 Golden Image .....	13

# 1 HPE Synergy Image Streamer Artifact Bundle for SLES 15

## 1.1 Introduction

HPE Synergy Image Streamer Artifact Bundle for SLES 15 includes artifacts that are helpful to personalize the SLES 15 OS.

## 1.2 Prerequisite

### 1.2.1 Filesystem

The filesystem of SLES 15 image should be XFS, ext3, ext4.

As we are using EFI partition (/boot/efi/) to execute the scripts we assume that root partition (/) is mounted on /dev/sda1 (Which is the EFI partition). If the root partition is not on the mentioned device the user has to edit HPE-SLES15-EFI-Mount Plan Script.

### 1.2.2 Logical Volume Management (LVM)

User must ensure that disk is in a clean state – there are no existing logical volumes and disk partitions.

User must add a local drive for LVM type partitioning. While creating the server profile, user must edit **Integrated storage controller mode** option of local storage to add a local drive for the server. Only two partitions are created.

### 1.2.3 Adding Multiple NIC's

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

### 1.2.4 Adding the user

The user can add one or more linux 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 users. User can change password after first login to the host.

## Build Plans

### 1.2.5 Build Plan: HPE-SLES15-EFI-MultiNIC

This Build Plan personalizes the SLES 15 server by creating new users, configuring network parameters, updating the hostname, creating partition on the disk, server hardening and changing the root password as per user parameters.

Steps: Plan Script Names	Attributes
HPE-SLES15-EFI-mount	
HPE-SLES15-EFI-wrapper	Wrapper script
HPE-SLES15-EFI-configure-multiple-NICs	MgmtNIC1(NIC) MgmtNIC2(NIC) MgmtNIC3(NIC) MgmtNIC4(NIC) TotalMgmtNICs(Option)
HPE-SLES15-EFI-configure-hostname	DomainName(FQDN) Gateway(String)
HPE-SLES15-EFI-configure-users	NewRootPassword(Password) NewUserName(String) NewUserPassword(Password)
HPE-SLES15-EFI-LVM	DiskName(String) FirstPartitionSize(Number) LogicalVolumeGroupName(String) LogicalVolumeName(String) LogicalVolumeSize(Number)

	SecondPartitionSize(Number)
HPE-SLES15-EFI-manage-ssh-service	SSH(Optional)
HPE-SLES15-EFI-unmount	

## 1.2.6 Build Plan: HPE-SLES15-EFI-BONDING

This Build Plan personalizes the SLES 12 server by creating new users, configuring network parameters, updating the hostname, creating partition on the disk, server hardening and changing the root password as per user parameters.

Steps: Plan Script Names	Attributes
HPE-SLES15-EFI-mount	
HPE-SLES15-EFI-configure-bonding	Bond0NIC1(NIC) Bond0NIC2(NIC) Bond1NIC1(NIC) Bond1NIC2 (NIC) FirstNicBondName SecondNicBondName TotalNicbondings(Optional)

HPE-SLES15-EFI-ibftBonding	Creates ibftTeam
HPE-SLES15-EFI-configure-hostname	DomainName(FQDN)  Gateway(String)
HPE-SLES15-EFI-configure-users	NewRootPassword(Password)  NewUserName(String)  NewUserPassword(Password)
HPE-SLES15-EFI-LVM	DiskName(String)  FirstPartitionSize(Number)  LogicalVolumeGroupName(String)  LogicalVolumeName(String)  LogicalVolumeSize(Number)  SecondPartitionSize(Number)
HPE-SLES15-EFI-manage-ssh-service	SSH(Optional)
HPE-SLES15-EFI-unmount	

## 1.3 Plan Scripts

### 1.3.1 Plan Script: HPE-SLES15-EFI-mount

This Plan Script lists all mount partitions and mounts the /boot/efi partition of the image.

### 1.3.2 Plan Script: HPE-SLES15-EFI-configure-multiple-NICs

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

Attributes:

MgmtNIC1 (NIC)

This attribute is of type NIC and has the following three sub-attributes:

- MgmtNIC1.gateway
- MgmtNIC1.ipaddress
- MgmtNIC1.mac
- MgmtNIC1.netmask

These sub-attributes are used to edit the network file of the first NIC in SLES 12.

MgmtNIC2 (NIC)

This attribute is of type NIC and has the following three sub-attributes:

- MgmtNIC2.gateway
- MgmtNIC2.ipaddress
- MgmtNIC2.mac
- MgmtNIC2.netmask

These sub-attributes are used to edit the network file of the second NIC in SLES 12.

MgmtNIC3 (NIC)

This attribute is of type NIC and has the following three sub-attributes:

- MgmtNIC3.gateway
- MgmtNIC3.ipaddress
- MgmtNIC3.mac
- MgmtNIC3.netmask

These sub-attributes are used to edit the network file of the third NIC in SLES 12.

MgmtNIC4 (NIC)

This attribute is of type NIC and has the following three sub-attributes:

- MgmtNIC4.gateway
- MgmtNIC4.ipaddress
- MgmtNIC4.mac
- MgmtNIC4.netmask

These sub-attributes are used to edit the network file of the fourth NIC in SLES 12.

TotalMgmtNICs (Option)

This attribute is of type option where the user has to select the number of NICs to be configured.

### 1.3.3 Plan Script: SLES-15- configure-bonding

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



Attributes:

FirstNicBondName (String)

User can specify the name for first NIC bonding.

SecondNicBondName (String)

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

Bond0NIC1 (NIC)

This attribute is of type NIC which has three sub attribute

- Bond0NIC1.gateway,
- Bond0NIC1.ipaddress
- Bond0NIC1.mac
- Bond0NIC1.netmask

All these attributes are used for network Bonding Bond0NIC1 and Bond0NIC2 as static or dhcp.

Bond0NIC2 (NIC)

This attribute is of type NIC which has three sub attribute

- Bond0NIC2.gateway,
- Bond0NIC2.ipaddress
- Bond0NIC2.mac
- Bond0NIC2.netmask

All these attributes are used for network Bonding Bond0NIC1 and Bond0NIC2 as static or dhcp.

Bond1NIC1

This attribute is of type NIC which has three sub attribute

- Bond1NIC3.gateway,
- Bond1NIC3.ipaddress
- Bond1NIC3.mac
- Bond1NIC3.netmask

All these attributes are used for network Bonding Bond1NIC1 and Bond1NIC2 as static or dhcp.

Bond1NIC2

This attribute is of type NIC which has three sub attribute

- Bond1NIC3.gateway,
- Bond1NIC3.ipaddress
- Bond1NIC3.mac
- Bond1NIC3.netmask

All these attributes are used for network bonding Bond1NIC1 and Bond1NIC2 as static or dhcp.

TotalNicBondings (Option)

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

### 1.3.4 Plan Script: HPE- SLES15-EFI-ibftBonding

This script creates bonding of two deployment connection ibft0 and ibft1 and creates a bonding interface ibftTeam. We create a Systemd service "ibft.service" so that the deployment bonding persist across reboots.

### 1.3.5 Plan Script: HPE-SLES15-EFI- configure-hostname

This script assigns the hostname given by user, adds the alias in /etc/hosts file with respect to the interface name present in the /tmp/interface\_names file and also add the default gateway so that the host is accessible from the outside world. The script for updating hosts is added in **after.local** file which is present in /etc/init.d folder.

This planscript has to be added after build step SLES-12-configure-multiple-NICs in the build plan.

Custom Attributes:

DomainName (FQDN)

Fully qualified domain name with which the host should be configured.

Gateway (String)

IP address of the gateway to be configured on the server

### 1.3.6 Plan Script: HPE-SLES15-EFI-configure-users

Changes the root password and adds new users with the input given by the user while creating the server profile. This script is added to the **after.local** file to execute the operations. Script takes new root password and new user details as parameters.

Custom Attributes:

NewRootPassword (Password)

Root password of the server

NewUserName (String)

User accounts to be created in the server. Multiple user name can also be specified by either comma separated or semicolon separated values

NewUserPassword (Password)

Password for the newly created user accounts. Same password is assigned to all the user accounts. The password can be changed after user's first login to the host.

### 1.3.7 Plan Script: HPE-SLES15-EFI-LVM

Partitions the newly added disk (example /dev/sda) into 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 must add a local disk while creating server profile. User must ensure that there are no prior LVs and disk partitions existing in the disk.

Attributes:

DiskName (String)

Name of the disk to be partitioned ( for eg., /dev/sda )

FirstPartitionSize (Number)

Size of the first partition in GiB units

LogicalVolumeGroupName (String)

Name of the logical volume group to be created on the disk.

LogicalVolumeName (String)

Name of the logical volume

LogicalVolumeSize (Number)

Size of the logical volume in GiB units

SecondPartitionSize (Number)

Size of the second partition in GiB units.

#### 1.3.6.1 Sample test screenshot:

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

```
myhost:~ # 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 254:0      0   15G  0 lvm  /root/LVM-Data1
├─sda2                             8:2      0   10G  0 part
│   └─new_vol_group-new_vol 254:0      0   15G  0 lvm  /root/LVM-Data1
└─sdb                               8:16     0   20G  0 disk
    ├─sdb1                         8:17     0   156M  0 part /boot/efi
    ├─sdb2                         8:18     0    2G  0 part [SWAP]
    └─sdb3                         8:19     0   17.9G  0 part /
loop0                             7:0      0  100G  0 loop
└─docker-8:19-141747-pool 254:1      0  100G  0 dm
loop1                             7:1      0    2G  0 loop
└─docker-8:19-141747-pool 254:1      0  100G  0 dm

myhost:~ # df -h
Filesystem                Size  Used Avail Use% Mounted on
/dev/sdb3                  18G   3.2G   14G  20% /
devtmpfs                   32G   4.0K   32G   1% /dev
tmpfs                      32G   88K   32G   1% /dev/shm
tmpfs                      32G   11M   32G   1% /run
tmpfs                      32G    0   32G   0% /sys/fs/cgroup
/dev/sdb1                  156M   4.8M  152M   4% /boot/efi
/dev/mapper/new_vol_group-new_vol 15G   38M   14G   1% /root/LVM-Data1

myhost:~ # vgs
  VG          #PV #LV #SN Attr   VSize  VFree
  new_vol_group    2  1  0 wz--n- 18.99g 3.99g

myhost:~ # lvs
  LV          VG          Attr   LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  new_vol_group new_vol_group -wi-ao---- 15.00g

myhost:~ # 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               ITI6i8-oGAF-ps4I-WSDn-nf6R-Ee12-yRpBxZ

--- Physical volume ---
PV Name               /dev/sda2
VG Name               new_vol_group
PV Size               9.00 GiB / not usable 4.00 MiB
Allocatable           yes
PE Size               4.00 MiB
Total PE              2303
Free PE              1022
Allocated PE          1281
PV UUID               Y01EQs-Z70c-eM9G-cEtj-D9p4-Lour-RRBToa
```

### 1.3.8 Plan Script: HPE-SLES15-EFI-manage-ssh-service

The script performs server hardening like disabling the **ssh** service and disabling the firewall service. It also provides an option to user either to enable or disable the SSH.

Attributes:

SSH (Option)

Enable or disable the SSH service on the server.

### 1.3.9 Plan Script: HPE-SLES15-EFI-unmount

This script sets up **after.local** file. It removes the temporary directory created during mount and unmounts the root partition.

## 1.4 Procedure for creating a SLES 15 Golden Image

1. Ensure that you have access to SLES 12 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 Synergy Server will be configured for access to this empty OS Volume.
3. Launch iLO Integrated Remote Console of this server and set SLES15 ISO file as virtual CD-ROM/DVD image file. Power on the server.
4. When the Grub Screen appears edit the install linux line by pressing 'e' and add ip=ibft or rd.iscsi.ibft=1 to the end of the line which starts with 'kernel'
5. SLES installation starts and SLES installer detects the configured empty OS Volume as an iSCSI disk device. Select this iSCSI disk device as the target for SLES installation.
6. Follow onscreen instructions and complete the SLES installation.
7. After the OS boots up Create the following directories
  - `mkdir -p /boot/efi/EFI/HPE/isdeploy`
  - `mkdir -p /boot/efi/EFI/HPE/isdeploy/{scripts,tmp,data}`
8. To make personalization work a systemd process needs to be created which will call the wrapper script. Please follow below steps for creating a systemd process
  - `cd /etc/systemd/system/`
  - `vi personalization.service` (add Below line in this file save and exit)

```
[Unit]
Description=Personalization
After=network-online.target

[Service]
Type=oneshot
RemainAfterExit=yes
```

```
WorkingDirectory=/boot/efi/EFI/HPE/isdeploy/  
ExecStart=/bin/bash HPE-ImageStreamer.bash  
  
[Install]  
WantedBy=multi-user.target
```

9. Power off the server.
10. Enable the service "systemctl enable personalization.service"
11. Navigate to ImageStreamer -> Golden Images and Click 'Create Golden image'
12. Select the OS volume corresponding to the server profile created for empty OS volume and choose "SLES-12-generalize" as the capture build plan.
13. ImageStreamer generalizes and captures SLES image and adds it as a golden image.