



Hewlett Packard
Enterprise

HPE Synergy

Image Streamer POC Cookbook

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About this document

Abstract

This document outlines a recipe/process for executing a customer proof-of-concept (POC) with the HPE Synergy Image Streamer product.

Audience

This whitepaper is created for Hewlett Packard Enterprise Solution Architects leading an Image Streamer POC and customers evaluating this new capability.

Note to the reader

The reader should be familiar with HPE Synergy architecture and the HPE Synergy Composer powered by HPE OneView. Concepts explained in this document assume the reader possesses basic knowledge of HPE Synergy hardware, HPE OneView, and Image Streamer components.

For additional information on the HPE Synergy solution, please go to the [HPE Synergy](#) website.

For additional information on HPE OneView, please go to the [HPE OneView](#) website.

GitHub Image Streamer

Recommended Image Streamer documents:

- Image Streamer Primer
- Image Streamer Technical Overview Webinars/Presentations
- Image Streamer Users Guide
- Image Streamer Installation Guide
- Image Streamer POC Use Case Guides
- OV4VC 8.2 Installation and User Guides

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HPE Synergy POC Planning

A successful proof of concept evaluation must be carefully scoped, planned, and executed on a mutually agreed timeline. The process starts with a POC kick-off meeting to establish:

- Customer POC objectives – why are we doing this POC, what problem does it solve?
- Review the POC details and prerequisites – HPE lead discussion
 - POC hardware overview
 - POC setup overview including image streamer
 - Review POC use cases
 - Customer prerequisites
 - POC Technical Support
- POC Team – Customer and Hewlett Packard Enterprise. The POC may require customer IT staff from facilities, networking and server administration staff. Clearly document who will be part of the POC and key responsibilities. Please refer to the Appendix A POC plan form for assigning key responsibility tasks.
- Scope – define what is in and out of scope for this POC. Examples include OS platforms, evaluation requirements beyond the standard POC use cases.
- Timeline – key milestone dates including starting and ending the POC
 - POC Hardware ship/delivery dates
 - Customer prerequisite setup
 - Facilities rack/power
 - Networking
 - Target POC shutdown and demo equipment return – HPE lead
 - Customer POC online survey and feedback
- The completed POC Plan form (Appendix A) should be mailed to all kick-off participants after the session.

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Image Streamer Requirements

This section details the physical infrastructure and software required for the Image Streamer POC.

POC Hardware Requirements

Standard Synergy POC hardware includes:

Qty	Standard HPE Synergy POC Bill of Materials (BOM)
1	HPE Synergy 12000 Frame
6	Platinum hot-plug power supplies and C19 power cords
10	Hot-plug variable speed fans
1	HPE Synergy composer (HPE OneView appliance)
1	Synergy Image Streamer appliance
2	Synergy Frame Link Modules
2	Virtual Connect SE 40Gb F8 Module for Synergy
2-4	SY480, SY660, SY680 HPE Synergy compute nodes – varies by customer requirements
2+	Ethernet/Fibre-Channel uplink transceivers and cables for Ethernet/FC uplinks – varies by customer requirements (see follow page for options)
1	HPE QSFP to SFP+ adapter 720193-B21
1	HPE 10GbaseT SFP+ transceiver 813874-B21
4	6' CAT6A Cable 861412-B21
2	HPE c-Class 40G QSFP+ to QSFP+ 1m DAC Cable 720196-B21
Opt	HPE Synergy D3940 Composable Storage module and P542D mezz cards
Opt	HPE Synergy VC SE 16 Gb Module for Synergy and 3830C 16Gb HBAs

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POC Uplink Transceivers and Cables

It is important to discuss the customer switch infrastructure and specify the appropriate transceivers and cables for the POC.

Option 1: 40Gb Ethernet uplink trunks to HPE Networking switch:

- Qty 2: 40G QSFP+ to QSFP+ 3m DAC cable 720199-B21

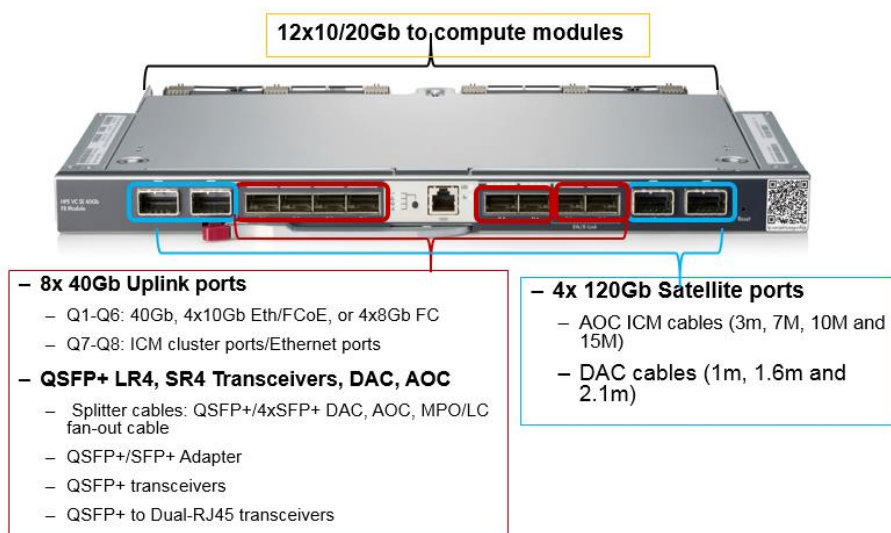
Option 2: 10Gb Ethernet uplink trunks to TOR switch, 8Gb uplink to Edge FC Switch:

- Qty 4: QSFP+ to SFP+ Adapter 720193-B21
- Qty 2: SFP+ transceiver 455883-B21 (Ethernet Trunk)
- Qty 2: 8Gb FC SFP+ AJ718A (FC) OR Qty 2 455883-B21 (FCoE)
- Qty 4: OM3 5M LC-LC fiber cables AJ836A

NOTE: Uplink switch transceivers (Ethernet and FC) will be provided by the customer

Customer requires 16Gb Fibre-Channel – use HPE VC SE 16Gb FC Module for Synergy

Master Module



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POC Software Requirements

Hewlett Packard Enterprise will provide HPE Synergy firmware, NFR licenses, and Image Streamer POC artifact bundles.

Customer Premise Requirements

The following section summarizes the customer premise requirements for a Synergy POC:

- A standard EIA rack with 10RU available for the HPE Synergy 12000 frame
- 220v single-phase rack PDU with minimum three C19 outlets, recommendation: 6 C19 outlets
- Minimum one 10/40Gb QSFP/SFP+ uplink ports to Top-of-rack (TOR) access Ethernet switch (trunk), recommendation: two uplinks
- Minimum one 1/10Gb CAT6 uplink ports to TOR Ethernet switch (out of band management network), recommendation: two uplinks
- HPE Synergy management IPv4 VLAN and address pool – 15 address range
- HPE Synergy image streamer IPv4 deployment VLAN and address pool – 15 address range
- KVM console/crash cart for Synergy first-time setup, optionally use laptop
- Synergy uplink customer access/edge switch transceivers
- DHCP service on the Synergy management network IF OneView address pools is not used
- Hewlett Packard Enterprise recommends installing Synergy POC into the lower portion of the rack, hosted in a raised floor lab/datacenter facility with HVAC cooling.

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Image Streamer POC Installation Overview

This section summarizes the HPE Synergy POC installation/setup.

1. Synergy 12000 rack installation and power up
2. Synergy Ethernet/SAN switch port configuration and uplinks
3. Image Streamer, Cable Frame-Link Module 2 to Synergy F8 40Gb master module
4. Insert Image Streamer appliance
5. HPE Synergy discovery and first time setup
6. Create IPV4 address range for HPE Synergy management and a separate address range for deployment network
7. Create management network and associate it to management address pool
8. Create deployment network and associate it to deployment address pool
9. Create additional Ethernet and FC network as applicable
10. Add SAN manager (if applicable)
11. Add Storage Systems (if applicable)
12. Add/upgrade using recommended firmware bundle
13. Add image streamer deployment server in the composer
14. Create LIG with networks, shared uplinks, and image streamer network/uplink
15. Create EG with deployment network as external (non-production setup)
16. Create LE with new Image Streamer enabled EG

Post installation steps (covered in the Image Streamer POC use case guide):

1. Import POC artifact bundle(s)
2. Import POC provided gold image(s)
3. Complete the use cases in the guide

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Image Streamer Key Features

This section highlights the key features of Synergy Image Streamer. During the POC, it is important to discuss each of these features with your customer and demonstrate the benefits.

- Designed for scale-out server environments
- A full-feature framework for creating/maintaining gold OS images
- Supports VMware and Linux platforms
- Supports custom attributes for server personalization
- High-availability architecture for management and network boot
- Automated image streamer repository replication across the management domain
- No local boot drives, CAPEX/OPEX savings compared to legacy environments
- Deploy operating systems in minutes not hours => activation replaces OS scripted installations
- Significantly reduces OS maintenance/patch management
- Built to support rolling upgrades in cluster environments
- An image is more than the operating system, it can contain the entire stack of system software and application. Example includes web server golden image with Linux operating system, system utilities, and Apache web service.

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POC Installation/Setup Procedure

This document assumes image streamer will be configured as part of a *new* POC installation.

Image Streamer can be added to an existing Synergy demo/POC environment however, it is a disruptive upgrade process. A summary of the upgrade steps are summarized below:

1. Power down any compute nodes with server profiles
2. Unassigned server profiles
3. Add deployment server in HPE OneView after discovery
4. Delete the logical enclosure (LE)
5. Add image streamer address pool and networks
6. Edit Logical Enclosure Group (LIG) template – add image streamer uplink and deployment network
7. Edit Enclosure Group (EG) template – add image streamer as EXTERNAL (POC)
8. Create a new logical enclosure (LE)

NOTE: The following procedure assumes a new HPE Synergy POC installation including Image Streamer.

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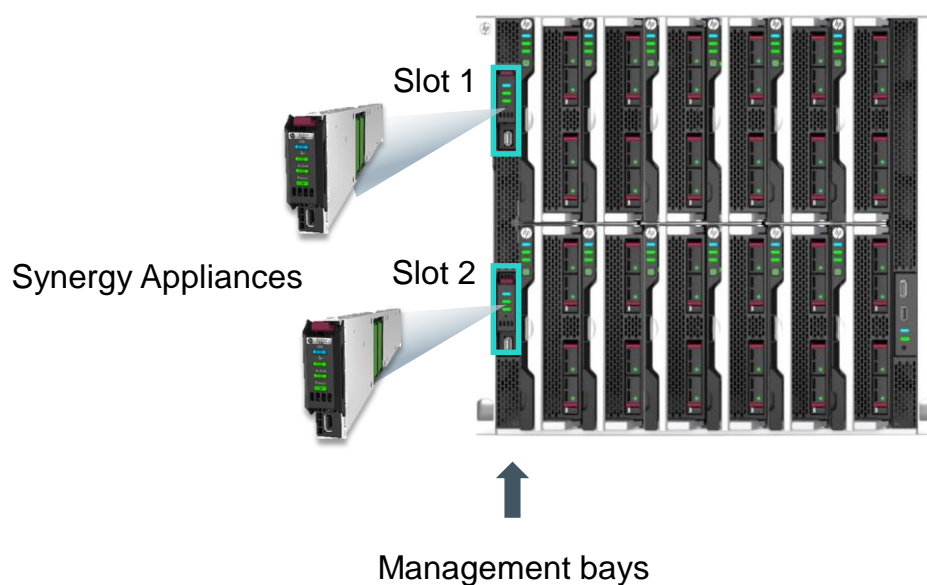
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Step 1: Insert the Image Streamer



Image Streamer Hardware Specs: 32GB RAM, 800 GB SDD, Intel Xeon Processor E3-1268L v3 (4 Core, 8M Cache, 2.3 GHz, ECC, VT-x, VT-d, Turbo Boost)

Insert Image Streamer appliance into appliance slot 2 on the front of the frame.



It takes approximately 20 minutes to boot the appliance after insertion and be discovered in HPE OneView. The Image Streamer appliance is ready when it's visible in the add deployment server pulldown field from HPE OneView.

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Step 2: Physical Cabling including Image Streamer

1. Connect the provided C19-C20 power cords from the power supplies to the rack PDU outlets
2. Connect two RJ45 Cat6 cables from FLM-1 and FLM-2 MGMT ports to the management uplink ports on the Top of Rack (TOR) switch. 1Gb or 10Gb uplinks are supported for the management uplinks.
3. Connect one RJ45 Cat6 cable from the LINK port on FLM-1 to LINK port on FLM-2.
4. If the out of band management network is cabled correctly, the front display port health status LED and rear Frame Link Module health status should be green.

Typical POC configurations use the following uplinks. This configuration is not mandated, it is recommended to standardize the POC environments.

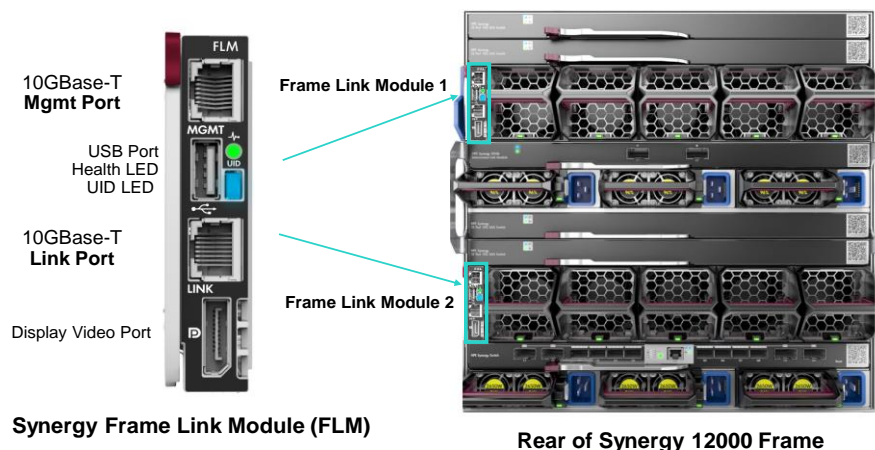
- Q1 (or Q1:1) Ethernet shared uplink(s). on Bay 3 and 6 MLAG active/active – some customers may want to add additional uplink ports to the MLAG uplinks. If so please use QSFP ports Q3 and Q4. Recommendation: use Q1 (40Gb) or Q1:1 (10Gb) for Bays 3 & 6 for support consistency.
- Q2:1 Image Streamer POC deployment uplink. Production configuration requires full redundancy with two uplinks per Synergy F8 module. For Beta a single uplink can be used. Recommend using Bay 3 Q2:1 for support consistency.
- Q5:1 Storage fabric uplink(s). Fibre-Channel or FCoE uplinks to customer storage fabric.
- Q6 & Q7 Synergy 40Gb F8 Master Module IRF connection (DAC cables provided)

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Cable the POC Image Streamer Uplink

- Using the provided cable, transceiver, and QSFP/SFP+ carrier connect FLM-2 Mgmt port to the selected Synergy 40 F8 master module QSFP port in Bay 3 (i.e. Q2:1).



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Step 3: Image Streamer Address Pool / Network Setup

Image Streamer setup requires two networks and an address range for each. The following section details the steps required.

Step 3a: Create Synergy MGMT and DEPLOY address pools

The Image Streamer cluster requires an address range to assign the cluster virtual IP (VIP), Image Streamer appliance maintenance, and storage cluster nodes. For an Image Streamer POC configuration, a minimum 6 IPV4 addresses are required in this address range.

Subnet ID	Subnet Mask	Gateway	Domain	DNS Servers			
192.168.20.0	255.255.255.0	192.168.20.1	mgmt.hpe.local	192.168.20.2			
▼ Address Ranges		Available addresses 58					
Name	Enabled	Start	End	Count	Allocated	Available	
Mgmt	<input checked="" type="checkbox"/>	192.168.20.30	192.168.20.99	70	12	58	 

NOTE: A single IPv4 management address range can be leveraged for both Synergy ICM/ILO management and Image Streamer. For single frame Beta configurations the formula for calculating the size of the address pool is: 1 for each compute node ILO, + 2 for Master modules + 6 for Image Streamer. An address range cannot be expanded once it's in use.

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1. Click Settings from the OneView main menu
2. Click Addresses and Identifiers and click the Edit link
3. Click the **Add IPv4 subnet and address range** icon

Edit Addresses and Identifiers IPv4 Subnets and Address Ranges ?

IPv4 Subnets and Address Ranges

Subnet ID	Subnet Mask	Gateway	Domain	DNS Servers
No subnets have been defined				

[Add IPv4 subnet and address range](#)

MAC Addresses

☒ Enable Virtual

Type	Enabled	Start	End	Count	Allocated	Remaining
Generated	<input checked="" type="checkbox"/>	32:44:21:70:00:00	32:44:21:7F:FF:FF	1048576	0	1048576 X
Total				1048576	0	1048576

[Add auto-generated](#) [Add custom range](#)

World Wide Names

☒ Enable Virtual

[OK](#) [Cancel](#)

4. Enter a valid subnet ID, subnet mask, and gateway for the Synergy management network

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Add IPv4 subnet and address range
?

Subnet

Subnet ID
192.168.20.0

Subnet mask
255.255.255.0

Gateway
192.168.20.1

Domain
mgmt.hp.local

DNS
optional

DNS
optional

DNS
optional

Address Ranges

Add address range

Add
Add +
Cancel

4. Click **Add address range** icon

Add Address Range
?

Address Range

Name
is3-mgmt-range

First IP address
192.168.20.25

Last IP address
192.168.20.30



Add
Add +
Cancel

5. Provide a name for the range and an IPv4 address range. Click the **Add** icon to close the address range then click the **Add** icon again on the Edit Addresses window.

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6. Add a second IPv4 Address Range for iSCSI Deployment Network

10.99.10.0	255.255.255.0	10.99.10.1	deploy.hpe.local	none			
▼ Address Ranges		Available addresses 46					
Name	Enabled	Start	End	Count	Allocated	Available	
Deploy	<input checked="" type="checkbox"/>	10.99.10.101	10.99.10.150	50	4	46	 

7. Click Add IPv4 subnet and address range to create a second address pool. This 2nd address range is for the iSCSI boot network (aka DEPLOY).

Edit Addresses and Identifiers
IPv4 Subnets and Address Ranges
?

IPv4 Subnets and Address Ranges

Subnet ID	Subnet Mask	Gateway	Domain	DNS Servers		
192.168.20.0	255.255.255.0	192.168.20.1	mgmt.hp.local	none		

▼ Address Ranges
Available addresses 6

Name	Enabled	Start	End	Count	Allocated	Available		
is3-mgmt-range	<input checked="" type="checkbox"/>	192.168.20.25	192.168.20.30	6	0	6		

Add IPv4 subnet and address range

MAC Addresses

☒ Enable Virtual

Type	Enabled	Start	End	Count	Allocated	Remaining	
Generated	<input checked="" type="checkbox"/>	32:44:21:70:00:00	32:44:21:7F:FF:FF	1048576	0	1048576	
Total				1048576	0	1048576	

Add auto-generated

Add custom range

OK

Cancel

7. Specify the subnet parameters gateway, domain, and optional DNS.

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Edit 10.99.10.0
?

Subnet

Subnet ID
10.99.10.0

Subnet mask
255.255.255.0

Gateway

Domain

DNS
optional

optional

optional


Address Ranges

Name	Start	End	
Deploy	10.99.10.101	10.99.10.150	

Add address range

Update

Cancel

8. Once the subnet and address range is defined, click the  icon twice to close the windows and add the 2nd address pool for the Deploy network.

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Step 3b: Create MGMT and DEPLOY Networks

NOTE: Ensure all Ethernet, Storage, and Image Streamer networks are created before creating the Logical Interconnect Groups.

With two address pools created, the next step is to create a MGMT and DEPLOY networks in OneView and associate each to the address ranges.

1. From the OneView main menu, click Networks, then the **+ Create Network** icon
2. Create the DEPLOY network, associate it to the address range, ensure the Purpose is Management. Since the boot network is dedicated select preferred network bandwidth at 10Gb.
3. Change the purpose to iSCSI
4. Change the preferred and maximum bandwidth to 10 Gbs.

5. Click the **Create+** icon

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6. Enter the name MGMT for the management network

Create Network ?

Name

MGMT

Type

☒ Ethernet
 ☐ Fibre Channel
 ☐ FCoE

VLAN

Tagged

VLAN ID

1101

Associate with subnet ID

192.168.20.0

Purpose

Management

Preferred bandwidth


2

Gb/s

Maximum bandwidth

2

Gb/s


 Changed: Maximum bandwidth to "2"

Create

Create +

Cancel

7. Associate this network to an address range previously defined
8. Change the purpose to Management
9. Change the preferred / maximum bandwidth or leave default
10. Click the **Create** icon

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Step 4: Add Image Streamer Deployment Server

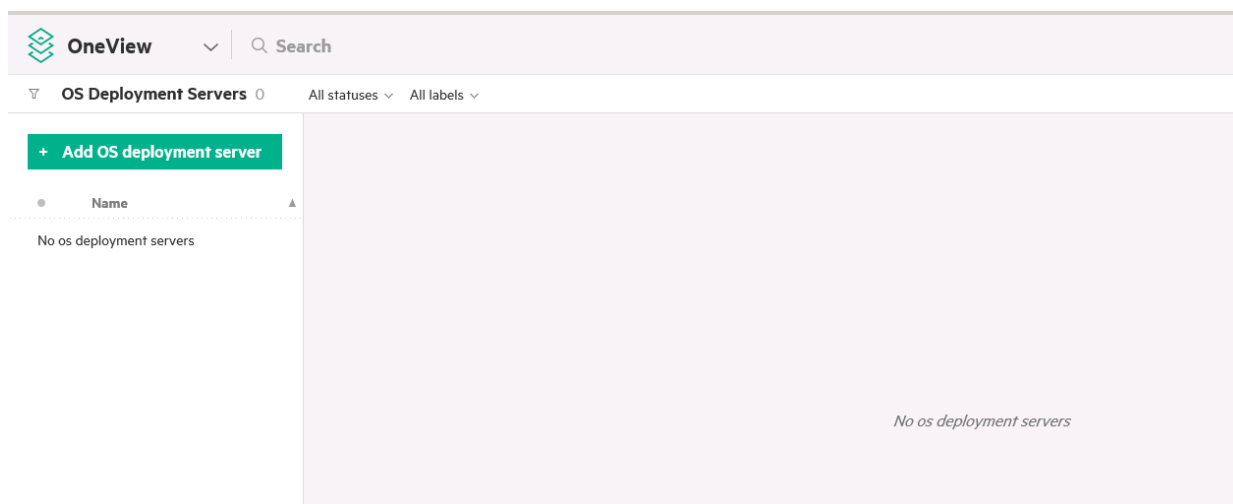
Two address pools have been created with two OneView networks (MGMT and DEPLOY). From the OneView main menu Click Add OS Deployment Server, choose the OS Deployment Servers

OneView ▼					
GENERAL	SERVICES	NETWORKING	STORAGE	FACILITIES	
Dashboard	Server Profiles	Networks	Volumes	Data Centers	Settings
Activity	Server Profile Templates	Network Sets	Volume Templates	Racks	Users and Groups
Firmware Bundles	Enclosure Groups	Logical Interconnect Groups	Storage Pools	Power Delivery Devices	Hardware Setup
Reports	Logical Enclosures	Logical Interconnects	Storage Systems	Unmanaged Devices	OS Deployment Servers
	Enclosures	Interconnects	SANs		
	Server Hardware		SAN Managers		
	Server Hardware Types		Drive Enclosures		

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From the OS Deployment Server page, click the **+ Add OS Deployment server** icon.



1. Provide a deployment server name and description.
2. The discovered deployment appliance should be pre-populated in the deployment appliance field. If the appliance is not shown, please refresh the Synergy frame from the Enclosures screen Action pulldown. The appliance will not be discovered until it is fully booted, approximately 15 minutes after power up.

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3. Choose the MGMT network address pool
4. Click the **Add** icon.

Add OS deployment server ?

General

Name: OSDS1

Description: I3S deployment server for Beta evaluation

Type: Image Streamer

Management Settings

Deployment appliance: CN75160600, appliance 1

Management network: MGMT

It is strongly recommended to select a tagged network to allow for connectivity between the management network and interconnects. [Learn more](#)

Changed: Management network to "MGMT"

Add **Cancel**

The Add deployment server process takes approximately 10 minutes.

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The Image Streamer appliance is added to OneView and configured with the appropriate management and deployment networks.

The screenshot displays the OneView web interface for managing OS Deployment Servers. The main heading is "OS Deployment Servers" with a sub-header "All statuses" and "All labels". A table on the left lists the servers, with "OSDS1" selected. The right pane shows the configuration for "OSDS1" under the "General" tab. A progress bar at the top indicates "Assigning Image Streamer active appliance." with a status of "Administrator" and a timestamp of "10/11/16 11:36:26 am".

General	
State	Connected
Type	Image Streamer
Image Streamer UI	pending
Description	I3S deployment server for Beta evaluation

Management Settings	
Deployment appliance	pending
Management network	MGMT

OS Deployment Plans	
	none

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Add deployment server task is now complete.

The screenshot displays the OneView web interface for managing OS Deployment Servers. The top navigation bar includes the OneView logo, a search bar, and user profile icons. The main header shows 'OS Deployment Servers' with filters for 'All statuses' and 'All labels'. A left sidebar lists the server 'OSDS1'. The main content area shows the configuration for 'OSDS1' in the 'General' tab. A status bar at the top of the configuration area indicates 'Add Completed 3m14s' by 'Administrator' on '11/28/16 2:40:43 pm'. The configuration is divided into three sections: General, Management Settings, and OS Deployment Plans.

General	
State	Connected
Type	Image Streamer
Image Streamer UI	192.168.20.31
Description	not set

Management Settings	
Deployment appliance	OSDS1-appliance-1-primary
Management network	MGMT

OS Deployment Plans	
	none

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Step 5: Create Logical Interconnect Group(s)

A Logical Interconnect Group is a template for the Fabric modules, a standard configuration which is consistently applied to Enclosure Groups which specify a LIG for each fabric in use.

In this section one LIG will be created for the shared network uplink (SUS), an optional second LIG is required if the POC frame includes the D3940 Composable Storage Module . A third/fourth SAN-A/SAN-B LIGs may be required if the POC frame includes the optional HPE VC SE 16Gb FC Modules.



GENERAL	SERVERS	NETWORKING	STORAGE	FACILITIES	
Dashboard	Server Profiles	Networks	Volumes	Data Centers	Settings
Activity	Server Profile Templates	Network Sets	Volume Templates	Racks	Users and Groups
Firmware Bundles	Enclosure Groups	Logical Interconnect Groups	Storage Pools	Power Delivery Devices	Hardware Setup
Reports	Logical Enclosures	Logical Interconnects	Storage Systems	Unmanaged Devices	OS Deployment Servers
	Enclosures	Interconnects	SANs		
	Server Hardware		SAN Managers		
	Server Hardware Types		Drive Enclosures		

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Recommended LIG Creation Order:

1. Create a LIG for the Synergy SE 40Gb F8 module (converged Eth/FC)
2. *Optionally*: Create LIG for the SAS fabric (if D3940 is included)
3. *Optionally*: Create two LIGs for SAN A and SAN B (if Synergy VC SE 16Gb modules are included)

Recommended Synergy SE 40Gb module POC Uplinks:

- Qty 2 Ethernet uplinks are active/active on Bay-3 Q1:1 and Bay-6 Q1:1
- Qty 1 Image Streamer single POC uplink is on Bay-3 Q2:1
- FCOE storage networks are on Bay-3 Q5:1 (SAN A) and Bay-6 Q5:1 (SAN B)

Step 5a: Create Virtual Connect 40Gb F8 module LIG

LIG creation sequence summary:

1. From the OneView menu pulldown, choose Logical Interconnect Groups
2. Click the **+ Create logical interconnect group** icon
3. Provide a name (i.e. SUS)
4. Choose Virtual Connect SE 40Gb F8 for the interconnect type
5. Leave Enclosure count default setting as 1
6. Leave Interconnect bay set default setting as 3
7. Leave Redundancy default setting as Redundant
8. Click the **Select Interconnects** icon
9. Add the shared uplink by clicking the **Add uplink set** icon
10. Select uplink port(s) and shared uplink networks (i.e. Bay3 Q1:1 and Bay6 Q1:1)
11. Add uplink for Image Streamer by clicking the **Add uplink set** icon
12. Select uplink port and DEPLOY network for this uplink (i.e. Bay3 Q2:1)
13. Add optional uplink for SAN-A/SAN-B FC/FCoE uplinks by clicking the **Add uplink set** icon (i.e. Bay3: Q5:1 and Bay6 Q5:1)

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For single frame Beta units, leave the default enclosure count at 1, bay set 3, and redundant master modules (Bays 3 and 6).

Click the **Select Interconnects** icon. Select the Virtual Connect SE 40Gb F8 Module for Synergy in Bays 3 and 6.

A minimum two uplinks must be created in the Virtual Connect F8 Synergy module LIG:

- The first is the shared uplink set for trunked Ethernet networks.
- The second is the single POC Image Streamer uplink.
- The optional 3rd/4th uplinks are the native FC or FCoE uplink (SAN Storage).

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Step 5b: Shared Uplink Set Creation

14. Click the **Add Uplink Set** icon

Create Logical Interconnect Group

Logical Interconnect Group

?

Logical Interconnect Group

no networks

Add uplink set

3

L1	L2	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		Q1				Q2				Q3				Q4			

Virtual Connect SE 40Gb F8 Module for Synergy

L3	L4	Q5				Q6				Q7				Q8			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

6

L1	L2	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		Q1				Q2				Q3				Q4			

Virtual Connect SE 40Gb F8 Module for Synergy

L3	L4	Q5				Q6				Q7				Q8			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Create

Create +

Cancel

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15. Create the shared Ethernet MLAG active/active uplink. Add the appropriate trunked ports to the uplink set and chose the physical uplink ports. NOTE: 10Gb uplinks to customer provided TOR switch will use a 10Gb subchannel on the QSFP port (4). For example if Q1 is used, Q1:1 (subport 1) is selected as the 10Gb uplink port.

Add Uplink Ports to SUS?

1 selectedall 60

Interconnect Module	Enclosure	Bay	Port	Capability
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q1	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q1:1	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q1:2	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q1:3	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q1:4	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q2	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q2:1	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q2:2	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q2:3	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q2:4	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q3	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q3:1	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q3:2	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q3:3	Ethernet + FCoE
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q3:4	Ethernet + FCoE

AddAdd +Cancel

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16. Choose the appropriate Ethernet uplink port, click **Add+** to add more than one.

Create Uplink Set

?

Name

SUS

Type

Ethernet

Connection mode

Automatic

LACP timer

Short (1s)

Networks

Name	Type	VLAN ID	Native
MGMT	Ethernet	1101	<input type="checkbox"/> x

Add networks

Remove all

Uplink Ports

Interconnect Module	Enclosure	Bay	Port	Capability
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q1	Ethernet + FCoE x
Virtual Connect SE 40Gb F8 Module for Synergy	1	6	Q1	Ethernet + FCoE x

Create

Create +

Cancel

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Step 5c: Image Streamer Uplink Set Creation

17. Click Create+ to add the image streamer uplink

18. Enter a name for the image streamer uplink

19. Choose Image Streamer as the Uplink Set type

Create Uplink Set ?

General

Name

Type **Select type** Select a type

- Ethernet
- Fibre Channel
- Tunnel
- Untagged
- Image Streamer**

Create **Create +** **Cancel**

20. Click Network pulldown and choose the DEPLOY network previously created

21. On the Uplink Ports choose Enclosure 1, Bay 3, Q1:1 port

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General

Name

streamer

x

Type

Image Streamer

Networks

Network

DEPLOY

x

Uplink Ports

The MGMT ports for link modules in the same enclosures as an Image Streamer appliance must be connected to uplink ports on different interconnect modules. [Learn more](#)

Enclosure 1, Bay 3, Port Q1:1

x

Search


Search

Search

22. Click the Create icon

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Hewlett Packard
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Create Uplink Set

?

General

Name

I3S

Type

Ethernet

Connection mode

Automatic

LACP timer

Short (1s)

Networks

Name	Type	VLAN ID	Native
DEPLOY	Ethernet	99	<input type="checkbox"/>

Add networks

Remove all

Uplink Ports

Interconnect Module	Enclosure	Bay	Port	Capability
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q2:1	Ethernet + FCoE

Create

Create +

Cancel

NOTE: For image streamer, the iSCSI network (i.e. DEPLOY) and physical uplink (i.e. Bay 3 Q1:1) must be specified in the Synergy SE 40Gb F8 Module LIG.

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Optional configuration depending on POC hardware configuration

Step 5d: Optional Converged FC LIG Uplink Set Creation

Some POC environments will connect to external SAN fabrics and storage systems. Optionally create SAN storage uplinks (FC or FCoE). The Synergy F8 40G module is a converged switch supporting Ethernet, multi-hop FCoE, and Fibre-Channel. For POC consistency use port Q5:1 for the FC/FCoE uplinks. For Synergy POC configurations, recommended ports Q5:1 in Bay 3 and 6.

Create Uplink Set ?

General

Name

SAN A

Type

Ethernet

Connection mode

Automatic

LACP timer

Short (1s)

Networks

Name	Type	VLAN ID	Native
SAN A	FCoE	2101	n/a

Add networks

Remove all

Uplink Ports

Interconnect Module	Enclosure	Bay	Port	Capability
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q5:1	Ethernet + FCoE

Create

Create +

Cancel

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Optional configuration depending on POC hardware configuration

1. Optionally create a redundant SAN B uplink:

Create Uplink Set ?

Name:

Type:

Connection mode:

LACP timer:

Networks

Name	Type	VLAN ID	Native
SAN B	FCoE	2102	n/a

There are no available Ethernet networks to add.

[Remove all](#)

Uplink Ports

Interconnect Module	Enclosure	Bay	Port	Capability
Virtual Connect SE 40Gb F8 Module for Synergy	1	6	Q5:1	Ethernet + FCoE

[Create](#) [Create +](#) [Cancel](#)

- Click the **Create** icon to create the SAN B uplink
- When finished creating all the uplinks/networks in the LIG, click the **Create** icon to create the new Logical Interconnect Group

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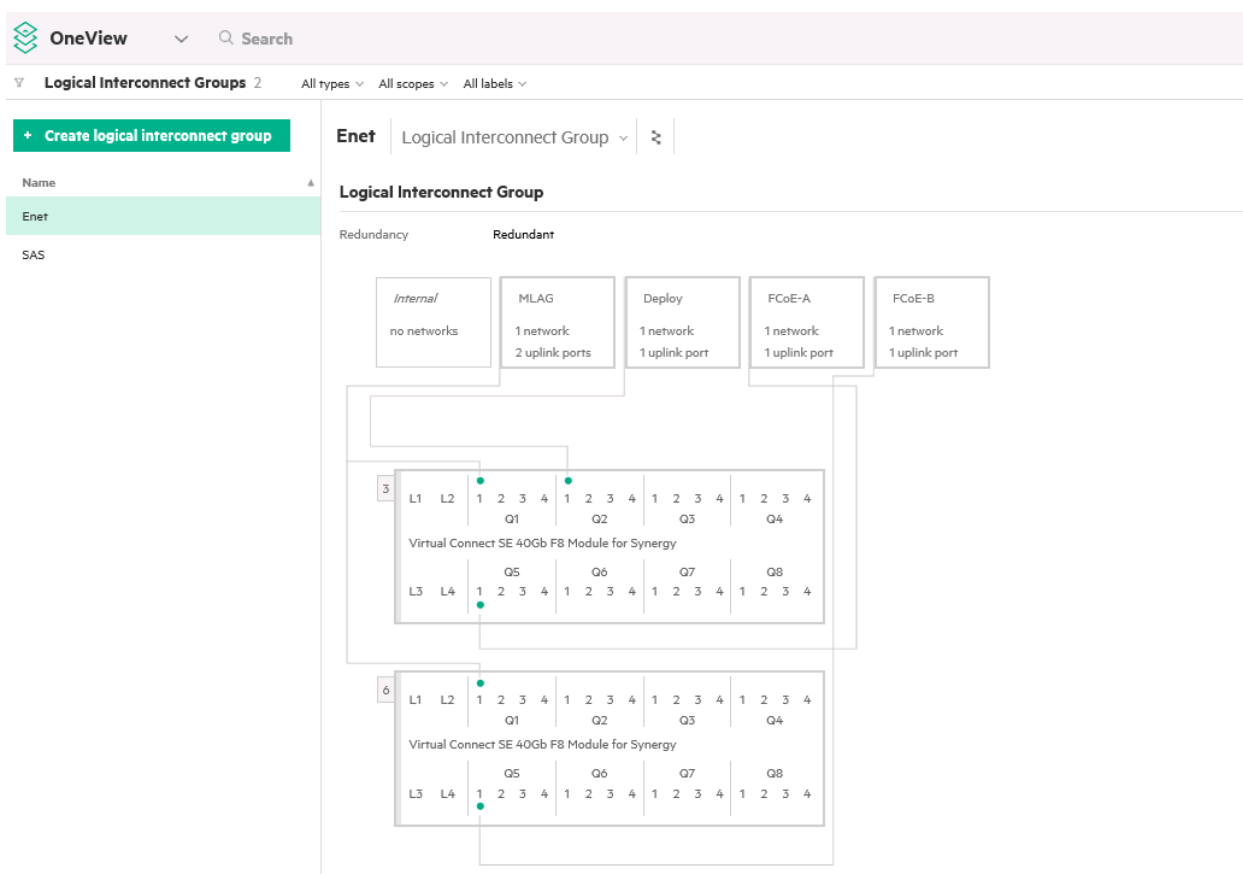
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Optional configuration depending on POC hardware configuration

Step 5f: Optional D3940 SAS Fabric LIG Creation

Depending on if D3940 is in the POC configuration and/or SAN connectivity, there will be one to three LIGs created:

1. Synergy SE 40Gb F8 template. A shared network LIG with 2+ uplinks
 - a. Shared Ethernet uplink
 - b. Image streamer iSCSI boot network
 - c. Optionally SAN A and SAN B FCOE/FC uplinks
2. *Optional*: SAS Composable Storage template with single or redundant controllers
3. *Optional*: Storage Fabric: HPE VC SE 16Gb FC module or Brocade Module - non-converged fibre-channel template



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Step 6: Create Enclosure Group

Synergy Enclosure Group (EG) is a template which defines how each physical enclosures and interconnect modules will be consistently configured as part of a Logical Enclosure creation process. The EG template defines how many enclosures are linked (1-5) and which fabric templates (LIG) to be used to configure the interconnect modules.

The EG also defines other management options including IPv4 assignments and power settings.

Click **Create Enclosure Group** icon.

- From the OneView main menu select Enclosure Groups

- Click the **+ Create enclosure group** icon
- Provide a name for the enclosure group i.e. EG1.
- For IPv4 management choose a static address pool previously created or use DHCP if a Synergy mgmt. DHCP scope/server is available.

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9. On the OS deployment network type choose External and choose the Deploy network.

The screenshot shows the 'Edit EG' configuration window with the 'General' tab selected. The 'General' section includes fields for Name (EG), Enclosure count (1), and IPv4 management address configuration (Use address pool selected). Below this is a table for IPv4 address pools with columns for Range Name, Domain, and IPv4 Addresses. The 'OS Deployment Settings' section shows 'Deployment network type' set to 'External' and 'Deployment network' set to 'Deploy'. The 'Interconnect Bay Configuration' section shows 'Enclosure 1' with an 'Interconnect' module 'Synergy 12Gb SAS Connection Module'. At the bottom, a message indicates 'Changed: Deployment network to "Deploy"' with 'OK' and 'Cancel' buttons.

Range Name	Domain	IPv4 Addresses
Mgmt	mgmt.hpe.local	192.168.20.30 - 192.168.20.99

NOTE: The deployment type **internal** vs **external** defines whether it's in a production HA configuration (3 frame, 2 streamers) or a dev/test POC configuration (1 frame, 1 streamer)

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10. On the Interconnect Bay Configuration, choose the appropriate LIGs based on the configuration. If D3940 is present, SAS LIG for Bays 1 and 4 of the corresponding frame.

Create Enclosure Group

Interconnect Bay Configuration

?

Interconnect Bay Configuration

1

Interconnect Synergy 12Gb SAS Connection Module

Logical interconnect group SAS

2

Logical interconnect group None

3

Interconnect Virtual Connect SE 40Gb F8 Module for Synergy

Logical interconnect group Enet

4

Logical interconnect group None

5

Logical interconnect group None

6

Interconnect Virtual Connect SE 40Gb F8 Module for Synergy

Logical interconnect group Enet

Power

4

Changed: Deployment network to "Deploy"

Create

Create+

Cancel

11. Click the **Create** icon

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Step 7: Create Logical Enclosure (LE)

Create LE with new Image Streamer enabled EG. A logical enclosure is the instantiation of a single frame or a stacked configuration (2 to 5 frames). The LE creation process applies the template configuration to the interconnect modules. When the process completes, the Synergy frame(s) are in a managed state.

Provide a name for the LE, choose the Enclosure(s), and the enclosure group created in Step 16. Optionally specify the firmware baseline. Note, a big bang firmware update either can be done during LE creation time by specifying a baseline or after LE creation has completed from the Actions pulldown.

Create Logical Enclosure?

Name

LE1

Enclosures

CN75160600 ✕ 🔍

Enclosure group

EG1 ✕ 🔍

Select a compatible enclosure group.

Firmware

Firmware baseline

Manage manually ▼

The appliance firmware repository is empty. To set a firmware baseline, visit the [Firmware Bundles](#) page. This page can be used to download firmware bundles from HPE and to upload them into the appliance repository.

2

Changed: Enclosure group to "EG1"

Create

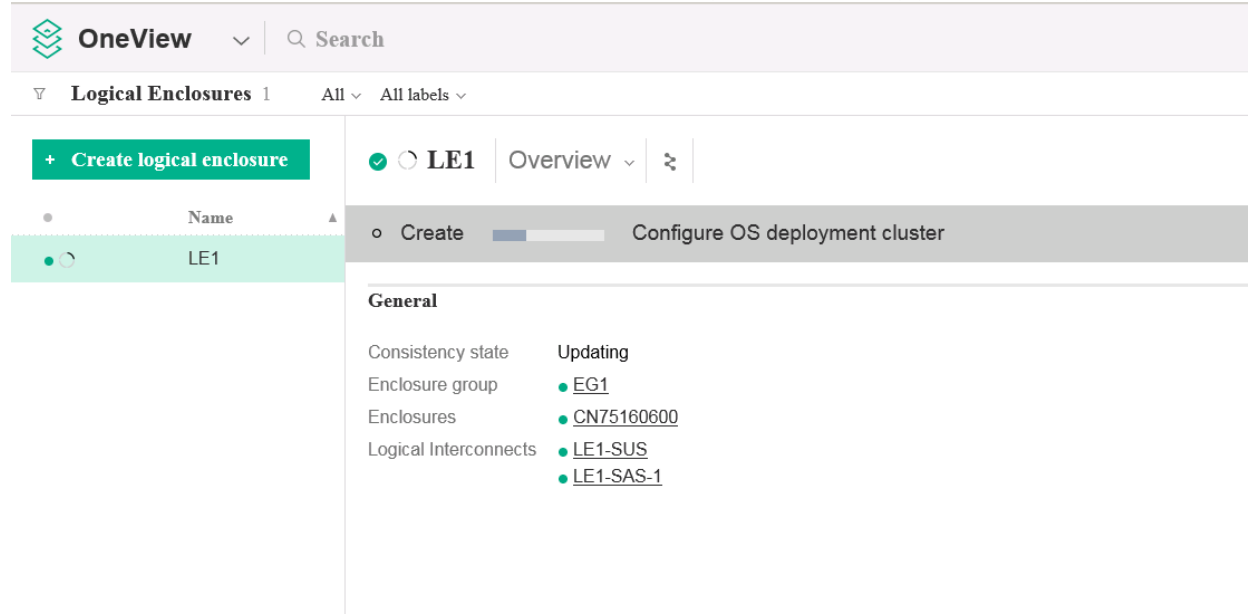
Create +

Cancel

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1. Click the **Create** icon. The LE creation process takes approximately 60 minutes. Adding an Image Streamer deployment service includes creating a VSA storage cluster as part of the LE creation which extends the LE creation process by approximately 25 minutes.



Once the Logical Enclosure creation process is complete, Image Streamer is ready for use.

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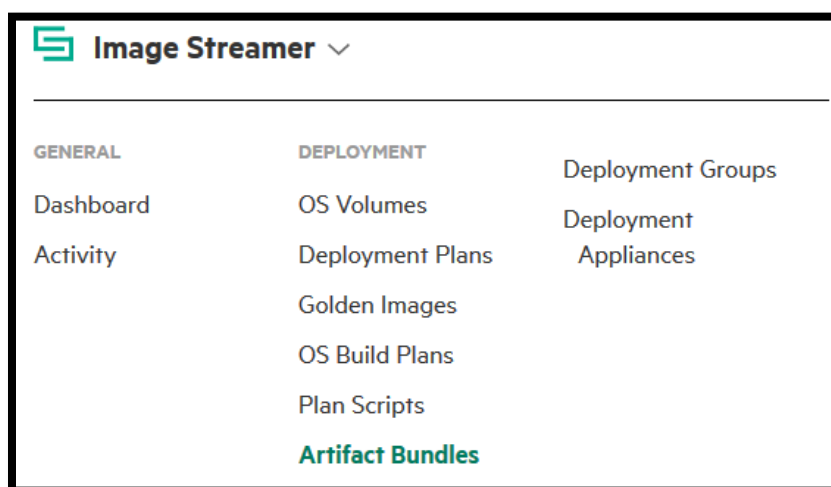
Step 8: Artifact Bundles

Artifact bundles contain plan scripts and build plans for generalizing and customizing the operating systems that Image Streamer supports. Other foundational artifact bundles provide the basics for capturing and deploying images without any customization.

HPE will provide a variety of artifact bundles for Image Streamer and make them publicly available via the HPE GitHub web site once the product is released.

Please to the HPE Synergy POC Welcome Document for instructions on where to download the POC Artifact bundle(s), HPE ESXi POC gold images, and POC use case guides.

1. From the Image Streamer main menu select *Artifact Bundles*



2. Select *Add artifact bundle* and then select *Browse*
3. In the File Upload dialog find and select the .zip file artifact bundle titled **HPE_POC_Foundation_Artifacts** and select open.

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4. Choose *Add*. The artifact bundle is uploaded and contents summary is displayed in the *Artifact Bundle* page within Image Streamer.
5. Repeat those steps for the artifact bundle titled **HPE-POC-ESXi-Artifacts**.

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6. Select the HPE_POC_Foundation artifact bundle in the left pane and explore the contents. Notice the bundle contains a Deployment plan, OS build plans and plan scripts. Golden images are not included in this bundle and are typically not provided by HPE.

HPE_Foundation_Artifacts_1_00-2016-08-30a

General ▾

General

Deployment plans

Name	Description	Read-only
▶ HPE - Foundation 1.0 - create empty OS Volume	Create empty OS Volume - version 1.00 Create an empty OS Volume to be the target for OS install.	No

OS build plans

Name	Description	Read-only
▶ HPE - Foundation 1.0 - create empty OS Volume	Create empty OS Volume version 1.00 Create an empty OS Volume to be the target for OS install.	No
HPE - Foundation 1.0 - capture OS Volume as is	Capture OS Volume as is - version 1.00 Create a new Golden Image from an OS Volume with no generalization changes to the OS Volume content.	No
▶ HPE - Foundation 1.0 - example artifact types		No
HPE - Foundation 1.0 - deploy Golden Image as is	Deploy Golden Image as is - version 1.00 Deploy Golden Image to OS Volume with no personalization changes to the OS Volume content.	No

Golden images

none

Plan scripts

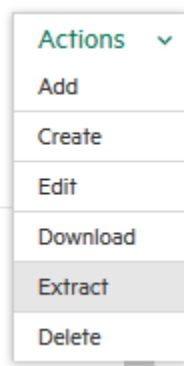
Name	Description	Read-only
HPE - Foundation 1.0 - add example messages to log	Add example messages to log - version 1.00 Add a example messages to the OS deployment	No

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Presently, the artifact bundle has only been uploaded to the Image Streamer appliance. The artifacts within the bundle must be extracted on the appliance in order to utilize them.

7. From the *Artifact Bundles* screen select the HPE_POC_Foundation bundle then from the *Actions* menu on the right of the main window, select *Extract*.



Now that the bundle has been extracted, you can view details of its contents by navigating to the actual deployment plans, build plans, and plan scripts in their respective pages within the Image Streamer UI.

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Step 9: Add HPE Synergy Image Streamer POC Gold Images (Optional)

ESXi gold images will be provided through Hewlett Packard Enterprise via GitHub for official customer POCs only. These gold images will be distributed as a separate artifact bundle, initially for ESXi only. The purpose of using pre-built images is showcasing deployments immediately after setup. The expectation is most customers will create their own gold images throughout the POC.

1. Download the POC ESX Gold Image Artifact Bundle from GitHub
2. From the Synergy Image Streamer UI, click Artifact Bundles
3. From the Artifact Bundle UI, click + Add artifact bundle
4. The upload will take several minutes because of size, once completed click the Actions pulldown on the right side of the screen and select Extract
5. The extraction process will run for some time, please do not refresh or close the browser window during the extraction process.
6. Once extraction has completed, the POC ESXi Gold Image will be listed in the Golden Images
7. For the initial test create a Deployment Plan specifying the ESXi Gold Image (5.5 or 6.0) just imported and a Deploy Gold Image As-Is OS build plan imported from ESXi POC Foundation Bundle. This OS build plan performs no personalization, just a fast-track method to demonstrate the boot volume snap clone process.
8. To apply personalization, please start with the POC ESXi Simple Host Configuration OS build plan which will prompt for several custom attributes at Server Profile creation time. Examples include hostname, mgmt. IPv4 address settings, SSH enabled, and ESXi root password.

Download instructions for Synergy POC Use Case guides, POC Gold Images, and Image Streamer POC artifact bundles will be provided in the Synergy POC Welcome Document.

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HPE Synergy Image Streamer Use Cases

A Synergy Image Streamer use case guides will be download from GitHub POC site.

Examples of step-by-step use cases guides include:

- Image Streamer Architecture and UI
- Artifact Bundles
- Personalization through Custom Attributes
- Create gold images and deployment - ESXi
- OV4VC ESXi Grow Cluster
- Create gold images and deployment - RHEL/SLES
- Image Streamer – Docker provisioning
- Artifact Management Virtual Machine (AMVM)

Download instructions for Synergy POC Use Case guides, POC Gold Images, and Image Streamer POC artifact bundles will be provided in the Synergy POC Welcome Document.

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Appendix A: Image Streamer POC Kick-Off Planning Checklist

The following checklist is a guide to planning/scheduling a Synergy POC.

	Task	Person/Team	Start Date	End Date
<input type="checkbox"/>	Image Streamer Kick-Off Meeting			
<input type="checkbox"/>	POC Milestone Dates			
<input type="checkbox"/>	Network planning for Synergy POC, test vlans/subnets and uplinks			
<input type="checkbox"/>	POC hardware BOM and shipment			
<input type="checkbox"/>	Customer POC network and facilities pre-prerequisites			
<input type="checkbox"/>	Validate Ethernet and FC uplinks - network transceivers and cables			
<input type="checkbox"/>	Layer-3 routable management VLAN/subnet for Synergy mgmt. address pool			
<input type="checkbox"/>	Layer-2 deployment VLAN/subnet for Synergy image streamer deployment address pool			
<input type="checkbox"/>	Test VLANs created, trunked on TOR switch			
<input type="checkbox"/>	Customer provided OS Server Media and Licenses			
<input type="checkbox"/>	Optional: Synergy Frame connected to customer storage fabric and SAN storage volumes provisioned/presented to compute nodes			
<input type="checkbox"/>	Synergy 12000 frame racked and powered			
<input type="checkbox"/>	Ethernet mgmt. and trunk switch uplinks configured and cabled			
<input type="checkbox"/>	Synergy Composer setup			
<input type="checkbox"/>	POC use case testing			
<input type="checkbox"/>	POC hardware shutdown and decommission			
<input type="checkbox"/>	POC equipment shipped back to HPE			
<input type="checkbox"/>	POC feedback survey completed			

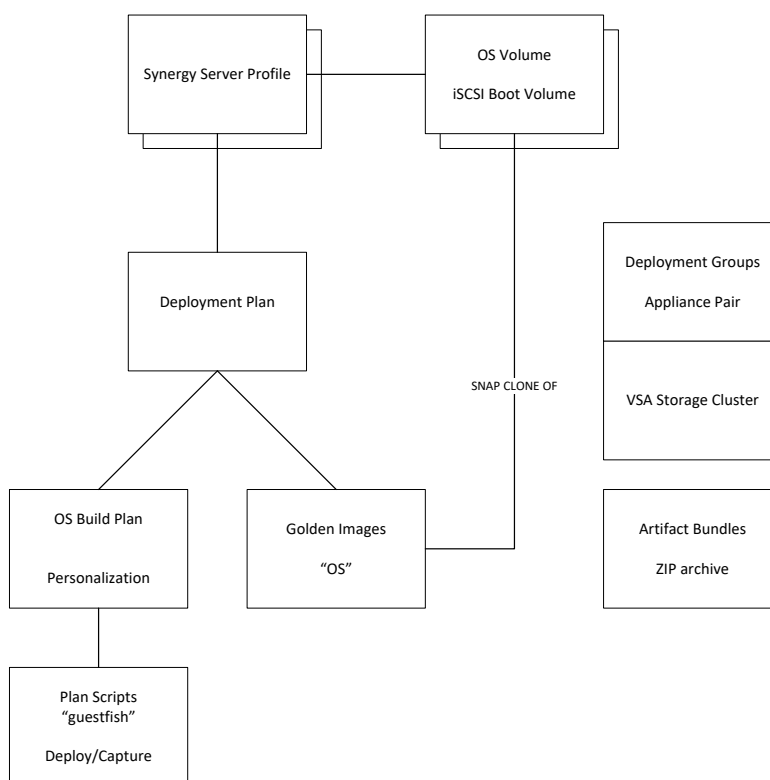
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Appendix B: libguestfs

Image Streamer is an open source project with community contributions of plan scripts and OS Build Plans via GitHub. Personalization is applied to OS boot volumes using plan scripts. Plan scripts use another open source project libguestfs. Libguestfs is a library and includes a CLI guestfish. Image Streamer plan scripts are guestfish commands which edit configuration files on the OS boot volume.

You are encouraged to read the Synergy Image Streamer Primer document and product guides for a deeper understanding of Image Streamer components and the use of libguestfs to perform edit images. Red Hat is a primary sponsor/contributor to the libguestfs project. Libguestfs links are provided at the end of this section.



Online libguestfs links:

- [Libguestfs FAQ](#)
- [Libguestfs Wiki](#)
- [Libguestfs GitHub](#)
- [Libguestfs Website](#)
- [Advanced image editing using Libguestfs](#)

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