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HPE Synergy ImageStreamer Developer Artifact Bundle Documentation

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1 Image Streamer Artifact Exercises

1.1 Introduction

The Image Streamer Developer Bundle includes example artifacts to study the basics of deployment, capture, and artifacts.

These exercises rely on a very small and simple “OS” image in the Developer Bundle. The image is not really an OS but rather a very minimal OS Volume having only UEFI boot loader content in a UEFI Extended System Partition.

The example UEFI artifacts perform personalization and generalization to a message.txt file in the OS Volume. The contents of this file is displayed on the server console after boot.

While the “OS” image used is small and simple, these exercises do cover the fundamentals of how real OSes are handled.

Image Streamer Artifact Exercises

1. Load Image Streamer Developer Artifact Bundle
2. Provision server with Image Streamer OS Deployment
3. Boot a Deployed Server
4. Review OS Deployment Log
5. Modify OS Deployment Settings
6. Review OS Deployment Plan, Build Plan, and Plan Scripts
7. Modifying Example Artifacts
8. Capturing a Golden Image from a Volume
9. Deploy a new Golden Image
10. Create an Empty OS Volume for Installing a New OS
11. Congratulations!

1.2 Load Image Streamer Developer Artifact Bundle

1.2.1 Obtain HPE_ImageStreamer_Developer_Bundle.

Download the bundle from: TBD

1.2.2 Upload the bundle to your Image Streamer Deployment Server.

Login to OneView and navigate to the OS Deployment Servers page. Select the link to the Image Streamer UI. Once at the Image Streamer UI navigate to the Artifact Bundles page. Select Add Artifact Bundle. Choose the bundle file and select Add to upload the bundle.

1.2.3 Extract the Image Streamer Developer Bundle.

The extract action copies the artifacts out of the bundle into the Image Streamer appliance for use.

1.3 Provision server with Image Streamer OS Deployment

The screenshot shows the 'Create Server Profile' dialog box in the HPE OneView interface. The 'General' tab is selected, and the 'OS Deployment' section is active. The 'OS deployment plan' is set to 'HPE - Developer 1.0 - Deployment Test (UEFI)'. Below this, there is a table for 'Deployment Settings' with columns for 'Setting' and 'Value'. The settings include 'ExampleFQDN' (example.com), 'ExampleIPv4Address' (10.1.2.3), 'ExampleNumber1' (50), 'ExampleNumber2' (9999), 'ExampleOption' (Option 1), 'ExampleString1' (Deployment Plan Default), 'ExampleString2' (Build Plan Default), 'ExampleString3' (Script Default), and 'ExampleString4' (Build Plan Override). At the bottom, there is a 'Firmware' section with a note 'Changed: Name to "BruceL test"'. The 'Create' button is highlighted in green, and there are also 'Create +' and 'Cancel' buttons.

| Setting | Value |
|--------------------|-------------------------|
| ExampleFQDN | example.com |
| ExampleIPv4Address | 10.1.2.3 |
| ExampleNumber1 | 50 |
| ExampleNumber2 | 9999 |
| ExampleOption | Option 1 |
| ExampleString1 | Deployment Plan Default |
| ExampleString2 | Build Plan Default |
| ExampleString3 | Script Default |
| ExampleString4 | Build Plan Override |

1.3.1 Navigate to OneView Server Profile page and start creation of a Server Profile.

Give the Server Profile a name. Select Server Hardware so that creating the server will result in Image Streamer OS Deployment. If the Server Profile is not assigned to Server Hardware OS deployment will be deferred until assignment occurs later. Selecting Server Hardware will imply the Server Hardware Type. One of those must be given for the OS Deployment section of the Server Profile to present a choice of OS deployment plan.

1.3.2 Select HPE – Developer – Deployment test (UEFI).

The plan name may include version number details not shown here.

1.3.3 Review or modify Deployment Settings.

The OS deployment will include these values in the server console message.

1.3.4 Complete Creation of Server Profile.

Once Create is selected OS Deployment will begin. It is generally one of the earlier parts of the Server Profile creation process. OS Deployment will typically be completed in 15 seconds. Additional Server Profile work is needed to complete server provisioning. The Server Profile create process will take a several minute depending on the configuration work to be done. The details will include the message “Deploy Image Streamer OS volume.”

1.4 Boot a Deployed Server

1.4.1 Launch server console.

The Server Profile has an action to Launch console. This can be done while the Server Profile create process completes.

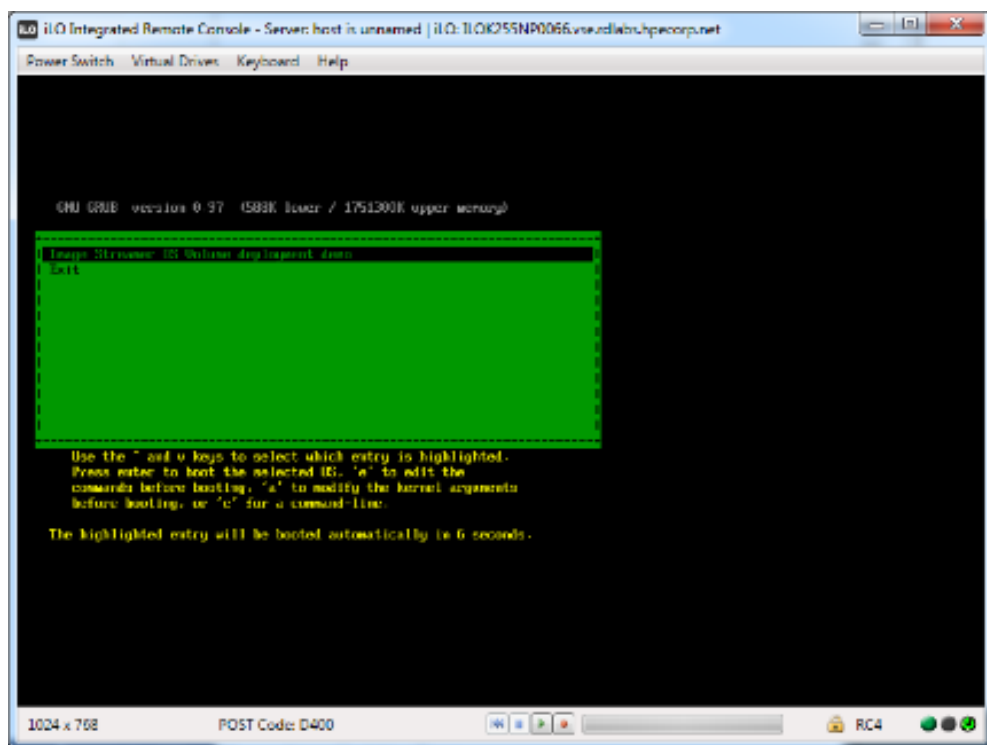
1.4.2 Power on and boot the server.

Once Server Profile create is complete the server must be powered on to boot. There is a Server Profile action to do that. The Server console also has a menu bar selection.

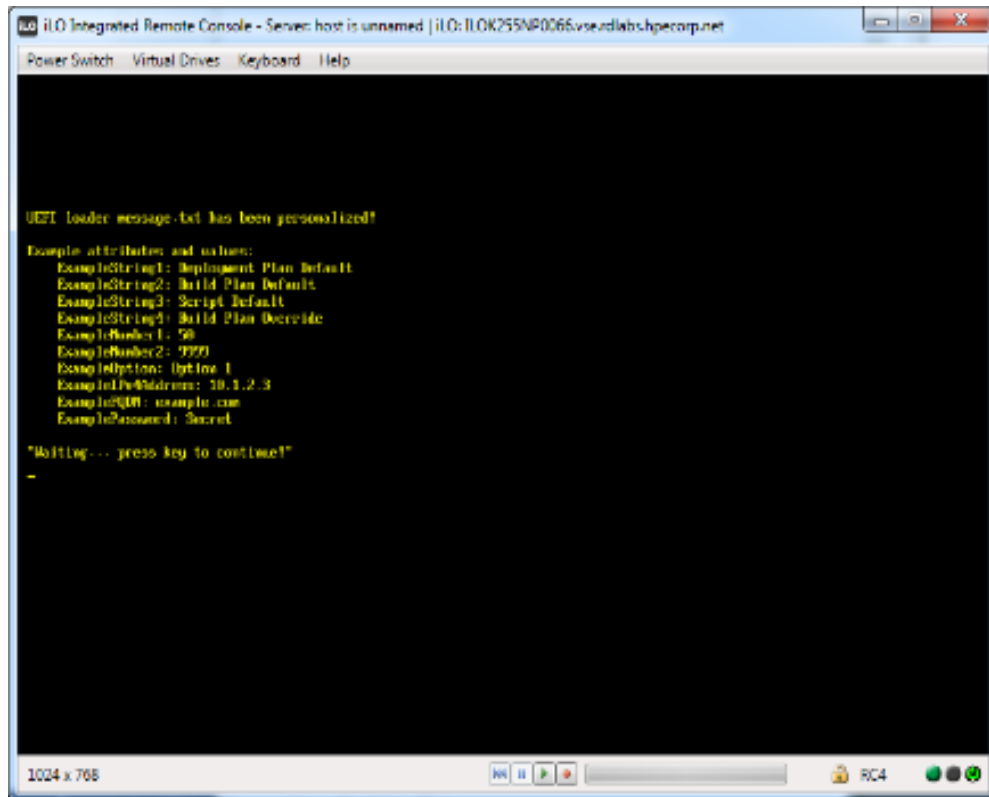
1.4.3 Wait for the server to boot.

Image Streamer uses iSCSI for OS Volumes. Server the server will require multiple boots to accomplish configuration. During the process you may see “iSCSI Error. iSCSI login failed.” This is a normal part of the iSCSI boot firmware configuration process. The server boot process takes several minutes. It should not be necessary to use the Boot Menu to ensure booting from the Image Streamer OS Volume.

1.4.4 Look for the loader boot menu.



1.4.5 Look for the personalization message.



1.4.6 Power off the server.

Changing Server Profile OS Deployment Plans or plan setting requires redeployment which in turn requires the server power to be off.

1.5 Review OS Deployment Log

1.5.1 Navigate to the Image Streamer Activity Page.

Note that OneView and Image Streamer each have activity pages. The overall progress and results of deployment are included in the OneView Activity Page. Details of OS deployment are shown on the Image Streamer Activity Page.

1.5.2 Find the activity items for your OS deployment.

It may be necessary to refresh the page, sort the items according to date, and review the list. There will be two entries for each OS deployment:

1.5.3 Add of Server Profile.

Image Streamer pulls Server Profile details from OneView to drive OS Deployment. Internally Image Streamer uses the term “Stateless Server” for that association.

1.5.4 Create of OS Volume.

OS deployment is creation of an OS Volume followed by personalization of that OS Volume.

1.5.5 Download deployment log.

The Create action will include a link to download the deployment log.

1.5.6 Open and review deployment log.

Open the deployment log in your favorite text file editor. Note that the deployment log uses Linux style end of line formatting which may not be handled well by all text file editors. The log file includes 4 sections:

- i) **OS Volume create and iSCSI access details.**
The first part of the log is details from the appliance on its independent work to create the OS Volume based on the Golden Image and make that OS Volume available to the build environment where Plan Scripts run.
- ii) **Plan Script expansion.**
The next section shows how the Plan Scripts have been modified to replace attribute names and default values with OS deployment settings values.
- iii) **Plan Script output.**
The next section shows any output from Plan Script execution.
- iv) **Deployment Wrap-up**
The final section of the log shows details of independent appliance work to complete the deployment process.

1.6 Modify OS Deployment Settings

1.6.1 Edit Server Profile and redeploy.

You may want to go back to the Server Profile to modify OS Deployment Settings and cause a new OS deployment. Settings changes will result in redeployment of the OS when the Server Profile is saved.

1.7 Review OS Deployment Plan, Build Plan, and Plan Scripts

1.7.1 Navigate to the OS Deployment Plan and review.

You can navigate to the Server Profile, go to the OS Deployment section, and use the link to the OS Deployment Plan that was used for deployment. If you know the Deployment Plan that was used you can navigate on the Image Streamer UI. Notice the variety of attribute names, types, defaults, and visibility. Only attributes that are mark as visible will be shown on the Server Profile.

1.7.2 Navigate to the Golden Image and review.

Use the Image Streamer UI or the link from the Deployment Plan to go to the correct Golden Image. Note the compressed size. You may want to figure out and navigate to the OS volume to compare OS Volume size to Golden Image size.

1.7.3 Navigate to the Build Plan and review.

The Build Plan includes a set of plan steps. Each refers to a Plan Script. The Build Plan defines types, constraints, and default values for attributes.

1.7.4 Navigate to the Plan Scripts and review.

The Plan Scripts have the detailed guestfish instructions for personalization.

1.7.5 Review artifact hierarchy.

The example includes defaults at various levels in the artifact hierarchy. The concept of the hierarchy is:

- i) Plan Scripts form the building blocks. Developing them takes considerable OS-specific expertise. Each is relatively independent forming one part of the overall process.
- ii) Build Plans provide an overall recipe for the type and layout of the image. Developing a Build Plan require consideration of selection and sequence of steps. Things like layout of the OS Volume and the Golden

Image software stack may be important factors.

- iii) Deployment Plans provide the link between Build Plans and Golden Images. They also provide the Software Administrator an ability to control data center policies by controlling which attributes make be modified The overall approach allows for more flexible and reusable lower level artifacts while making OS Deployment Plan in use in server provisioning less complex.

1.8 Modifying Example Artifacts

1.8.1 Switch to using the User example artifacts.

Two copies of the example artifacts are included in the HPE Developer Bundle. One copy is HPE read-only artifacts which may not be modified. The second set is User artifacts which are writable.

1.8.2 Experiment.

Modify the User artifacts at will. Note that artifacts cannot be modified when they are in use by a Serve Profile. Certain Server Profile operations require the Server Profile to redeploy the OS. The Deployment Plan needs to be available to support these operations. The Server Profile may be edited to no longer use the Deployment Plan so that those artifacts may be edited.

1.8.3 Undo mistakes.

While experimenting there is a good chance that some User artifact will get messed up such that it's not clear how to fix it. There are good ways to handle this:

- i) Make a copy of the known good HPE artifact
- ii) Delete the problem artifacts and expand the Artifact Bundle again

1.9 Capturing a Golden Image from a Volume

1.9.1 Determine the correct OS Volume.

The OS deployment section of a Server Profile includes the name of the Image Streamer OS Volume assigned to the server. Make a note of the OS Volume name.

1.9.2 Navigate to the Image Streamer Golden Image page.

Capturing a Golden from an OS Volume is described as a create operation in the UI. By comparison, add describes uploading a Golden Image to the appliance in the form of an archive file.

1.9.3 Create a Golden Image.

Create a Golden Image using the OS Volume name you noted earlier. You will need to select the capture Build Plan to be used. This plan would detail the generalization modifications to be made to the image as part of capture. The HPE Foundation Bundle includes an “as is” capture Build Plan which makes no generalization changes.

1.9.4 Wait for capture to complete.

The capture process includes several steps within the appliance and takes significant time:

- i) A snapshot clone of the OS Volume is made so that capture uses one point in time. Note that it is strongly recommended that the server be shutdown and powered off but that is not required.
- ii) Generalization changes are made to the image contents based on the capture Build Plan.
- iii) The appliance works to squeeze file system free space to reduce Golden Image size. Generally when a file is removed in a file system metadata marks the file as removed but the data content is left in the unused disk space. This content from deleted files could make the Golden Image large and that data may include content which should not be included. The appliance searches for recognizable file systems on the OS Volume to squeeze free space.
- iv) The OS Volume content is copied and converted to a compressed file format.
- v) The new Golden Image file content is used to create a Golden Image resource in the appliance. The process used matches what would be done for a Golden Image that is added as a result of upload.

1.10 Deploy a new Golden Image

1.10.1 Create a new Deployment Plan.

Navigate to the Deployment Plan page and create a new Deployment Plan using a name you will remember. The HPE Foundation Artifact Bundle includes an “as is” Build Plan that does no personalization during deployment. Select your newly created Golden Image.

1.10.2 Consider thin vs. thick provisioning implications.

Using “as is” capture and “as is” deploy will result in an exact duplicate of the original captured OS Volume. However, each of these OS Volumes, and the Golden Image, will use separate space in Image Streamer appliance storage. While Image Streamer could technically be used to backup OS Volumes that is not its intended purpose.

1.10.3 Deploy the Golden Image to a Server.

Navigate to the OneView Server Profile page and use the new Deployment Plan to deploy the Golden Image.

1.11 Create an Empty OS Volume for Installing a New OS

1.11.1 Create Server Profile Using Empty OS Volume Deployment Plan.

The HPE Foundation Artifact Build includes a special Deployment Plan which takes a single attribute value for VolumeSize and will create an empty OS Volume of that size. This OS Volume may be used as the target storage for installing an OS using a traditional OS install source such as DVD media or a network install server.

1.11.2 Optionally Install an OS.

You may power on the server to install a new OS to the empty OS Volume. During the boot process you probably will want to use the server console boot menu to boot from the correct install source. The iLO Virtual Media feature may be used to have an ISO image file on your laptop appear to the server as is loaded in a server DVD device. Note that Image Streamer OS Volumes are accessed via iSCSI. You may need to include additional drivers as part of the install process.

1.11.3 Optionally Capture the New OS Install as a Golden Image.

After install is completed you typically want to capture a new Golden Image of the resulting OS Volume.

1.11.4 Optionally Deploy the New Golden Image as is.

Typically the first thing to try with a new Golden Image from a new OS install is to deploying it as is. Often this will result in the server booting. The resulting server will have duplicate configuration settings since the OS Volume is an exact copy. This newly booted server will aid figuring out what needs to be personalized to create the needed Build Plan. However, the OS image may include server-specific settings which must be corrected for OS boot to succeed. In that case studying the originally installed server may be useful. Thus, it's a good idea to keep the originally installed server as it was installed until initial artifact development for a

new OS has progressed.

1.12 Congratulations!

If you have completed these exploration activities you will have gained a significant understanding of Image Streamer functionality and how to develop artifacts.

You will want to study other parts of this document to learn more subtle aspects of designing, developing, and testing artifacts.