

IMAGE BUILDER PATCHING

Chris Weber, Technical Account Manager

INTRO

Recently, I helped someone work through building a custom ESXi image that was newer than the ISO that they already had. In their case they needed to use a hardware vendor's custom image, add these updates and add some custom drivers. Adding drivers seems to be commonly documented but adding patches to the ISO doesn't. Adding the patches to the image file saves you the process of patching the host after it's deployed. It only takes a few PowerShell commands.

STEP BY STEP INSTRUCTIONS

There are a few extra steps below to help visualize what's going on at each interval but ultimately this example takes six lines to complete. I started with those six lines, so you won't have to copy, paste, scroll and repeat if you are following along. Don't forget to update the path and file names to reflect your particular version, environment and naming convention.

```
Add-EsxSoftwareDepot .\update-from-esxi6.5-6.5_update02.zip
```

```
New-EsxImageProfile -CloneProfile (Get-EsxImageProfile |Select -Last 1).Name -Name MyCustomImage -Vendor "Friendly Neighborhood TAM"
```

```
Add-EsxSoftwareDepot .\ESXi650-201810001.zip
```

```
Set-EsxImageProfile MyCustomImage -SoftwarePackage (Get-EsxSoftwarePackage -Newest)
```

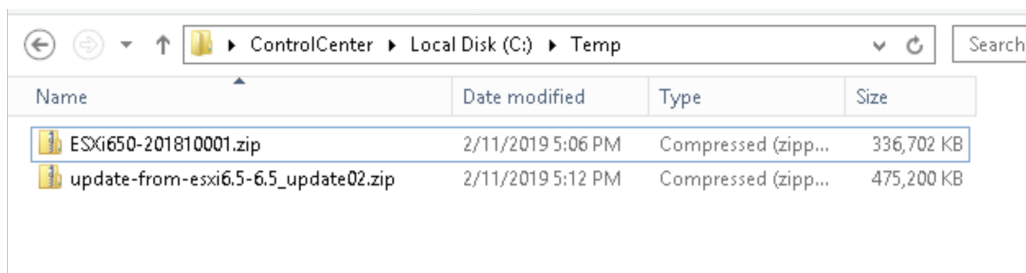
```
Export-EsxImageProfile MyCustomImage -ExportToIso .\ESXi.6.5U2-Patched.iso
```

```
Export-EsxImageProfile MyCustomImage -ExportToBundle .\ESXi.6.5U2-Patched.zip
```

EXAMPLE

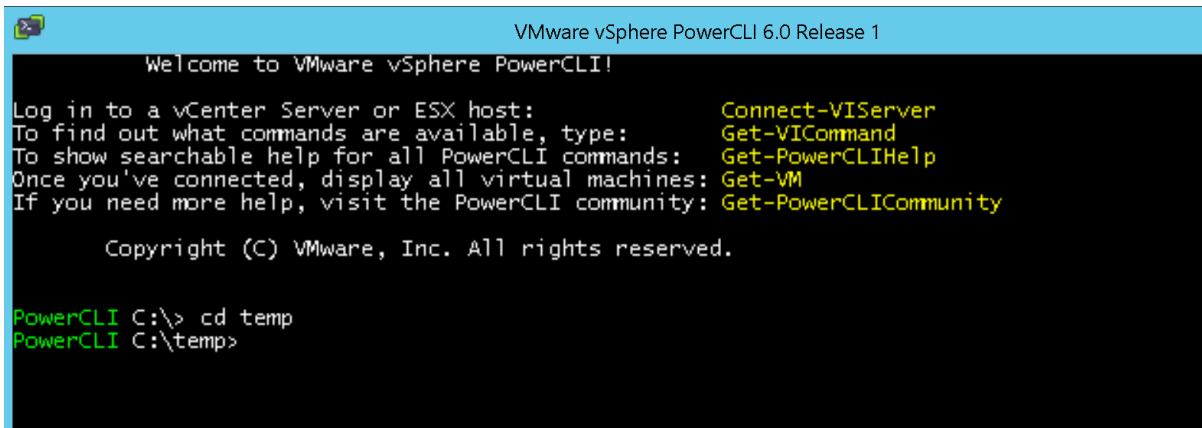
In my example, I have two files. One image and one update file. The process is the same, regardless of the pair of versions you use.

1. To avoid qualifying a path I started with both files in one directory so that I can work from that location (cd to that directory). Remember to download the zip bundles for both from <http://www.vmware.com/downloads>



The screenshot shows a Windows File Explorer window with the address bar set to 'ControlCenter > Local Disk (C:) > Temp'. The search bar is empty. Below the address bar is a table listing files in the directory:

Name	Date modified	Type	Size
ESXi650-201810001.zip	2/11/2019 5:06 PM	Compressed (zipp...	336,702 KB
update-from-esxi6.5-6.5_update02.zip	2/11/2019 5:12 PM	Compressed (zipp...	475,200 KB



```
VMware vSphere PowerCLI 6.0 Release 1
Welcome to VMware vSphere PowerCLI!
Log in to a vCenter Server or ESX host:          Connect-VIServer
To find out what commands are available, type:   Get-VICommand
To show searchable help for all PowerCLI commands: Get-PowerCLIHelp
Once you've connected, display all virtual machines: Get-VM
If you need more help, visit the PowerCLI community: Get-PowerCLICommunity


Copyright (C) VMware, Inc. All rights reserved.

PowerCLI C:\> cd temp
PowerCLI C:\temp>
```

Just to understand that you are adding content to the software depot that you are building, run `Get-EsxSoftwareDepot` and `Get-EsxImageProfile`. You should see the command executes but that there is nothing to return.

Get-EsxSoftwareDepot

Get-EsxImageProfile



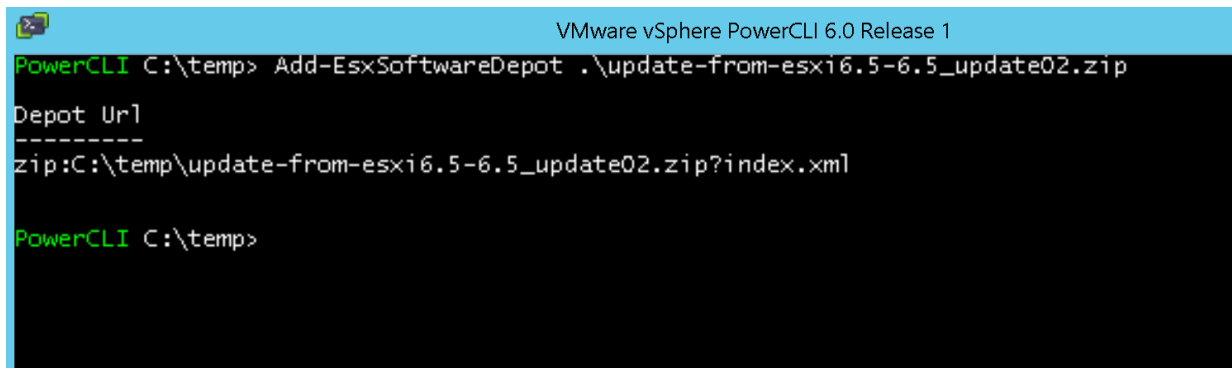
```
VMware vSphere PowerCLI 6.0 Release 1
Welcome to VMware vSphere PowerCLI!
Log in to a vCenter Server or ESX host:          Connect-VIServer
To find out what commands are available, type:   Get-VICommand
To show searchable help for all PowerCLI commands: Get-PowerCLIHelp
Once you've connected, display all virtual machines: Get-VM
If you need more help, visit the PowerCLI community: Get-PowerCLICommunity

Copyright (C) VMware, Inc. All rights reserved.

PowerCLI C:\> cd temp
PowerCLI C:\temp> Get-EsxSoftwareDepot
PowerCLI C:\temp> Get-EsxImageProfile
PowerCLI C:\temp>
```

2. Add the image file to the software depot.

Add-EsxSoftwareDepot .\update-from-esxi6.5-6.5_update02.zip



```

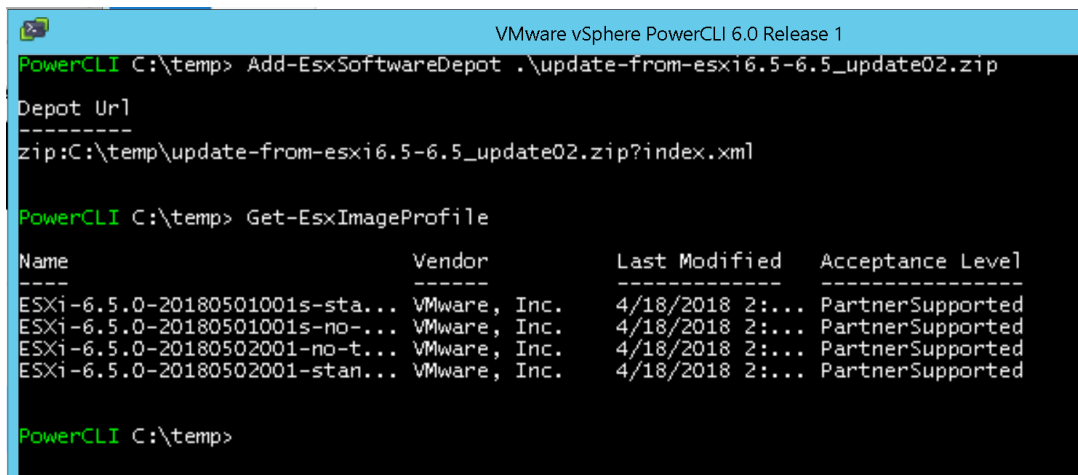
VMware vSphere PowerCLI 6.0 Release 1
PowerCLI C:\temp> Add-EsxSoftwareDepot .\update-from-esxi6.5-6.5_update02.zip

Depot Url
-----
zip:C:\temp\update-from-esxi6.5-6.5_update02.zip?index.xml

PowerCLI C:\temp>

```

3. To see the images included in the zip file, check the loaded images.



```

VMware vSphere PowerCLI 6.0 Release 1
PowerCLI C:\temp> Add-EsxSoftwareDepot .\update-from-esxi6.5-6.5_update02.zip

Depot Url
-----
zip:C:\temp\update-from-esxi6.5-6.5_update02.zip?index.xml

PowerCLI C:\temp> Get-EsxImageProfile

Name                               Vendor           Last Modified   Acceptance Level
----                               -
ESXi-6.5.0-20180501001s-sta... VMware, Inc.     4/18/2018 2:... PartnerSupported
ESXi-6.5.0-20180501001s-no-... VMware, Inc.     4/18/2018 2:... PartnerSupported
ESXi-6.5.0-20180502001-no-t... VMware, Inc.     4/18/2018 2:... PartnerSupported
ESXi-6.5.0-20180502001-stan... VMware, Inc.     4/18/2018 2:... PartnerSupported

PowerCLI C:\temp>

```

Get-EsxImageProfi

4. We need the name of the standard image to clone to our custom image.

There are a few ways that we can do that, but the most straight-forward is to pipe to the full list and copy the name of the image. You will generally want to start with the Standard Image.

*Get-EsxImageProfile | fl **. Copy the name of the “Standard Image” from the output.

```

VMware vSphere PowerCLI 6.0 Release 1
PowerCLI C:\temp> Get-EsxImageProfile |fl *

Name           : ESXi-6.5.0-20180501001s-standard
Vendor        : VMware, Inc.
Author        :
Description    : For more information, see http://kb.vmware.com/kb/53095.
CreationTime  : 4/18/2018 2:51:31 AM
ModifiedTime  : 4/18/2018 2:51:31 AM
ReadOnly      : False
VibList       : {ne1000 0.8.0-16vmw.650.1.26.5969303, vmkplexer-vmkplexer 6.5.0-0.0.
sata-ata-piix 2.12-10vmw.650.0.0.4564106, igbn 0.1.0.0-15vmw.650.1.3
AcceptanceLevel : PartnerSupported
Guid          : 664adce242b311e897d10200c3c7f3fa
Rules         :
StatelessReady : True

Name           : ESXi-6.5.0-20180501001s-no-tools
Vendor        : VMware, Inc.
Author        :
Description    : For more information, see http://kb.vmware.com/kb/53096.
CreationTime  : 4/18/2018 2:51:31 AM
ModifiedTime  : 4/18/2018 2:51:31 AM
ReadOnly      : False
VibList       : {ne1000 0.8.0-16vmw.650.1.26.5969303, vmkplexer-vmkplexer 6.5.0-0.0.
sata-ata-piix 2.12-10vmw.650.0.0.4564106, igbn 0.1.0.0-15vmw.650.1.3
AcceptanceLevel : PartnerSupported
Guid          : 664a142e42b311e897d10200c3c7f3fa
Rules         :
StatelessReady : True

Name           : ESXi-6.5.0-20180502001-no-tools
Vendor        : VMware, Inc.
Author        :
Description    : For more information, see http://kb.vmware.com/kb/53091.
CreationTime  : 4/18/2018 2:51:31 AM
ModifiedTime  : 4/18/2018 2:51:31 AM
ReadOnly      : False
VibList       : {smartpqi 1.0.1.553-10vmw.650.2.50.8294253, vmkplexer-vmkplexer
6.5.0-0.0.4564106, bnxtnet 20.6.101.7-11vmw.650.2.50.8294253, igbn
0.1.0.0-15vmw.650.1.36.7388607...}
AcceptanceLevel : PartnerSupported
Guid          : 664bd02042b311e897d10200c3c7f3fa
Rules         :
StatelessReady : True

Name           : ESXi-6.5.0-20180502001-standard ←
Vendor        : VMware, Inc.
Author        :
Description    : For more information, see http://kb.vmware.com/kb/53090.
CreationTime  : 4/18/2018 2:51:31 AM
ModifiedTime  : 4/18/2018 2:51:31 AM
ReadOnly      : False
VibList       : {smartpqi 1.0.1.553-10vmw.650.2.50.8294253, vmkplexer-vmkplexer
6.5.0-0.0.4564106, bnxtnet 20.6.101.7-11vmw.650.2.50.8294253, igbn
0.1.0.0-15vmw.650.1.36.7388607...}
AcceptanceLevel : PartnerSupported
Guid          : 664945ee42b311e897d10200c3c7f3fa
Rules         :
StatelessReady : True

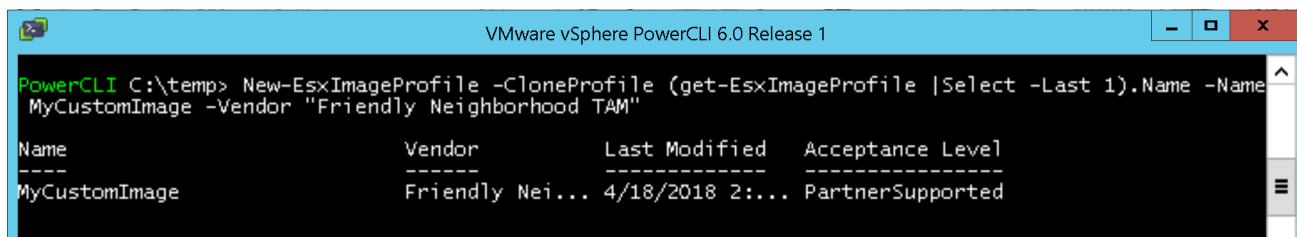
```

- You'll need to refer to the source image and clone it to a new one to work with. You can use that name that you copied directly in the command.

```
New-EsxImageProfile -CloneProfile "ESX-6.5.0-20180502001-standard" -Name MyCustomImage
-Vendor "Friendly Neighborhood TAM"
```

However, generally, I would identify the Image from the list itself to select the source.

```
New-EsxImageProfile -CloneProfile (Get-EsxImageProfile |Select -Last 1).Name -Name
MyCustomImage -Vendor "Friendly Neighborhood TAM"
```

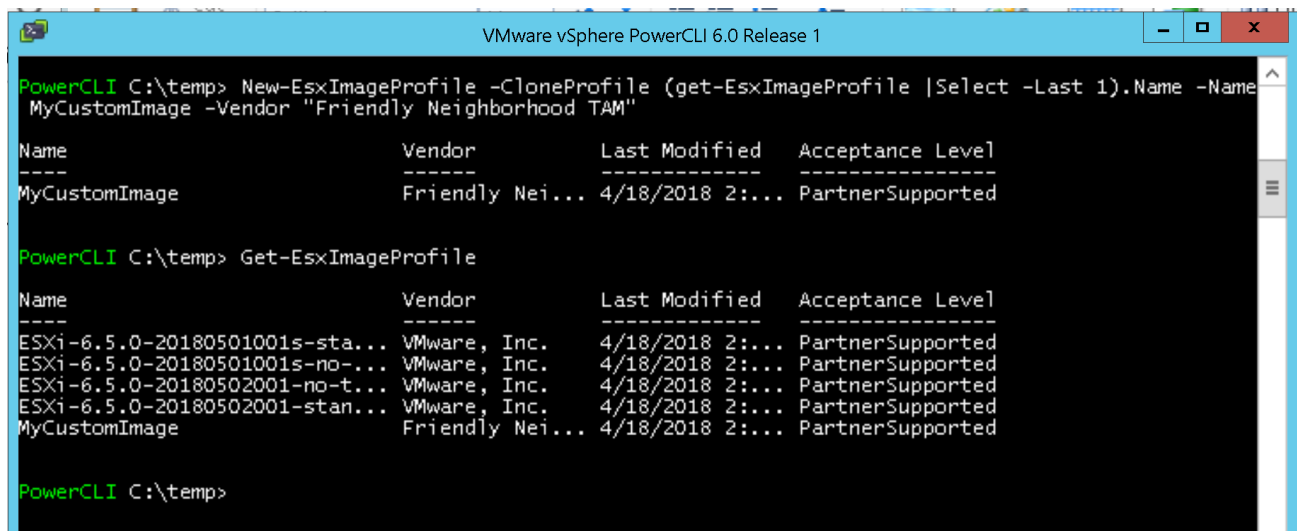


```
PowerCLI C:\temp> New-EsxImageProfile -CloneProfile (get-EsxImageProfile |Select -Last 1).Name -Name
MyCustomImage -Vendor "Friendly Neighborhood TAM"
```

Name	Vendor	Last Modified	Acceptance Level
MyCustomImage	Friendly Nei...	4/18/2018 2:...	PartnerSupported

You'll see the image in the Image Profile list now.

```
Get-EsxImageProfile
```



```
PowerCLI C:\temp> New-EsxImageProfile -CloneProfile (get-EsxImageProfile |Select -Last 1).Name -Name
MyCustomImage -Vendor "Friendly Neighborhood TAM"
```

Name	Vendor	Last Modified	Acceptance Level
MyCustomImage	Friendly Nei...	4/18/2018 2:...	PartnerSupported

```
PowerCLI C:\temp> Get-EsxImageProfile
```

Name	Vendor	Last Modified	Acceptance Level
ESXi-6.5.0-20180501001s-sta...	VMware, Inc.	4/18/2018 2:...	PartnerSupported
ESXi-6.5.0-20180501001s-no-...	VMware, Inc.	4/18/2018 2:...	PartnerSupported
ESXi-6.5.0-20180502001-no-t...	VMware, Inc.	4/18/2018 2:...	PartnerSupported
ESXi-6.5.0-20180502001-stan...	VMware, Inc.	4/18/2018 2:...	PartnerSupported
MyCustomImage	Friendly Nei...	4/18/2018 2:...	PartnerSupported

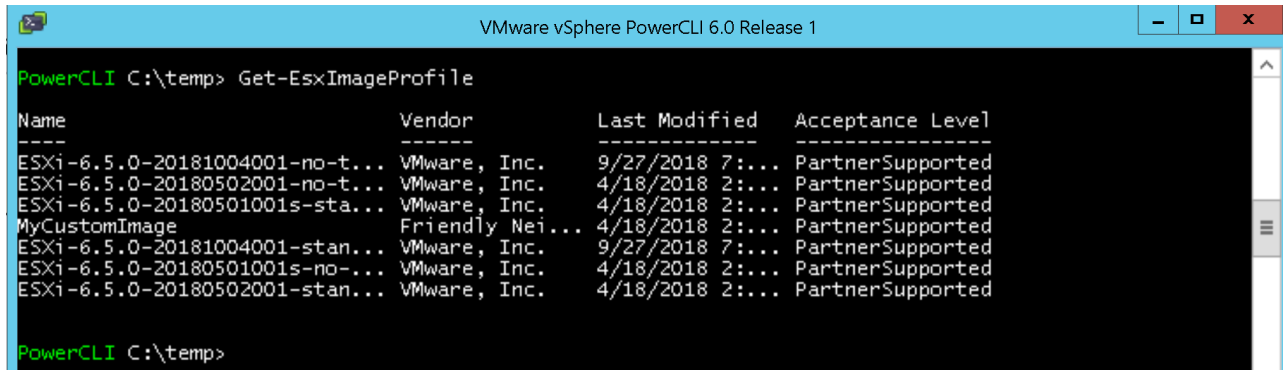
```
PowerCLI C:\temp>
```

- Add the update file to the software depot

```
Add-EsxSoftwareDepot .\ESXi650-201810001.zip
```

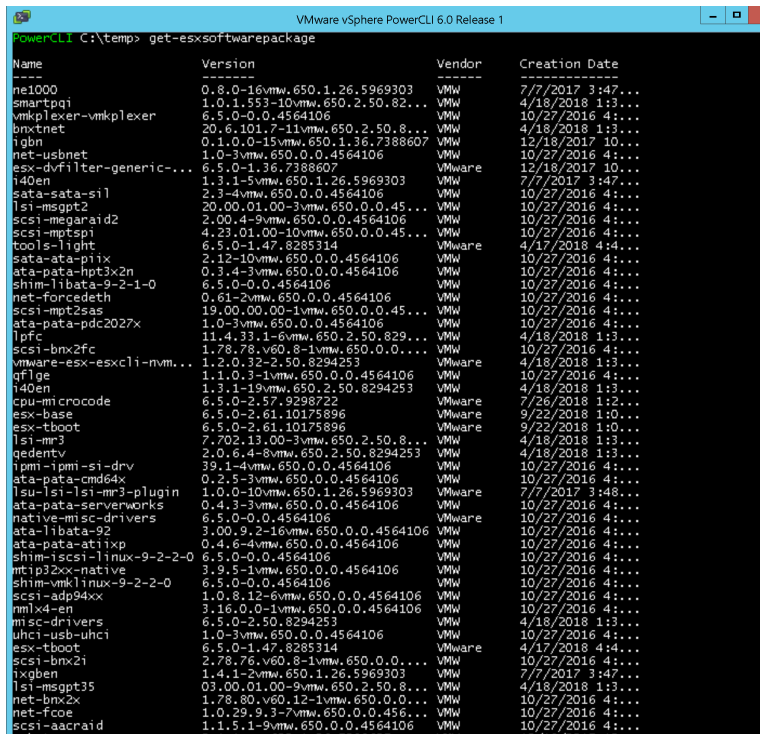
You can now see two images that are newer than what you were already working with in the depot. In this example, they have a last modified date 9/27/2018.

Get-EsxImageProfile



7. At this point listing the software packages will list all the bundles available from all of the images from both files.

Get-EsxSoftwarePackage



- Coming at the list from another direction you can select just the custom image and select its `viblist` property to see only the bundles that are attached to our working custom image.

(Get-EsxImageProfile MyCustomImage).viblist

```

PowerCLI C:\temp> (Get-EsxImageProfile MyCustomImage).viblist

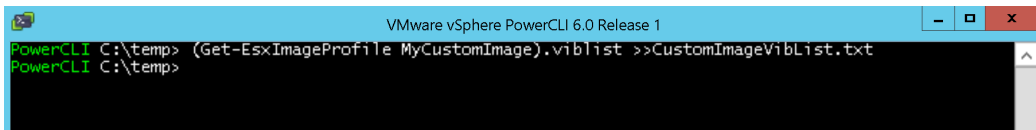
Name                               Version                               Vendor                               Creation Date
----                               -
smartpqi                           1.0.1.553-10vmw.650.2.50.82...     VMW                                4/18/2018 1:3...
vmkplexer-vmkplexer                6.5.0-0.0.4564106                  VMW                                10/27/2016 4:...
bnxtnet                             20.6.101.7-11vmw.650.2.50.8...     VMW                                4/18/2018 1:3...
igbn                                0.1.0.0-15vmw.650.1.36.7388607    VMW                                12/18/2017 10...
net-usbnet                         1.0-3vmw.650.0.0.4564106          VMW                                10/27/2016 4:...
esx-dvfilter-generic-...          6.5.0-1.36.7388607                 VMware                             12/18/2017 10...
sata-sata-sil                      2.3-4vmw.650.0.0.4564106          VMW                                10/27/2016 4:...
scsi-megaraid2                    2.00.4-9vmw.650.0.0.4564106       VMW                                10/27/2016 4:...
hid-hid                            1.0-3vmw.650.0.0.4564106          VMW                                10/27/2016 4:...
tools-light                        6.5.0-1.47.8285314                 VMware                             4/17/2018 4:4...
sata-ata-piix                     2.12-10vmw.650.0.0.4564106        VMW                                10/27/2016 4:...
ata-pata-hpt3x2n                  0.3.4-3vmw.650.0.0.4564106       VMW                                10/27/2016 4:...
shim-libata-9-2-1-0               6.5.0-0.0.4564106                 VMW                                10/27/2016 4:...
net-forcedeth                     0.61-2vmw.650.0.0.4564106        VMW                                10/27/2016 4:...
scsi-mpt2sas                      19.00.00.00-1vmw.650.0.0.45...    VMW                                10/27/2016 4:...
ata-pata-pdc2027x                 1.0-3vmw.650.0.0.4564106          VMW                                10/27/2016 4:...
lpfc                               11.4.33.1-6vmw.650.2.50.829...    VMW                                4/18/2018 1:3...
scsi-bnx2fc                       1.78.78.v60.8-1vmw.650.0.0...    VMW                                10/27/2016 4:...
qflge                              1.1.0.3-1vmw.650.0.0.4564106     VMW                                10/27/2016 4:...
t40en                              1.3.1-19vmw.650.2.50.8294253     VMW                                4/18/2018 1:3...
lsi-mr3                            7.702.13.00-3vmw.650.2.50.8...    VMW                                4/18/2018 1:3...
qedentv                            2.0.6.4-8vmw.650.2.50.8294253    VMW                                4/18/2018 1:3...
ipmi-ipmi-si-drv                  39.1-4vmw.650.0.0.4564106         VMW                                10/27/2016 4:...
ata-pata-cmd64x                   0.2.5-3vmw.650.0.0.4564106        VMW                                10/27/2016 4:...
lsu-lsi-lsi-mr3-plugin            1.0.0-10vmw.650.1.26.5969303      VMware                             7/7/2017 3:48...
ata-pata-serverworks              0.4.3-3vmw.650.0.0.4564106       VMW                                10/27/2016 4:...
native-misc-drivers               6.5.0-0.0.4564106                 VMware                             10/27/2016 4:...
ata-libata-92                     3.00.9.2-16vmw.650.0.0.4564106    VMW                                10/27/2016 4:...
ata-pata-atiixp                   0.4.6-4vmw.650.0.0.4564106       VMW                                10/27/2016 4:...
shim-iscsi-linux-9-2-2-0         6.5.0-0.0.4564106                 VMW                                10/27/2016 4:...
mtip32xx-native                  3.9.5-1vmw.650.0.0.4564106       VMW                                10/27/2016 4:...
shim-vmklinux-9-2-2-0            6.5.0-0.0.4564106                 VMW                                10/27/2016 4:...
scsi-adp94xx                      1.0.8.12-6vmw.650.0.0.4564106    VMW                                10/27/2016 4:...
nmlx4-en                          3.16.0.0-1vmw.650.0.0.4564106    VMW                                10/27/2016 4:...
misc-drivers                      6.5.0-2.50.8294253                VMW                                4/18/2018 1:3...
ipmi-ipmi-msghandler              39.1-5vmw.650.2.50.8294253       VMW                                4/18/2018 1:3...
misc-cnic-register                1.78.75.v60.7-1vmw.650.0.0...    VMW                                10/27/2016 4:...
scsi-bnx2i                        2.78.76.v60.8-1vmw.650.0.0...    VMW                                10/27/2016 4:...
lsi-msgpt35                       03.00.01.00-9vmw.650.2.50.8...    VMW                                4/18/2018 1:3...

```

- There isn't a need to, but if you are interested in comparing the whole list of available bundles to the list in the in the working image, you can send them out to a text file during the process.

(Get-EsxImageProfile MyCustomImage).viblist >>CustomImageVibList.txt

Get-EsxSoftwarePackage >> AllVibList.txt

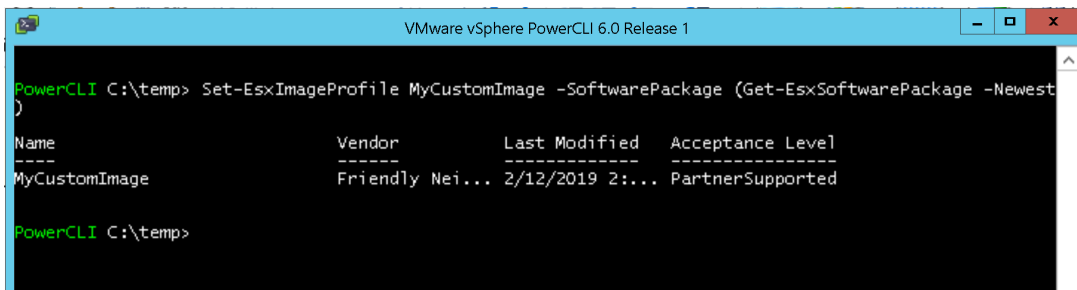


```
VMware vSphere PowerCLI 6.0 Release 1
PowerCLI C:\temp> (Get-EsxImageProfile MyCustomImage).viblist >>CustomImageVibList.txt
PowerCLI C:\temp>
```

10. The next step is to update our working image. We could add and remove VIBs selectively but that tends to be tedious and difficult to manage. We tend to use that method adding a single driver to an image or adding third party component.

Here what we really want is to select all of the newest versions of each bundle and make our image from that.

Set-EsxImageProfile MyCustomImage -SoftwarePackage (Get-EsxSoftwarePackage -Newest)



```
VMware vSphere PowerCLI 6.0 Release 1
PowerCLI C:\temp> Set-EsxImageProfile MyCustomImage -SoftwarePackage (Get-EsxSoftwarePackage -Newest)
Name
----
MyCustomImage
Vendor
-----
Friendly Nei...
Last Modified
-----
2/12/2019 2:...
Acceptance Level
-----
PartnerSupported
PowerCLI C:\temp>
```

If you are interested in keeping track of what changed, export the VIBlist back out to a new text file.

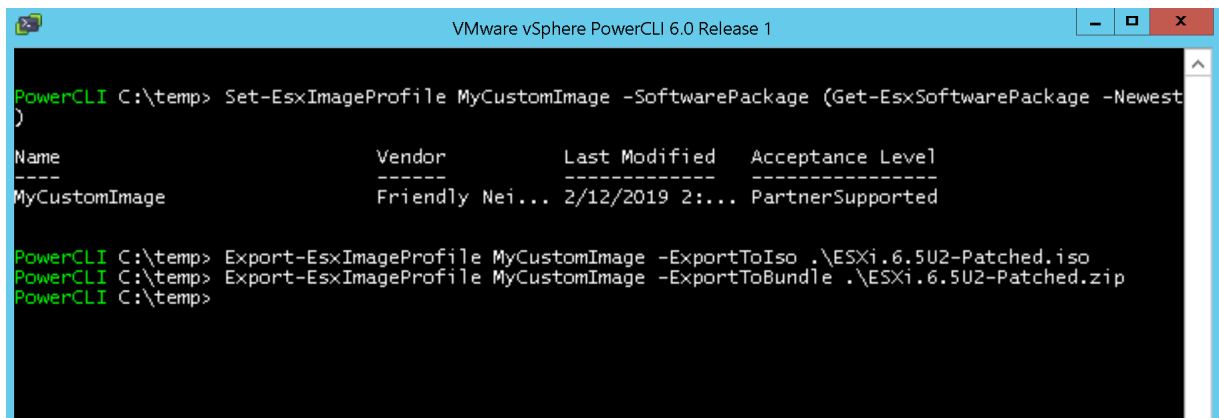
(Get-EsxImageProfile MyCustomImage).viblist >> UpdatedCustomImageVibList.txt

11. The only step remaining is to export your image to an ISO and a Bundle (.zip)

You'll need the zip file to edit this image in the future, so I recommend exporting both at once, even if you only need the ISO.

Export-EsxImageProfile MyCustomImage -ExportToIso .\ESXi.6.5U2-Patched.iso

Export-EsxImageProfile MyCustomImage -ExportToBundle .\ESXi.6.5U2-Patched.zip



```

VMware vSphere PowerCLI 6.0 Release 1

PowerCLI C:\temp> Set-EsxImageProfile MyCustomImage -SoftwarePackage (Get-EsxSoftwarePackage -Newest
)

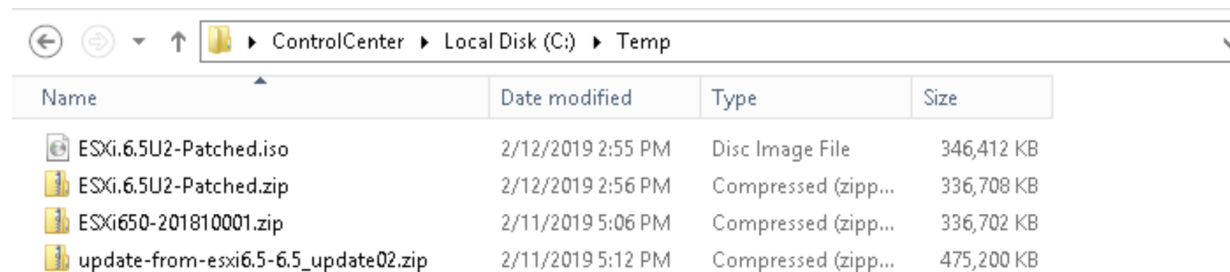
Name                Vendor          Last Modified    Acceptance Level
----                -
MyCustomImage       Friendly Nei... 2/12/2019 2:...  PartnerSupported

PowerCLI C:\temp> Export-EsxImageProfile MyCustomImage -ExportToIso .\ESXi.6.5U2-Patched.iso
PowerCLI C:\temp> Export-EsxImageProfile MyCustomImage -ExportToBundle .\ESXi.6.5U2-Patched.zip
PowerCLI C:\temp>

```

IMAGE PATCH COMPLETED

Back to the file browser and we see we have our original files, a new ISO and a new Zip bundle.



Name	Date modified	Type	Size
ESXi.6.5U2-Patched.iso	2/12/2019 2:55 PM	Disc Image File	346,412 KB
ESXi.6.5U2-Patched.zip	2/12/2019 2:56 PM	Compressed (zipp...	336,708 KB
ESXi650-201810001.zip	2/11/2019 5:06 PM	Compressed (zipp...	336,702 KB
update-from-esxi6.5-6.5_update02.zip	2/11/2019 5:12 PM	Compressed (zipp...	475,200 KB