Configure Identity Persistence in Secure Endpoint

Contents

Introduction

What is Identity Persistence?

- Requirements
- When Do You Need Identity Persistence?
  - Virtual Endpoint Deployment
  - Physical Endpoint Deployment

Overview of Identity Persistence Process

- Identify Duplicates in Your Organization
  - Externally Available GitHub Scripts
- Reasons Why Duplicates Are Created

Common Issues/Symptoms with Incorrect Identity Persistence Deployment

Deployment Best Practices

- Configure snapvol File
- Portal Policy Planning
  - Configuration
- Golden Image Creation
  - Secure Endpoint Version 8.4.4+:
  - Virtual Machine(VMware,Citrix,AWS, and Azure)
  - Outdated - Golden Image Override Flag for versions before 8.4.4
  - Golden Image Creation Steps
  - Update the Golden Image
- Golden Image Code
  - Golden Image Setup Script
  - Golden Image Startup Script

AWS Workspace Process

VMware Horizon Duplication Issues

- No Longer Needed Configuration/Changes
- Script Methodology
- VMware Horizon Configuration

Removing Duplicate Entries

Introduction

This document describes how to go over the Cisco Secure Endpoint Identity Persistence feature.

What is Identity Persistence?

Identity Persistence is a feature that allows you to maintain a consistent event log in virtual environments or when computers are re-imaged. You can bind a Connector to a MAC address or hostname so that a new connector record is not created every time a new virtual session is started or a computer is re-imaged. This feature is designed specifically for non-persistent VM and Lab environments. The recommended method is

hostname across business and enable the feature on the policies where you want to sync identities.

Requirements

Cisco recommends that you have knowledge of these topics:

- Access to the Cisco Secure Endpoints portal
- You need to contact Cisco TAC to have them enable the Identity Persistence feature in your organization.
- Identity Persistence is only supported on Windows Operating System (OS)

When Do You Need Identity Persistence?

Identity Persistence is functionality on Secure Endpoints which helps in the identification of Secure Endpoints at the time of initial Connector registration and matches them against previously known entries based on identity parameters like MAC Address or Hostname for that specific connector. The implementation of this feature not only helps to keep a correct license count but most importantly allows for proper tracking of historical data on non-persistent systems.

Virtual Endpoint Deployment

The most common use for Identity Persistence in Virtual Deployments is Non-Persistent Virtual Desktop Infrastructure (VDI) Deployment. VDI host desktop environments are deployed upon end-user requests or need. This includes different vendors like VMware, Citrix, AWS AMI Golden Image Deployment, and so on.

Persistent VDI, also often called 'Stateful VDI' is a setup where each individual user’s desktop is uniquely customizable and ‘persists’ from one session to another. This type of Virtual Deployment does not need the functionality of Identity Persistence, as these machines are intended not to be re-imaged regularly.

As with all software that could possibly interact with the performance of the Secure Endpoint, Virtual Desktop applications need to be evaluated for possible exclusions in order to maximize functionality and minimize impact.

Reference: https://docs.vmware.com/en/VMware-Horizon/2103/horizon-architecture-planning/GUID-AED54AE0-76A5-479B-8CD6-3331A85526D2.html

Physical Endpoint Deployment

There are two scenarios that can apply for the deployment of Identity Persistence on Secure Endpoints physical machines:

- When you deploy or reimage a physical endpoint with a golden image with the Secure Endpoint connector pre-installed, the Goldenimage Flag must be enabled. Identity Persistence can be used to avoid duplication in instances of re-imaged machines but is not required.

- When you deploy or reimage a physical endpoint with a golden image and later install the Secure Endpoint connector, Identity Persistence can be used to avoid duplication in instances of re-imaged machines but is not required.

Overview of Identity Persistence Process

1. The connector is downloaded with a token in the policy.xml file, which ties it back to the policy in

question on the cloud side.
2. The connector is installed, storing the token in local.xml, and the connector makes a POST request to the portal with the token in question.
3. The Cloud side goes through this order of operations:
   a. The computer checks the policy for the ID sync policy configuration. Without this, registration occurs as normal.
   b. Depending on the policy settings, Registration checks the existing database for the hostname or MAC address.
      Across Business:All policies are checked for a match on Hostname or MAC, depending on the setting. The matched object GUID is noted and sent back to the end client machine. The client machine then assumes the UUID and assumes any group/policy settings of the previously matched host. This overrides the installed policy/group settings.
      Across Policy: The token matches the policy on the cloud side and looks for an existing object with the same hostname or MAC address WITHIN that policy only. If one exists it assumes the UUID. If there is not an existing object tied to that policy, a new object is created. Note: duplicates can exist for the same hostname tied to other groups/policies.
   c. If a match can not be made to a group/policy due to a missing token (previously registered, bad deployment practice, and so on) the connector falls to the default connector group/policy set under the business tab. Based on the setting of the group/policy, it attempts to review all policies for a match (across the business), only that policy in question (across policy), or none at all (none). With this in mind, it is generally advised to place your default group to be one that contains their desired ID sync settings so machines sync back correctly in the event of a token issue.

Identify Duplicates in Your Organization

Externally Available GitHub Scripts

Find the Duplicate UUIDs: https://github.com/CiscoSecurity/amp-04-find-duplicate-guids

Reasons Why Duplicates Are Created

There are a few common instances that can cause duplicates to be seen on your end:

1. If these steps have been followed while VDI Pool:

- Initial deployment on a nonpersistent VM/VDI is done with Identity Persistence disabled (use a golden image for example).
- The policy is updated in the cloud to have Identity Persistence enabled, which during the day, updates it on the endpoint.
- Machines get refreshed/reimaged (use the same golden image), which then places the original policy back onto the endpoint without Identity Persistence.
- The policy locally does not have Identity Persistence so the registration server does not check for previous records.
- This flow results in Duplicates.

2. The user deploys the original golden image with Identity Persistence enabled in the policy in one group and then moves an endpoint to another group from the Secure Endpoints portal. It then has the original record in the ‘moved-to’ group but then creates new copies in the original group when the VMs get re-imaged/re-deployed.

Note: This is not an exhaustive list of scenarios that could cause duplicates but some of the most common ones.

Common Issues/Symptoms with Incorrect Identity Persistence Deployment

Incorrect Identity Persistence implementation can cause these issues/symptoms:

- Incorrect connector seat count
- Incorrect Reported results
- Device Trajectory data mismatch
- Machine name swaps within audit logs
- Connectors register and de-register randomly from the console
- Connectors do not report properly to the cloud
- UUID Duplication
- Machine name Duplication
- Data inconsistency
- Machines register to Default Business Group/Policy after recomposition

- Deploying manually with Identity Persistence enabled on the policy.

- If you deploy endpoint manually via command line switch with Identity Persistence already enabled in the policy and then later uninstall the endpoint and try re-install with package from different Group/Policy the endpoint will automatically switch back to the original policy.

- Output from SFC logs showing policy switch on it’s own with in 1-10sec

```
(167656, +0 ms) Dec 14 11:37:17 [1308]: Util::VerifyOsVersion: ret 0
(167656, +0 ms) Dec 14 11:37:17 [1308]: ERROR: ETWEnableConfiguration::IsETWEnabled: ETW not initialize
(167656, +0 ms) Dec 14 11:37:17 [1308]: UiPublisher::PublishPolicyInfo: Name -UTMB-WinServer-Protect Se
(167656, +0 ms) Dec 14 11:37:17 [1308]: UiPublisher::PublishLastPolicyUpdateTime: Publish Last Policy U
(167656, +0 ms) Dec 14 11:37:17 [1308]: UiPublisher::PublishAgentVersion: Agent Version 7.5.7.21234
(167656, +0 ms) Dec 14 11:37:17 [1308]: HeartBeat::PolicyNotifyCallback: EXIT
(167656, +0 ms) Dec 14 11:37:17 [1308]: AmpkitRegistrationHandler::PolicyCallback: EXIT (0)
.
.
.
(173125, +0 ms) Dec 14 11:37:22 [4704]: AmpkitRegistrationHandler::UpdateConfiguration: Enter
(173125, +0 ms) Dec 14 11:37:22 [4704]: AmpkitRegistrationHandler::UpdateConfiguration: Aborting - not
(173125, +0 ms) Dec 14 11:37:22 [4704]: AmpkitRegistrationHandler::ConnectionStateChanged: Starting Pro
(173125, +0 ms) Dec 14 11:37:22 [4704]: UIPipe::SendPolicyReloaded sending policy reloaded to UI. ui.da
(173125, +0 ms) Dec 14 11:37:22 [4704]: PipeSend: sending message to user interface: 28, id: 0
(173125, +0 ms) Dec 14 11:37:22 [4704]: UIPipe::SendStatus: notifying UI: No Product
(173125, +0 ms) Dec 14 11:37:22 [4704]: UIPipe::SendStatus: notifying UI: No Product
(173125, +0 ms) Dec 14 11:37:22 [4704]: UIPipe::SendStatus: notifying UI: No Product
(173125, +0 ms) Dec 14 11:37:22 [4704]: UIPipe::SendStatus : engine1 (0, 0), engine2 (0, 0)
(173125, +0 ms) Dec 14 11:37:22 [4704]: PipeSend: sending message to user interface: 1, id: 0
(173125, +0 ms) Dec 14 11:37:22 [4704]: UiStatusHandler::ConnectionStateChangedState: 0
(173125, +0 ms) Dec 14 11:37:22 [4704]: UiPublisher::PublishConnectionStatus: State 0
(173125, +0 ms) Dec 14 11:37:22 [4704]: AmpApiServer.cpp:AmpApiServer::PublishScanAvailable:223: Cloud
(173125, +0 ms) Dec 14 11:37:22 [4704]: AmpkitProxyHelper::LoadProxyFromConfig: Enter
(173125, +0 ms) Dec 14 11:37:22 [4704]: AmpkitProxyHelper::LoadProxyFromConfig proxy server is NULL
(173125, +0 ms) Dec 14 11:37:22 [4704]: AmpkitProxyHelper::LoadProxyFromConfig: Direct connection detec
(173125, +0 ms) Dec 14 11:37:22 [4704]: AmpkitProxyHelper::LoadProxyFromConfig: Exit(1)
(173125, +0 ms) Dec 14 11:37:22 [4704]: UiAgentGuidUpdater::ConnectionStateChanged
(173125, +0 ms) Dec 14 11:37:22 [4704]: UiAgentGuidUpdater::RefreshAgentGuidUi: Agent GUID: e1a756e2-65
(173125, +0 ms) Dec 14 11:37:22 [4704]: UiPublisher::PublishAgentGuid: Agent GUID did not change (e1a75
(173125, +0 ms) Dec 14 11:37:22 [4704]: AmpkitSubscriptionThread::NotificationWorker: Waiting on queue
```

The other side effect if you try install connector that belongs to different group. You will see in the portal that connector is assigned to the correct group but with **“wrong”** original policy

This is due to fact how Identity Persistence (ID SYNC) work.

Without ID SYNC once connector is uninstalled completely or by using re-register command line switch. You should see new Created Date and connector GUID in case of un-install or just new connector GUID in case of re-register command. However, with ID SYNC that is not possible ID SYNC overwrites with the old GUID and DATE. That's how we 'sync' the host.

If this issue is observed fix has to be implemented through the policy change. You will need to move affected endpoint(s) back to the original Group/Policy and make sure the policy sync up. Then move the endpoint(s) back to the desired Group/Policy

Deployment Best Practices

Configure snapvol File

In case you use App Volumes for your VDI Infrastructure, it is recommended you make these configuration changes to your **snapvol.cfg** configuration

These exclusions must be implemented into **snapvol.cfg file**:

Paths:

- C:\Program Files\Cisco\AMP
- C:\ProgramData\Cisco
- C:\Windows\System32\drivers
- C:\Windows\System32\drivers\ImmunetNetworkMonitor.sys
- C:\Windows\System32\drivers\immunetprotect.sys
- C:\Windows\System32\drivers\immunetselfprotect.sys
- C:\Windows\System32\drivers\ImmunetUtilDriver.sys
- C:\Windows\System32\drivers\trufos.sys

Registry Keys:

- HKEY_LOCAL_MACHINE\SOFTWARE\Immunet Protect
- HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\Immunet Protect
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\services\CiscoAMP
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CiscoAMPCEFWDriver
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CiscoAMPELAMDriver
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CiscoAMPHeurDriver
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CiscoOrbital
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CiscoSAM
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CiscoSCMS
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\services\ImmunetProtectDriver
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\services\ImmunetSelfProtectDriver
- HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\services\Trufos

On x64 systems, add these:

- HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Immunet Protect
- HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Microsoft\Windows\CurrentVersion\Uninstall\Im

Protect

References:

- https://docs.vmware.com/en/VMware-App-Volumes/index.html
- https://docs.vmware.com/en/VMware-App-Volumes/2103/app-volumes-admin-guide/GUID-0B588F2C-4054-4C5B-B491-F55BDA33A028.html

Portal Policy Planning

These are some of the best practices that must be followed when you implement Identity Persistence on the Secure Endpoint Portal:

1. It is highly recommended to use separate policies/groups for Identity Persistence endpoints for easier segregation.

2. If you plan to use Endpoint Isolation and implement the **Move Computer to Group upon compromise** action. The destination group must also have Identity Persistence enabled and must only be used for VDI computers.

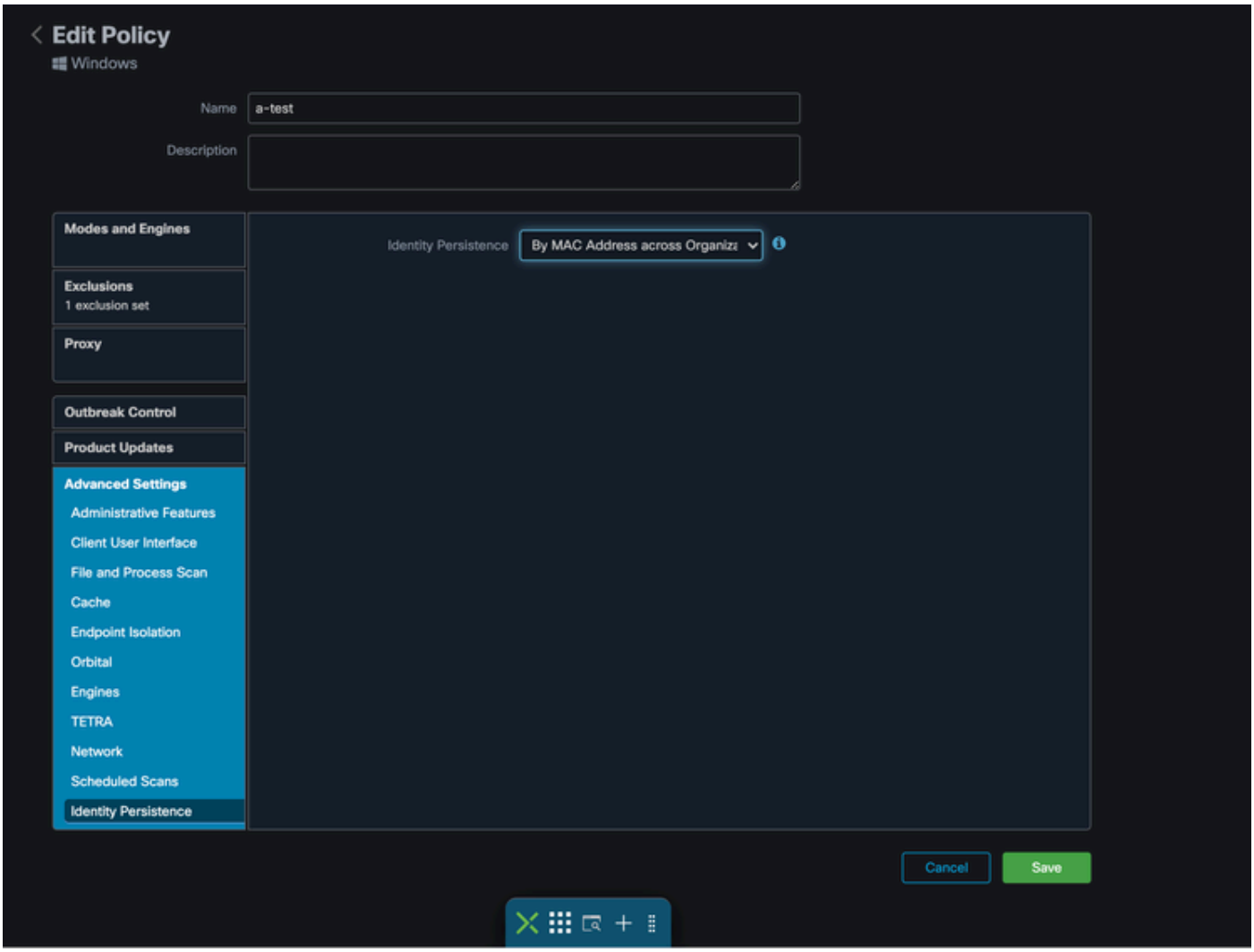
3. It is not recommended to enable **Identity Persistence** on the Default Group/Policy on your organization settings unless Identity Persistence has been enabled Across All policies with Across Organization as the settings scope.

Configuration

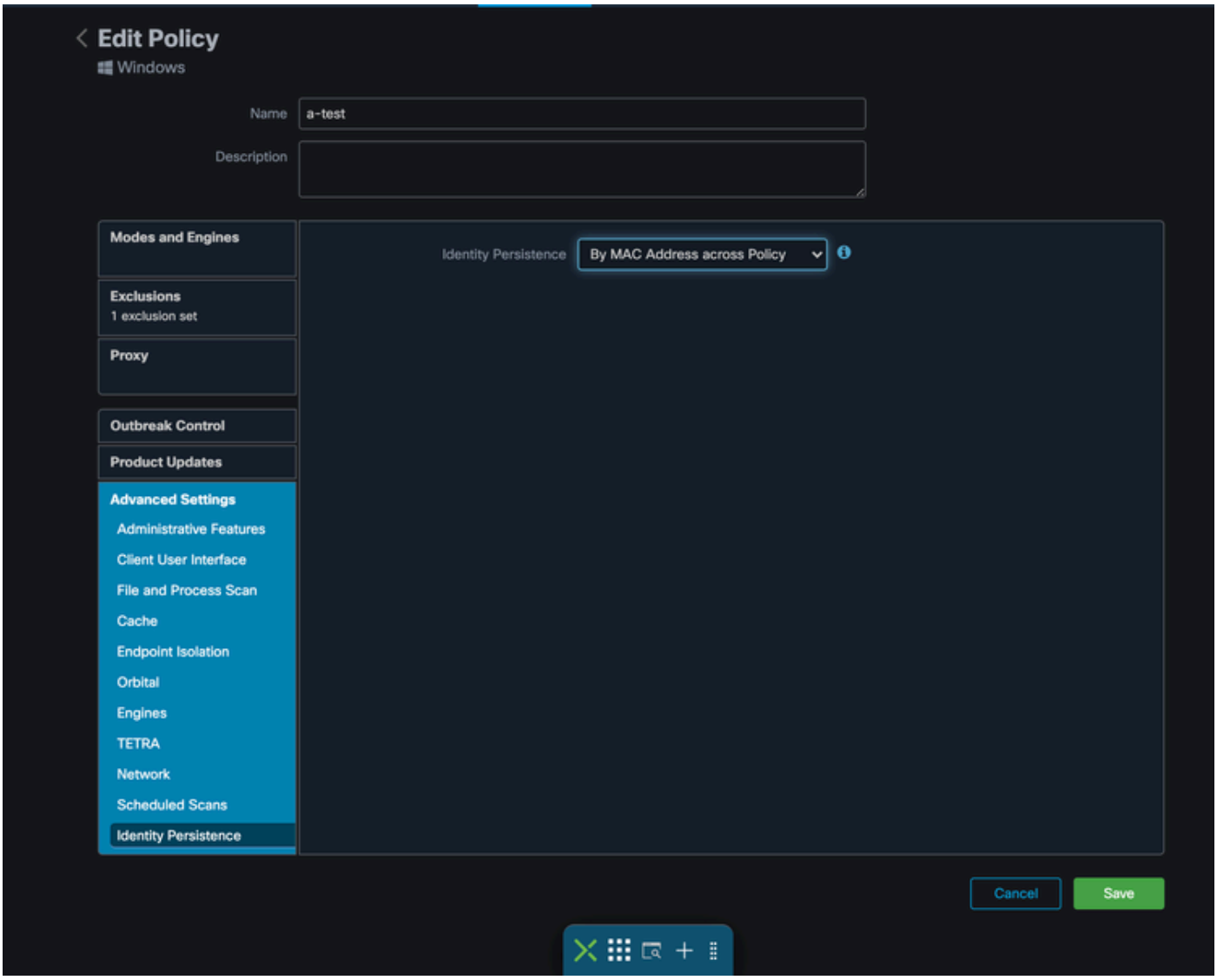
Follow these steps in order to deploy the Secure Endpoint connector with Identity Persistence:

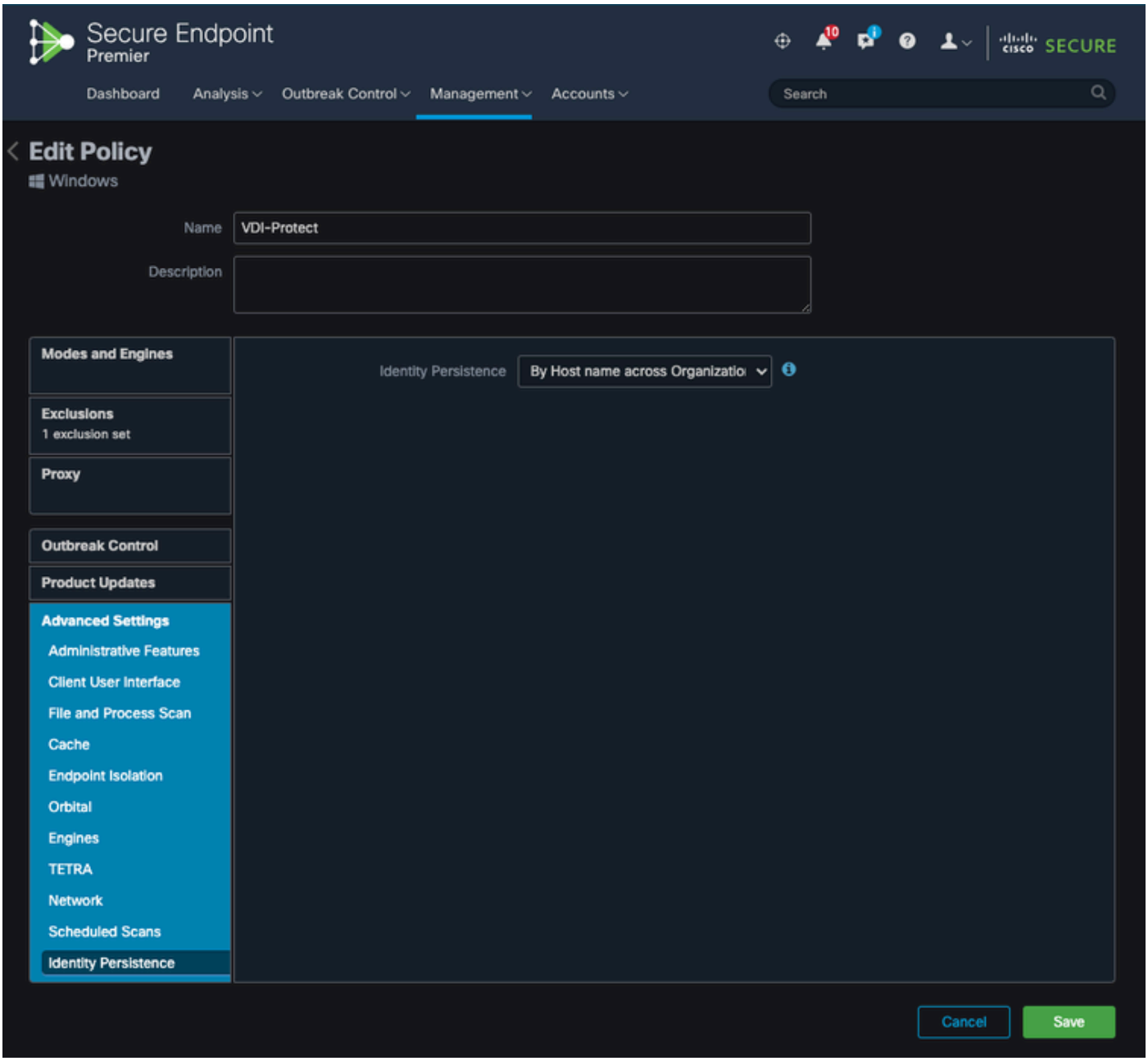
Step 1. Apply the desired Identity Persistence setting to your policies:

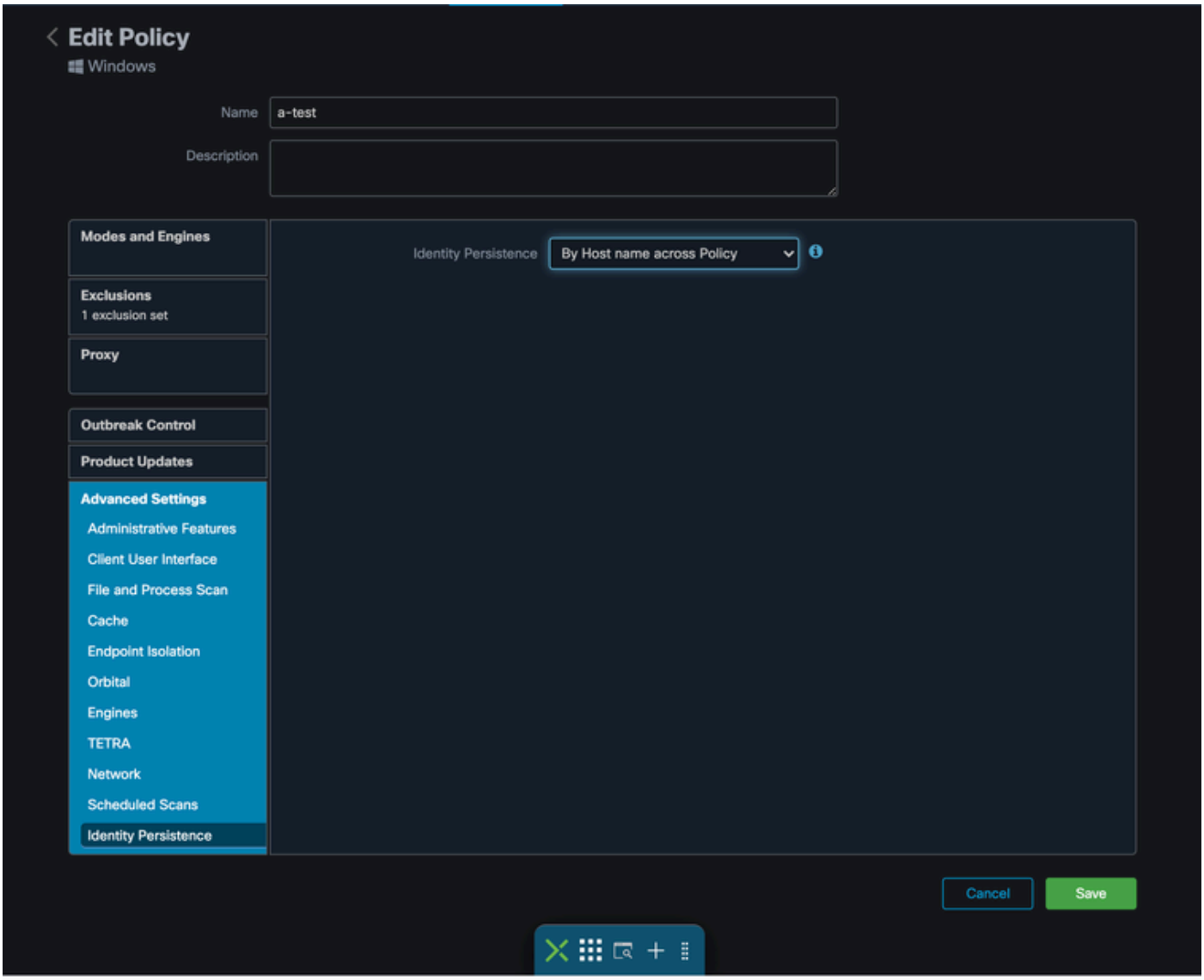
- In the Secure Endpoint portal, navigate to **Management > Policies**.
- Select the desired policy you want to enable Identity Persistence on and then click**Edit**.
- Navigate to the**Advanced Settings**tab and then click the **Identity Persistence** tab at the bottom.
- Select the Identity Persistence drop-down and choose the option that makes the most sense for your environment. Refer to this image.


Edit Policy
Windows
Name
a-test
Description
Modes and Engines
Exclusions
1 exclusion set
Proxy
Outbreak Control
Product Updates
Advanced Settings
Administrative Features
Client User Interface
File and Process Scan
Cache
Endpoint Isolation
Orbital
Engines
TETRA
Network
Scheduled Scans
Identity Persistence
Identity Persistence
By MAC Address across Organiz
Cancel
Save

Test - 123


Edit Policy
Windows
Name
a-test
Description
Modes and Engines
Exclusions
1 exclusion set
Proxy
Outbreak Control
Product Updates
Advanced Settings
Administrative Features
Client User Interface
File and Process Scan
Cache
Endpoint Isolation
Orbital
Engines
TETRA
Network
Scheduled Scans
Identity Persistence
Identity Persistence
By MAC Address across Policy
Cancel
Save


Secure Endpoint
Premier
Dashboard
Analysis
Outbreak Control
Management
Accounts
Search
SECURE
Edit Policy
Windows
Name
VDI-Protect
Description
Modes and Engines
Exclusions
1 exclusion set
Proxy
Outbreak Control
Product Updates
Advanced Settings
Administrative Features
Client User Interface
File and Process Scan
Cache
Endpoint Isolation
Orbital
Engines
TETRA
Network
Scheduled Scans
Identity Persistence
Identity Persistence
By Host name across Organizatio
Cancel
Save



There are five options you can choose from.

- Note that Feature is not enabled. Connector UUIDs are not synchronized with new Connector installs under any circumstance. Each new installation generates a new machine object.
- By MAC Address across Business: New or refreshed installations look for the most recent Connector record that has the same MAC address in order to synchronize previous historical data with the new registration. This setting looks through all business records

  across all policies in the organization that have Identity Synchronization set to a value other than None. The Connector can update its policy to reflect the previous installation if it differs from the new one.

- By MAC Address across Policy: New or refreshed installations look for the most recent Connector record that has the same MAC address in order to synchronize previous historical data with the new registration. This setting only looks through the records associated with the policy used in the deployment. If the Connector was not previously installed in this policy but was previously active in another, it can create duplicates.
- By Hostname across Business: New or refreshed installations look for the most recent Connector record that has the same Hostname in order to synchronize previous historical data with the new registration. This setting looks through all business records, regardless of the Identity Persistence settings in other policies and the Connector can update its policy to reflect the previous installation if it differs from the new. Hostname includes FQDN so duplicates can occur if the connector regularly

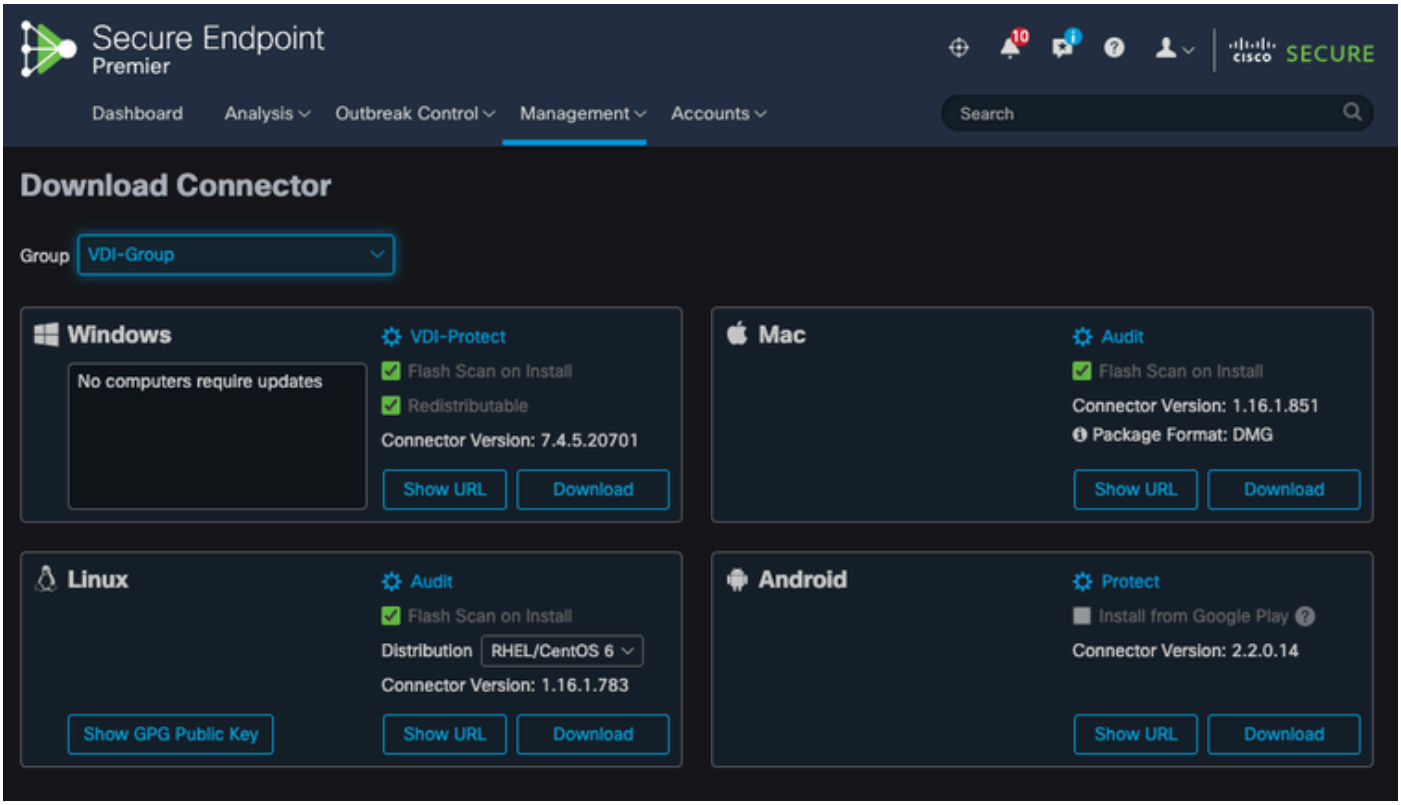
moves between networks (like a laptop).

- By Hostname across Policy: New or refreshed installations look for the most recent Connector record that has the same Hostname in order to synchronize previous historical data with the new registration. This setting only looks through the records associated with the policy used for the deployment. If the Connector was not previously installed in this policy but was previously active in another, it can create duplicates. Hostname includes FQDN so duplicates can also occur if the connector regularly moves between networks (like a laptop).

Note: If you choose to use Identity Persistence, Cisco suggests that you use **By Hostname across Business or Policy**. A machine has one hostname but can have more than one MAC address and many VMs clone the MAC Addresses.

Step 2. Download the Secure Endpoint Connector.

- Navigate to**Management > Download Connector**.
- Select the group for the policy you edited in Step 1.
- Click**Download** for the Windows Connector as shown in the image.



Step 3. Deploy Connector to endpoints.

- You can now use the downloaded connector to install Secure Endpoint (with Identity Persistence now enabled) manually on your endpoints.
- Otherwise, you can also deploy the connector using a golden image (see image)

Note: You need to select the redistributable installer. This is a ~57 MB (size can vary with newer versions) file that contains both the 32- and 64-bit installers. In order to install the connector on multiple computers, you can place this file on a network share or push it to all the computers accordingly. The installer contains a policy.xml file that is used as a configuration file for the installation.

Golden Image Creation

Secure Endpoint Version 8.4.4+:

New process for versions of Secure Endpoint 8.4.4. We recommend updating to this version at a minimum to get started with your golden image process as this method is both easier and quicker. These switches are intended for use when creating a Windows operating system image as a deployable golden image (Secure Endpoint Windows connector version 8.4.4 and later):

- sfc.exe -enablegoldenimage <password>- Stops the connector service, deletes the registry keys and local xml nodes associated with query connections, and adds hostname to local.xml for golden image recognition where <password> is theConnector Protection Password.

Virtual Machine(VMware,Citrix,AWS, and Azure)

Follow the best practices guidelines from the Vendor document (VMware, Citrix, AWS, Azure, and so on.) when you create a Golden Image to be used for the VDI Cloning process.

For example, VMware Golden Image Process: https://docs.vmware.com/en/VMware-Horizon/2106/virtual-desktops/GUID-D9C46AEF-1C41-4711-BF9E-84362EBE6ABF.html.

As you have identified the VMware, AWS composition process restarts the Cloned (Child VMs) multiple times before the finalization of the VM configuration, this causes issues with the Secure Endpoint registration process as at this time the Cloned (Child VMs) do not have the final/correct hostnames assigned and that causes the Cloned (Child VMs) to use the Golden Image Hostname and registers to the Secure Endpoint Cloud. This breaks the cloning process and causes issues.

This is not an issue with the Secure Endpoint connector process but incompatibility with the Cloning Process and Secure Endpoint registration. In order to prevent this issue, we have identified a few changes to be implemented in the cloning process which help resolve these issues.

These are the changes that need to be implemented on the Golden Image VM before the image is frozen to clone

1. Always use the **Goldenimage** flag on the Golden Image at the time of the installation of Secure Endpoint.

2. Implement the **Golden Image Setup Script** and **Golden Image Startup Script** section to find the scripts that would help turn ON the Endpoint service only when we have a final hostname implemented on the Cloned(Child VMs). Refer to the section VMware Horizon Duplication Issues for more details.

Outdated - Golden Image Override Flag for versions before 8.4.4

When you use the installer, the flag to use for golden images is **/goldenimage 1**.

The golden image flag prevents the connector from starting and registering on the base image; and, so on the next start of the image, the connector is in the functional state it was configured to be in by the policy assigned to it.

For information on other Flags, you can use, please see this article.

When you use the installer, the new flag to use for golden images is **/goldenimage [1|0]**

0 - Default Value - this value will not trigger the golden image option, and operates just as if the installer

was run without the option at all. Do not skip Initial Connector registration and startup on install.

```
C:\> CiscoInstaller_goldenimage.exe /R /S /goldenimage 0 [other options…]
```

1 -Install as a golden image. This is the typical option used with the flag and is the only expected usage. Skips initial Connector registration and Startup on installation.

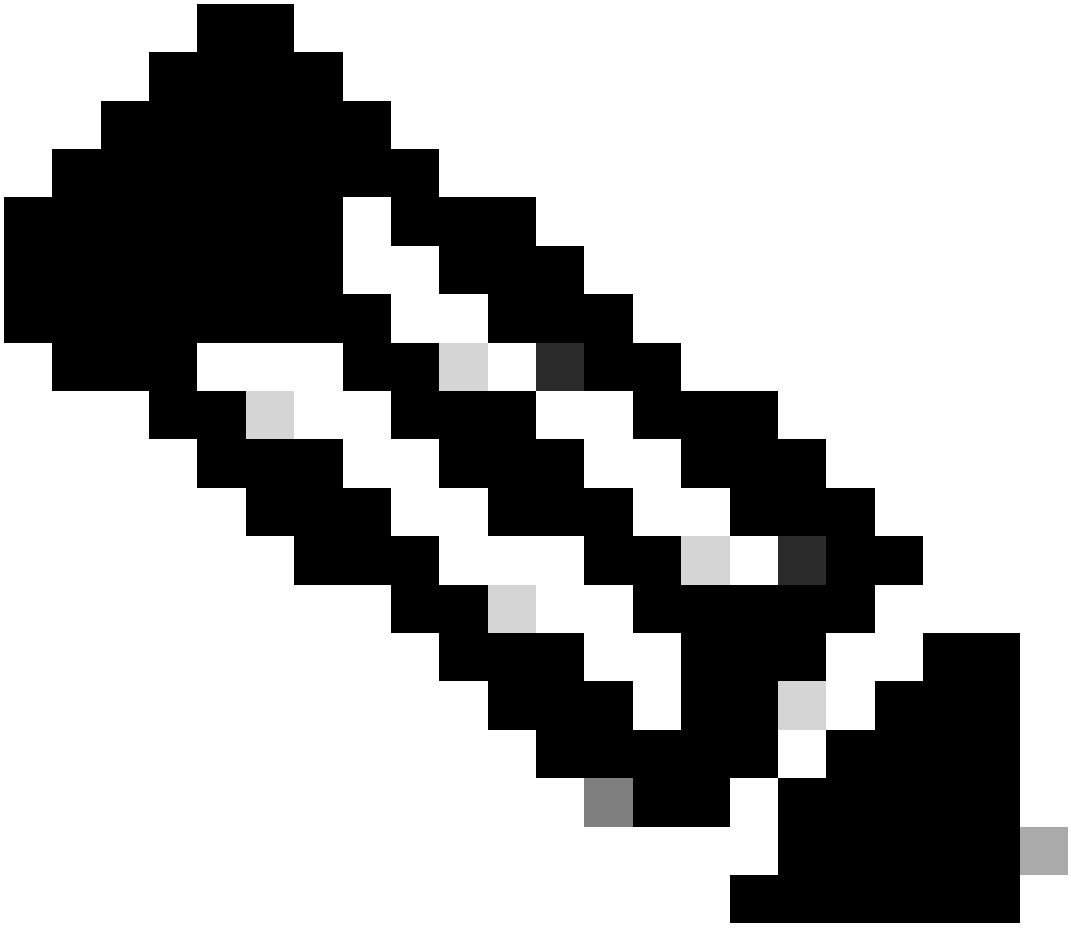
```
C:\> CiscoInstaller_goldenimage.exe /R /S /goldenimage 1 [other flags here…]
```

Golden Image Creation Steps

It is best practice to install the connector last for the preparation of the **Golden Image**.

Please also refer to our recommendation in the section above (**Secure Endpoint Version 8.4.4+)** as we heavily encourage utilizing version 8.4.4 and up

1. Prepare the Windows image to your requirements; install all your required software, and configurations for the Windows imageexcept for the connector.
2. Install the Cisco Secure Endpoint connector.
3. sfc.exe -enablegoldenimage <password>- Stops the connector service, deletes the registry keys and local xml nodes associated with query connections, and adds hostname to local.xml for golden image recognition where <password> is theConnector Protection Password.
4. Freeze Golden Image



Note: Please note you can utilize the following command if you no longer want it to keep monitoring for hostname changes as it stops the connector and deletes the golden image host name from local.xml to return it to the regular operating state.

sfc.exe -disablegoldenimage <password if connector is running>

If the connector is running, you will need to enter the Connector Protection Password.

Outdated method Prior to 8.4.4 steps below

1. Prepare the Windows image to your requirements; install all your required software, and configurations for the Windows imageexcept for the connector.
2. Install the Cisco Secure Endpoint connector.

Use the**/goldenimage 1**flag in order to indicate to the installer that this is a golden image deployment.

```
C:\> CiscoInstaller_goldenimage.exe /R /S /goldenimage 1
```

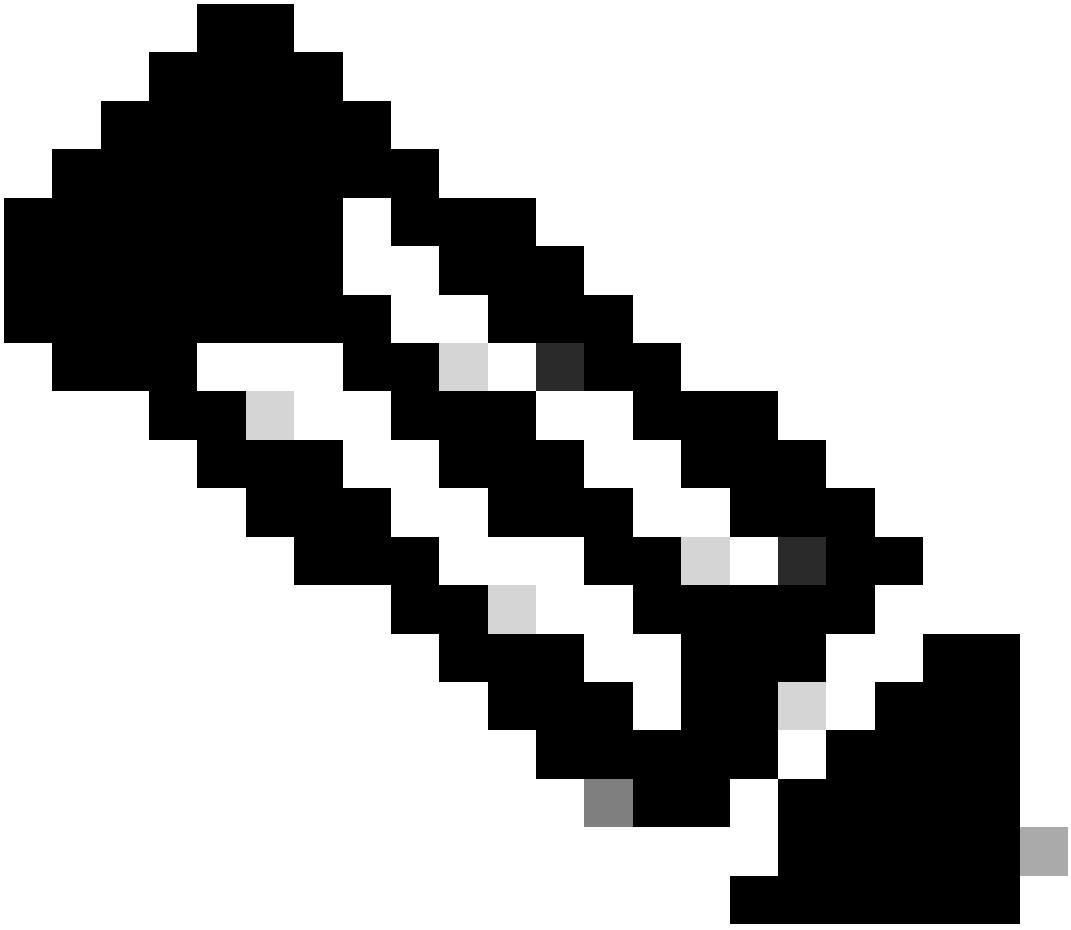
3. Implement the Script Logic(If needed) as described here

4. Complete installation

5. Freeze your golden image

After the Golden Image has had applications installed, the system prepped and Secure Endpoint has been installed with the/**goldenimage**flag, the host is ready to be frozen and distributed. Once the cloned host boots up, Secure Endpoint then starts and registers to the cloud. No further action is required with regard to configuring the connector unless there are changes that you want to make to the policy or host. If changes are made after the golden image has completed registration, this process must be restarted. The flag prevents the connector from starting and registering on the base image. On the next start of the image, the connector will be in the functional state it was configured to be in by the policy assigned to it.

Note: If the Golden Image gets registered to the Secure EndpointCloud before you are able to freeze the VM, it is recommended to uninstall and re-install Secure Endpoint on the Golden Image VM and then freeze the VM again to prevent registration and duplicate connector issues. It is not suggested to modify any registry values for Secure Endpoint as part of this uninstallation process.



Note: If you are deploying the Secure Endpoint connector utilizing version 8.4.4 and up, please see

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the section right above "8.4.4+ Update"

Update the Golden Image

You have two options when you need to update a Golden Image in order to retain an unregistered connector.

Recommended Process

1. Uninstall the connector.
2. Install the host updates / upgrades.
3. Reinstall the connector after the golden image process using the golden image flags.
4. The host **should not** start the connector if the process is followed.
5. Freeze the image.
6. Verify before spinning up clones that the Golden Image did not register to the Portal to prevent unwanted duplicate hosts.

Alternate Process

1. Ensure the host has no connectivity to the internet to prevent the connector from registering.
2. Stop the connector service.
3. Install updates.
4. Freeze the image once the updates have been completed
5. The connector needs to be prevented from registering in order to prevent duplicate hosts from occurring. When you remove connectivity, this prevents it from reaching out to register to the cloud. Also, the connector being stopped will keep it in that state until the next reboot which will allow the clones to register as unique hosts.
6. Verify before spinning up clones that the Golden Image did not register to the Portal to prevent unwanted duplicate hosts.

Golden Image Code

This section consists of the code snippets that can help support the Golden Image Process and would help prevent connector duplicates when implementing Identity Persistence.

Golden Image Setup Script

Setup Script Description

The first script, 'Setup', is executed on the Golden Image before cloning it. It has to be manually executed just **one time**. Its main purpose is to establish initial configurations that will allow the following script to function correctly on the cloned virtual machines. These configurations include:

- Changing the Cisco Secure Endpoint service startup to manual to avoid auto-start.
- Creating a scheduled task that executes the following script (Startup) at system startup with the highest privileges.
- Creating a system environment variable called "AMP_GOLD_HOST" that stores the hostname of the Golden Image. That would be used by the Startup script to verify if we have to revert the changes

Setup script code

```
rem Turn AMP to manual start
```

```
sc config CiscoAMP start=demand

rem Add host name to a system variable that we can check on startup
setx -m AMP_GOLD_HOST %COMPUTERNAME%

rem Add the startup script to the startup scripts
rem /rp password when there is a password
schtasks /create /tn "Startamp" /tr "C:\Users\XXXXXX\Desktop\VMWareHorizonAMPStartup.bat" /sc onstart /
```

The Setup script code is quite straightforward:

Line 2: Changes the startup type of the malware protection service to manual.

Line 5: Creates a new environment variable called "AMP_GOLD_HOST" and saves the current computer's hostname in it.

Line 9: Creates a scheduled task named "Startamp" that runs the specified 'Startup' script during system startup with the highest privileges, without needing a password.

Golden Image Startup Script

Startup Script Description

The second script, 'Startup', runs on each system startup on the cloned virtual machines. Its main purpose is to check if the current machine has the hostname of the 'Golden Image':

- If the current machine is the Golden image, no action is taken and the script ends. Secure Endpoint will continue running at system startup since we maintain the scheduled task.
- If the current machine is NOT the 'Golden' image, the changes made by the first script are reset:
  - Changing the Cisco Secure Endpoint service startup configuration to automatic.
  - Starting the Cisco Secure Endpoint service.
  - Removing the "AMP_GOLD_HOST" environment variable.
  - Deleting the scheduled task that executes the startup script and deleting the script itself.

Startup script code

```
echo "Current hostname: %COMPUTERNAME% vs %AMP_GOLD_HOST%"

if "%COMPUTERNAME%" == "%AMP_GOLD_HOST%" ( goto same ) else ( goto notsame )

:same
rem Do nothing as we are still the golden image name
goto exit

:notsame
rem Turn AMP to autostart
sc config CiscoAMP start=auto

rem Turn on AMP
sc start CiscoAMP

rem Remove environment variable
REG delete "HKLM\SYSTEM\CurrentControlSet\Control\Session Manager\Environment" /F /V AMP_GOLD_HOST
schtasks /delete /tn Startamp
```

```
goto exit
:exit
```

Line 2: Compares the current hostname with the stored "AMP_GOLD_HOST" value; if they are the same, the script jumps to the "same" label, otherwise, it jumps to the "notsame" label.

Line 4-6: When the "same" label is reached, the script does nothing since it is still the Golden Image and proceeds to the "exit" label.

Line 8-16: If the "notsame" label is reached, the script performs the following actions:

- Changes the startup type of the malware protection service to automatic.
- Starts the malware protection service.
- Removes the "AMP_GOLD_HOST" environment variable.
- Deletes the scheduled task named "Startamp"

Note: Please note the scripts contained in this document are not officially supported by TAC.

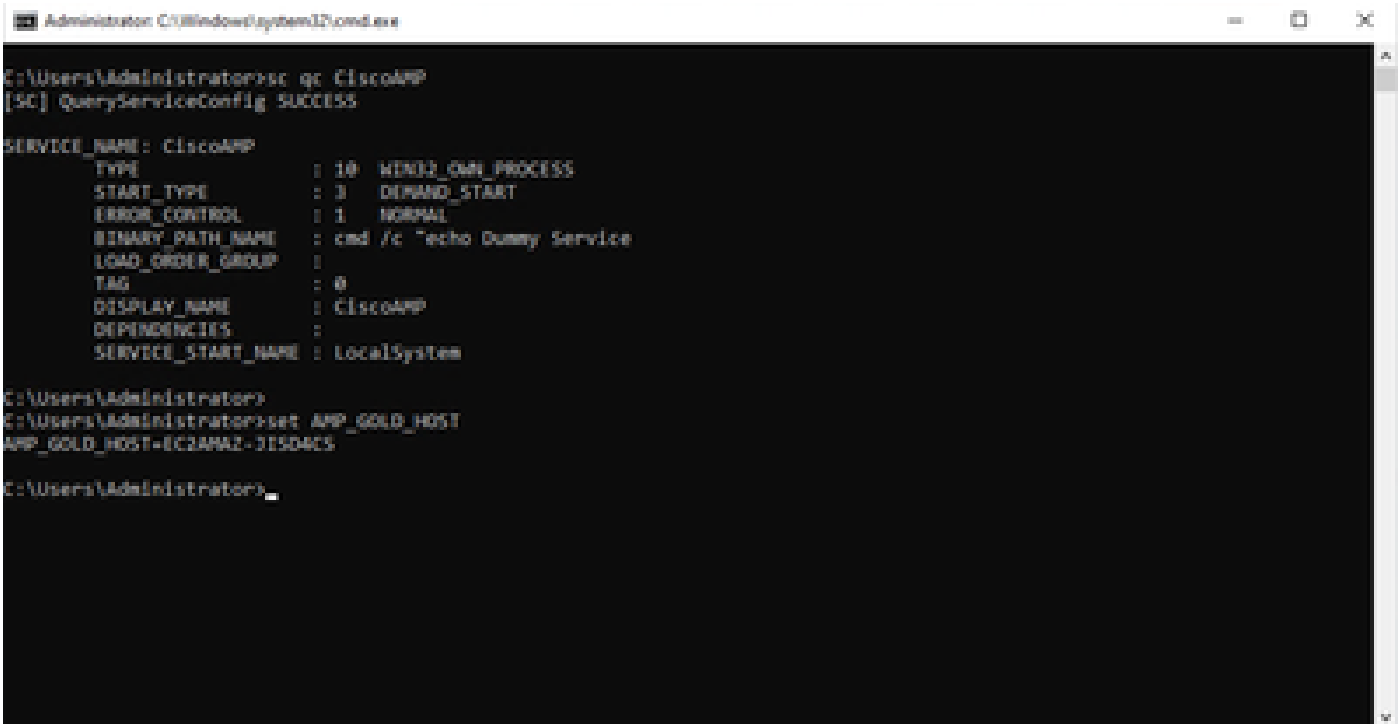
Note: These two scripts allow the Cisco AMP service startup in cloned virtual machine environments. By properly configuring the Golden image and using the startup scripts, it ensures that the Cisco Secure Endpoint runs on all cloned virtual machines with the correct configuration.

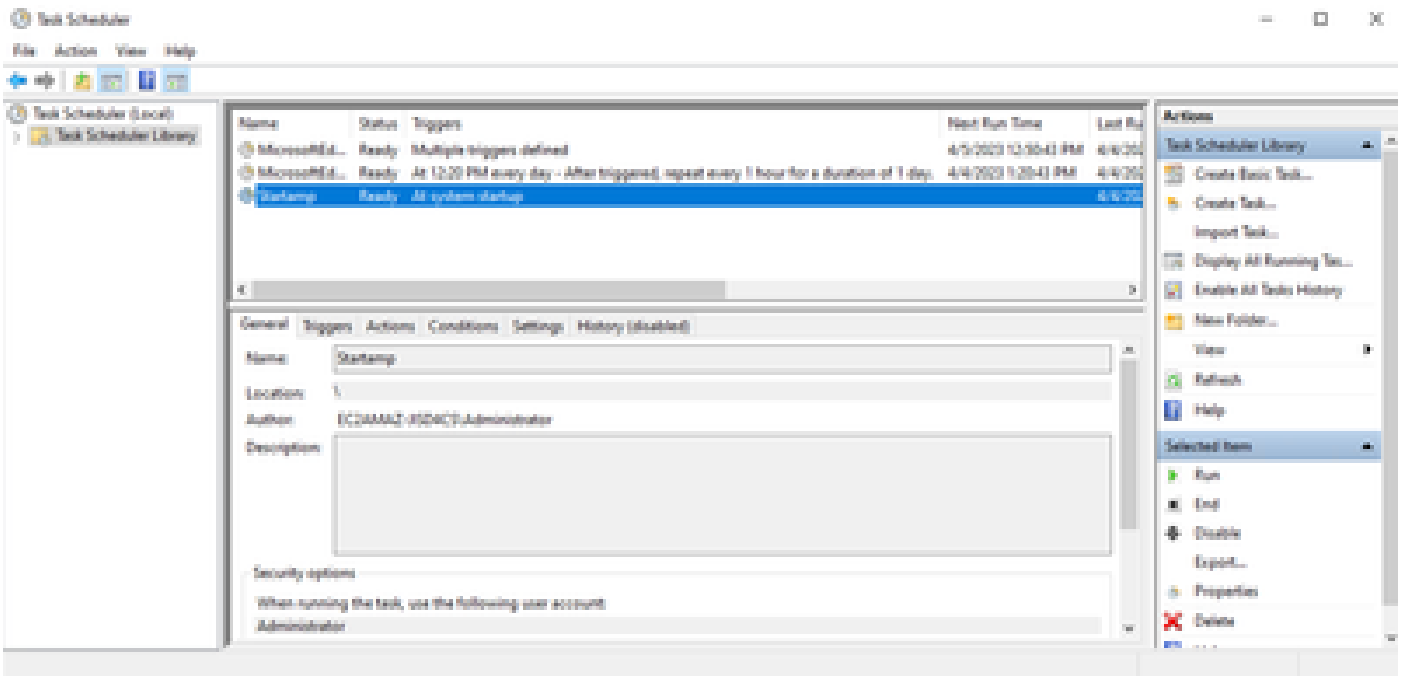
AWS Workspace Process

This solution consists of a 'Setup' script executed on the Golden Image prior to cloning and a 'Startup' script that runs on each cloned virtual machine during system startup. The primary objective of these scripts is to ensure the proper configuration of the service while reducing manual intervention. These two scripts allow the Cisco Secure Endpoint service startup in cloned virtual machine environments. By properly configuring the Golden image and using the startup scripts, it ensures that the Cisco Secure Endpoint connector runs on all cloned virtual machines with the correct configuration

Refer to the **Golden Image Setup Script Code** and **Golden Image Startup Script Code** section for the script code required for implementing Golden Image on AWS Workspace.

After executing the Setup Script we can verify that the configuration changes have been successfully deployed.





Since we performed this action on the golden image all the new instances will have this configuration and will execute the Startup Script at startup.

VMware Horizon Duplication Issues

With VMware Horizon, we were able to identify that the Child VM machines when they are being created are rebooted multiple times as part of the Horizon compose process. This causes issues as the Secure Endpoint services get enabled when the Child VMs are not ready (they do not have the final/correct NetBios Name assigned). This causes further issues with Secure Endpoint getting confused and hence the process breaks. To avoid running into this issue, we came up with a solution for this incompatibility with Horizon Process and this involves implementing the attached scripts on the Golden Image VM and using the post-synchronization script Functionality for VMware Horizon: https://docs.vmware.com/en/VMware-Horizon/2103/published-desktops-applications.pdf.

No Longer Needed Configuration/Changes

- You no longer need to uninstall and re-install Secure Endpoint if you want to make any changes to the Golden Image after the first deployment.
- No need to set the Secure Endpoint Service to **Delayed Start**.

Script Methodology

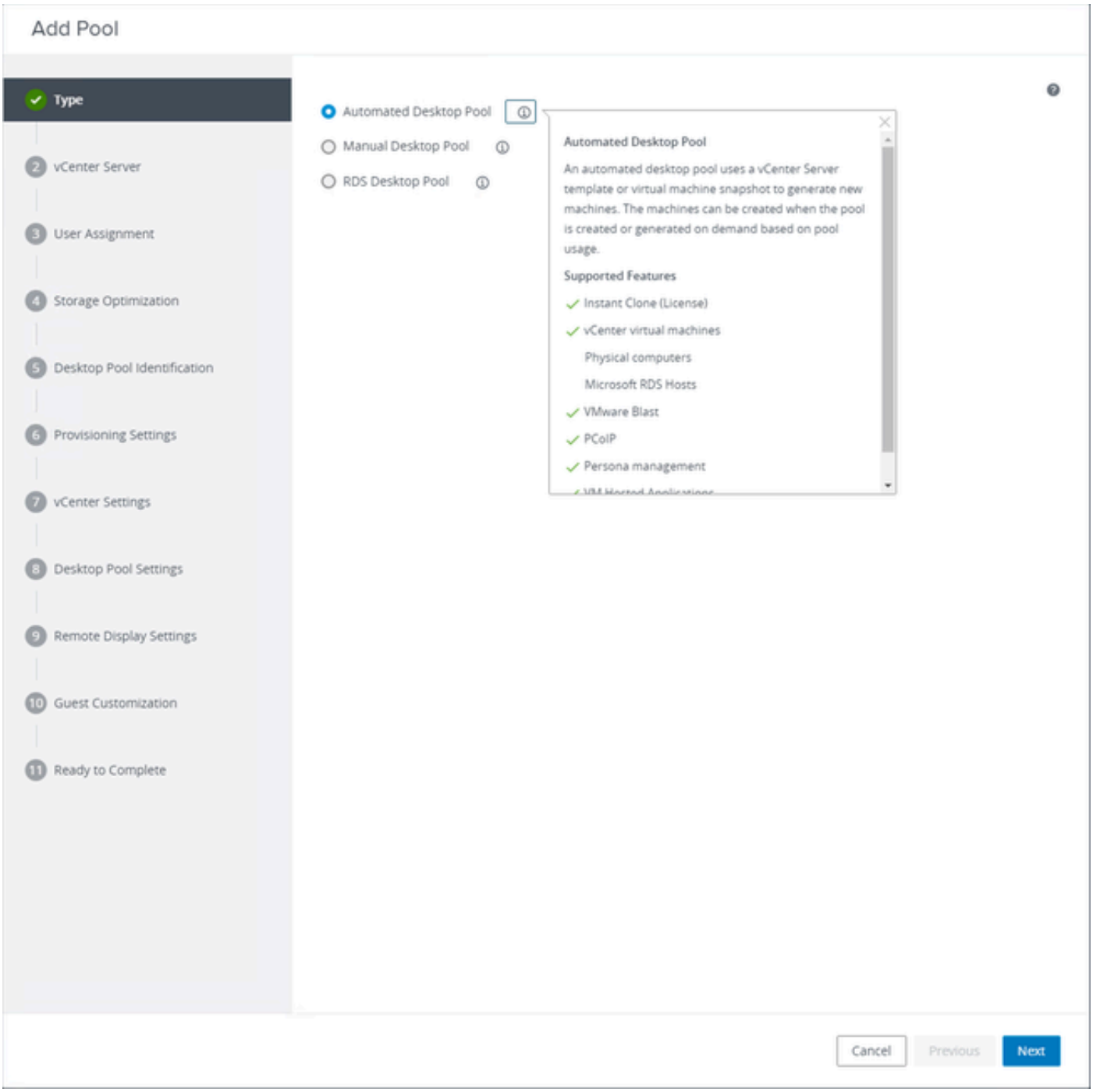
Examples of the scripts can be found below.

- **Golden Image Setup Script:** This script must be implemented once the Secure Endpoint connector is installed as described previously with the flags as documented earlier. This script modified the Secure Endpoint service to Manual Start and saves the Golden Image Hostname as an Environment Variable for reference in the next step.

- **Golden Image Startup Script:** This script is a logical check where we match the hostname on the Cloned (Child) VMs to the one stored in the previous step to ensure we identify when the Cloned (Child) VM gets a hostname that is anything other than the Golden Image VM (which would be the final hostname for the machine) and then you go ahead and start up the Secure Endpoint Service and change that to be Automatic. You also remove the Environment Variable from the previously mentioned script. This is normally implemented with the use of the mechanisms available from the deployment solution like VMware. On VMware, you can use post-synchronization parameters: https://docs.vmware.com/en/VMware-Horizon-7/7.13/virtual-desktops/GUID-E177899E-023D-4E61-B058-AFE3822158AA.html Similarly for AWS, you can use Startup Scripts in a similar manner: https://docs.aws.amazon.com/AWSEC2/latest/WindowsGuide/ec2-windows-user-data.html.

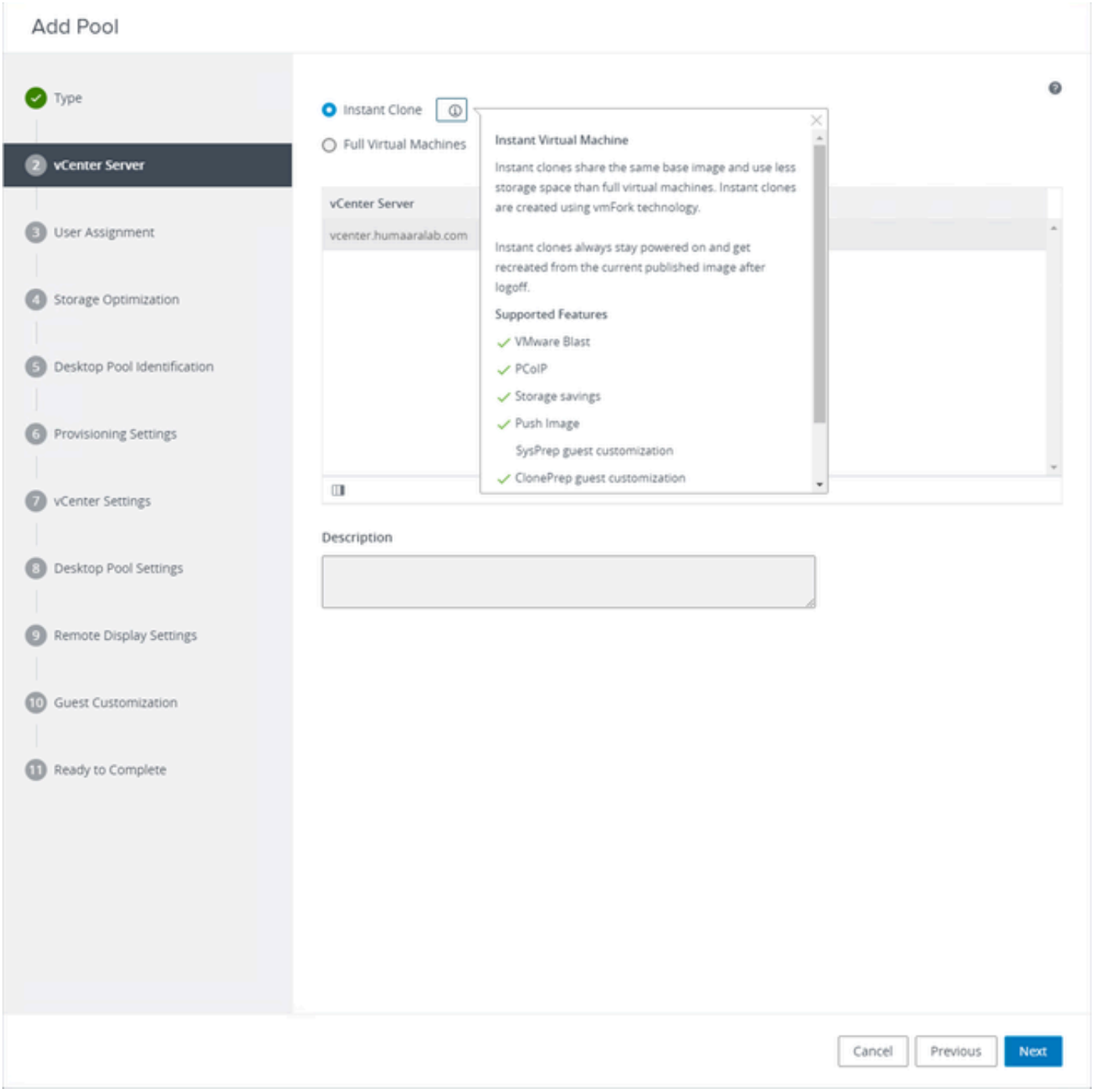
VMware Horizon Configuration

1. Golden Image VM is prepped and all the required applications for the initial deployment of the pool are installed on the VM.
2. A secure Endpoint is installed with this Command-Line Syntax to include the goldenimage Flag. For example, **<ampinstaller.exe> /R /S /goldenimage 1**. Please note that The Golden Image Flag ensures that the Secure Endpoint service does not run until a reboot which is critical for this process to work correctly. Refer to https://www.cisco.com/c/en/us/support/docs/security/sourcefire-fireamp-endpoints/118587-technote-fireamp-00.html
3. After the Secure Endpoint Installation, execute the **VMWareHorizonAMPSetup.bat** script on the Golden Image VM first. Essentially, this script changes the Secure Endpoint Service to **Manual Start** and creates an Environment Variable that stores the Golden Image Hostname for later use.
4. You need to copy the **VMWareHorizonAMPStartup.bat** to a universal path on the Golden Image VM like "**C:\ProgramData**" as this would be used in the later steps.
5. The Golden Image VM can now be Shutdown and the composition process can be initiated on VMware Horizon.
6. This is the step-by-step information on what it looks like from the VMware Horizon perspective:



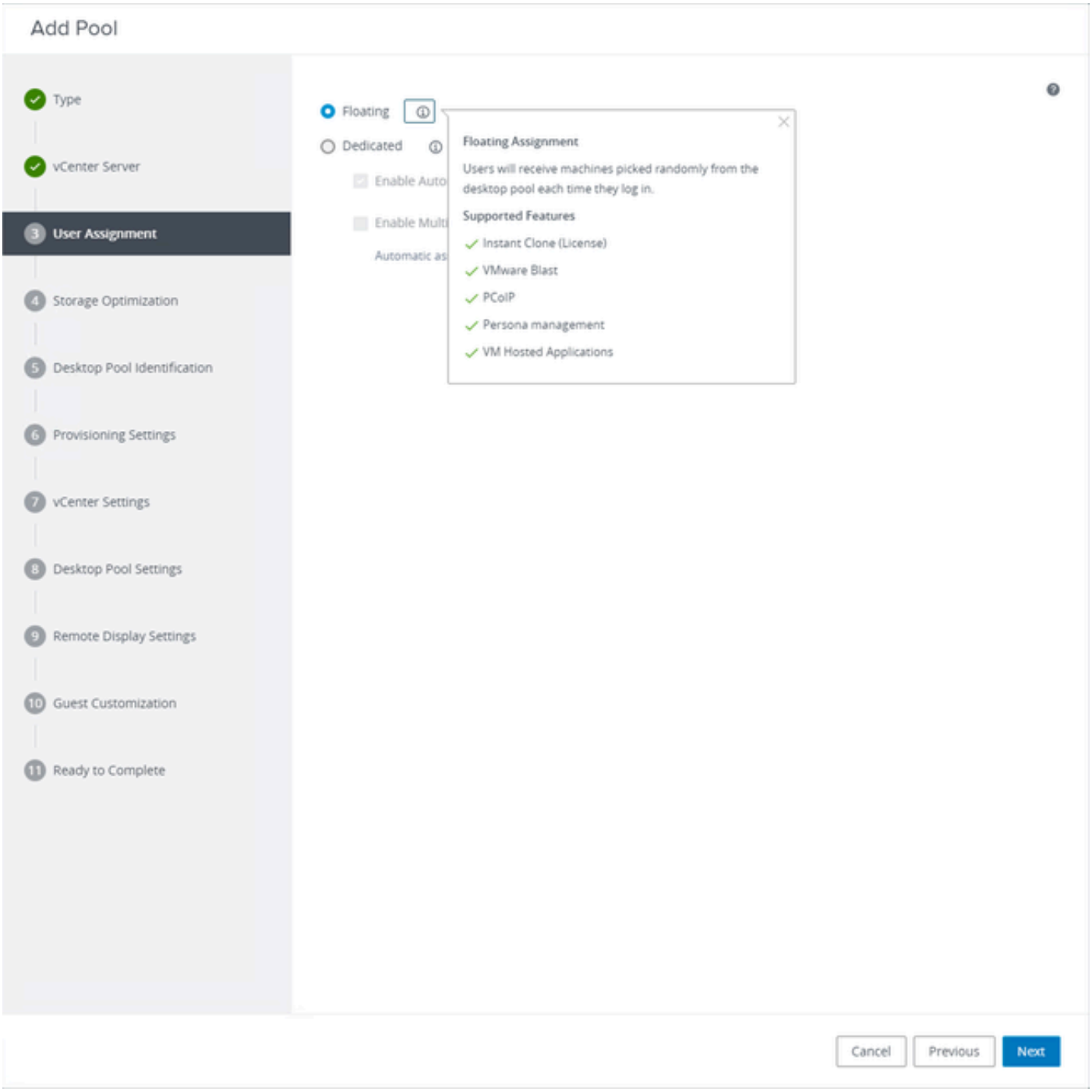
Selecting "Automated Desktop Pool"

Refer to: https://docs.vmware.com/en/VMware-Horizon/2106/virtual-desktops/GUID-6C3AB7F3-0BCF-4423-8418-30CA19CFC8FC.html



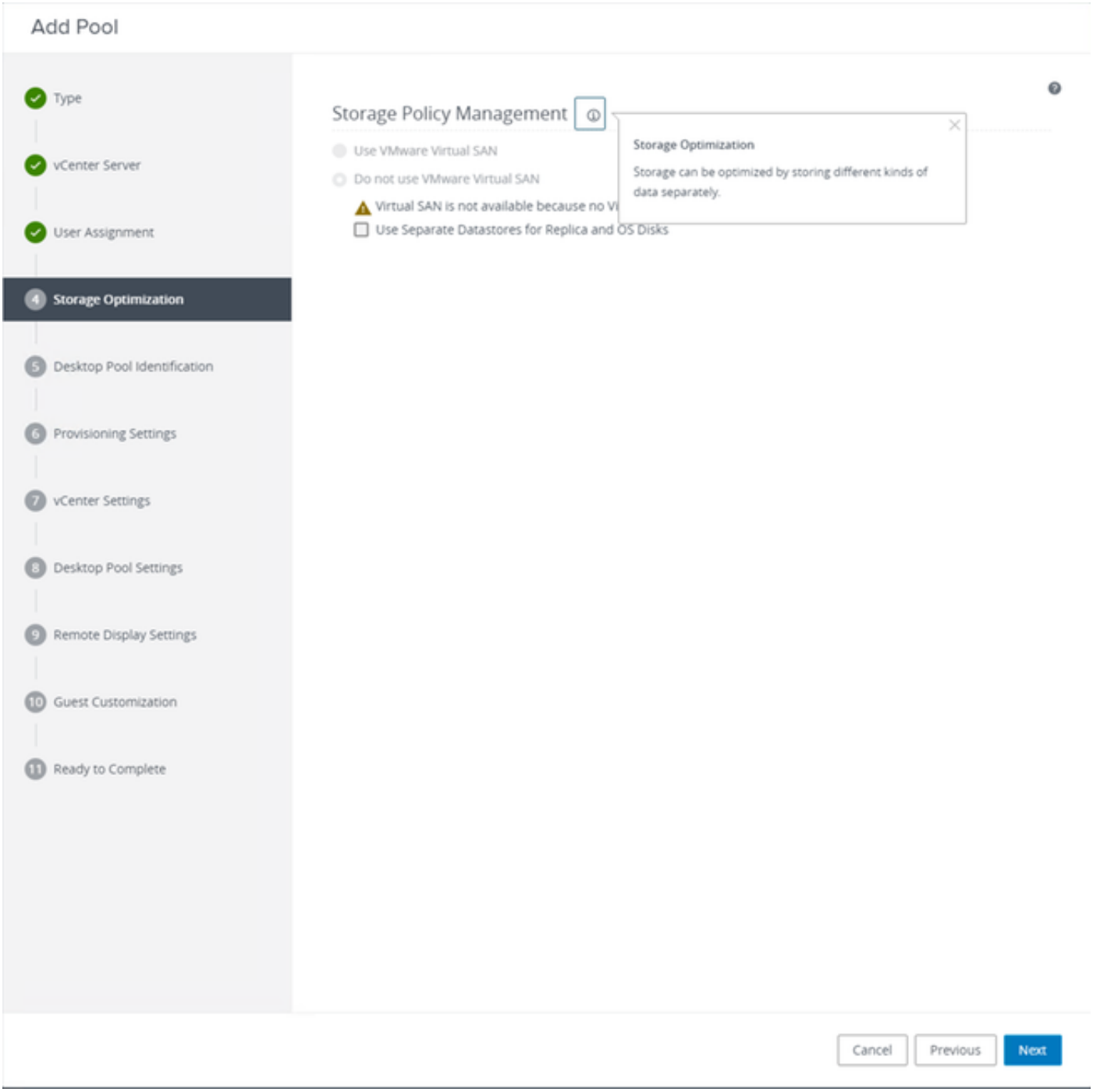
Selecting "Instant Clones"

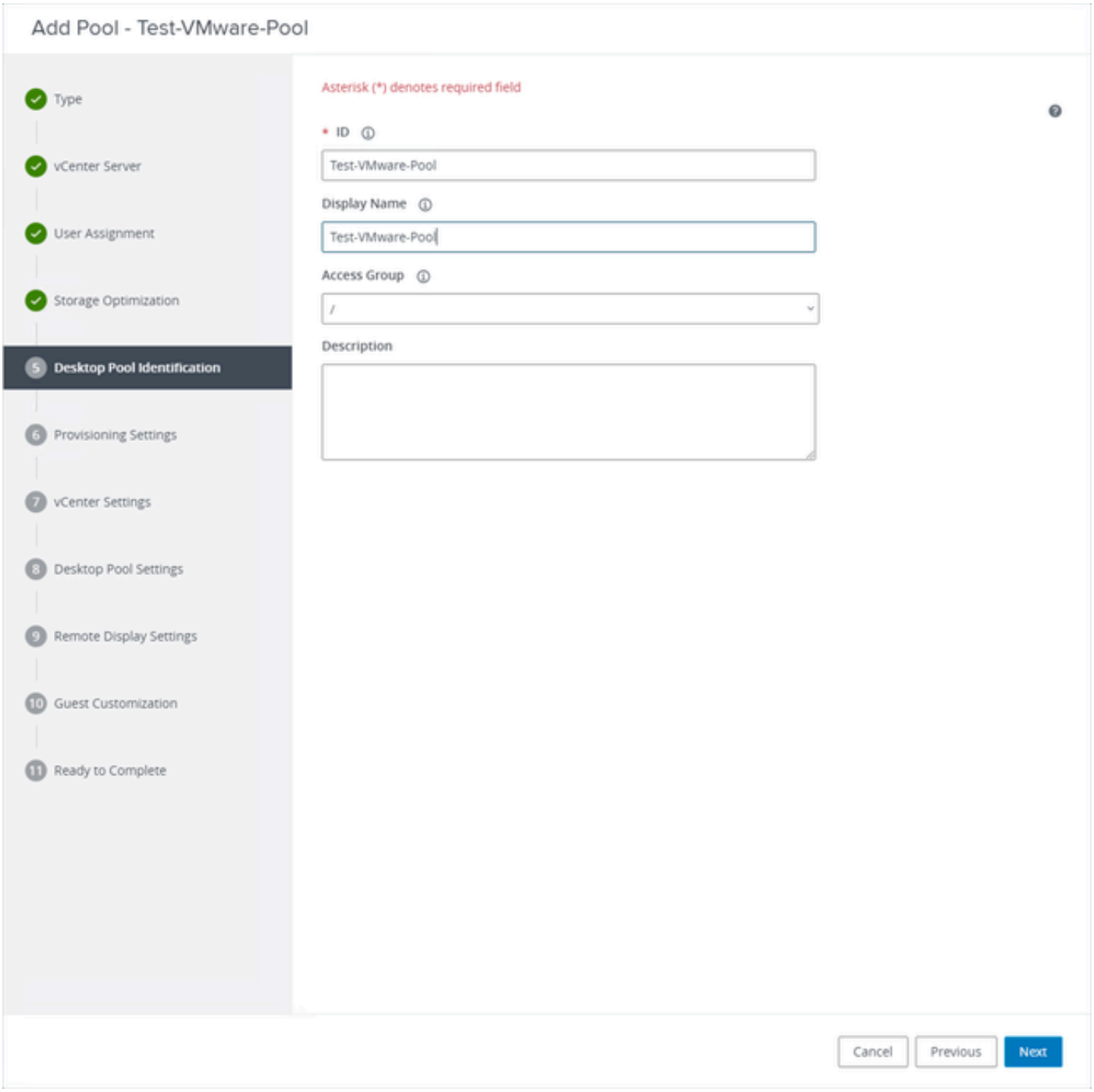
Refer to: https://docs.vmware.com/en/VMware-Horizon-7/7.13/virtual-desktops/GUID-D7C0150E-18CE-4012-944D-4E9AF5B28347.html



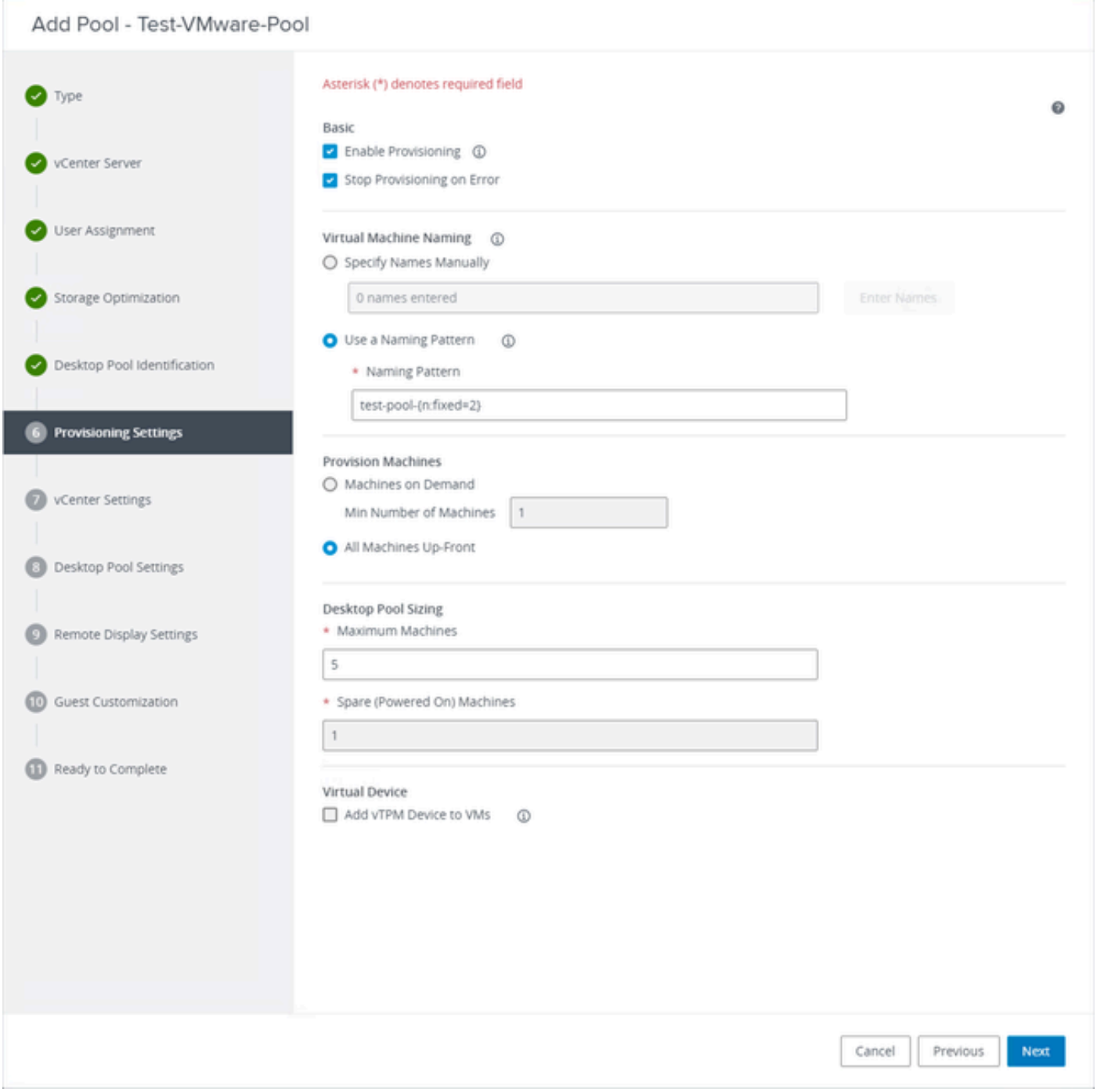
Selecting "Floating" type

Refer to: https://docs.vmware.com/en/VMware-Horizon-Cloud-Service-on-IBM-Cloud/21.1/horizoncloudhosted.deploy/GUID-34C260C7-A63E-452E-88E9-6AB63DEBB416.html

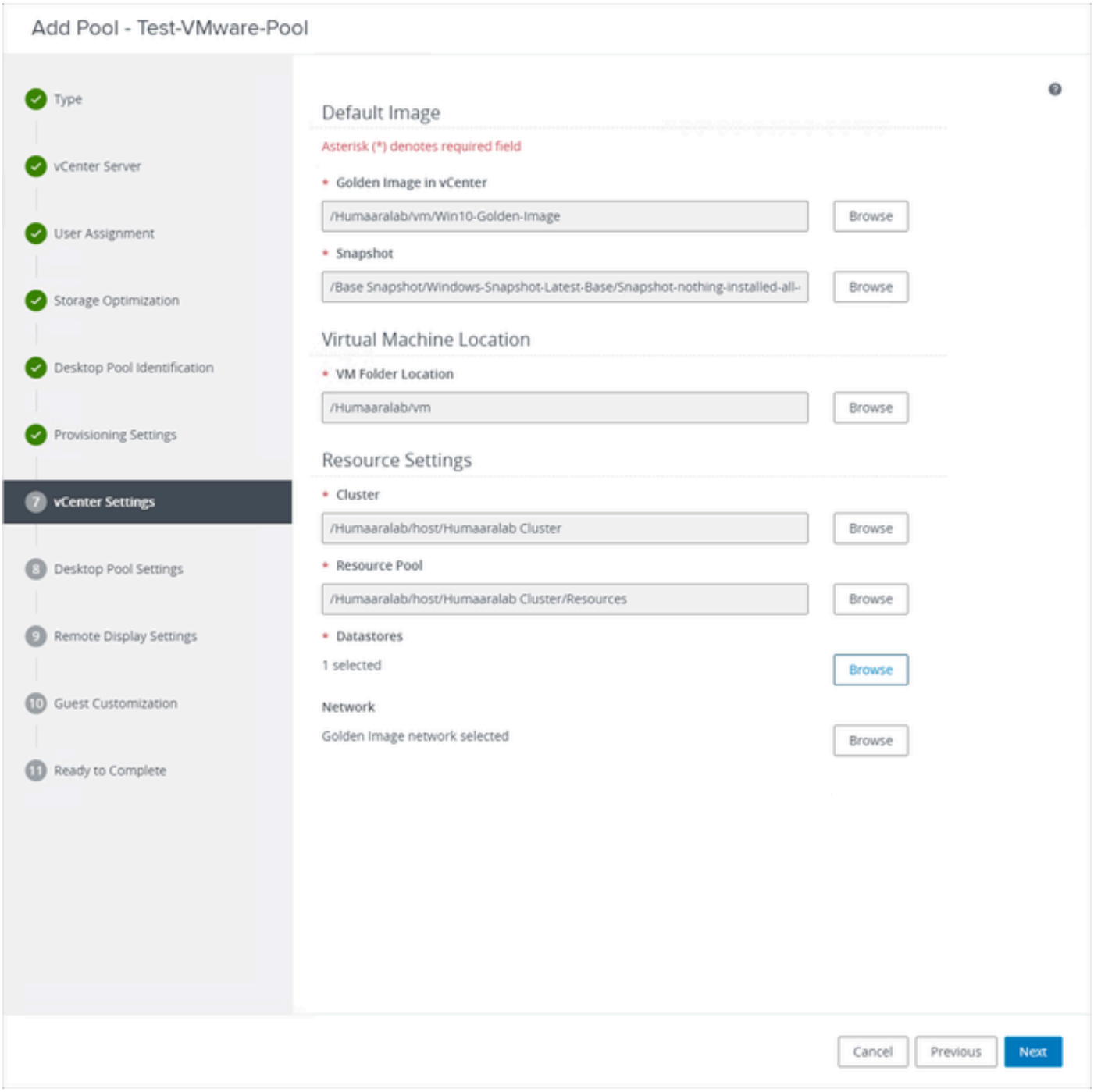

Add Pool
Type
vCenter Server
User Assignment
4 Storage Optimization
5 Desktop Pool Identification
6 Provisioning Settings
7 vCenter Settings
8 Desktop Pool Settings
9 Remote Display Settings
10 Guest Customization
11 Ready to Complete
Storage Policy Management
Use VMware Virtual SAN
Do not use VMware Virtual SAN
Virtual SAN is not available because no V
Use Separate Datastores for Replica and OS Disks
Storage Optimization
Storage can be optimized by storing different kinds of data separately.
Cancel
Previous
Next



Desktop Pool Names

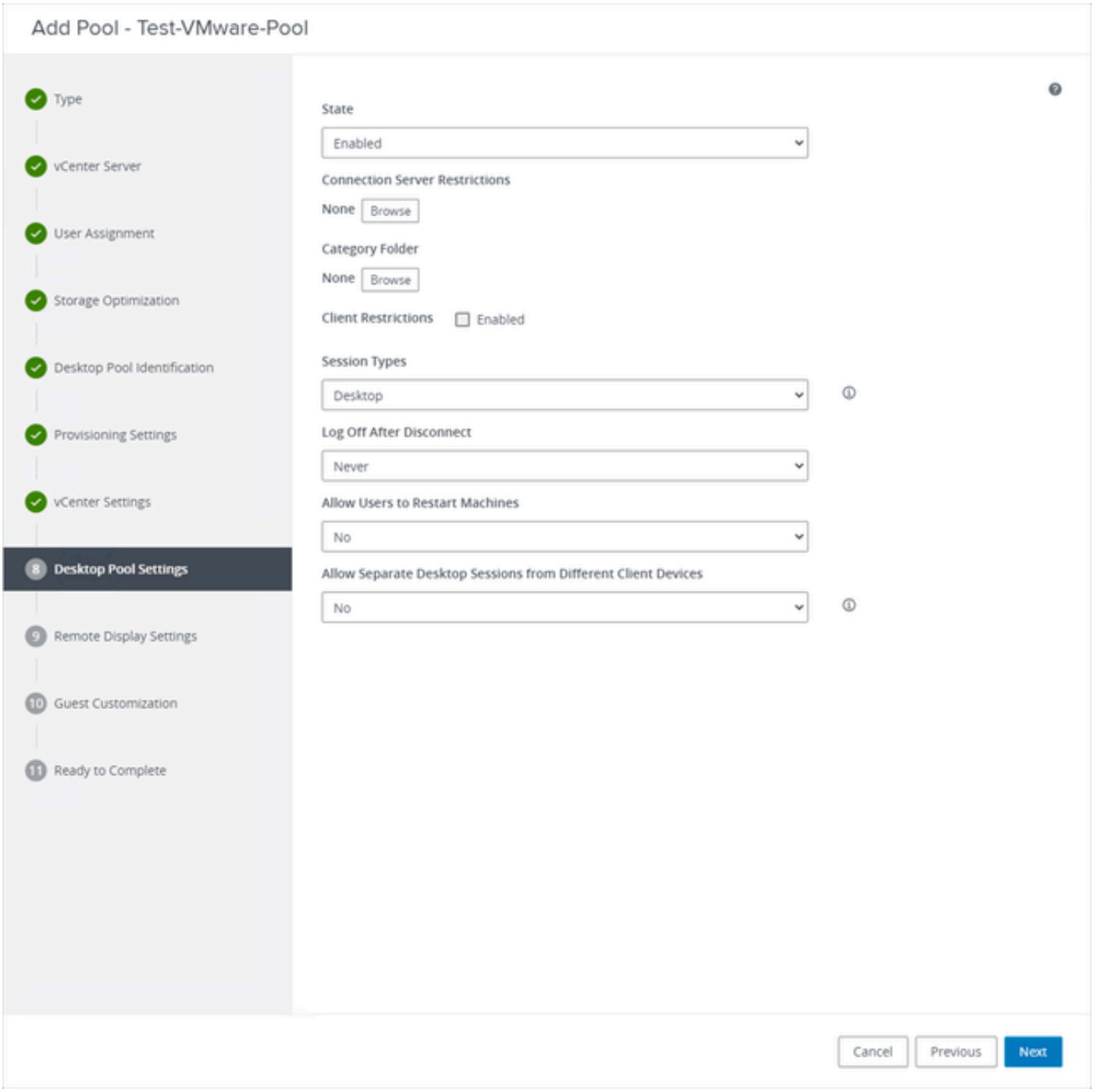


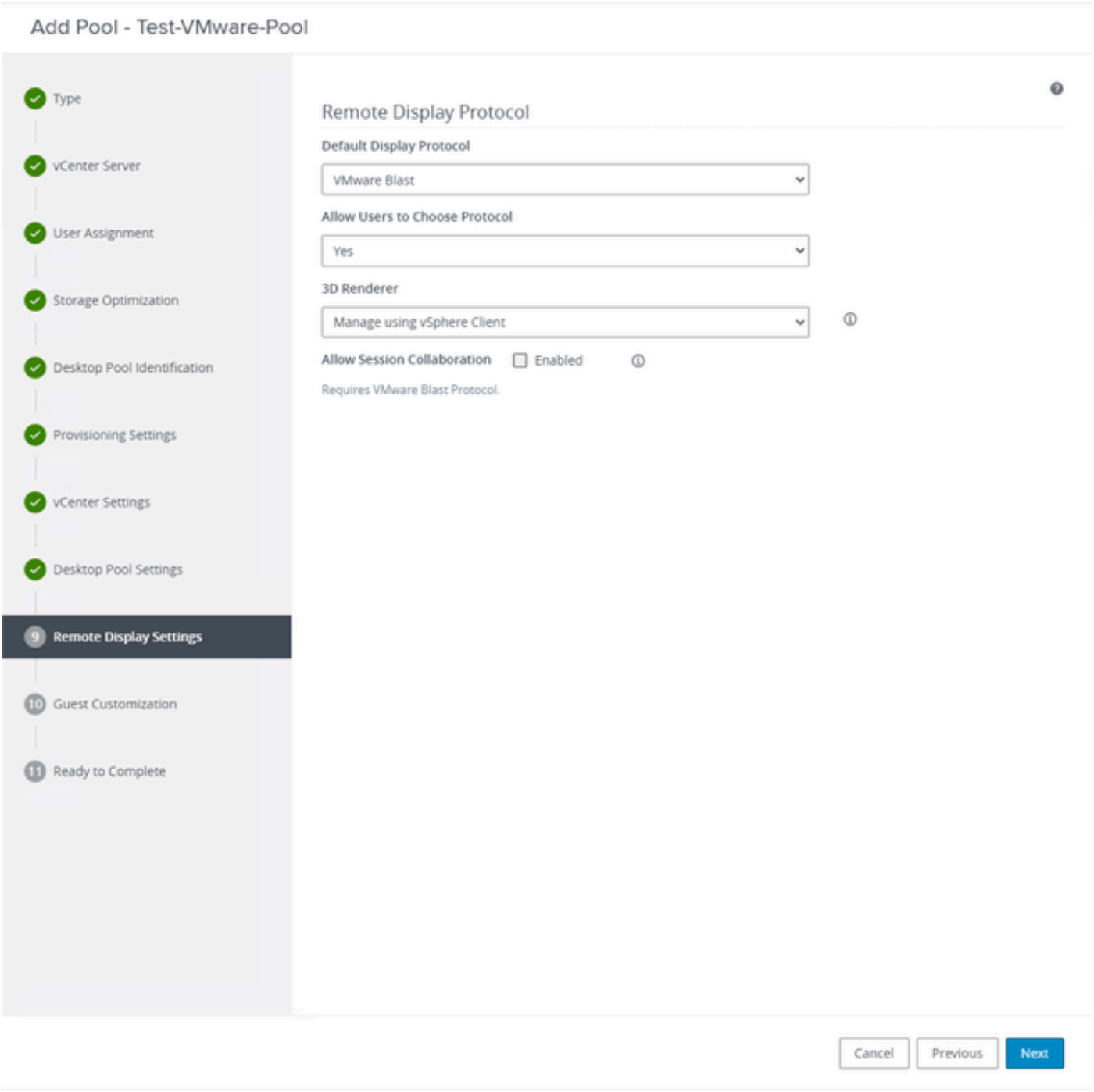
VMware Horizon Naming Pattern: https://docs.vmware.com/en/VMware-Horizon/2103/virtual-desktops/GUID-26AD6C7D-553A-46CB-B8B3-DA3F6958CD9C.html

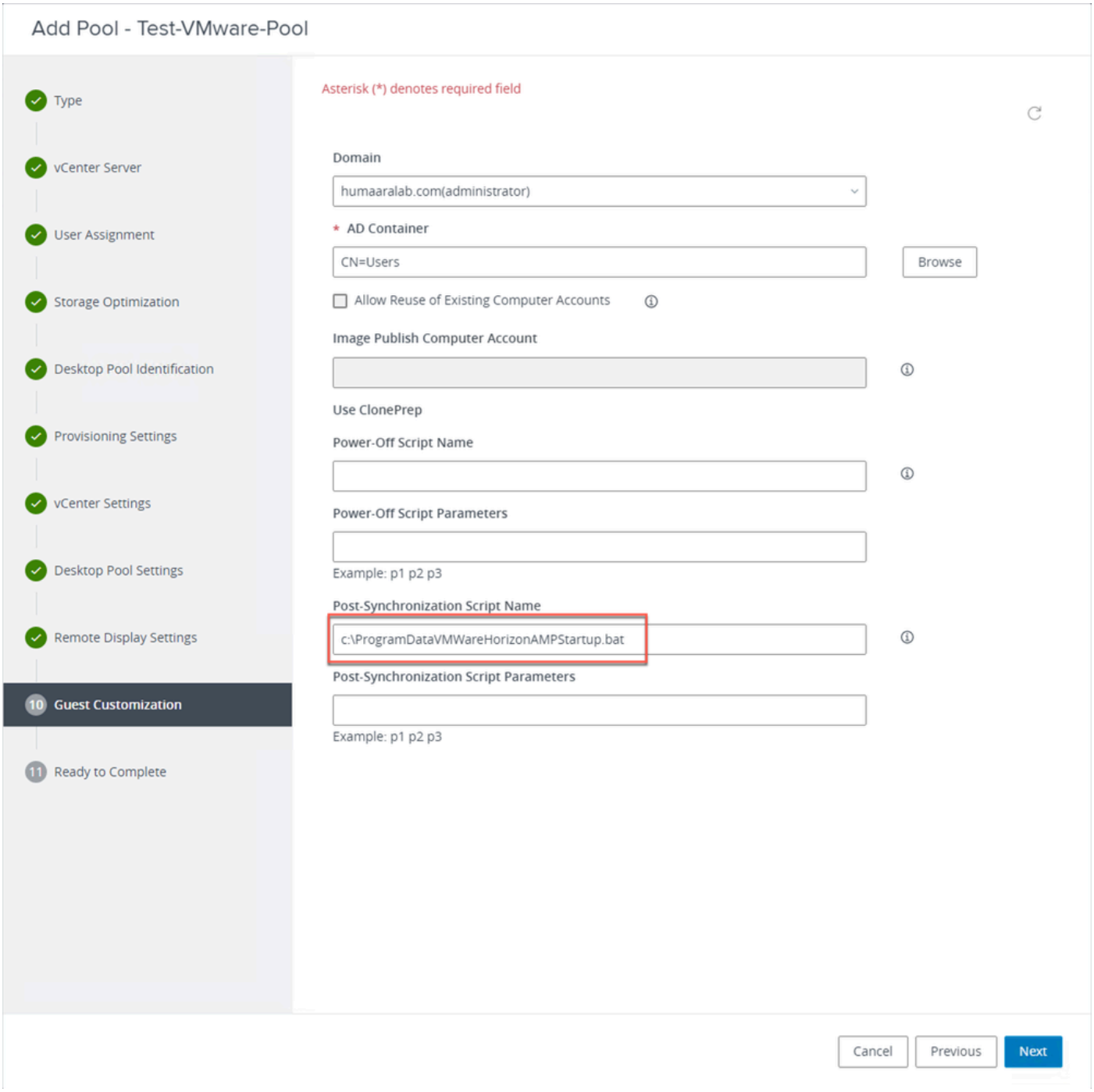


Golden Image: This is the actual Golden Image VM.

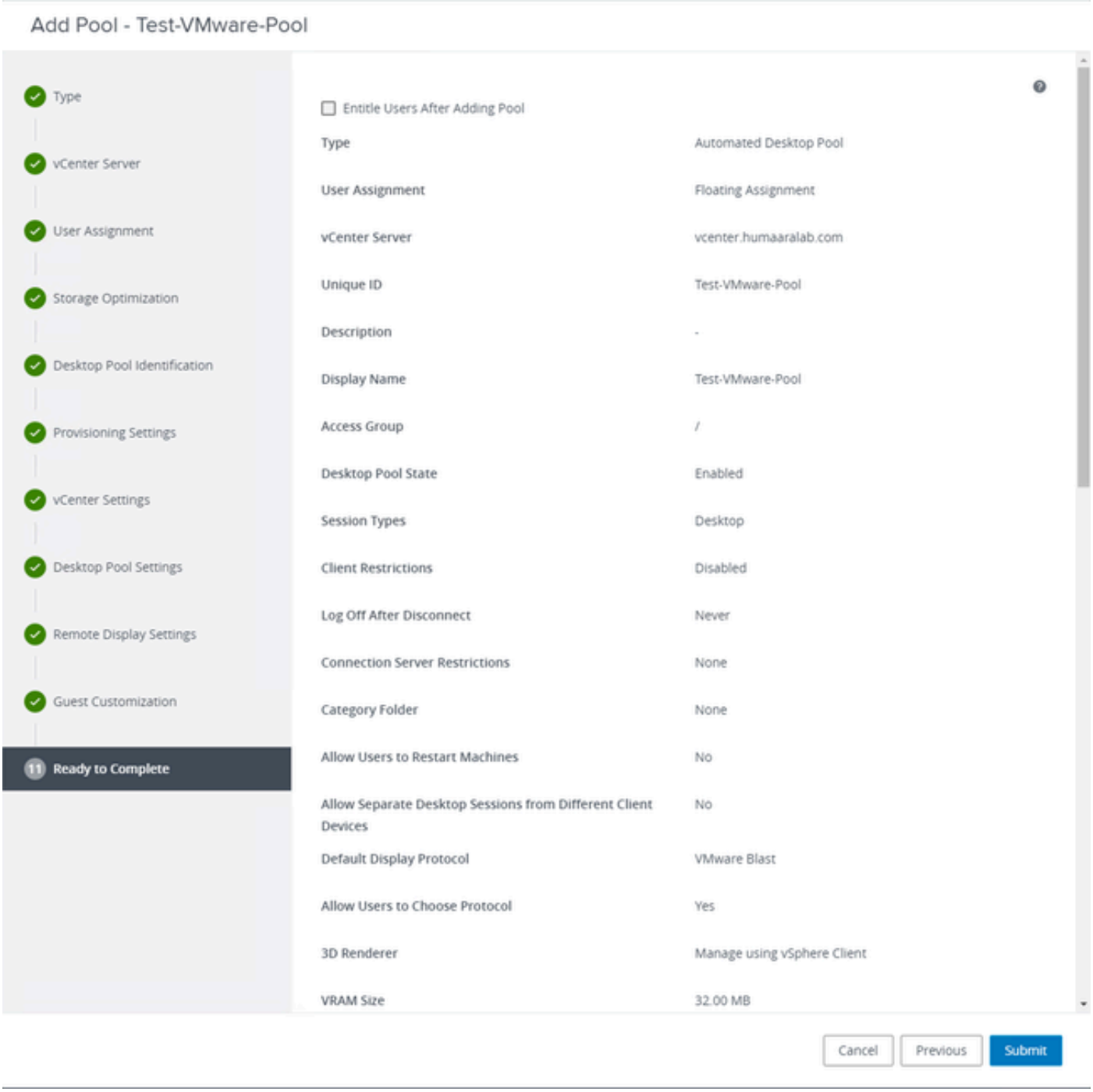
Snapshot: This is the image that you want to use in order to deploy the child VM. This is the value that is updated when you update the Golden Image with any changes. Rest are some of the VMware Environment-specific settings.


Add Pool - Test-VMware-Pool
Type
vCenter Server
User Assignment
Storage Optimization
Desktop Pool Identification
Provisioning Settings
vCenter Settings
8 Desktop Pool Settings
9 Remote Display Settings
10 Guest Customization
11 Ready to Complete
State
Enabled
Connection Server Restrictions
None
Browse
Category Folder
None
Browse
Client Restrictions
Enabled
Session Types
Desktop
Log Off After Disconnect
Never
Allow Users to Restart Machines
No
Allow Separate Desktop Sessions from Different Client Devices
No
Cancel
Previous
Next


Add Pool - Test-VMware-Pool
Type
vCenter Server
User Assignment
Storage Optimization
Desktop Pool Identification
Provisioning Settings
vCenter Settings
Desktop Pool Settings
9 Remote Display Settings
10 Guest Customization
11 Ready to Complete
Remote Display Protocol
Default Display Protocol
VMware Blast
Allow Users to Choose Protocol
Yes
3D Renderer
Manage using vSphere Client
Allow Session Collaboration
Enabled
Requires VMware Blast Protocol.
Cancel
Previous
Next



7. As mentioned previously, Step 10. in the wizard is where you set the **script path**.



8. Once, completed and submitted, VMware Horizon begins the composition and the Child VMs will be created.

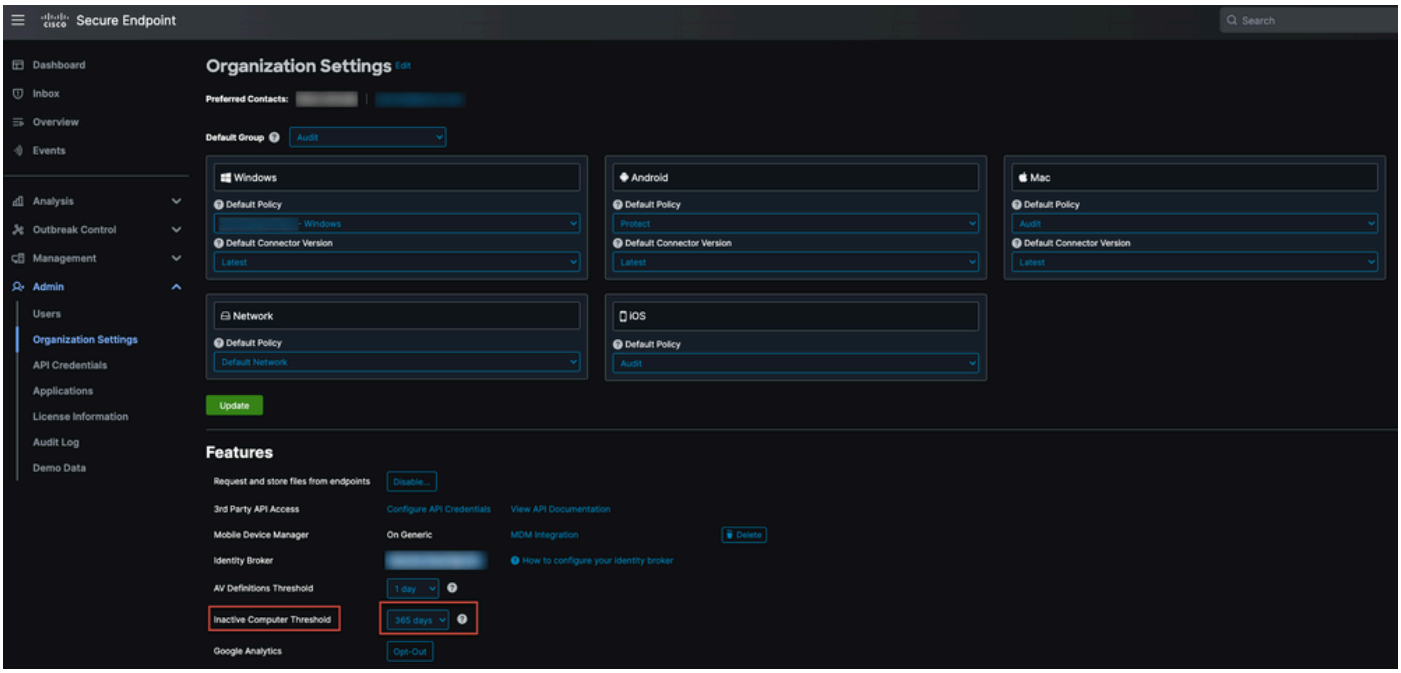
Note: Refer to the VMware guide for information on these steps but they are self-explanatory.

Removing Duplicate Entries

There are some available ways by which we can remove the Connector Duplicate Entries:

1. Utilize the Automated Removal Feature on the Secure Endpoint Portal to remove Duplicate(Inactive) Entries:

You will be able to find this setting under **Admin** > **Organization Settings**



The Inactive Computer Threshold allows you to specify how many days a connector can go without checking in to the Cisco cloud before it is removed from theComputer Management page list. The default setting is 90 days. Inactive computers will only be removed from the list and any events they generate will remain in your Secure Endpoint organization. The computer will reappear in the list if the connector checks in again.

2. Utilize the available Orchestration Workflows: https://ciscosecurity.github.io/sxo-05-security-workflows/workflows/secure-endpoint/0056-remove-inactive-endpoints

3. Use the Externally available script to remove the Stale/Old UUIDs: https://github.com/CiscoSecurity/amp-04-delete-stale-guids