# Table of Contents

Lab Overview - HOL-1851-02-ADV - Horizon 7.1: Instant Clones

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Guidance</td>
<td>3</td>
</tr>
<tr>
<td>Module 1 - Introduction to Instant Clones (15 minutes)</td>
<td>10</td>
</tr>
<tr>
<td>Introduction</td>
<td>11</td>
</tr>
<tr>
<td>Instant Clone Technology</td>
<td>12</td>
</tr>
<tr>
<td>Conclusion</td>
<td>24</td>
</tr>
<tr>
<td>Module 2 - RDS Farm Provisioning (30 minutes)</td>
<td>26</td>
</tr>
<tr>
<td>Introduction</td>
<td>27</td>
</tr>
<tr>
<td>Creating an RDSH Farm with Instant Clones</td>
<td>28</td>
</tr>
<tr>
<td>Publish Virtualized Application from RDSH Instant Clone Farm</td>
<td>49</td>
</tr>
<tr>
<td>Launch RDSH Published Application</td>
<td>58</td>
</tr>
<tr>
<td>Conclusion</td>
<td>66</td>
</tr>
<tr>
<td>Module 3 - Desktop Pool Provisioning (30 Minutes)</td>
<td>68</td>
</tr>
<tr>
<td>Introduction</td>
<td>69</td>
</tr>
<tr>
<td>Instant Clone Desktop Pool</td>
<td>70</td>
</tr>
<tr>
<td>Connect to Instant Clone Desktop</td>
<td>83</td>
</tr>
<tr>
<td>Conclusion</td>
<td>93</td>
</tr>
<tr>
<td>Module 4 - Advanced Provisioning (30 Minutes)</td>
<td>94</td>
</tr>
<tr>
<td>Introduction</td>
<td>95</td>
</tr>
<tr>
<td>Install Notepad++ into Instant Clone Master Image</td>
<td>96</td>
</tr>
<tr>
<td>Conclusion</td>
<td>120</td>
</tr>
</tbody>
</table>
Lab Overview - HOL-1851-02-ADV - Horizon 7.1: Instant Clones
Lab Guidance

Note: It will take more than 90 minutes to complete this lab. You should expect to only finish 2-3 of the modules during your time. The modules are independent of each other so you can start at the beginning of any module and proceed from there. You can use the Table of Contents to access any module of your choosing.

The Table of Contents can be accessed in the upper right-hand corner of the Lab Manual.

Attendees will learn about the new features within Horizon 7.1 Instant Clone Technology, RDS Farm Provisioning using Instant Clones, Desktop Pool Provisioning of Instant Clones, and explore Advanced Provisioning of the Instant Clone technology. The attendee will explore how Instant Clones technology fits into the VMware Just-In-Time Management Platform (JMP) message and day 1 operations.

Lab Module List:

- **Module 1 - Introduction to Instant Clones** (15 minutes) (Basic) What are they? Why use them? How they fit into JMP. How you work with them operationally
- **Module 2 - RDS Farms Provisioning** (30 minutes) (Basic) Creating RDS Farms with Instant Clones
- **Module 3 - Desktop Pool Provisioning** (30 minutes) (Basic) Creating Windows 10 Desktop Pools with Instant Clones.
- **Module 4 - Advanced Provisioning** (30 minutes) (Advanced) Push image updates to Instant Clone Pools and Farms.

Lab Captains:

- **Module 1 - Laurel Spadaro, Sr Systems Engineer, US; Tom Baella, Systems Engineer, US**
- **Module 2 - Laurel Spadaro, Sr Systems Engineer, US; Tom Baella, Systems Engineer, US**
- **Module 3 - Laurel Spadaro, Sr Systems Engineer, US; Tom Baella, Systems Engineer, US**
- **Module 4 - Laurel Spadaro, Sr Systems Engineer, US; Tom Baella, Systems Engineer, US**

This lab manual can be downloaded from the Hands-on Labs Document site found here:

http://docs.hol.vmware.com
This lab may be available in other languages. To set your language preference and have a localized manual deployed with your lab, you may utilize this document to help guide you through the process:


**Location of the Main Console**

1. The area in the RED box contains the Main Console. The Lab Manual is on the tab to the Right of the Main Console.
2. A particular lab may have additional consoles found on separate tabs in the upper left. You will be directed to open another specific console if needed.
3. Your lab starts with 90 minutes on the timer. The lab can not be saved. All your work must be done during the lab session. But you can click the **EXTEND** to increase your time. If you are at a VMware event, you can extend your lab time twice, for up to 30 minutes. Each click gives you an additional 15 minutes. Outside of VMware events, you can extend your lab time up to 9 hours and 30 minutes. Each click gives you an additional hour.

**Alternate Methods of Keyboard Data Entry**

During this module, you will input text into the Main Console. Besides directly typing it in, there are two very helpful methods of entering data which make it easier to enter complex data.
Click and Drag Lab Manual Content Into Console Active Window

You can also click and drag text and Command Line Interface (CLI) commands directly from the Lab Manual into the active window in the Main Console.

Accessing the Online International Keyboard

You can also use the Online International Keyboard found in the Main Console.

1. Click on the Keyboard Icon found on the Windows Quick Launch Task Bar.
Click once in active console window

In this example, you will use the Online Keyboard to enter the "@" sign used in email addresses. The "@" sign is Shift-2 on US keyboard layouts.

1. Click once in the active console window.
2. Click on the Shift key.

Click on the @ key

1. Click on the "@ key".

Notice the @ sign entered in the active console window.
Activation Prompt or Watermark

When you first start your lab, you may notice a watermark on the desktop indicating that Windows is not activated.

One of the major benefits of virtualization is that virtual machines can be moved and run on any platform. The Hands-on Labs utilizes this benefit and we are able to run the labs out of multiple datacenters. However, these datacenters may not have identical processors, which triggers a Microsoft activation check through the Internet.

Rest assured, VMware and the Hands-on Labs are in full compliance with Microsoft licensing requirements. The lab that you are using is a self-contained pod and does not have full access to the Internet, which is required for Windows to verify the activation. Without full access to the Internet, this automated process fails and you see this watermark.

This cosmetic issue has no effect on your lab.

Look at the lower right portion of the screen
Please check to see that your lab is finished all the startup routines and is ready for you to start. If you see anything other than "Ready", please wait a few minutes. If after 5 minutes your lab has not changed to "Ready", please ask for assistance.
Introduction

Attendees will learn about the new features within Horizon 7.1 Instant Clone Technology, RDS Farm Provisioning using Instant Clones, Desktop Pool Provisioning of Instant Clones, and Advanced Provisioning of the Instant Clone technology.
Module 1 - Introduction to Instant Clones (15 minutes)
Introduction

Instant Clones: This module will go over what are Instant Clones and why to use them.

This Module contains the following lessons:

• Instant Clone Technology- Overview of the Instant Clone Technology looking at different desktop types, comparing to Composer clones and current restrictions.
**Instant Clone Technology**

What is Instant Clone Technology?

Instant Clone Technology is all about delivering VDI desktops *just in time*. Instant Clone Technology allows administrators to rapidly clone and deploy virtual machines at a rate of about one clone per second on average. Horizon 7 can provision 2000 Virtual Desktops in about 20 minutes. Previously, it took 4-5 hours with View Composer doing linked clones.

The VMware Instant Clone Technology included in the View component of the Horizon 7 Enterprise Edition and Horizon Apps Advanced Edition improves and accelerates the process of creating cloned virtual machines over the previous View Composer linked-clone technology. In addition, instant clones require less storage and less expense to manage and update because the desktop is deleted when the user logs out, and a new desktop is created using the latest master image.

For Just-in-Time Desktops, you can combine instant clones with VMware App Volumes and VMware User Environment Manager to create disposable desktops that retain user customizations, personas, and user-installed apps from session to session, even though the cloned desktop is destroyed when the user logs out. Users experience a stateful desktop, while the enterprise realizes the economy of stateless desktops. Just-in-Time Desktops are part of the JMP desktop and application delivery platform, a feature of the Horizon 7 Enterprise Edition.
For Just-in-Time Apps, App Volumes attaches applications to the RDSH server at boot time. User Environment Manager retains user preferences and applies contextual policy management. RDSH farms are created using Instant Clone Technology, and the RDSH server VMs can be refreshed according to a recurring maintenance schedule. Just-in-Time Apps are also part of JMP, and are included in Horizon 7 Enterprise Edition and Horizon Apps Advanced Edition.

A clone is a copy of a master virtual machine with a unique identity of its own, including a MAC address, UUID, and other system information. Instant clones represent the newest generation of cloning technology, after full clones and View Composer linked clones.

**Review Virtual Desktop Types**

![Trade-offs Between Virtual Desktop Types Today](image)

Lets review the two types of Virtual Desktops, Persistent and Non-persistent.

**Persistent desktops** are usually full cloned VMs, and sometimes Linked Clones. A persistent desktop retains data on the desktop itself between logons and reboots. This includes all data such as user settings, applications, internet bookmarks and so on, and does not require other methods of copying data to additional desktops. Additionally a user can have an application installed directly on their desktop which will be retained for them to use and does not require all users having it on their desktop or virtualizing the application.
When using a persistent desktop a user is assigned a single specific desktop that is only for their use. This ensures they can access their desktop with all their settings and installed applications. Desktops are created from a master image but not re-created after use.

By using persistent desktops the provisioning method used increases the storage usage compared to non-persistent desktops. As there is a desktop for each user, their settings and applications, which may be 25-35 GB in size per desktop, increases storage costs. Additionally because the desktops are not re-created from the master image at logoff or frequently refreshed, the desktop updates and other changes must be managed by another solution such as Altiris, WSUS or SCCM. This increases management overhead and lowers user density per host.

**Non-persistent desktops** are usually Linked Clones today. A non-persistent virtual desktop does not retain any data on the desktop itself after a logoff or reboot. This includes any data such as user settings, application settings, internet bookmarks and so on. Instead this data is retained using other methods such as folder redirection and profile solutions such as User Environment Manager (UEM) to store user settings in a central location and applied to any desktop they logon to.

Additionally a non-persistent desktop does not allow a user to install an application and have it available across other non-persistent desktops a user may log into. If users require that ability, writable volumes with App Volumes would allow that.

When using a non-persistent desktop a user is not assigned any specific desktop, this is because all desktops are identical and created from a single master image. Typically at each logoff the desktop is recreated from the master image or refreshed. By using non-persistent desktops this provisioning method provides several benefits. Some of those benefits are a reduction in storage requirements of around 80% resulting in cost savings, easier maintenance of desktops for updates as only the master images need updating. Security is increased as a desktop is re-created from the clean master image once a user logs off. User settings data is also backed up centrally when folder redirection and a profile management solution is implemented.
Just-In-Time Management Platform or JMP (pronounced *jump*) represents capabilities in VMware Horizon 7 Enterprise Edition that deliver Just-in-Time Desktops and Apps in a flexible, fast, and personalized manner. JMP is composed of the following VMware technologies:

- VMware Instant Clone Technology for fast desktop and RDSH provisioning.
- VMware App Volumes for real-time application delivery.
- VMware User Environment Manager for contextual policy management.

JMP allows components of a desktop or RDSH server to be decoupled and managed independently in a centralized manner, yet reconstituted on demand to deliver a personalized user workspace when needed. JMP is supported with both on-premises and cloud-based Horizon 7 deployments, providing a unified and consistent management platform regardless of your deployment topology. The JMP approach provides several key benefits, including simplified desktop and RDSH image management, faster delivery and maintenance of applications, and elimination of the need to manage full persistent desktops.
Instant Clones by default are a non-persistent desktop type but as you add additional VMware technologies you can move to a complete persistent experience.

Administrators can quickly provision from a parent virtual machine whenever new desktops are needed, just in time for a user to log in. With this type of speed, you can reduce the number of spare machines needed. When you factor in VMware App Volumes and the ability to dynamically attach AppStacks with applications assigned to each user, as well as user-specific writable volumes, along with role-based persona and customization through VMware User Environment Manager, you now have a fully personalized desktop that feels persistent to the end user. However, this desktop is completely stateless and built on the attractive economics of non-persistent desktops.
A **full clone** is an independent copy of a virtual machine (VM). It shares nothing with its master VM, and it operates entirely separately from the master VM used to create it.

A **linked clone** uses significantly less storage space than a full clone because it accesses software on shared virtual disks. Because of this sharing mechanism, a linked clone must always have access to the disk used for cloning.

To make a linked clone, you take a snapshot of the master VM and then the cloning process creates a replica VM to use for cloning. The linked clone shares virtual disks with the replica VM. The differential the bits of software that are unique to the linked clone is stored in a diff disk or redo disk. This arrangement allows the linked clone to occupy a smaller amount of physical disk space than the master VM but still access the software installed on the shared virtual disks. You can create hundreds of linked diff disks from one replica, reducing the total storage space required.

Like a linked clone, an **instant clone** shares virtual disks with the replica VM after the linked clone is created. The process of creating instant clones differs from that used for linked clones in the following way: The cloning process creates a running parent VM from the replica VM. At creation time, the instant clone shares the memory of the running parent VM from which it is created.

Instant clones use copy-on-write for memory and disk management. Instant clones are based on a running parent VM, derived from a master VM.
1.) At the instant when an instant clone is created from a running parent VM, any reads of unchanged information come from the already existing running parent VM. However, any changes made to the instant clone are written to a delta disk, not to the running parent VM. This strategy preserves security and isolation between the instant clones by ensuring that

- Each instant clone is immediately accessible.
- Changes do not affect the shared data and memory of the running parent VM on which all other instant clones are based. Sharing the memory of a running parent VM at creation time enables instant clones to be created within a few seconds and instantly powered on. An instant clone requires no boot time when the cloning process is finished.
- After creation, the clone is linked to the replica VM and not to the running parent VM. You can delete the running parent VM without affecting the instant clone.

Because an instant clone can be created so quickly, an instant-clone desktop does not need to persist after a user logs out. Instead, the instant clone is deleted when the user logs out. Depending on the number of spare VMs configured for the desktop pool, a new instant clone might be created immediately after a used instant clone is deleted. In this manner, users get a newly created desktop whenever they log in. If the master image the master VM snapshot used to create the pool has been updated since the last login, the user gets the new image.

Note: The instant clone is deleted when the user logs out, not necessarily when the user disconnects. If the user disconnects the session, the virtual desktop remains, unless the administrator has configured the user to be automatically logged out after disconnecting.

For RDSH server farms, the instant clone is deleted and recreated according to a recurring maintenance schedule set by the administrator.
Provisioning Instant Clone vs View Composer

As you can see from this slide some comparison data in provisioning with Instant Clones vs View Composer. Most notable being Provision time for 2,000 desktops. Going from 4-5 hours with View Composer down to less than 40 minutes with Instant Clones.

How Instant Clone Desktop Pools and RDSH Server Farms are Created

Creating an instant-clone desktop pool or RDSH server farm is a two-part process:

1. Publishing—also called priming— the master image
2. Provisioning the VMs in the pool or farm

Publishing the Master Image

Publishing the master image can take from 7 to 40 minutes, depending on the type of storage you are using. Provisioning the VMs takes only 1 or 2 seconds per VM. You can perform these tasks at separate times, so that the provisioning process occurs either at a scheduled time or immediately after the publishing process is complete.

The Add Desktop Pool wizard or the Add Farm wizard in Horizon Administrator guides you through the process of publishing the master image—that is, using the specified VM snapshot and creating all the required types of internal VMs, including the running
parent VMs. Completing the wizard for instant clones is similar to adding any type of pool or farm in Horizon Administrator, except there are fewer settings to configure.

Publishing the master image means completing the process to create running parent VMs so that the system is ready to instantly clone VMs during the second part of the pool- or farm-creation process.

**Provisioning Instant Clone VMs**

Provisioning Instant-Clone VMs After the master image is published and the running parent VMs are created, the provisioning of instant clones can begin. The instant-clone engine performs the following tasks to create instant clones:

1. The engine brings the running parent VM to a quiescent, or quiet, state and then forks it using the vSphere vmFork technology. The forking process is like creating two similar branches of development so that disk and memory can be shared.
2. The engine customizes each forked instant clone. This ClonePrep process performs the following customization tasks, all without requiring a reboot:
   - Gives the VM a unique MAC address
   - Changes the Active Directory password
   - Joins the machine to the Active Directory domain. This domain join does not require a reboot because the associated internal template VM was already joined to the domain and rebooted during the publishing process described earlier.
   - Activates the Microsoft license

You can use scripts for the ClonePrep process so that one script runs immediately after a clone is created and another script can run before the clone is powered off. These scripts can invoke any process that can be created with the Windows CreateProcess API, such as cmd, vbscript, exe, and batch-file processes.

The provisioning process does not require power operations, and the clones are forked from a running parent VM, so the process takes only a couple of seconds.

**Benefits of Using Instant Clones**

Instant clones are easy to implement and manage and offer significant savings by reducing storage costs and support costs. Instant Clone Technology does not require a database or a separate dedicated server, so overall support costs for the virtual desktop infrastructure (VDI) are reduced, as is the complexity of future infrastructure upgrades. You can also use VMware vSphere Distributed Resource Scheduler, VMware vSphere High Availability (HA), and VMware vSphere vMotion with instant clones.
What's New with Instant Clones in Horizon 7.1

- **Instant Clones for RDSH servers** - VMware Horizon 7.1 extends the use of instant clones to creating RDSH farms. As a key component of the JMP (Just-in-Time Management Platform), this provides several key benefits, including simplified RDSH image management, faster delivery, and maintenance.

- **vGPU support** - With Horizon 7.1, instant clones can now support vGPU-accelerated desktops. This covers the use of NVIDIA M-series cards with instant clones and extends the benefits to more use cases.

- **Multi-VLAN support for Instant Clone desktop pools** - In some environments, the physical network offers constraints because the subnet size is smaller than the desired number of desktops or RDSH servers. With instant clones, we can now support the use of multiple VLANs and port groups, effectively dividing up and distributing the VMs across multiple network segments.

- **Automatically delete Parent VMs with vSphere host maintenance** mode to simplify maintenance operations.

Current Restrictions with Instant Clones

In Horizon 7.x, instant clones have certain restrictions:

- Only Windows 7 and Windows 10 guest operating systems are supported for single-user desktop pools.
- For RDSH servers, Windows Server 2008 R2, Windows Server 2012 R2, and Windows Server 2016 are supported, and you must use Horizon 7 version 7.1 or later.
- To use App Volumes with RDSH instant-clone server farms, you must assign App Volumes AppStacks to Active Directory OUs rather than groups. Contact Global Support Services for the App Volumes 2.12.3 hot patch. This fix will also be included in general releases of App Volumes later than 2.12.
- To use the 3D Renderer feature, which includes hardware acceleration for graphics such as vGPU, you must use Horizon 7 version 7.1 or later. Only desktop pools are supported, not RDSH server VMs.
- You can have up to four monitors if you use Horizon 7 version 7.1 or later and Horizon Client 4.4 or later. The maximum display resolution of each monitor is 2560 x 1600 pixels.
- You cannot use Sysprep with instant clones, so all instant clones in a pool share the same system ID (SID). Some legacy applications might require a unique SID.
- If you want instant clones to reuse pre-existing computer accounts in Active Directory, you must use Horizon 7 version 7.2 or later. This feature is not supported in earlier versions.
- Virtual Volumes and VAAI (vStorage APIs for Array Integration) native NFS snapshots are not supported.
- Local ESXi datastores are supported only if you use Horizon 7 version 7.2 or later.
- IPv6 is not supported.
• To assign multiple network labels to a pool, to use multiple VLANs, you must have Horizon 7 version 7.1 or later.
• You cannot clone automated pools of instant clones.

The workaround for these limitations is to use View Composer linked clones. Check the release notes for the most up-to-date information and to find out whether these limitations have changed.

**Instant Clone Domain Administrator**

![Image](image.png)

**NOTE:** *No work for you to perform, these Steps are defined for your reference.* Since Instant Clones is different than Linked Clones, you need to define the administrator.

Before you can create an instant-clone desktop pool, you must add an instant clone domain administrator to View.

The instant clone domain administrator must have certain Active Directory domain privileges. For more information, see "Create a User Account for Instant Clone Operations" in the View Installation document.

To create the instant clone domain administrator you need to
1. Expand the View Configuration
2. Click on Instant Clone Domain Admins
3. Click on Add
4. Enter the domain user name and password, then click ok

FOR REFERENCE ONLY. NO LAB STEPS TO PREFORM FOR THE INSTANT CLONE DOMAIN ADMINISTRATOR.
Conclusion

This concludes the Module 1 on Introduction to Instant Clones.

You've finished Module 1

Congratulations on completing Module 1.

If you are looking for additional information on Horizon 7 Instant Clone technology, try one of these:

- Click on this link
- Or go to http://bit.ly/HorizonInstantClones
- Or use your smart device to scan the QRC Code.

Proceed to any module below which interests you most.

- **Module 2 - RDS Farms Provisioning** (30 minutes) (Basic) Creating RDS Farms with Instant Clones
- **Module 3 - Desktop Pool Provisioning** (30 minutes) (Basic) Creating Windows 10 Desktop Pools with Instant Clones
- **Module 4 - Advanced Provisioning** (30 minutes) (Advanced) Attendee will gain insight into how to push image updates to Instant Clone Pools and Farms and the update process.
How to End Lab and not continue on to the other modules

You can continue on to the other modules in this lab or you can end your lab completely just click on the END button.
Module 2 - RDS Farm Provisioning (30 minutes)
Introduction

We will show and configure published applications delivered from Remote Desktop Session Hosts (RDSH), powered by the Just-in-Time Management Platform, or JMP, utilizing Instant Clone Technology to bring increased speed, scale, and simplicity.

Here's a high-level of what will be completed:

- Creating an RDSH Farm with Instant Clones
- Publish Virtualized Applications from RDSH Instant Clone Farm
- Launch Virtual Desktop and RDSH Published Applications
Creating an RDSH Farm with Instant Clones

Creation Process

The creation of the VM template, replicas, and parents is the publishing—also called priming—process, and the creation of the RDSH VMs (the instant clones) is the provisioning process.

What Benefits Do Instant Clones Bring to the Deployment and Management of RDSH?

Instant clones allow you to deploy RDSH servers more rapidly, scale more easily, and perform maintenance up to 85 percent more quickly than was previously possible. Instant clones improve security by regenerating and automatically refreshing RDS hosts on a scheduled basis. Instant Clone Technology requires half the required steps compared to View Composer when deploying or scaling.
Publishing is done only when you create a new farm or make changes and want to update an existing farm to reflect the changes. Publishing the master image can take from 7 to 40 minutes, depending on the type of storage and number of hosts you are using. Provisioning the servers takes only 1 or 2 seconds per server. You can perform these tasks at separate times by not enabling provisioning in the Add Farm wizard, so that the provisioning process occurs either at a scheduled time or immediately after the publishing process is complete. When you scale up the pool, all that needs to be done is provisioning.

The provisioning process does not require power operations, and the clones are forked from a running parent VM, so the process takes only a couple of seconds. The engine customizes each forked instant clone. This ClonePrep process performs the following customization tasks in roughly 30 seconds, all without requiring a reboot:

- Gives the VM a unique MAC address
- Updates the computer account password
- Restarts quiesced services
- Joins the machine to the Active Directory domain
- Activates the Microsoft license
## Example Deployment Times

<table>
<thead>
<tr>
<th>Total for 1 and then scaling to 51 RDSH Hosts</th>
<th>Instant Clones</th>
<th>Composer Linked Clones</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 minutes 45 seconds</td>
<td>35 minutes 56 seconds</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Instant Clones</th>
<th>Composer Linked Clones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template creation</td>
<td>3 minutes 38 seconds</td>
<td>N/A</td>
</tr>
<tr>
<td>Replica creation</td>
<td>3 minutes 58 seconds</td>
<td>3 minutes 4 seconds</td>
</tr>
<tr>
<td>Parent creation</td>
<td>13 seconds</td>
<td>N/A</td>
</tr>
<tr>
<td>Clone 1 RDSH host</td>
<td>2 seconds</td>
<td>25 seconds</td>
</tr>
<tr>
<td>ClonePrep \ SysPrep (for 1 RDSH host)</td>
<td>26 seconds</td>
<td>13 minutes 38 seconds</td>
</tr>
<tr>
<td><strong>Total for 1 RDSH host</strong></td>
<td><strong>8 minutes 17 seconds</strong></td>
<td><strong>17 minutes 7 seconds</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Instant Clones</th>
<th>Composer Linked Clones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clone 50 RDSH hosts</td>
<td>48 seconds</td>
<td>4 minutes 1 second</td>
</tr>
<tr>
<td>ClonePrep / SysPrep (for 50 RDSH hosts)</td>
<td>40 seconds</td>
<td>14 minutes 48 seconds</td>
</tr>
<tr>
<td><strong>Scaling from 1 to 51 RDSH hosts</strong></td>
<td><strong>1 minute 28 seconds</strong></td>
<td><strong>18 minutes 49 seconds</strong></td>
</tr>
</tbody>
</table>

Please note these are real-world timing estimates and do not apply to the Hands On Labs deployment rates you may see in this lab.

Example deployment times (including waiting times) in our testing environment are as seen above. Note how quickly you can scale from 1 to 51 RDS hosts, with instant clones: in 1 minute 28 seconds. In the testing environment, 200 RDS hosts can be instant cloned, including template/replica/parent creation, in less time than View Composer takes for replica creation and a single RDS host!

### Provision RDSH Instant Clones with Horizon 7
Open Chrome Browser from Windows Quick Launch Task Bar

1. Click on the Chrome Icon on the Windows Quick Launch Task Bar.

Launch Horizon 7 Web Administrative Console

1. Click on View-01A Admin from the Chrome bookmarks bar. It should log you into the follow URL: https://view-01a.corp.local/admin/

Log in to Horizon 7 Web Administrative Console

1. Type in the user name administrator
2. Type in the default password VMware1!
3. Click on Log In to start the authentication process into the console
Verify RDSH Instant Clone Farm Is Running

Now that you are logged into the Horizon 7 Administrative Console, let's look at the RDSH Farms in the environment.

1. From the **System Health** Dashboard, click on the hyperlink from the **RDS Farms** marked **RDS-IC**. It should have a green box next to it.

    **If the RDS-IC RDS Farm does not have a green box next to it (either a red box or other icon) please wait for a few minutes to allow the RDS Farm to spin up.**

2. This will open up the **RDS-IC details** (RDSH Instant Clone farm).
3. Verify the **Status** is currently marked as **No problem detected**.
4. Click **OK** to continue.
Open the Resources Menu and Farm Resources

1. Click on the right triangle arrow besides the Resources menu under Inventory, if it is not already opened downward.
2. Click on Farms.

RDS-IC Farm in Horizon 7 Web Administrative Console

1. The RDS-IC Farm is currently enabled and should have (1) RDS Hosts listed in the RDS Hosts column.
We will be walking through the creation process of a new RDS Farm in the lab, but we will not complete the wizard as we already have an RDSH Instant Clone farm ready for you to work with later.

1. Click on the **Add...** button to start the **Add Farm** wizard.

Please do not click **Finish** on this wizard as this will slow down the lab and could potentially cause it to become unusable.
1. Choosing **Automated Farm** allows us to take advantage of the Instant Clone Technology.
2. You note that the **Supported Features** List is dynamic as you choose from our different technology types. This pane also acts as a helpful guide to what each technology type is as well.
3. Click **Next** to continue.
1. Click on **Instant clones**, as this is the technology we want to use.
2. Be sure to click on the actual **vCenter Server** you will be using before you can move forward in the wizard.
3. Again, this right hand pane delivers helpful guidance on the technology chosen as well as the **Supported Features** for that selected technology.
4. Click **Next** to continue.
Add Farm Wizard - Identification and Settings

Please note that this screen is set to show you all of the details. You may not see this the first time you get to this part of the Add Farm wizard. This can be remedied by using the pull down tab in the lower right (marked with the red arrow) to adjust the size of the window. You may also need to pull the Add Farm window up a bit in the main console as well.

1. Add an ID to this new farm. It is noteworthy that the ID must not contain any spaces nor special characters. If the box remains outlined in red then it means it cannot accept the name formatted as you have typed. It is also required before we can move on to the next step. Just add in a sample name here of your choice.

2. Browse through the Farm Settings, but do note that HTML Access is not enabled by default. Also notice we can control the maximum number of sessions per RDS Host with a simple pulldown menu giving us options of Unlimited or No More Than.

3. Click Next to continue.
Add Farm Wizard - Provisioning Settings & Storage Optimization

**Provisioning Settings**

- **Basic**
  - Enable provisioning
  - Stop provisioning on error

**Virtual Machine Naming**

Use a naming pattern:

- Naming Pattern: `rds-(n)`

**Farm Sizing**

- Max number of machines: 12
- Minimum number of ready(provisioned) machines during Instant Clone maintenance operations:

**Naming Pattern**

Virtual machines will be named according to the specified naming pattern. By default, View Manager appends a unique number to the specified pattern to provide a unique name for each virtual machine.

To place this unique number elsewhere in the pattern, use `(n)`. (For example: `vm-(n)-sales`).

The unique number can also be made a fixed length. (For example: `vm-(n:fixed=3)-sales`).

See the help for more naming pattern syntax options.

**Storage Optimization**

- Use VMware Virtual SAN
- Do not use VMware Virtual SAN

⚠️ Virtual SAN is not available because no Virtual SAN datastores are configured.

- Select separate datastores for replica and OS disks
1. Choose a **Naming Pattern** for the RDS Hosts that will be created. It is required before we can move on to the next step. Just add in a sample name here of your choice, noting the options available to you for the number patterns.

2. Enter in the **Max number of machines** for this RDSH Instant Clone farm. You can scale your farm here as well after the farm is created if you want a larger or smaller farm.

3. Click **Next** to continue.

4. Under **Storage Optimization**, simply click **Next** as we do not have Virtual SAN.

---

**Add Farm Wizard - vCenter Settings**

1. Each setting here must be filled in to continue. We will insert each option by **Browsing** to each setting for options 1 - 7.
Add Farm Wizard - vCenter Settings - Parent VM

1. Click on the **Browse** button next to the field marked **Parent VM**.
2. Click on the **base-rds-w12-x64-01** Parent VM, which will mark the image with a blue highlight bar.
3. Click **OK** to continue.

Add Farm Wizard - vCenter Settings - Snapshot

1. Click on the **Browse** button next to the field marked **Snapshot**.
2. Select the snapshot **Base-IC**.
3. Click **OK** to continue.
1. Click on the **Browse** button next to the field marked **Snapshot**.
2. Click on the **Base-IC** Snapshot, which will mark the image with a blue highlight bar.
3. Click **OK** to continue.

### Add Farm Wizard - vCenter Settings - VM Folder Location

1. Click on the **Browse** button next to the field marked **VM folder location**.
2. Click on the **RegionA01 VM Folder Location**, which will mark the image with a dark blue highlight bar.
3. Click **OK** to continue.
Add Farm Wizard - vCenter Settings - Cluster

1. Click on the **Browse** button next to the field marked **Cluster**.
2. Click on the **RegionA01-IC01** Cluster, which will mark the image with a dark blue highlight bar.
3. Click **OK** to continue.

It is worth noting that **Instant Clones** requires a vSphere environment have a **Cluster** object in the hierarchy for **Instant Clones** to work and create itself properly. If a vSphere environment has no **Cluster** object this wizard will not allow you to continue.

Add Farm Wizard - vCenter Settings - Resource Pool

1. Click on the **Browse** button next to the field marked **Resource pool**.
2. Click on the **RegionA01-IC01** Resource Pool, which will mark the image with a dark blue highlight bar.
3. Click **OK** to continue.

### Add Farm Wizard - vCenter Settings - Datastores

1. Click on the **Browse** button next to the field marked **Datastores**.
2. Click on the check box next to the **COMP01-ISCSI01** Datastore, which will mark the image with a blue highlight bar.
3. Click **OK** to continue.
1. Please note all the settings you have entered and that the **Next** button is now available.
2. Click **Next** to continue.
1. Click on the **Browse** button next to the field marked **AD container**.
2. Click on the arrow next to **corp.local** which will open up the AD containers setup in the domain.
3. Click on **OU=Horizon**, which will mark the image with a dark blue highlight bar. It is a best practice to create a separate OU object for your Horizon desktops and RDSH servers.
4. Click **OK** to continue.
1. **ClonePrep** is the tool built into **Instant Clones** that provides guest customization without requiring a reboot. It is part of the technology that make Instant Clones so fast and keeps the load on vCenter lower than linked clones.

2. Please note the remaining options available to the customization process. The small bubbled question mark icons are additional help screens in relation to the technology fields they are adjacent to.

3. Click **Next** to continue.
Add Farm Wizard - Ready to Complete

Note the settings here and scroll through everything we covered.

1. Please do not click **Finish** on this wizard as this will slow down the lab and could potentially cause it to become unusable. Click **Cancel**.
2. Please **Confirm** the cancellation by clicking **OK** to return to the Horizon 7 Administrative Console.
Publish Virtualized Application from RDSH Instant Clone Farm

JMP - Next-Generation Application Delivery Platform

JMP (pronounced jump) represents capabilities in VMware Horizon 7 Enterprise Edition that deliver Just-in-Time Desktops and Apps in a flexible, fast, and personalized manner. JMP is composed of the following VMware technologies:

- VMware Instant Clone Technology for fast RDSH provisioning.
- VMware App Volumes for real-time application delivery.
- VMware User Environment Manager™ for contextual policy management.

JMP allows components of an RDSH server to be decoupled and managed independently in a centralized manner, yet reconstituted on demand to deliver a personalized user workspace when needed. JMP is supported with both on-premises and cloud-based Horizon 7 deployments, providing a unified and consistent management platform regardless of your deployment topology. The JMP approach provides several key benefits, including simplified RDSH image management, faster delivery and maintenance of applications, and elimination of the need to manage “full persistent” desktops.

Publishing Applications in Horizon 7 Web Administrative Console for RDSH Instant Clones

Open Chrome Browser from Windows Quick Launch Task Bar

From the Main Console, Click on your open browser tab to return to the View Administrator for Horizon 7.

If you closed the browser, open up the Chrome Browser again.

1. Click on the **Chrome Icon** on the Windows Quick Launch Task Bar.
Launch Horizon 7 Web Administrative Console

Return to the View Administrator for Horizon 7 if you still have it open. If you logged out you can reopen by

1. Click on View-01A Admin from the Chrome bookmarks bar. It should log you into the follow URL: https://view-01a.corp.local/admin/#

Log in to Horizon 7 Web Administrative Console

1. Type in the user name administrator
2. Type in the default password VMware1!
3. Click on Log In to start the authentication process into the console
Application Pools in the Horizon 7 Web Administrative Console

1. From the left hand side of the Horizon 7 Web Administrative Console, under **Inventory**, click on the arrow next to **Catalog**.
2. Click on **Application Pools**, which will highlight it in a dark blue bar.
3. Note the applications that are currently virtualized. These are from an existing RDSH host and not from the RDSH Instant Clone farm creation step from the previous exercise.
4. Click on **Add...** to start the application pools wizard.

---

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<thead>
<tr>
<th>ID</th>
<th>Display Name</th>
<th>Farm</th>
<th>Version</th>
<th>Publisher</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrobat_Reader_DC</td>
<td>Acrobat Reader DC</td>
<td>RDS</td>
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<td>Adobe Systems</td>
<td>Available</td>
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<tr>
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<td>Available</td>
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<tr>
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<td>WinMerge</td>
<td>RDS</td>
<td>2.14.0</td>
<td><a href="http://winmerge">http://winmerge</a></td>
<td>Available</td>
</tr>
</tbody>
</table>
1. Use the pull down menu (the down arrow) next to the field marked **Select an RDS farm**.
2. Click and choose the **RDS-IC** farm in the list. The application list will change at the bottom to reflect the applications that are available on the RDSH hosts in this farm to virtualize.
3. Click and choose the checkbox next to **WordPad**. You'll note the path leads to the link for **WordPad**.
4. Click **Next** to continue.
Add Application Pools - Edit ID & Display Name

1. The ID for the application defaults to the name WordPad. Type in and make this ID WordPad_RDS_IC for WordPad from the RDS Instant Clone farm.

2. The Display Name defaults to WordPad. Type in and make this Display Name WordPad RDS IC for WordPad from the RDS Instant Clone farm.

3. Keep the checkbox marked to Entitle users after this wizard finishes.

4. Click Finish to conclude and jump into the entitlement window.
Add Entitlements - Application Pool Entitlement Add

1. Click on the Add... button to open the Find User or Group wizard.
2. In the Find User or Group wizard, in the field next to Name/User name type in Horizon.
3. Click on Find.
4. This will query AD and will find all user and group objects with the name Horizon. Click on the Horizon Users name and this will highlight the bar in blue.
5. Click OK to continue.
Add Entitlements - Application Pool Entitlement Additional Add

1. Click on the **Add...** button to open the **Find User or Group** wizard.
2. In the **Find User or Group** wizard, in the field next to **Name/User name** type in **Lab**.
3. Click on **Find**.
4. This will query AD and will find all user and group objects with the name **Lab**. Click on the **Lab 1 User** name and this will highlight the bar in blue.
5. Click **OK** to continue.
1. Make sure that the two user / group objects **Horizon Users** and **lab1user@corp.local** are listed in the **Add Entitlements** field.
2. Click **OK** to finish.
1. WordPad is now available as a virtualized application through the new RDSH Instant Clone farm.
Launch RDSH Published Application

Horizon Apps

The creation of the remote application done in previous steps is the essence of what VMware calls Horizon Apps. Horizon makes apps simple. With the unveiling of Just-in-Time apps in Horizon 7.1, we make this simple to buy, as well. Horizon Apps is a new stand-alone offering focused on published applications. **Horizon Apps comes in two editions:**

1. **Standard Edition:** Includes app publishing (RDSH apps and session-based desktops), User Environment Manager, VMware vSphere and VMware vCenter.

For customers who need published applications but don’t need VDI desktops, Horizon Apps is a great choice.

**Main Console - Launch Horizon Client**

From the Main Console, find the icon **VMware Horizon Client**. Launch the client.
1. With the **VMware Horizon Client** open, the Horizon Connection Server `view-01a.corp.local` should be visible. If it is not visible, please click on **New Server** and add this connection server. Launch the connection to this connection server.
1. In the **User name** field, place the user called **lab1user**
2. In the Password field, place the password **VMware1!**
3. In the **Domain** field, verify that it is marked as **CORP**
4. Click on **Login** to continue.
1. Within the **Horizon Client**, you will see the newly created **WordPad RDS IC** virtual application. Launch the application.
The virtualized application will begin to load. Please wait as the application loads from the RDSH Instant Clone farm.
1. **WordPad** is actually running from the RDSH Instant Clone host, but appears to run as if it is natively installed in the desktop OS. When you are done, click on **File**.

2. Go down to **Exit** to close the application. Close the connection to the connection server by clicking on the image of a **plug** in the upper left corner of the **Horizon Client**.
Conclusion

This concludes Module 2 on RDS Farm Provisioning

You've finished Module 2

Congratulations on completing Module 2.

If you are looking for additional information on Horizon 7 Instant Clone technology, try one of these:

- Click on this link
- Or go to this blog
- Or use your smart device to scan the QRC Code.

Proceed to any module below which interests you most.

- **Module 3 - Desktop Pool Provisioning** (30 minutes) (Basic) Creating Windows 10 Desktop Pools with Instant Clones
- **Module 4 - Advanced Provisioning** (30 minutes) (Advanced) Attendee will gain insight into how to push image updates to Instant Clone Pools and Farms and the update process.
How to End Lab and not continue on to the other modules

You can continue on to the other modules in this lab or you can end your lab completely just click on the END button.
Module 3 - Desktop Pool Provisioning (30 Minutes)
Introduction

This Module contains the following lessons:

- Instant Clone Desktop Pool - In this lesson you will walk through the steps to create an Instant Clone desktop pool. We will look at the different settings.
- Connect to Instant Clone Desktop - In this lesson you will connect to an already created Windows 10 Instant Clone Pool. We will demonstrate the elasticity of the Instant Clone Pool.
Instant Clone Desktop Pool

An instant-clone desktop pool is an automated desktop pool. vCenter Server creates the desktop virtual machines based on the settings that you specify when you create the pool.

Similar to View Composer linked clones, instant clones share a virtual disk of a parent virtual machine and therefore consume less storage than full virtual machines. Instant clones are created using the vmFork technology. An instant-clone desktop pool has the following key properties:

- The provisioning of instant clones is significantly faster than View Composer linked clones.
- Instant clones are always created in a powered-on state, ready for users to log in. Guest customization and AD domain join are completed as part of the initial power-on workflow.
- When a user logs off, the desktop virtual machine is deleted. New clones are created according to the provisioning policy, which can be on demand or up-front.
- With the push image operation, you can recreate the pool from any snapshot of any parent virtual machine. You can use push image to roll out OS and application patches.
- Clones are automatically rebalanced over available data stores when clones are created.
- View storage accelerator is automatically enabled.
- Transparent page sharing is automatically enabled.

Because View can create instant clones very quickly, you typically do not need to provision a large number of desktops up front or have a large number of ready desktops. For this reason, when compared with View Composer linked clones, Instant Clones can make the task of managing a large number of desktops easier and also reduce the amount of hardware resources that is required.

Module disclaimer: This lab environment is utilizing shared infrastructure and may not perform as well as a properly designed and scaled production environment would. Observed latency in the Instant Clone process is due to the the constraints within the lab environment. This module is meant to demonstrate functionality only and should NOT be used to gauge performance or performance benchmarking.

Create an Instant Clone Desktop Pool
Note: Due to the nature of the Hands-on-Labs you will create a Instant Clone Pool, but will not save your settings.

1. Double Click the Google Chrome icon on the Windows Quick Launch Task Bar to launch.

**Launch the View Administrator**

1. Click on the View-01A Admin in the toolbar to open the Horizon 7 Administrator
2. Enter the User name: Administrator
3. Enter the Password: VMware1!
4. Click Log In

1. Click on the View-01A Admin in the toolbar to open the Horizon 7 Administrator
2. Enter the User name: Administrator
3. Enter the Password: VMware1!
4. Click Log In
Add Desktop Pool

1. Expand Catalog
2. Click on Desktop Pools
3. Click on Add
1. Choose Automated Desktop Pool
2. Click Next
Desktop Pool User Floating

1. Choose Floating
2. Click on Next
1. Choose Instant clones
2. Click on your vCenter Server
3. Click Next
Desktop Pool Identification

1. Enter Win10_IC for the ID
2. Enter Instant Clone in display name
3. Click Next
Desktop Pool Settings

Take the defaults for the pool except for

1. Confirm the default Remote Display Protocol is VMware Blast
2. Select No for Allow users to choose protocol
3. Check HTML Access Enabled
4. Click Next
Provision Settings

1. Enter HOL-\{n\}-w10 for Naming Pattern
2. Select 5 for Max number of machines
3. Select Provision machines on demand
4. Enter 1 of minimum number of machines
5. Click Next

This will build a pool of desktops to a maximum of 5 on demand.
Storage Optimization

Take the defaults

1. Click Next
1. Browse for the Parent VM, **base-w10-x64-01** - Click OK
2. Browse for the Snapshot, **Base-IC** - Click OK
3. Browse for the VM folder, select **RegionA01** - Click OK
4. Browse for the Cluster, **RegionA01-IC01** - Click OK
5. Browse to **RegionA01-IC01** for the resource pool - Click OK
6. Browse to the datastores and select one
7. Click Next
Guest Customization

Instant Clones uses ClonePrep for guest customization.

ClonePrep customizes instant clones when they are created and customizes the powered on VM without the need for reboots.

ClonePrep joins all instant clones to the Active Directory domain. The clones have the same computer security identifiers (SIDs) as their parent VM. ClonePrep also preserves the globally unique identifiers (GUIDs) of applications, although some applications might generate a new GUID during customization.

When you add an instant-clone desktop pool, you can specify a script to run immediately after a clone is created and another script to run before the clone is powered off.

1. Click Next
1. Please do not click **Finish** on this wizard as this will slow down the lab and could potentially cause it to become unusable. Click **Cancel**.
2. Please **Confirm** the cancelation by clicking **OK** to return to the Horizon 7 Administrative Console.

**NOTE:** You will cancel the pool creation wizard because the pool is already created for you. These steps were to demonstrate how an Instant Clone pool is created in the Horizon Administrator.
Connect to Instant Clone Desktop

You are going to validate the Instant Clone pool inventory before connecting to a desktop and watch how Instant Clone Technology creates and destroys virtual machines in seconds.

Connect to Horizon 7 Administrator

From the Horizon 7 Administrator

1. Click on the Catalog to expand
2. Click on Desktop Pools
3. Double Click on Win10-IC pool
4. Click on the Inventory Tab in the Win10-IC to see one desktop provisioned
Edit the Desktop Pool

The Desktop Pool has been disabled so we will enable. We will also increase the Max number of machines in the desktop pool.

1. Click back on the Summary tab
2. Click on Edit
3. Click on the **Provisioning Settings** tab
4. In the Basic section, Make sure the box is checked to Enable Provisioning
5. In the Desktop Pool Sizing increase the Max number of machines: 3
6. In the Provision Timing section, click on Provision machines on demand
7. Edit Min number of machines to 1
8. Click OK to make the changes
Inventory

1. Click on Inventory
2. Notice that you only have a single Windows 10 desktop available.
3. Minimize the browser

Launch Horizon Client

Launch the Horizon Client from the Main Console

1. From the desktop of the Main Console, double click the VMware Horizon Client Icon
Login to Horizon 7

Login to the View-01a.corp.local server.

1. Double click the view-01a.corp.local server

Login as lab1user

1. Login as lab1user
2. Enter password VMware1!
3. Click Login
Choose the Instant Clone Pool

Double Click the **Windows 10 Instant Clone** desktop pool to connect to a Windows 10 desktop.

It will take a few minutes for the desktop to be ready.

**Workspace ONE - Identity Manager Desktop - Login**

If you get prompted to Login to Workspace ONE from the Windows 10 Instant Clone Desktop, you can just close it as it is used for another lab module and we will not be using in this module.

1. Click on the upper left corner
2. Click Close

You can now proceed to the desktop to continue.
Notice that you are connected as the lab1user on Win10-IC-01. Stay logged into this desktop. Just minimize by clicking the - in top right corner.

*This is the same desktop as the one from the inventory.*

**Return to Horizon 7 Administrator**

From the Main Console, Click on your open browser tab to return to the View Administrator for Horizon 7.
Review the Inventory

1. You may need to Click the Refresh icon several times
2. Review the Instant Clone Pool. You have a second Windows 10 machine, Win10-IC-02. (*Please click the refresh icon until the machine shows available.*)
3. Return to the Instant Clone Windows 10 desktop by clicking **Windows 10 Instant Clone** in the task bar.

Return to the Instant Clone Windows 10 Desktop

We will return to the Windows 10 Desktop

1. Validate you are on the Instant Clone Win10-IC-01 desktop
Disconnect and Log Off Win10-IC-01 Desktop

1. Click Options
2. Click Disconnect and Log Off
3. Click OK when prompted
Return to Horizon 7

Click on your open browser tab to return to the Horizon 7 Administrator

Elastic Pool

1. Click the Refresh Icon several times. You will see the desktop being deleted and removed from inventory. This will take a few refreshes and could take a minute.
2. Notice that you only have 1 desktop available now

Instant Clone Pools can be provisioned using elastic pool settings. They will grow to the maximum number defined in the pool settings but they will also shrink or destroy the virtual machines when not in use. Since Instant Clones can be created so quickly it is a viable solution to create them as they are needed. This is one of the main building blocks of the Just In Time desktop.

Elastic pool provisioning driven by 3 variables:

- **Minimum** controls minimum # of provisioned and powered-on clones in the pool. Can be entered when The Provision Machines on Demand radio button is selected
- **Maximum** controls the maximum # of provisioned and powered-on clones in the pool
- **Spare** controls the # of spare VMs powered-on as headroom for user login

Return to the Horizon Client

Click the VMware Horizon Client in the taskbar to return to the client
Log Off as lab1user

1. Click the Log Off icon
2. Click OK
Conclusion

This concludes Module 3 on Provisioning Desktop Pools.

You've finished Module 3

Congratulations on completing Module 3.

If you are looking for additional information on Horizon 7 Instant Clone technology, try one of these:

- Click on this [link]
- Or go to [http://bit.ly/HorizonInstantClones]
- Or use your smart device to scan the QRC Code.

Proceed to any module below which interests you most.

- **Module 4 - Advanced Provisioning** (30 minutes) (Advanced) Attendee will get insight into how to push image updates to Instant Clone Pools and Farms and the update process.

How to End Lab and not continue on to the other modules

You can continue on to the other modules in this lab or you can end your lab completely just click on the **END** button.
Module 4 - Advanced Provisioning (30 Minutes)
Introduction

In this module, we will show the ease of updating a parent image (and all the details needed in the Horizon Admin Console) with the software noted below and subsequently simulate a push to the image of the Instant Clones.

Here's a high-level of what will be completed:

- Take an existing pool and add NotePad++ to its master image
- Show the Push sequence in the Horizon Admin Console
Install Notepad++ into Instant Clone Master Image

Let's get started!

Demonstration of the deployment of an application to an Instant Clone Master Image.

Due to the limitations of the environment running this module, pushing the image will not be done but the steps leading up to it will be shown.

Open Chrome Browser from Windows Quick Launch Task Bar

1. Click on the Chrome Icon on the Windows Quick Launch Task Bar.

Open the vCenter Server Web Client

1. From the Chrome toolbar favorites, choose the HOL-1851 Admin folder then select vCenter Web Client. This should resolve to the address https://vcsa-01a.corp.local/vsphere-client/?csp.
vCenter Web Client Log In

1. Log into the vCenter Server with user name administrator@vsphere.local
2. Use the password VMware1!
3. Click on Login to continue.

vCenter Main Page - Instant Clone Master Image

1. From the Navigator Pane on the left hand side, click on the arrow next to RegionA01-COMP01 to minimize this set of VM's in this cluster. Expand the RegionA01-IC01 cluster by clicking on the arrow next to it.
2. Click on the VM named base-w10-x64-01, which is the Instant Clone Master Image we will modify. This will highlight the VM with a dark blue bar.
3. Right-mouse click base-w10-x64-01, click on Power.
4. Click on Power On to bring this VM up and running. If the VM is already powered on, please continue.
5. Right-mouse click base-w10-x64-01 again, and click on Open Console. This will open a new tab and console into the Instant Clone Master Image.
1. Click on the **Send Ctrl-Alt-Delete** from the upper right hand corner of the console screen.
2. Click on the **Other user** icon.
3. In the user name field type in **administrator**
4. In the password field type in **VMware1!**
5. Be sure the **Sign in to: BASE-W10-X64-01** is listed.
1. In the Windows 10 base image, click on the **Windows Explorer** icon.
2. In the explorer field, type in `\controlcenter\c$\tools` and press Enter.
3. Right-mouse click on the **npp.7.4.1.Installer** (NotePad++ Installer) which will open up a separate menu.
4. Click on **Copy**.
1. Right-mouse click out onto the desktop of the Windows 10 base image.
2. Under the menu that appears, choose Paste.
3. Note that the NotePad++ icon will appear. Launch the installer.

**Instant Clone Master Image - Install NotePad++ - Language**

It may take a few moments to load the installer. If you receive a "Windows SmartScreen can't be reached right now" error prior to this screen, please click Run anyway.

1. Click OK to continue with the default English language.
1. Click on **Next** to continue past the **Welcome Screen**.
1. Click on I Agree in the License Agreement window.
Instant Clone Master Image - Install NotePad++ - Install Location

1. Click Next accepting the Default Folder for the application in the Choose Install Location window.
1. Click the checkmark box next to **Auto-Updater** to de-select it. We want to be able to update applications on our own as opposed to having it update automatically,
2. Click **Next** to continue.
1. Click the checkmark box to enable the Create Shortcut on Desktop
2. Click Install to continue.
Instant Clone Master Image - Install NotePad++ - Installing...
1. Click on **Finish** to complete the install. NotePad++ will launch.
Instant Clone Master Image - NotePad++

Verify that the application is up and running.

1. Once you verify that NotePad++ is running properly, click on File.
2. Click on Exit to close the application.
1. Right-mouse click on the installer `npp.7.4.1.Installer` icon.
2. Click on **Delete**. Right-mouse click the **Recycle Bin**. click **Empty the Recycle Bin**, and accept the remove of the installer.
Instant Clone Master Image - Closing Image Procedures

1. Right-mouse click the Windows Start Menu button.
2. Click on Command Prompt (Admin).

Instant Clone Master Image - Closing Image Procedures - Command Prompt

1. Type into the Administrative Command Prompt, type ipconfig /release
2. Close out the Administrative Command Prompt.

**Instant Clone Master Image - Shutdown**

1. Right-mouse click the *Windows Start Menu* button.
2. Click on Shut Down or sign out.
3. Finally, click on Shut down. The Instant Clone Master Image Console will eventually disconnect. Please close that tab only in Chrome. Note that vCenter may have logged you out.

**vCenter Main Page - Re-Log in**

1. Log into the vSphere Web Client with user name `administrator@vsphere.local`
2. Use the password `VMware1!`
3. Click on **Login** to continue.
Please verify that **base-w10-x64-01** has shutdown completely within the vSphere Web Client, as we are about to create a powered-off snapshot. Please refresh the vSphere Web Client until you see the **base-w10-x64-01** image as in step 1 with **no** powered-on status (no green arrow on the VM icon).

1. Click on the VM named **base-w10-x64-01**, which is the Instant Clone Master Image previously modified. This will highlight the VM with a dark blue bar.
2. Click on **Snapshots**.
3. Click on **Take Snapshot**...
vCenter Main Page - Instant Clone Master Image - Snapshot Name

1. Use the default Name for the snapshot or use one of your own.
2. Click OK to start the snapshot capture.

vCenter Main Page - Instant Clone Master Image - Snapshot Complete

1. Note that in the Recent Tasks, the snapshot will be marked as Completed.

Open Horizon 7 Web Administrative Console

1. Open up a new tab in Chrome.
2. Click on the View-01A Admin toolbar favorite.
3. This should resolve to the address https://view-01a.corp.local/admin/#

**Horizon 7 Web Administrative Console - Login**

1. Type in the user name **administrator**
2. Type in the default password **VMware1!**
3. Verify that the Domain is set to **CORP**
4. Click on **Log In** to start the authentication process into the console.

**Horizon 7 Web Administrative Console - Desktop Pools**

1. Click on the **arrow** next to **Catalog** to open it.
2. Click on **Desktop Pools**.
3. Click on the Instant Clone VDI pool named Win10-IC. The name itself is a hyperlink so clicking onto it will open up the pool properties.

**Horizon 7 Web Administrative Console - Instant Clone Push Image

1. Inside the properties of the Win 10-IC Instant Clone Pool, click on **Push Image**.
2. Click on **Schedule**.

---

**Horizon 7.1: Instant Clones**
Horizon 7 Web Administrative Console - Schedule Push Image

1. Select the Snapshot that you created by clicking on the snapshot name.
2. Click Next to continue.
1. Keep the defaults but note the settings that are available to you when pushing an updated image. Click **Next** to continue.
1. Note the details. Please click **Cancel** to complete this exercise.

Please do not click **Finish** as this will cause the module to possibly become unusable.
## Horizon 7 Web Administrative Console - Push Image Processing

<table>
<thead>
<tr>
<th>Summary</th>
<th>Inventory</th>
<th>Sessions</th>
<th>Entitlements</th>
<th>Tasks</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

### Machine Status

Available: 1

### vCenter Server

**Server name:** vcsa-01a.corp.local  
**Current Image:**  
- Parent VM: base-w10-x64-01
- Snapshot: Base-IC
- State: Published

**Pending Image:**
- Parent VM: base-w10-x64-01
- Snapshot: VM Snapshot 6%25252f7...
- State: Publishing
- Operation: Push Image

1. If we had done the image push, this is what we would have seen in the **Summary** tab inside the **Win 10-IC** pool settings under the vCenter Server section. The new image would have published and the Instant Clone desktops would have been recreated with the updated image with our NotePad++ install.
Conclusion

This concludes Module 4 on Advanced Provisioning

You've finished Module 4

Congratulations on completing Module 4.

If you are looking for additional information on Horizon 7 Instant Clone technology, try one of these:

- Click on this link
- Or go to https://tinyurl.com/yzhof2z6
- Or use your smart device to scan the QRC Code.

Proceed to any module previously which interests you most.

How to End Lab

To end your lab click on the END button.
Conclusion

Thank you for participating in the VMware Hands-on Labs. Be sure to visit http://hol.vmware.com/ to continue your lab experience online.

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