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Lab Overview -
HOL-1951-04-VWS -
VMware Horizon 7 Enterprise - Advanced
Lab Guidance

Note: It may 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.

Configure VMware Horizon 7 Instant Clones, Horizon Apps and Horizon VMware Cloud on AWS.

Lab Module List:

- **Module 1** - Horizon Instant Clones (60 Minutes)(Advanced)
- **Module 2** - Horizon Apps (60 Minutes)(Advanced)
- **Module 3** - Horizon on VMware Cloud on AWS (30 Minutes)(Advanced)

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- Captain - **Jim Yanik** - Senior Manager, EUC Technical Marketing, 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:

Ask for a headset or use your own - video reference material ahead!

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.

Insert @ Symbol

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.
3. Click on the @ sign
4. 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

[Image of the lower right portion of the screen]
Please check to see that your lab has finished all the startup routines and is ready for you to start. If you see anything other message than "Ready", please wait a few minutes. If after 5 minutes if your lab has not changed to "Ready", please ask for assistance.
Module 1 - Horizon Instant Clones (60 Minutes)
Introduction

This module will show features that utilize Instant Clone Technology to bring increased speed, scale, and simplicity.

Module 1 contains the following lessons:

- Instant Clone Technology
- Instant Clone Desktops
- Instant Clone Master Image Update
- RDSH Farm - Instant Clone
- Instant Clone RDSH Farm + Published Applications
- Conclusion
READ ME GUIDE - Understanding Instant Clone Technology

Drag the window containing the Manual open to see more of the content screen. This section contains Instant Clones reference material only.

VMware Horizon 7 remotely delivers a Windows desktop and application experience to the user endpoint device from centralized VMware vSphere enterprise servers. In comparison to physical desktops, virtual desktops and published applications improve IT responsiveness, and the centralized delivery enhances application and data security.

Instant Clone Technology is a new feature of the View component within VMware Horizon 7. The View component (formerly the product called Horizon View) offers a virtual desktop infrastructure (VDI) and remote applications through Remote Desktop Session Host (RDSH). Desktop and application delivery are done through a single platform, which simplifies desktop administration and operations and enhances the user experience.

The VMware Instant Clone Technology included in the View component of the Horizon 7 Enterprise Edition improves and accelerates the process of creating cloned virtual desktops as compared to 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 image on which the instant-clone pool is based.
JMP – Next-Generation Desktop and 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:

1. **VMware Instant Clone Technology** for fast desktop and RDSH provisioning
2. **VMware App Volumes** for real-time application delivery
3. **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-Clone Use Cases**

If you want to use instant clones for virtual desktops, you create one or more pools of instant clones. Like View Composer linked-clone pools, instant-clone pools have been
tested to support up to 2,000 desktops in a pool. To use instant clones for published applications, you create a farm of instant-clone RDSH servers.

Instant clones fit several use cases in enterprise environments:

- For task workers, where everyone in the pool requires the same applications, and a specific desktop need not be dedicated to a specific user
- Where you want to take advantage of the benefits of cloned desktops, and provide personalization with other VMware products such as App Volumes and User Environment Manager
- Wherever you previously used View Composer floating desktop pools or RDSH farms that used a naming pattern

**Cloning Technology**

<table>
<thead>
<tr>
<th>TERM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master VM</td>
<td>The VM that you create and configure as the model for the virtual desktops or RDSH servers you plan to deploy.</td>
</tr>
<tr>
<td>Master VM snapshot</td>
<td>A reproduction of a master VM exactly as it was when you took the snapshot. The snapshot includes the state of the data on all VM disks.</td>
</tr>
<tr>
<td>Internal template VM</td>
<td>A linked clone of the master VM, based on the master VM snapshot. This VM is used for the AD domain join.</td>
</tr>
<tr>
<td>Replica VM</td>
<td>A thin-provisioned full clone of the internal template VM. The View Storage Accelerator feature uses a content-based read cache digest of this VM.</td>
</tr>
<tr>
<td>Running parent VM</td>
<td>A linked clone of the replica VM, based on a snapshot the system takes of the replica VM.</td>
</tr>
<tr>
<td>Instant clone</td>
<td>A desktop VM or RDSH server VM created from the memory and disk of the running parent VM. After the instant clone is created, it shares the read disks of the replica VM, exactly like a linked clone.</td>
</tr>
</tbody>
</table>
Process creating various types of VMs for Instant Clone

![Diagram showing the process of creating various types of VMs]

**Full Clones**

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.

**Linked Clones**

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” 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.

**Instant Clones**

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. At the point 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.
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:

- **Publishing** - also called "priming" the master image
- **Provisioning** - the VMs in the pool or farm

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.
Publishing the Master Image
The Add Desktop Pool wizard or the Add Farm wizard in Horizon Administrator guides you through the process of publishing the master image, 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. The image above is the same for desktops or RDSH VMs in a server farm.

The following steps describe the publishing process shown

1. In the Add Desktop Pool wizard or Add Farm wizard, you select a snapshot of a master VM to use for the instant-clone pool or farm. After you complete the wizard, the instant-clone engine performs the rest of the steps.
2. The instant-clone engine uses the master VM snapshot that you specified to create one internal template VM on the same datastore as the master VM. This internal template VM is linked to the master VM. The internal template VM is used to create the replica VMs. The system performs a domain join on this internal template VM, which ensures that all the proper Windows registry keys and settings are correctly populated. This process involves a reboot. Using this internal template VM for the domain-join process means that the process is performed only once on one VM. Without the internal template VM, the domain-join process would have to be performed on all the replica VMs that are created during the next step of the process.
3. One or more replica VMs are created from the internal template VM. The replica VM is a thin provisioned full clone of the internal template VM. The replica VM shares a read disk with the instant clone VMs after they are created. A content-based read cache (CBRC) digest is created. (For more information about this digest file, see the vSphere blog about View Storage Accelerator.) While completing the wizard, you can choose to place the replica VM on a different datastore from the instant-clone VMs in the desktop pool or server farm, just as you can for View Composer pools. For example, in a tiered storage scenario such as that shown in the diagram, you can store the replica VM on a solid-state, disk-backed datastore. Solid-state disks have low storage capacity and high-read performance, typically supporting 20,000 IOPS. If you choose to have replica VMs on the same datastores as your instant clones, one replica VM is created per datastore, as shown in the diagram.
4. The system takes a snapshot of each replica VM and uses it to create one running parent VM per VMware ESXi host per datastore. The running parent VMs memory and disks are used to create the instant clones.

Note: Although the running parent is used to create the instant clone, after the clone is created, 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.
Important: If you use the same master VM snapshot for multiple pools or farms, those pools or farms use the same running parent VMs. If additional pools or farms use additional datastores or ESXi hosts, additional running parent VMs are created for the ESXi hosts and datastores.

**Provisioning Instant-Clone VMs**

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. The diagram shows the steps in the provisioning process for instant clones as compared with the View Composer provisioning process for linked clones.
Initial Pool Creation – Walk-Through

1. Template is created, powered on, cloned from master VM, joined to domain.
2. Template is powered off.
3. Replicas are placed on selected datastores.
4. Replica is reconfigured.
5. Replica is powered on and placed on ESXi host in the cluster.
6. Replica shuts down.
7. CBRC digest is created on replica.
8. Snapshot is taken of replica VM.
9. Parent VMs are cloned to each ESXi host on each datastore.
10. Parent VMs are powered on.
11. Desktop VMs are created (vmFork) and powered on.
12. Desktop VMs are customized (ClonePrep).

- Priming: 20-40 Minutes
- Push: @1 Second per Desktop
This shows the entire process of publishing the image and provisioning the instant-clone VMs. The publishing process, which comprises the first 10 of the 12 steps in the diagram, can be completed ahead of time so that when it is time to create the pool, VMs appear virtually instantly, just in time for users to log in.

**What Happened to These Linked-Clone Settings?**

If you are already using View Composer linked clones and are planning to replace them with instant clones, you will find that the wizard for creating instant clones requires less information. The following View Composer settings are not needed for instant clones:

1. **Delete or refresh machine on logout** - An instant clone desktop is always deleted whenever a user logs out. An instant clone with the newest image is ready when the user logs in again.
2. **Remote machine power policy** - Instant clones are always powered on. If an instant clone is powered off, the user is logged out. When a user logs out, the VM is deleted and recreated.
3. **Allow users to reset their machines** - To reset the machine, the user is logged out. When a user logs out, the virtual desktop is deleted. If a virtual desktop freezes, the administrator can use a recover operation, which deletes the current VM and creates a new one.
4. **Redirect Windows profile to a persistent disk** - To accomplish the same effect, use App Volumes.
5. **Disposable file redirection** - With instant clones, the virtual desktop is deleted when the user logs out.
6. **Select separate datastores for persistent and OS disks** - Deciding whether to use separate datastores is not necessary because with instant clones, there are no persistent disks. You can use App Volumes instead of using persistent and OS disks. Minimum number of ready (provisioned) machines during View Composer maintenance operations With instant clones, you do not use recompose operations, which typically occur during scheduled maintenance windows. Instant clones are provisioned so rapidly that maintenance operations are not required.
7. **Reclaim VM disk space** - Reclaiming disk space is not needed because the virtual desktop is deleted when a user logs out. For RDSH server farms, the VMs in the farm are deleted and recreated according to a maintenance schedule. VM disk space does not have much time to grow. The space-efficient disk format (SE sparse), with its wipe and shrink process, is not needed.

These settings are automatically enabled:

- **Use View Storage Accelerator** - View Storage Accelerator is automatically enabled. Clone-level CBRC is no longer needed, so you do not need to specify the level of CBRC. Master VMs and replicas still use CBRC, and the CBRC digest is calculated automatically.
- **Transparent page sharing scope** - Transparent page sharing is automatically enabled at the VM level.
Benefits of Using Instant Clones

1. Simple Setup
   - Does not require a separate server or database

2. Easy Management of OS and Software Updates
   - To manage OS patches and software updates with instant clones, you use the push-image operation for desktop pools or the Schedule Maintenance option for RDSH server farms. You make changes to the master VM and take a snapshot or use a snapshot from a different master VM. You can recreate the pool or server farm from any snapshot of any master VM
   - The push-image operation for instant clones achieves the same goal as the recompose operation for View Composer linked clones
   - Instant clones do not need to be recomposed, refreshed, or rebalanced

3. Smaller Load on vCenter Server
   - Although vmFork calls do place a higher load on vCenter Server than linked-clone calls, the instant clone process eliminates the power-cycle and reconfiguration calls. The result is a significantly lower overall load on vCenter Server. And fewer calls per task means fewer opportunities for errors to occur

<table>
<thead>
<tr>
<th>VCENTER SERVER CALL TYPE</th>
<th>LINKED CLONES</th>
<th>INSTANT CLONES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloning</td>
<td>1 clone call</td>
<td>1 vmFork call</td>
</tr>
<tr>
<td>Power cycle</td>
<td>2 power-cycle calls</td>
<td>0</td>
</tr>
<tr>
<td>Reconfiguration</td>
<td>3-4 reconfiguration calls</td>
<td>0</td>
</tr>
</tbody>
</table>

4. Simplified Desktop Pool and Server Farm Management
   - With instant clones, many management tasks are automated, and architectural elements are eliminated

5. Server Farm Maintenance Schedules
   - For RDSH server farms, you can schedule maintenance on the farm to delete the VMs in the farm and either recreate them from the current master image or create VMs from a new master image snapshot.
   - With instant-clone desktops, the desktops are destroyed and recreated fairly frequently, every time the user logs out. To achieve the same goal with a server farm, you set a recurring maintenance schedule to restore the operating system disk of each VM in the farm to its original state and size

   - You can easily monitor the following operations in Horizon Administrator:
Current image, pending image, current state, and current operation are displayed on the Summary tab of the Pool Details page or Farm Details page, along with a starting time stamp for the push operation, which is useful for troubleshooting.

The Inventory tab of the Pool Details page or Farm Details page identifies which VMs are using which image during a push.

Tasks to switch users to a new image appear on the Tasks tab of the Pool Details page or Farm Details page.

7. Reduced Storage Costs
   - For desktop pools, when a user logs out, the desktop VM is deleted and a new desktop is created, automatically controlling VM growth. You do not need to refresh the desktop pool.
   - For server farms, the VMs are deleted according to a recurring schedule set by the administrator.
   - View Storage Accelerator is automatically enabled. This feature uses the CBRC feature in vSphere hosts to cache VM disk data.
   - Transparent page sharing is automatically enabled.
   - VMFS, VMware vSAN, and NFS disks are supported.

<table>
<thead>
<tr>
<th>NUMBER OF OBJECTS</th>
<th>VM TYPE</th>
<th>DISK SPACE USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Master</td>
<td>60.0 GB</td>
</tr>
<tr>
<td>1</td>
<td>Internal template</td>
<td>55.0 MB</td>
</tr>
<tr>
<td>1 per datastore</td>
<td>Replica</td>
<td>210 GB</td>
</tr>
<tr>
<td>1 per ESXi host</td>
<td>Running parent</td>
<td>2.5 GB (primarily swap)</td>
</tr>
<tr>
<td>1 per desktop</td>
<td>Instant-clone desktop</td>
<td>2.5 GB (growth on use)</td>
</tr>
</tbody>
</table>

To help you determine storage requirements, the diagram lists the various types of VMs that get created as part of the publishing process. The disk space usage shown is for general reference only. These numbers are not intended to provide sizing guidance for every environment. In this example, a 60-GB VM is used, but because the VMs are thin-provisioned, only 2.5 GB per VM is used to start with.

Note: If multiple pools or farms use the same master VM snapshot, the publishing process is performed only once. For example, if four infrastructure VMs (master, internal template, replica, running parent) are created during the publishing of one image, and you create 10 pools or server farms from that image, the same four infrastructure VMs are used for all 10 pools or farms, as long as the pools or farms use the same datastores and ESXi hosts.
Instant Clone Desktops

The Add Desktop Pool wizards guides you through the steps of creating an instant-clone desktop pool.

Pre-requisites (Verified for this lab)

1. Verify that the virtual switch that the instant-clone VMs connect to has enough ports to support the expected number of VMs. Each network card on a VM requires one port.
2. Verify that you have the master image ready.
3. Gather the configuration information for the pool and use the Worksheet for Creating an Instant-Clone Desktop Pool.
4. Verify that you added an instant-clone domain administrator in Horizon Administrator.

Chrome

On the HOL-1951 Main Console Desktop

1. Select **Google Chrome**

New TAB

1. Click - **new TAB** in Chrome
2. Select the **Horizon** folder
3. Click - **Horizon-01-Admin**

**Horizon Login**

![Login Screen]

1. User Name = **administrator**
2. Password = **VMware1!**
3. Domain = **CORP**
4. Click - **Log In**

**Horizon Dashboard**

1. Click to **expand** the View Configuration. We will first check if we have an Administrator account that is entitled to Instant Clone Engine
1. Click **Instant Clone Domain Admins**

**Domain Admin Verify**

<table>
<thead>
<tr>
<th>Domains</th>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>corp.local</td>
<td>administrator</td>
</tr>
</tbody>
</table>

We have an account that is already entitled to use this feature. Let’s move to the pool creation process next and see how to create an Instant Clone Pool.

**Catalog**
1. Click **Catalog** and expand if needed
2. Click **Desktop Pools**

**Desktop Pools**

1. Click **Add**

**Desktop Pools - Automated**

1. Select **Automated Desktop Pool**
2. Click **Next**
**Desktop Pools - User Assignment**

<table>
<thead>
<tr>
<th>Desktop Pool Definition</th>
<th>User Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>User assignment</td>
</tr>
<tr>
<td>User Assignment</td>
<td></td>
</tr>
<tr>
<td>Setting</td>
<td></td>
</tr>
<tr>
<td>vCenter Server</td>
<td></td>
</tr>
</tbody>
</table>

1. **Select Floating** (with JMP, the desktop user can have a stateful experience on a stateless desktop and we can be placed in this pool as a "Floating" assignment and still create a persistent experience. Ensure your use case is aligned to the real need for "Dedicated" before selecting this option)
2. **Click Next**
1. Click **Ignore** (as we have not enabled this feature in the Hands-on-labs, but I strongly recommend this in a production environment to ensure your performance on the storage is correctly managed.)
2. Select **Instant Clones**
3. Click **Next**

**NOTE:** Every step of the selection process the supported features and benefits are pointed out in the right column.
### Desktop Pools - Identification

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Marketing</td>
</tr>
<tr>
<td>Display name</td>
<td>WIN10-JMP</td>
</tr>
<tr>
<td>Access group</td>
<td>Default</td>
</tr>
</tbody>
</table>

- Complete ID = **Marketing**
- Complete Display Name = **WIN10-JMP**
- Access Group = **Default**
- Click **Next**
Desktop Pools - Pool Settings

We will use most of the defaults for this module, but the below settings will at minimum ensure that our user connects using Blast, whilst having access via HTML and we have session collaboration to assist the user:

1. Change Allow user to choose protocol = NO
2. HTML Access = Enabled
3. All Session Collaboration = Enabled
1. Change Naming Pattern = **Marketing-{n:fixed=2}**
2. Max number of machines = **1** (**Please do not increase this number due to capacity restrictions**)
3. Click **Next**
Desktop Pools - Storage Optimization

As we have no VSAN and no storage gains separating the replica and OS disk in this lab we will leave the default selection and continue.

Normally the design for an Instant Clone desktop pool will have to consider the advantages and capabilities of the disks that each master or replica resides on.

1. Click **Next**
1. Click **Browse**
2. Click and select the **base-w10-1709-x64-01** image
3. Click **OK**
1. Click **Browse**
2. Click and select the **HoL Instant Clone Base** snapshot
3. Click **OK**
1. Click **Browse**
2. Click and select the **RegionA01** folder
3. Click **OK**

**Cluster**

1. Click **Browse...**
2. Click the **RegionA01-IC01** folder
3. Click **OK**
1. Click **Browse**
2. Click and select **RegionA01-IC01**
3. Click **OK**

**Resource Pool**

1. Click **Browse**
2. Click and select **RegionA01-IC01** resource pool
3. Click **OK**
## Datastores

Select the instant clone datastores to use for this desktop pool. Only datastores that can be used by the selected host or cluster can be selected.

<table>
<thead>
<tr>
<th>Datastore</th>
<th>Capacity</th>
<th>Free (GB)</th>
<th>FS Type</th>
<th>Drive</th>
<th>Storage Overcommit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESX04a-Local</td>
<td>249.75</td>
<td>121.4</td>
<td>VMFS</td>
<td>SSD</td>
<td>Unbounded</td>
</tr>
</tbody>
</table>

1. Click Browse to select.
2. Select ESX04a-Local datastore.
3. Click OK.
1. Click **Browse**
2. Click and select the **ESX04a-Local** Datastore
3. Click **OK**

---

**Warning**

You have selected a local datastore for your instant clone pool. Please note the following:

1) If you are deploying instant clones on a single ESXi host with local datastore, you must configure a cluster containing that single ESXi host. If you have a cluster of two or more ESXi hosts with local datastores, select the local datastore from each of the hosts in the cluster. Instant clone creation fails otherwise.

2) VMotion, VMWare High Availability, and vSphere Distributed Resource Scheduler (DRS) are not supported.

3) We recommend that you use direct Solid-State Disks (SSDs). Local spinning-disk drives may not have the throughput required by instant clones.

---

1. Click **OK**

**Networks**

We will leave the Networks setting in place to connect to the same network as the parent image. Although the Master Image and the snapshot network setting may work for most use cases, we can at this point specify unique values to connect to different networks in order to use the same image, but network specific per pool.
1. Click **Next**
Guest Customization

In the first step we verified that we have a user that has rights to the instant clone engine, but more importantly have the rights to create object in Active Directory under the selected AD container.

Using a script to further customize the desktop power off or Post-synchronization is available, but an optional feature.

1. We will accept the defaults and click **Next**
1. Click and select **Entitle users after this wizard finishes**
2. Click **Finish**
Entitle Users or Groups

1. Click Add
2. In the Name/User name: enter User4Mod4
3. Select the account
4. Click OK

Horizon Admin Console - Desktop Pool
Testing the Instant Clone Desktop

1. Open a **new tab** in chrome
2. Click **VMware Horizon**

**Horizon HTML Access**

You can connect to your desktop and applications by using the VMware Horizon Client or through the browser.

The VMware Horizon Client offers better performance and features.

1. Click VMware Horizon **HTML Access**
Login

1. Username = **User4Mod4**
2. Password = **VMware1!**
3. Domain = **Corp**
4. Click **Login**

**WIN10-JMP**
Error

This desktop currently has no desktop sources available. Please try connecting to this desktop again later, or contact your system administrator.

OK

Please allow the newly created desktop pool some time to complete 5-20 minutes depending on the current POD.

Feel free to watch the vSphere Console create the new pool while waiting, but keep this session open.
vSphere Login

1. **Switch** to the vSphere tab in chrome (if not already open select the vCenter favorites and then select **RegionA vSphere Client (HTML)**).
2. Click "**Use Windows session authentication**"
3. Click **Login**
IC Pool Creation

1. When the cloning and provisioning process is complete then switch back to the VMware Horizon tab. Feel free to follow the process and browse around.

2. Click the Horizon Tab
Congratulations you have successfully created a desktop pool and tested the Instant Clone result!

Host Name: MARKETING-01  
User: User4Mod4  
IP Address: 192.168.100.185
1. Click Windows
2. Click User
3. Click Sign out
Instant Clone Master Image Update

Exercise: Demonstration of the deployment using an application update to an Instant Clone Master Image.

We will use the default instant clone pool to demonstrate the ease of updating a master image with a change made. These changes can be anything, from patching to a new application that is needed on the master image. In this scenario we will include NotePad++ to the original image and push the new image to the pool.

Chrome

On the HOL-1951 Main Console Desktop

1. Select Google Chrome

Region A - vSphere Client

When the Chrome browser launch the vCenter should automatically load, if not then follow these steps to login

1. Click - vCenter
2. Select the RegionA vSphere Client (HTML)
vCenter Web Client Login

Log into the vCenter Server

1. Click **Use Windows session authentication**
2. Click **Login**

If session authentication fails then use:

1. User name = **administrator@vsphere.local**
2. Password = **VMware1!**
3. Click on **Login**

vCenter Entry Page - Power On
1. In the Navigator pane right-click base-w10-1709-x64-01
2. Click Power
3. Click Power On

Base Image Login

1. Click Launch Web Console

When a new chrome tab opens, look for the options on the right hand side of the screen

1. Click Send Ctrl+Alt+Delete
Instant Clone Master Image - Login

1. Click **CORP\Administrator** if not already selected
2. Password = **VMware1!**
1. Click **File Explorer**
2. In folder path type **\controlcenter\c$\SourceApps**
3. Right-click **npp.7.5.6.Installer.exe**
4. Click **Copy**
1. Click Downloads
2. Right-click in the white space
3. Click Paste

Install

HOL-1951-04-VWS
1. Double-click npp.7.5.6.Installer.x64

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.

Instant Clone Master Image - Install NotePad++ - Welcome

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)
Instant Clone Master Image - Install NotePad++ - Choose Components

1. Click the checkmark box next to **Auto-Updater** to de-select. We want to be able to update applications on our own as opposed to having it update automatically,
2. Click **Next** to continue.
Instant Clone Master Image - Install NotePad++ - Further Components

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.
Verify that **NotePad++** is running properly then:

1. 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**.
3. Right-mouse click the **Recycle Bin**. Click **Empty the Recycle Bin**, and click **Yes** to permanently delete the file.
1. Next to the start menu in the search box type **CMD**
2. Right click the **Command Prompt**.
3. Click on **Run as administrator**.
Instant Clone Master Image - Closing Image Procedures - Command Prompt

1. Type into the Administrative Command Prompt, type `ipconfig /release`
2. Close 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 the desktop tab only in Chrome returning to the vCenter that may have logged you out.

### vCenter Web Client Login

![Login Screen](image)

**Log into the vCenter Server**

1. Click **Use Windows session authentication**
2. Click **Login**

**If the session authentication fails then use:**

1. User name = **administrator@vsphere.local**
2. Password = **VMware1!**
3. Click on **Login**
Please verify that **base-w10-1709-x64-01** has shutdown completely within the vSphere Web Client. Instant clone requires a powered-off snapshot.

Refresh the vSphere Web Client until you see the **base-w10-1709-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 Name - Module4 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 Horizon-01-Admin toolbar favorite.
3. This should resolve to the address https://horizon-01.corp.local/admin/#

Horizon 7 Web Administrative Console - Login

1. Type the user name administrator
2. Type the default password VMware1!
3. Verify the Domain is set to CORP
4. Click on Log In
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 Pool1. 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 Pool1 Instant Clone Pool, click on Push Image.
2. Click on Schedule.
Horizon 7 Web Administrative Console - Schedule Push Image

Image

Select the snapshot that will be used as the image. This snapshot can be on the current parent VM or a different one.

The machines created in this desktop pool will use the information in the image as their baseline system configuration.

Parent VM in vCenter: RegionA01/vm/base-w10-1709-x64-01

Snapshots:

<table>
<thead>
<tr>
<th>Snapshot</th>
<th>Time Created</th>
<th>Description</th>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOL IC Base</td>
<td>5/5/2018 12:59:28 PM</td>
<td>Horizon Agent</td>
<td>/HOL IC Base</td>
</tr>
<tr>
<td>HoL Instant Clone Base</td>
<td>6/11/2018 10:18:58 AM</td>
<td></td>
<td>/HOL IC Base/HoL Instant Clone Ba</td>
</tr>
<tr>
<td>Module4</td>
<td>6/20/2018 3:42:39 AM</td>
<td></td>
<td>/HOL IC Base/HoL Instant Clone Ba</td>
</tr>
</tbody>
</table>

SVGA settings for Instant Clone Pool (Inherited from Master VM)

Number of monitors: 1  VRAM Size: 8.0 MB  Resolution: 1600x1200  3D Ren  Disabled

1. Select **Module4** that you created by clicking on the snapshot name.
2. Click **Next** to continue.
Horizon 7 Web Administrative Console - Scheduling Options

Scheduling
Specify when you want this task to start
Start at: 06/20/2018 3:53 AM Web browser local time

- Wait for users to log off
  Wait for connected users to disconnect before the task starts. The task starts immediately on machines without active sessions.
- Force users to log off
  Users will be forced to log off when the system is ready to operate on their virtual machines. Before being forcibly logged off, users may have a grace period in which to save their work (Global Settings).

- Stop at first error

The warning and grace period can be edited in global settings:

- Display warning before forced logoff:
  Log off time: 5 minutes
  Log off message: Your desktop is scheduled for an important update

1. Click **Force users to log off** (the default is to Wait).
2. Click **Next** to continue.
Horizon 7 Web Administrative Console - Push Image Complete

<table>
<thead>
<tr>
<th>Schedule Push Image</th>
</tr>
</thead>
</table>

**Ready to Complete**

Review the options and click Finish

**Forced logoff global settings:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log off message:</td>
<td>Your desktop is scheduled for an important update and will shut down in 5 minutes. Please save any unsaved work now</td>
</tr>
<tr>
<td>Log off time:</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Affected virtual machines:</td>
<td>1</td>
</tr>
<tr>
<td>Start time:</td>
<td>6/20/2018 3:53 AM</td>
</tr>
<tr>
<td>User log off:</td>
<td>Force users to log off</td>
</tr>
<tr>
<td>Stop at first error:</td>
<td>Yes</td>
</tr>
<tr>
<td>Parent VM in vCenter:</td>
<td>/RegionA01/vm/base-w10-1709-x64-01</td>
</tr>
<tr>
<td>Image:</td>
<td>/HoL IC Base/HoL Instant Clone Base/Module4</td>
</tr>
</tbody>
</table>

Show Details

1. Click **Finish**
vSphere - Clone Push Tasks

Recent Tasks will show that the progression of the Image update. This is informational only.

Horizon 7 Console - Current Image

1. **Scroll down** if you cannot see the Current image screen.

This will show the current Parent image with the applied snapshot. You will not be able to verify the new Notepad++ install on the clone image unless this screen is updated.
with the correct Snapshot details for Module4. Keep refreshing the screen to see updates.

Once the screen has updated we can test the image. Keep refreshing the screen to see updates.
Open a new tab in chrome if not already open

1. Click on **VMware Horizon** in the favorites bar
2. Click **VMware Horizon HTML Access**

**Horizon HTML Login**

1. Username = **User4Mod4**
2. Password = **VMware1!**
3. Ensure **CORP** is selected
4. Click **Login**
Instant Clone Pool

1. Click **Instant Clone Pool**

Verify Notepad++ - Desktop Pool1

Success! Congratulations your image update and push has been succesfull and Notepad++ has been added to the pool.
Instant Clone Image - Sign out

1. Right-click the Windows Start Menu button.
2. Click on Shut Down or sign out.
3. Finally, click on sign out.
RDSH Farm - Instant Clones

Creation Process

The creation of the VM template, replicas, and parents is the publishing stage, also called the priming process, and the creation of the RDSH VMs (the instant clones) is the provisioning process. We will have a quick look at the benefits and the architecture before we start with the provisioning exercise.

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

![Diagram showing the creation process of RDSH VMs]

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.

RDSH with Instant Clone Technology Architecture

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

**The disk space usage shown is for general reference only.**
- 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></td>
<td>9 minutes 45 seconds</td>
<td>35 minutes 56 seconds</td>
</tr>
</tbody>
</table>

| Template creation | 3 minutes 38 seconds | N/A |
| Replica creation  | 3 minutes 58 seconds | 3 minutes 4 seconds |
| Parent creation    | 13 seconds           | N/A |
| Clone 1 RDSH host  | 2 seconds            | 25 seconds |
| ClonePrep / SysPrep (for 1 RDSH host) | 26 seconds | 13 minutes 38 seconds |

| Total for 1 RDSH host | 8 minutes 17 seconds | 17 minutes 7 seconds |

| Clone 50 RDSH hosts | 48 seconds | 4 minutes 1 second |
| ClonePrep / SysPrep (for 50 RDSH hosts) | 40 seconds | 14 minutes 48 seconds |

| Scaling from 1 to 50 RDSH Hosts | 1 minute 28 seconds | 18 minutes 49 seconds |
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**

We will skip the priming (already done for this exercise) and dive straight into the fun part, provisioning a farm!

**Chrome**

On the HOL-1951 Main Console Desktop

1. Select **Google Chrome**

**New TAB**
1. Click - new TAB in Chrome
2. Select the Horizon folder
3. Click - Horizon-01-Admin

Horizon Login - Web Administrative Console

1. User Name = administrator
2. Password = VMware1!
3. Domain = CORP
4. Click - Log In

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. If the RDSH-01 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.

1. Click Dashboard
2. Click System Health > RDS Farms to expand
3. Click RDSH-01
4. Verify the Status is currently marked as No problem detected.
5. 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 Farm in Horizon 7 Web Administrative Console

1. The RDSH-01 Farm is currently enabled and should have (1) RDS Hosts listed in the RDS Hosts column.
RDSH Instant Clone Creation Walk-through in Horizon 7

This exercise will walk through the creation process of a new RDS Farm in the lab using the wizard.

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

Add Farm Wizard - Farm Type

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.

### Add Farm Wizard - vCenter Server

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. Click **Ignore**
4. Again, this right hand pane delivers helpful guidance on the technology chosen as well as the **Supported Features** for that selected technology.
5. Click **Next** to continue.
Add Farm Wizard - Identification and Settings

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. Click Enable, now browse through the Farm Settings, but do note that HMTL Access is not enabled by default. Also notice we can control the maximum

---

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. Click Enable, now browse through the Farm Settings, but do note that HMTL 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

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 (1) Max number of machines for this RDSH Instant Clone farm. This can be adjusted after the farm is created if you want a larger or smaller farm.

3. Click Next to continue.
Storage Optimization

1. 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-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. Click on the **RDS-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. Select a cluster on which to run the virtual machines created for this desktop pool.
3. Click **OK** to continue.
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 **ESX04a-local** Datastore, which will mark the image with a blue highlight bar.
3. Click **OK** to continue.
4. When a cluster warning appear due to local datastore, please click **OK**

Add Farm Wizard - vCenter Settings Filled In

1. After completing the minimum required settings the **Next** button is now available. We will leave the Network settings to be the same as the Parent VM.
2. Click **Next** to continue.

Selecting browse at this point will enable you to select any other networks currently available through the cluster.
1. Accept the defaults for the Domain
2. **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.
3. 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.
4. Click **Next** to continue.
Add Farm Wizard - Ready to Complete

Feel free to look over the settings here and scroll through the selection we made.

1. Click on **Finish** to add the Farm

Farm Completed
Review the new Farm

Switch Back to the vSphere tab

vSphere Login

1. Click the **vSphere tab**
2. Select **Use Windows session Authentication**
3. Click **Login**
1. Click **Menu**
2. Click **Tasks**
Task Completed

1. Wait for the Instant clone virtual machine to be completed before continuing

**Horizon - View Administrator**

Click - switch back to the View Administrator tab
Click Farms

1. Click **Farms**

**Module4-RDSH**

Success! Your farm has been created and enabled.

This is now ready to create an Instant Clone Desktop Pool or and Application Pool.
Create a Desktop Pool (RDS Host)

1. Click Desktop Pools
2. Click Add
Add Pool Type

1. Click RDS Desktop Pool
2. Click Next

Pool Identification

1. Click in the ID section and type - RDS-Pool
2. Click in the Display name box and type - **RDS Pool**
3. Click **Next**

### Desktop Pool Settings

![Desktop Pool Settings](image)

1. Accept all the defaults and click **Next**
Select RDS Farm

1. Click **Select and RDS farm for this desktop and pool**
2. Click **Module4-RDSH** (This is the farm we have just created)
3. Click **Next**
Review and complete

1. Click **Entitle users after this wizard finishes**
2. Click **Finish**

Entitlements

1. Click **Add**
Find User

1. In the name box type User4Mod4
2. Select the user
3. Click OK

Finish Entitlement

1. Click Close
RDS Pool created

RDS Desktop Pool created successfully! Well done!

Check to see if your RDS desktop is available?

1. In chrome open a new tab and select **VMware Horizon** from the favorites bar
Login via HTML

You can connect to your desktop and applications by using the VMware Horizon Client or through the browser.

The VMware Horizon Client offers better performance and features.

1. Click and choose to login using **VMware Horizon HTML Access**
1. Type username = User4Mod4
2. Type Password = VMware1!
3. Click Login
RDS Pool

RDS pool is created and ready to use.

1. Feel free to click on the **RDS Pool** and explore your newly created RDSH Desktop
2. Please **logout** when you are done
Explore the Server 2012 Desktop - Optional

You will now see your newly created desktop based on the RDS Farm settings -
Windows Server 2012
Sign out

1. Click **Windows**
2. Click and select - **Shut down or sign out**
3. Click **Sign out**
4. Click **Close**
Instant Clone RDSH Farm + Publish Applications

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 JMP Console for RDSH Instant Clones

Chrome

On the HOL-1951 Main Console Desktop

1. Select Google Chrome
New TAB - JMP

1. Click **new TAB** in Chrome
2. Select the **VMware JMP** in chrome favorites bar

Launch JMP Administrative Console

1. Type in the user name **administrator**
2. Type in the default password **VMware1!**
3. Click on **Sign in** to start the authentication process into the console
Desktop Management Experience

1. Click and Select Applications

Application Pools

1. Click Add
2. Click Add from Installed Applications
Add Application Pools - Select an RDS Instant Clone Farm

1. Use the pull down menu (the down arrow) next to the field marked **Select an RDS farm**.
2. Click and choose the **RDSH-01** 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. Scroll down
4. Click and choose the checkbox next to **Snipping Tool**
5. Click and choose the checkbox next to **Steps Recorder**

---

1. Use the pull down menu (the down arrow) next to the field marked **Select an RDS farm**.
2. Click and choose the **RDSH-01** 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. Scroll down
4. Click and choose the checkbox next to **Snipping Tool**
5. Click and choose the checkbox next to **Steps Recorder**
6. Click **Entitle users after adding pool**
7. Click **Next** to continue.

**Edit ID & Display Name**

<table>
<thead>
<tr>
<th>ID</th>
<th>Display Name</th>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snip_Tool_RDS_IC</td>
<td>Snipping Tool</td>
<td>C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Accessories\Snipping Tool.lnk</td>
</tr>
<tr>
<td>Steps_Rec_RDS_IC</td>
<td>Steps Recorder</td>
<td>C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Accessories\Steps Recorder.lnk</td>
</tr>
</tbody>
</table>

1. Type in and change the ID **Snip_Tool_RDS_IC** for **Snipping Tool** from the RDS Instant Clone farm.
2. Type in and change the ID **Steps_Rec_RDS_IC** for **Steps Recorder** from the RDS Instant Clone farm.
3. Click **Submit** to conclude and jump into the entitlement window.
1. Click **Add**
1. Click Name/User Name and type **User4Mod4**
2. Click and select **User4Mod4**
3. Click **OK** to continue.

Entitlements - User or Group

Find User or Group

- **Type**: Users, Groups
- **Domain**: Entire Directory
- **Name/User name**: Contains **User4Mod4**
- **Description**: Contains

Results:

<table>
<thead>
<tr>
<th>Name</th>
<th>User Name</th>
<th>Email</th>
<th>Description</th>
<th>In Folder</th>
</tr>
</thead>
<tbody>
<tr>
<td>User4 Mod4</td>
<td>user4mod4@co...</td>
<td>user4mod4@co...</td>
<td>corp.local/Users</td>
<td></td>
</tr>
</tbody>
</table>

4. Click **OK** to continue.
Add Entitlements - Application Pool Entitlement Additional Add

Add Entitlements

Add new users and groups who can use the selected pool(s).

Add Remove

<table>
<thead>
<tr>
<th>Name</th>
<th>Domains</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>User4 Mod4</td>
<td>corp.local</td>
<td><a href="mailto:user4mod4@corp.local">user4mod4@corp.local</a></td>
</tr>
</tbody>
</table>

1. Click **OK** to continue.

Add Entitlements - Add Users

<table>
<thead>
<tr>
<th>Name</th>
<th>Snipping Tool</th>
<th>Snipping Tool</th>
<th>RDSH-01</th>
<th>6.3.9600.1...</th>
<th>Microsoft Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snip_Tool_RDS_IC</td>
<td></td>
<td>Snipping Tool</td>
<td>RDSH-01</td>
<td>6.3.9600.1...</td>
<td>Microsoft Corporation</td>
</tr>
</tbody>
</table>

1. Click **Snip_Tool_RDS_IC** to explore the newly published application
1. Now that you confirmed your application is published, you can continue to edit or change entitlement.
2. Please close all open tabs once you finished exploring and let us test your application.
1. In chrome open a new tab and select **VMware Horizon** from the favorites bar

### Login via HTML

1. Click and choose to login using **VMware Horizon HTML Access**
1. Type username = **User4Mod4**
2. Type Password = **VMware1!**
3. Click **Login**
The applications selected have been deployed and as you can see available on your Login through Horizon HTML client.

**Snipping Tool**

1. Click **Snipping Tool**

New
1. Click **New**

**Snip and Draw**

Draw anything after you captured your screen.
Save As...

1. Click **File**
2. Click **Save As...**
3. Click **Save**
Close

Exit the Snipping tool

1. Click **Close**

Log out

1. Click **Menu**
2. Click **Log out**

Confirm Log off

1. Click **OK**
That concludes your application publishing using an Instant Clone Pool.
Conclusion

This concludes Module 1 on Instant Clone Provisioning.

- Instant Clone Technology
- Instant Clone Desktops
- Instant Clone Master Image Update
- RDSH Farm - Instant Clone
- Instant Clone RDSH Farm + Published Applications

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 https://techzone.vmware.com
- Or use your smart device to scan the QRC Code.

Proceed to any module previously which interests you most.

- Module 2 - Horizon Apps (60 Minutes)
- Module 3 - Horizon on VMware Cloud on AWS
How to End Lab

To end your lab click on the **END** button.
Module 2 - Horizon Apps (60 Minutes)
Welcome to Module 2 - Horizon Published Applications

Welcome to Module 2 - Horizon Published Applications. In this Module we will cover the Horizon 7 Published Applications feature and we will walk you through the necessary steps to configure and deploy applications via Horizon 7.

We will cover:

• Creating the RDSH Master Image
• Creating a new RDSH Farm
• Creating a new Application Pool
• Launching Apps from End-User Devices
• Performing Ongoing Administrative Tasks

Why Published Applications?

With published applications, you install applications on servers with the Microsoft Remote Desktop Session Host (RDSH) role, and entitle applications to corporate users through the Horizon 7 administration console. Once authenticated to Horizon 7 or Workspace ONE, users can launch an application, save files, and use network resources from a remote RDSH server just as if the users had the application installed on their local computer, tablet, or phone.

Published Applications offer several important benefits:

Accessibility
Users can access applications from anywhere on the network. You can also configure secure network access.

Device independence
With application pools, you can support a range of client devices, such as smart phones, tablets, laptops, thin clients, and personal computers. The client devices can run various operating systems, such as Windows, iOS, Mac OS, or Android.

Access control
You can easily and quickly grant or remove access to applications for one user or a group of users.

Accelerated deployment
With application pools, deploying applications can be accelerated because you only deploy applications on servers in a data center and each server can support multiple users.
**Manageability**
Managing software that is deployed on client computers and devices typically requires significant resources. Management tasks include deployment, configuration, maintenance, support, and upgrades. With application pools, you can simplify software management in an enterprise because the software runs on servers in a data center, which requires fewer installed copies.

**Security and regulatory compliance**
With application pools, you can improve security because applications and their associated data are centrally located in a data center. Centralized data can address security concerns and regulatory compliance issues.

**Reduced cost**
Depending on software license agreements, hosting applications in a data center can be more cost-effective. Other factors, including accelerated deployment and improved manageability, can also reduce the cost of software in an enterprise.
1. **Horizon Client**  Client software is available from app stores or from VMware for iOS, Android, Chrome, Windows, Linux, and macOS so that users can access published applications from any device. An HTML Access web client is also available, and it does not require installing any software on client devices.

2. **Connection Server/Horizon Administrator**  End users start Horizon Client to log in to the Connection Server. This server, which integrates with Windows Active Directory, provides access to published applications from a Microsoft RDSH server. This server also provides single-image management with automation capabilities.
**Note**: Installed with the Connection Server is Horizon Administrator, the browser-based administrative console you use to configure and manage Horizon 7. Wizards with embedded help text guide you through creating automated RDSH farms, adding application pools, and entitling users to applications.

3. **VMware Instant Clone Technology**  This key Horizon 7 feature provides single-image management with automation capabilities. You can create automated farms of instant-clone Microsoft RDSH servers.

Instant Clone Technology accelerates the process of creating cloned virtual machines over the previous View Composer linked-clone technology. In addition, instant clones require less storage and are less expensive to manage and update because the VM is deleted at scheduled intervals and a new RDSH server is created using the latest master image.

4. **RDSH servers**  To provide a published application, you install the application on one or more Microsoft RDSH servers.

5. **Horizon Agent**  You install the Horizon Agent service on all Microsoft RDSH servers that you use as sources for published applications. Horizon Agent communicates with Horizon Client to provide features such as connection monitoring, virtual printing, folder sharing (client-drive redirection), and access to locally connected USB devices.

6. **RDSH farms**  One or more RDSH servers make up a farm, and from that farm administrators create application pools in a similar manner to creating desktop pools. Each individual farm can contain up to 200 RDSH servers.

7. **Application pools**  Each application that you select to publish becomes an application pool. For example, using the Add Application Pool wizard, if you select the Paint and Calculator apps to publish, when you complete the wizard, you will have a Paint application pool and a Calculator application pool.

8. **App Volumes Manager**  Integration with VMware App Volumes (covered in HOL-1951-06-VWS), a real-time application delivery system, enables enterprises to deliver and manage applications at scale. Use App Volumes to attach applications to RDSH servers, simplifying application distribution and update.

9. **Unified Access Gateway**  A VMware Unified Access Gateway virtual appliance (formerly known as Access Point) functions as a secure gateway for users to access remote desktops and applications from outside the corporate firewall. Unified Access Gateway appliances typically reside within a network demilitarized zone (DMZ).
Sketch of Lab Environment

For your convenience and due to some of the limitations of the HOL environment, most of the work of setting up the environment (including Horizon Connection Server, App Volumes and RDSH Master Image) is already done and we will focus the hands-on part of this lab on the RDSH Farm, Application Pools and user Entitlement piece.

Note:

A step-by-step description of necessary steps for setting up a lab environment from scratch can be found in the **Reviewer’s Guide for View in Horizon 7: Publishing Applications**
Creating the RDSH Master Image

Each automated RDSH farm uses a master VM that serves as the model for the hosts in the farm. Creating the master VM includes installing the RDSH components on the Microsoft Windows Server side, configuring the guest operating system, and installing Horizon Agent and the applications you want to provide to your end users.

Details on how to prepare your template and configure RDSH Features can be found in the documentation and the Reviewer's Guide for Publishing Applications.

For this lab, we have already created and configured a template for you, which has everything needed installed. We also included the App Volumes Agent on the RDSH Master VM, which will allow us to use Application Stacks, instead of installing software directly on the RDSH VM. Using App Volumes to deliver applications to your RDSH Farm will significantly reduce the amount of storage you need and simplify day-2 operations for managing (patches/updates/upgrades etc.) your applications.

We have also installed some applications on the RDSH server. When you install new applications, you need to place the host into RD-install mode and switch back to RD-Execute mode after. For more information, see the Microsoft TechNet article Learn How To Install Applications on an RD Session Host Server.

**Note:** For those planning on migrating from Citrix, after installing Horizon Agent, you can also use the Horizon Migration Tool Fling to migrate published applications and desktops from Citrix XenApp to Horizon 7. Run from just a single XenApp server in each farm, the tool migrates the configuration required to publish each application and shared desktop into Horizon 7, along with the inventory of users and groups entitled to access them.
Creating A New RDSH Farm

Once you have the template for our RDS Host, you are ready to create a new RDSH Farm. In this chapter we will walk you through steps the Horizon Administrator has to take to create the RDSH Farm (leveraging Instant Clone technology), on which Application Pools can be hosted.

Create the RDSH Resource Farm

We will use Horizon Administrator to create the RDSH farm. To log in, open a browser.

1. Select **Horizon** folder
2. Select **Horizon-01-Admin**
3. User name: **administrator**
4. Password: **VMware1!**
5. **Log In**
Add new farm

1. Under Resources, select Farms
2. Click Add

**Note:** If you completed the Instant Clone Module (Module 1) prior to taking this Module, you can skip the steps of creating another RDSH Farm and continue here.
Configure Farm
Add Farm

Type
- vCenter Server
- Instant clones
- View Composer linked clones

vCenter Server
- vcsl-a.corp.local(corps\administrator)

Instant Virtual Machine
Instant clones share the same base image and use less storage space than full virtual machines. Instant clones are created using vmfork technology.

Supported Features
- VMware Blast
- PCoIP
- Storage savings
- Recompose
- Schedule Maintenance
- Sysprep guest customization
- ClonePrep guest customization
1. Verify **Automated Farm** is selected
2. Click **Next**
3. Verify **Instant Clones** is selected
4. Select the **vcsa-01a.corp.local** vCenter instance
5. Click **Ignore** to clear the information about storage accelerator
6. Click **Next**

**Note:** Due to the special setup in the Hands-On-Lab, View Storage Accelerator needs to be disabled.
Identification and Settings
1. Enter ID: **RDSH-02**
2. Scroll Down
3. Enable **Allow HTML Access to desktops and applications on this farm**
4. Switch **Max Sessions per RDS Host** to **No more Than** and enter **30** as value
5. Click **Next**

**Provisioning Settings**

1. Enter **HOL-{n}** for **Naming Pattern** (note options for naming pattern on the right)
2. Leave **Max Number of machines** set to **1**
Storage Optimization

1. Leave **Do not use VMware Virtual SAN** setting
2. Click **Next**
vCenter Settings
1. Click **Browse**
2. Click **Find**
3. Select **Base-RDS-01**
4. Click **OK**
vCenter Settings

![Image of vCenter Settings dialog box]

1. Browse...
2. RDSH IC Base Hol 2019
3. OK

Select default image:

- Parent VM in vCenter: /RegionA01/vm/base-RDS-01
- Snapshot: [Browse]
- VM folder location: [Browse]
- Cluster: [Browse]
- Resource pool: [Browse]
- Datastores: [Select]
- Networks: [Select]

[OK] [Cancel]
1. Click **Browse**
2. Select **RDSH IC Base Hol 2019**
3. Click **OK**
Select VM Folder

1. VM folder location: <Click Browse...>

2. Selected folder:
   - Discovered virtual machine

3. OK
1. Click **Browse**
2. Select **Discovered virtual machine**
3. Click **OK**

**Note:** Best practice would be to have a specific folder created on your vCenter for your RDSH-Farms.
Select Cluster

1. Click on "Cluster" to select the cluster.
2. Select the appropriate cluster from the list.
3. Click "OK" to proceed with the cluster selection.
1. Click **Browse**
2. Select **RegionA01-IC01**
3. Click **OK**
Select Resource Pool
1. Click **Browse**
2. Select **RegionA01-IC01**
3. Click **OK**
Select Datastore
Add Farm - RDSH-02

vCenter Settings

Default Image
1. Parent VM in vCenter: [RegionA01/vm/base-RDS-01]
2. Snapshot: [RDSH IC Base HOL 2019-1]

Virtual Machine Location
3. VM folder location: [/RegionA01/vm/Discovered virtual machines]

Resource Settings
4. Cluster: [/RegionA01/host/RegionA01-iC01]
5. Resource pool: [/RegionA01/host/RegionA01-iC01/RES01]
6. Datastores: Click Browse to select
7. Networks: Click Browse to select

Select Instant Clone Datastores

Select the instant clone datastores to use for this Automated Farm. Only datastores that can be used by the selected host or cluster can be selected.

<table>
<thead>
<tr>
<th>Datastore</th>
<th>Capacity (GB)</th>
<th>Free (GB)</th>
<th>FS Type</th>
<th>Drive Type</th>
<th>Storage Overcommit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESX04a-Local</td>
<td>249.75</td>
<td>122.00</td>
<td>VMFS6</td>
<td>SSD</td>
<td>Unbounded</td>
</tr>
</tbody>
</table>

Data Type | Selected Free Space (GB) | Min Recommended (GB) | 50% Utilization (GB) | Max Recommended (GB) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Instant clones</td>
<td>122.00</td>
<td>62.00</td>
<td>73.00</td>
<td>87.00</td>
</tr>
</tbody>
</table>

OK

Warning

You have selected a local datastore for your instant clone pool. Please note the following:

1. If you are deploying instant clones on a single ESXi host with local datastores, you must configure a cluster certificate.
1. Select **Browse**
2. Select **ESX04a-Local**
3. Click **OK**
4. Ignore the Warning and click **OK**

**Note:** In a regular environment the use of shared datastores is highly recommend for production. Use local datastores for testing only.

### Select Networks

![Image of VM selection settings]

1. Verify Networks is set to **Parent VM network selected**
2. Click **Next**
Guest Customization

1. Verify `corp.local(administrator)` is selected
2. Note `CN=Computers` is selected as AD Container (OU)
3. Click **NEXT**

**Note:** In a production environment, you would create a specific OU for this purpose allowing you to easily apply necessary group policies to your RDSH server.
1. **Scroll Down**  
2. **Click Finish**

### New Farm Created

As you can see, the new **RDSH-02** has been created and is enabled, but currently the number of RDS Hosts still shows **0**. If you switch to the vCenter, you would actually see the cloning process has started. In the HOL environment, the process of cloning, customizing and adding the host to the Farm will take a while. Instead of waiting, you can proceed to create a new application pool with the existing **RDSH-01** Farm. You can come back later to verify a host has been added.
Creating A New Application Pool

After configuring the RDSH Farm, the next step is to add an Application Pool. We already have some Application Pools created and will now walk you through adding a new one.

Add New Application Pool

1. Under Catalog, click on Application Pools
2. Click Add...
Add New Application Pool

1. Verify **RDSH-01** is selected (do not use the newly created RDSH-02 Farm)
2. Verify **Select installed applications** is selected
3. Type **wordp** as filter
4. Click **Find**
5. Check the box for **WordPad**
6. Click **Browse** to get to the Category Folder settings

**Note:**

An application pool has a single application and is associated with a single farm. To avoid errors, you must install the application on all of the RDS hosts in the farm.

When you create an application pool, View automatically displays the applications that are available to all users rather than individual users from the Start menu on all the RDS hosts in the farm. You can select one or more applications from the list. If you select multiple applications from the list, a separate application pool is created for each application. You can also manually specify an application that is not on the list. If an application that you want to manually specify is not already installed, View displays a warning message.

**Pre-launch:** Select this option to configure an application so that an application session is launched before a user opens the application in Horizon Client. When a
published application is launched, the application opens more quickly in Horizon Client. If you enable this option, the configured application session is launched before a user opens the application in Horizon Client regardless of how the user connects to the server from Horizon Client.

**Client Restriction**: Select whether to restrict access to entitled application pools from certain client computers. You must add the names of the computers that are allowed to access the application pool in an Active Directory security group. You can select this security group when you add users or groups to the application pool entitlement.

You can find more information on the Application Pool creation [here](#).

**Category Folder**

![Category Folder Image]

1. Switch from disabled to **Select a category folder from the folder list**
2. Enter **Remote Apps**
3. Click **Add**
4. **Enable** both **checkboxes** under shortcut locations
5. Click **OK**
6. Click **Next**

**Note**: Adding Category Folder, allows us to add shortcut to the Application Pool on the user's desktop or start menu, eliminating the need to open the client first.
Add Application Pool

1. Verify **Entitle users after this wizard finishes** is selected
2. Click **Finish**

**Note:** You can change *ID* and *Display Name* if you want.
Add Entitlement

Entitlements control which users or groups will have access to the Application Pool. The entitlements will carry over to Workspace ONE (if you connect Horizon with Workspace ONE) and determine if users will see the application in their Workspace ONE Catalog or not.

1. Click **Add**

Find User or Group

We can select the user(s) or group(s) we want to entitle. For this lab, we will just use a single user, in real life, you would likely have AD User Groups corresponding with your
application pools or with the role/persona (e.g. finance, IT Admins etc.) that will require the application.

1. Enter user4mod5
2. Click Find
3. Select User4Mod5
4. Click OK

**Note:** You can also allow access to *unauthenticated users*. Consider setting up unauthenticated access if your users require access to a seamless application that has its own security and user management. When a user starts a published application that is configured for unauthenticated access, the RDS host creates a local user session on demand and allocates the session to the user.

**Verify Entitlements**

Verify User4Mod5 is listed. You could add additional users/groups if you want to.

1. Click OK
Verify Application Pool

Verify the **Wordpad** Application Pool got created and is showing as available, it should also show a check mark in the **App Shortcuts** column.

Add Manual Application Pool Manually

In the previous steps we created an Application Pool using an application that has an existing shortcut on the RDS Host. But what if we want to publish an application that does not have a shortcut or we want to pass parameters to an application? Some examples would be:

- Open CMD.exe on the RDS Host
- Open a specific URL in the browser
- Use Remote Desktop (MSTSC.exe) to connect to a specific server
- etc.

We will walk you through adding a parameter (URL) to an executable (iexplore.exe) as an example.
1. Click **Add**

**Add Application Pool**

1. Select **Add application pool manually**
2. ID: **ie_JMP**
3. Display name: **VMware JMP**
4. Path: `c:\Program Files\Internet Explorer\iexplore.exe` (use click & drag)
5. Parameters: `https://horizon-01.corp.local/newadmin/#/` (use click & drag)
6. Scroll down
1. Click **Browse** to select Category Folder
1. Select **Select a category folder from the folder list**
2. Select **Remote Apps**
3. Check **StartMenu/Launcher** and **Desktop** checkboxes
4. Click **OK**

**Add Application Pool**

1. Click **Finish**
Add Entitlement

Entitlements control which users or groups will have access to the Application Pool. The entitlements will carry over to Workspace ONE (if you connect Horizon with Workspace ONE) and determine if users will see the application in their Workspace ONE Catalog or not.

1. Click **Add**

**Find User or Group**

We can select the user(s) or group(s) we want to entitle. For this lab, we will just use a single user, in real life, you would likely have AD User Groups corresponding with your
application pools or with the role/persona (e.g. finance, IT Admins etc.) that will require the application.

1. Enter **user4mod5**
2. Click **Find**
3. Select **User4Mod5**
4. Click **OK**

**Note:** You can also allow access to *unauthenticated users*. Consider setting up unauthenticated access if your users require access to a seamless application that has its own security and user management. When a user starts a published application that is configured for unauthenticated access, the RDS host creates a local user session on demand and allocates the session to the user.

**Verify Entitlements**

![Verify Entitlements](image)

Verify User4Mod5 is listed. You could add additional users/groups if you want to.

1. Click **OK**
Verify Application Pool

Verify the **ie JMP** Application Pool got created and is showing as available, it should also show a check mark in the **App Shortcuts** column.
Launching Apps from End-User Devices

As mentioned in the introduction, with Application Pools, you can support a range of client devices, such as smart phones, tablets, laptops, thin clients, and personal computers. The client devices can run various operating systems, such as Windows, iOS, Mac OS, or Android. In this lab, we will show you how to start an application using the Horizon HTML Access (web) and the local Horizon Client already installed on the Main Console.

Horizon HTML Access

1. Open a new Tab in Chrome
2. Select the VMware Horizon bookmark
3. Select VMware Horizon HTML Access
Login to VMware Horizon

Login to Horizon HTML Access:

1. Change username to: user4mod5 (please make sure to change default user)
2. Password: VMware1!
3. Click Login
Open WordPad

After authenticating, you will see the Desktop Pool and Application Pools **User4Mod5** is entitled to.

1. Click on **WordPad** to start the application

Enable Copy and Paste

1. Click **OK** to acknowledge the copy and paste option
WordPad opens in browser

After a few seconds, WordPad will start in your browser. You will see the Horizon Sidebar, allowing you to quickly start/switch to other entitled applications or desktops.

1. Click to minimize sidebar
2. Type Hello World! (or whatever you would like)

Do not close app or the browser window.

Switch to Horizon Client

1. Open Horizon Client
Note: User with local administrator rights can either install the Horizon Client themselves or you can use software deployment solutions to have the Horizon Client installed silently on your users device. In this lab, we have the Horizon Client already installed on the Main Console.

Open Horizon Client

1. Open **Horizon-01.corp.local**

Login

1. User name: **user4mod5**
2. Password: **VMware1!**
3. Click **Login**
Add Shortcuts

As set the option to create shortcut for the WordPad Application Pool, Horizon Client will ask upon first start if you want to add the shortcuts to your Start Menu and Desktop.

1. Click Yes

Reconnect to Application

Since you didn't close the app opened via web browser, Horizon Client recognizes you already have a remote application running and offers to reconnect to the application. This allows you switch devices and continue working in your app, picking up where you left.

1. Click Reconnect to Application
WordPad Opens in Horizon Client

After a few seconds WordPad will open and you can pickup writing the document where you left off.

1. Close **WordPad**
2. Click **Don't Save**

Close Horizon Client

1. Close Horizon Client
Close Horizon HTML Access

1. Click Close to confirm you have been disconnect
2. Close Chrome

Verify Shortcut Folder Got Created
The Remote Apps Folder should be present on your Desktop.

1. Open **Remote Apps** folder
2. Double click to open **VMware JMP**

**Open Horizon Client**

![Horizon Client Login Screen]

The Shortcut will open the URL for the JMP Server in the published Internet Explorer via the Horizon Client for

1. User name: **user4mod5**
2. Password: **VMware1!**
3. Click **Login**

**NOTE:** If you would have been logged into the Horizon Client for the server already, you would have not seen the Login prompt.
IE Settings

1. Verify IE opens with the URL we defined as parameter
2. Click Ask me later
3. Click Enable
4. Close the window

**Note:** We don't have to login to the Horizon JMP console at this time. This exercise was just to demonstrate that with a manually created published app, we have the ability to pass parameters, in this case a specific URL.

**Summary**

We have showed you 3 different ways you to access a Horizon Published Application:

- Via HTML Access
- Horizon Client
- Desktop Shortcut

There is a 4th way via Workspace ONE, which is covered in HOL-1951-03-VWS. While the HTML Access is very similar for other devices, you might want to install the VMware Horizon Client App when accessing from a mobile device.
Performing Ongoing Administrative Tasks

When you use automated instant-clone RDSH server farms, you can rapidly change the size of the farm, refresh the servers back to their original state and disk size, or update the servers to use a new master image.

The Horizon Admin Console also provides some monitoring capabilities, allowing you to manage your RDSH Farms, Application Pools and users.

Login To Horizon-01-Admin

Login to Horizon Administrator to perform some common administrative tasks. Open Chrome Browser and

1. Select Horizon folder
2. Select Horizon-01-Admin
3. User name: administrator
4. Password: VMware1!
5. Log In
1. Under **Resources**, select **Farms**
2. Verify RDSH Hosts for RDSH-02 should show 1 now (assuming you completed the steps at the beginning of the module)
3. Click on **RDSH-01**
Summary Tab

1. Click on maintenance and select **Schedule**
Maintenance

You can and should set up a recurring maintenance schedule for your Farm, during which the servers will be refreshed from the parent image.

RDS Hosts Tab

1. Click on RDS Hosts
   Here you can recover (re-create), remove or enable/disable hosts within the Farm
2. Click RDS Pools
RDS Pools Tab

Under **RDS Pools** you can see all the Application Pools for the Farm. The list can be exported as CSV file for reporting and license management purposes and

1. Click **Sessions**

Sessions Tab

Under **Sessions** you can see all active sessions and perform actions such as:
• Disconnect Session
• Logoff Session
• Restart Desktop
• Reset Virtual Machine
• Send Message

Feel free to login as a user via Horizon Client and test out the available actions for that session.
Conclusion

In this module we walked you through the creation of an RDSH Farm and an Application Pool to publish an application, accessing the application via Horizon HTML Access and the Horizon Client. We have also shown you where you can set maintenance schedules and perform monitoring of your RDSH Farm.

Additional Considerations

There is a better together story. With Horizon Enterprise (or Workspace ONE Enterprise) licensing you also have User Environment Manager, App Volumes, Workspace ONE and VMware vSAN available.

Profile Management with User Environment Manager
The user experience for Published Applications can be further enhanced with User Environment Manager. See HOL-1951-06-VWS for more information on User Environment Manager.

Streamlined Application Delivery with App Volumes
App Volumes provide an alternative to installing applications on your RDS Hosts VMs, you instead can deliver applications via App Stacks. See HOL-1951-06-VWS for more information on App Volumes.

Launching Published Applications via Workspace ONE
Instead of accessing published applications via the Horizon Portal or Client, users can single-sign-on via Workspace ONE and have a single portal to launch published applications along with their SaaS or mobile applications. Using Workspace ONE adds a number of features, such as conditional Multifactor Authentication, federated access etc. To learn more about the Workspace ONE integration with Horizon 7.5, see Module 2 of HOL-1951-01-VWS - VMware Workspace ONE Getting Started

Hyperconverged Infrastructure with VMware vSAN
VMware vSAN provide a great and cost-effective alternative to traditional storage options. Take a look at HOL-1908-01-HCI VMware vSAN v6.7 - Getting Started, to learn more about VMware vSAN.
Conclusion

This concludes Module 2 of this lab. You can find more information and links to additional resources in the Reviewer's Guide for Horizon 7 Publishing Applications:

- Go to https://techzone.vmware.com/resource/reviewers-guide-view-horizon-7-publishing-applications#section10
- Or scan QR Code above

You've finished Module 2

Congratulations on completing Module 2.

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

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

Proceed to any module previously which interests you most.

• [Module 1 - Horizon Instant Clones (60 Minutes) (Advanced)]
• [Module 2 - Horizon Apps (60 Minutes) (Advanced)]
• [Module 3 - Horizon on VMware Cloud on AWS (30 Minutes) (Advanced)]

**How to End Lab**

To end your lab click on the **END** button.
Module 3 - Horizon on VMware Cloud on AWS (30 Minutes)
Horizon with VMware Cloud on AWS - Overview

VMware Horizon version 7.5 or later can be optionally deployed on VMware Cloud on Amazon Web Services.

VMware Cloud on Amazon Web services is a partnership between VMware and AWS to provide a full VMware Software Defined Data Center (SDDC) stack as a cloud service.

- Integrates vSphere, VSAN, and NSX along with vCenter management, optimized to run on bare metal AWS hardware.
- Delivered, sold, and supported by VMware as an on-demand, elastically scalable service, while leveraging the global footprint of AWS.
- Customers can run any application across vSphere-based private, public, and hybrid cloud environments, including Horizon.

This is an Infrastructure as a Service offering that allows the customer full control of what is deployed within their SDDC instances while VMware manages the infrastructure. This is different than a fully managed Desktop as a Service which VMware also offers through Horizon Cloud with Hosted Infrastructure.

You will see the ease of this SDDC deployment in the interactive simulation later in this module.

Use Cases Enabled by Horizon 7 with VMware Cloud on AWS

- Data Center expansion
- App locality
- Disaster recovery and business continuity for on-prem deployment
- Temporary desktop and app capacity
- Quick POC of on-prem Horizon 7
• Data Center expansion - expand on-premises Horizon 7 footprint to the cloud without a lengthy hardware purchase and implementation. SDDC deployment on VMware Cloud takes a couple of hours.
• App locality - co-locate virtual desktops or RDSH hosts alongside latency sensitive apps hosted in the cloud.
• BC / DR - leverage elastic capacity to provide disaster recovery or business continuity for on-premises desktops and applications.
• Temporary capacity - provide temporary desktops and applications for contractors or seasonal workers.
• Proof-of-concept - Quick start a Horizon 7 proof-of-concept without having to stand acquire hardware and install and configure vSphere.

Enterprise Horizon 7 Scale with VMware Cloud on AWS

<table>
<thead>
<tr>
<th>Default Cluster Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Host Cluster</td>
</tr>
<tr>
<td>144 CPU Cores</td>
</tr>
<tr>
<td>331.2 GHz of CPU</td>
</tr>
<tr>
<td>2048 GB of Memory</td>
</tr>
<tr>
<td>32 NVMe Devices</td>
</tr>
<tr>
<td>40 TB Raw Capacity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum Size Cluster Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 Host Cluster</td>
</tr>
<tr>
<td>1152 CPU Cores</td>
</tr>
<tr>
<td>2649.6 GHz of CPU</td>
</tr>
<tr>
<td>16384 GB of Memory</td>
</tr>
<tr>
<td>256 NVMe Devices</td>
</tr>
<tr>
<td>320 TB Raw Capacity</td>
</tr>
</tbody>
</table>

By default, a 4-node cluster is created for production Horizon 7 on VMware cloud on AWS deployments. This size cluster provides enough SDDC capacity for about 600 virtual desktops for knowledge workers.

Clusters can be easily scaled to capacity for 5,000 desktops or 10,000 published applications.

We can create 25 pods like this to accommodate 125,000 desktops or 200,000 published application sessions.
vCenter as Primary Management Platform

Once SDDC is deployed, customer has access to the vCenter user interface for management.

- Same trusted view and known operations.
- All management VMs are managed by VMware so customer does not have to maintain them.
- All VMs deployed on top of that, such as the Horizon 7 infrastructure, are managed by the customer.

vCenter Hybrid Linked Mode can be used to provide a single view for SDDC resources around the world.

- Link vCenters between on-premises and other VMware Cloud on AWS SDDC instances.
- Leverage mechanisms such as vMotion to migrate VMs between SDDC instances.

VMware Cloud on AWS Connectivity Options

There are multiple options for providing connectivity between anything external and the AWS SDDC, such as an on-premises data center or cloud SDDC. These include:

- **Internet** - Public IP addresses with NAT connectivity for Management and Workloads. Stateful Edge FW for controlling access to Management and Workloads from both on-premises and public internet.
- **Direct Connect and IPSEC** - Encrypted connectivity via IPsec VPN: SDDC to on-premises, SDDC to SDDC, SDDC to Virtual Private Cloud. AWS Direct Connect (DX) high-speed, reliable, private connectivity.
• VMware Cloud Elastic Network Interface - Enables high speed, low latency connectivity between an SDDC and an AWS VPC in the same Availability Zone. Provides access to AWS regional services as well as private managed AWS services.

You will see an example of setting up an IPSEC VPN connection in the interactive simulation later in this module.

**Horizon 7 on VMware Cloud - Value Proposition**

Cloud Pod Architecture (CPA)

- Horizon 7 can be deployed either on-premises, inside VMware Cloud on AWS or both.
- When doing both you can build your own hybrid cloud by straddling Horizon 7 Cloud Pod Architecture across on-premises and one or multiple VMware Cloud on AWS locations. This enables uses cases such as expanded elastic capacity and disaster recovery while giving a user a single global entitlement to resources that may be on-premises or in the cloud.
- It offers the same admin experience on-premises and in the cloud for Horizon and vSphere.
- It is available with Horizon and Workspace ONE subscription licenses and hourly compute billing.

You will see the ease of setting up Cloud Pod Architecture federation between on-premises and cloud hosted Horizon instances in the interactive simulation later in this module.
Hands-on Labs Interactive Simulation: Horizon on VMware Cloud on AWS

This part of the lab is presented as a Hands-on Labs Interactive Simulation. This will allow you to experience steps which are too time-consuming or resource intensive to do live in the lab environment. In this simulation, you can use the software interface as if you are interacting with a live environment.

1. Click here to open the interactive simulation. It will open in a new browser window or tab.
2. When finished, click the “Return to the lab” link to continue with this lab.

The lab continues to run in the background. If the lab goes into standby mode, you can resume it after completing the module.
Conclusion

In this module we walked you through Horizon on VMware Cloud on AWS.

You've finished Module 3

Congratulations on completing Module 3.

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

- Click on this [link](https://techzone.vmware.com)
- Or go to [https://techzone.vmware.com](https://techzone.vmware.com)
- Or use your smart device to scan the QRC Code.

Proceed to any module previously which interests you most.

- Module 1 - Horizon Instant Clones (60 Minutes)(Advanced)
- Module 2 - Horizon Apps (60 Minutes)(Advanced)
- Module 3 - Horizon on VMware Cloud on AWS (30 Minutes)(Advanced)

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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