

VMware Horizon Air-Hybrid Mode with Hitachi Unified Compute Platform HC (UCP HC)

Tech Note

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October 2016

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VMware Horizon Air-Hybrid Mode with Hitachi Unified Compute Platform HC (UCP HC)

Tech Note

This tech note outlines a use case that creates 100 virtual machines (VMs) via different desktop assignments and multiple application assignments by means of VMware Horizon Air Hybrid-Mode 1.0 on top of a three-node Virtual SAN (VSAN) cluster using Hitachi Unified Compute Platform HC (UCP HC).

It also creates multiple enabled writable volume AppStacks and assigns them to desktops/users.

The desktops were deployed via instant clone technology.

Note — Testing of this configuration was in a HDS lab environment. Many things affect production environments beyond prediction or duplication in a lab environment. Follow the recommended practice of conducting proof-of-concept testing for acceptable results in a non-production, isolated test environment that otherwise matches your production environment before your production implementation of this solution.

Product Features

Hitachi Unified Compute Platform HC

Hitachi Unified Compute Platform HC, combines compute, networking, storage and data protection together with industry leading infrastructure virtualization to form radically simple hyper-converged infrastructure appliance offer by HDS. UCP HC leverages VMware vSphere with Virtual SAN (VSAN) to deliver an agile, simple and reliable platform for traditional and cloud-native applications.

<https://www.hds.com/en-us/products-solutions/converged-infrastructure/ucp-hc.html>

<https://www.hds.com/en-us/products-solutions/converged-infrastructure/ucp-hc.specifications.html>

VMware vSphere 6.0U2

[VMware vSphere 6](#) is a virtualization platform that provides a datacenter infrastructure. It features vSphere Distributed Resource Scheduler (DRS), High Availability (HA), Fault Tolerance (FT), and support for VASA 2.0 and Virtual Volumes.

VMware vSphere 6 has the following components:

- **ESXi** — A hypervisor that loads directly on a physical server. It partitions one physical machine into many virtual machines that share hardware resources.
- **vCenter Server** — Management of the vSphere environment through a single user interface. With vCenter, features are available such as vMotion, Storage vMotion, Storage Distributed Resource Scheduler, High Availability, and Fault Tolerance.
- **VSAN** — is a storage feature integrated in the vSphere kernel that pools disk space from multiple ESXi hosts. The distributed architecture of the software-defined storage feature in VMware VSAN enables the parameters of the storage policy to be enforced despite changes in virtual machine (VM) workload demands, or hardware or network failures.

VMware Horizon Air Hybrid-Mode

Horizon Air Hybrid-Mode enables unified management of on-premises virtual desktop and applications through a single cloud control plane. It quickly delivers and manages on-premises virtual desktops and applications on hyper-converged infrastructures.

It leverages a unified cloud management console to manage on-premises desktops and applications services.

Horizon Air Hybrid-Mode leverages VMware Instant Clone technology coupled with App Volumes to dramatically reduce infrastructure requirements while enhancing security. These technologies empower you to deliver brand-new personalized desktop and applications services instantly to end users every time they log in.

- Reduce endpoint security concerns by destroying desktops every time a user logs off.
- Drastically lower infrastructure costs by pooling the required infrastructure.
- Drive down storage costs by more than 30% with a truly stateless desktop.

<http://www.vmware.com/cloud-services/desktop/vmware-horizon-air-hybrid-mode.html>

Terminology Associated with VMware Horizon Air Hybrid-Mode

This defines terms used in this paper.

Horizon Air Cloud Service

A control panel hosted in the cloud by VMware for central orchestration and management of virtual desktops, applications, and user profiles on an on-premises infrastructure.

Horizon Air Node

Optimized hardware (Virtual SAN-ready nodes such as UCP HC) are connected to the cloud control panel by way of integrated Horizon Air Hybrid-Mode connector software.

Horizon Air Link

Horizon Air Node uses a field-installable bootstrap appliance called Horizon Air Link to pair with Horizon Air Cloud Services during installation. Horizon Air Link orchestrates the initial setup and pairing with the cloud control plane for ongoing management and communication.

Horizon Cloud Manager

The cloud control panel also hosts a common management UI called Horizon Cloud Manager. It is accessible from all major browsers and provides IT administration from a single location for managing desktop images, application assignments, user data, and profiles.

Cloud Connector

The cloud Connector provides connectivity to the cloud without requiring a dedicated site-to-site VPN.

Instance Clone technology

VMware Instant gives administrators the ability to rapidly clone and deploy virtual desktops, up to ten times faster than what is currently possible. Instant Clone uses rapid in-memory cloning of running virtual machines and copy-on-write to quickly deploy clones of a parent virtual desktop.

Writable Volumes

Writable volumes are containers for persistent, user-installed applications and settings. With writable volumes, you can maintain users' data, settings, and profiles between their login sessions. Users can have more than one writable volume assigned to them. A user can attach only one writable volume per VM. Horizon Air Hybrid-Mode handles most implementation details for writable volumes. In most cases, you only need to add or delete a writable volume. You do not need to directly modify writable volumes. A writable volume is attached to a desktop at user login. When the user logs out, the writable volume is unmounted and detached from the desktop VM. When two application assignments for a desktop operating system and a user have the writable volume option enabled, two unique writable disks are created in the back-end datastore. Only the writable volume that was created first is used. The other writable volume is not mounted.

App Volumes

VMware App Volumes support real-time application delivery to virtualized desktop environments. As a capability in Horizon Air Hybrid-Mode, App Volumes allows IT organizations to build a real-time application delivery system that ensures all applications are centrally managed. Applications are delivered to virtual desktops through virtual disks, without modifying the VM or applications themselves, and they can be scaled out to virtual desktops with superior performance, at lower costs, and without compromising end-user experience.

File Share

In order to use AppStack, a file share location AppStack needs to be added as an application file share. The file share should have read permissions from Horizon Air Node. Applications should start importing automatically and you could see the progress in Inventory → application screen.

Figure 1 shows the high-level concept of Horizon Air Hybrid-Mode deploying on Hitachi UCP HC.

Hitachi UCP HC & Horizon Air Hybrid-mode



Figure 1

Overview of VMware Horizon Air Hybrid-Mode

High Level Architecture

Horizon Air Hybrid-Mode consists of two main components — a cloud control plane and Horizon technology that works with hyper-converged infrastructure solutions such as HDS UCP HC. The VMware Horizon Manager cloud control plane, a cloud-based management layer hosted on VMware vCloud Air, is designed to offer IT administrators a 'single pane of glass' to unify the administration of on-premises virtual workspaces. Customers will be able to use the control plane to configure desktops, applications and policies for groups of users, whether they are hosted on HDS UCP HC or on any premises. The VMware Horizon technology resides on a hyper-converged infrastructure and it connects to the cloud control plane. The Horizon technology is managed and controlled from the control plane, and provides intelligent orchestration, delivery, and management of workloads running on the hyper-converged infrastructure solutions. One key element of Horizon technology is just-in-time (JIT) provisioning of virtual desktops and applications. Using the configurations made in the cloud-control plane, Horizon leverages the built-in VMware AppVolumes, User Environment Management, and the VMware Instant Clone technologies to assemble personalized virtual desktop and application environments when an end-user logs in, giving high flexibility to IT administrators in leveraging the infrastructure.

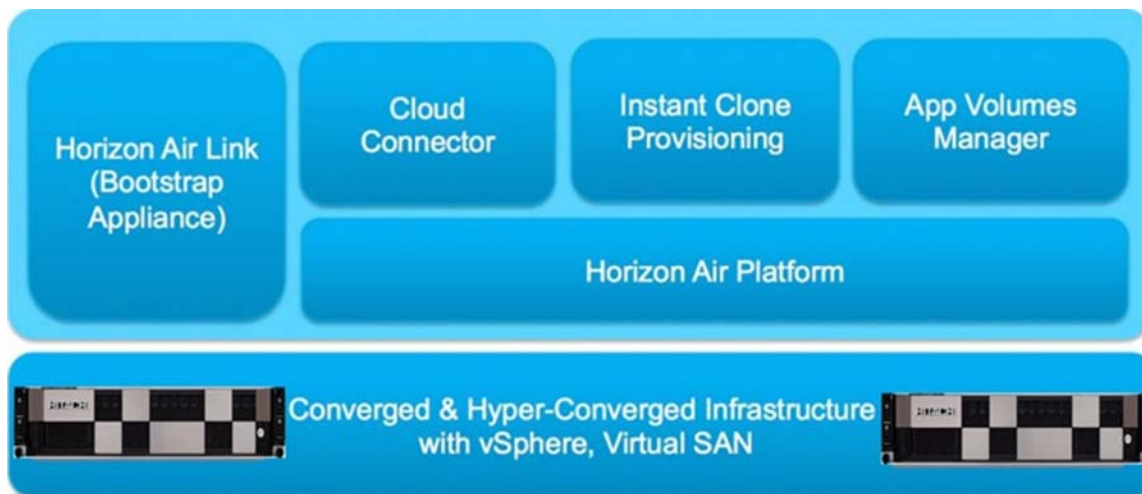


Figure 2

Horizon Air Cloud Service is a control panel that VMware hosts in the cloud. It enables the central orchestration and management of virtual desktops, applications, and user profiles on an UCP HC appliance infrastructure.

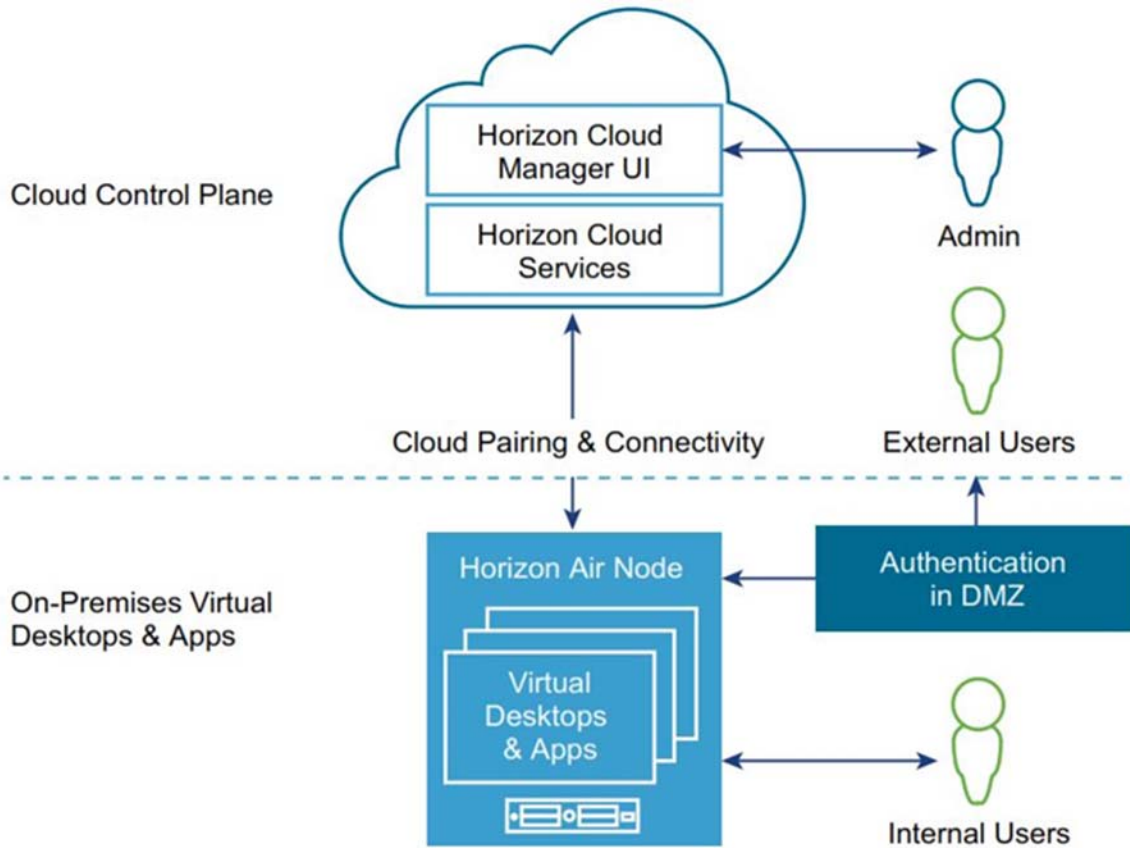


Figure 3

Users that have access to Cloud Management authenticate in two steps. First, they are authenticated via VMware cloud service, and then they are authenticated via Microsoft® Active Directory®.

Users that have access to desktops only are authenticated internally by Active Directory.

Requirements for Horizon Air Hybrid-Mode Implementation

To deploy Horizon Air Hybrid-Mode required software, hardware, network, and services are described as follows in the Horizon Air Hybrid-Mode Set-up Checklist:

<http://pubs.vmware.com/horizon-air-hybrid-mode-11/topic/com.vmware.ICbase/PDF/vmware-horizon-air-hybrid-mode-customer-setup-checklist.pdf>.

Table 1. Software Requirements

Software	Version
Hitachi Unified Compute Platform HC appliance with at least 3 nodes having 2 × 10 GB uplink per node	V1.1.0 or higher
VMware Horizon Client	4.0.1 or higher
VMware Horizon Air Hybrid-Mode Customer Account	
VMware Horizon Air Hybrid-Mode Software: <ul style="list-style-type: none"> ■ Horizon Air Link appliance ■ Horizon Air 7 Agent ■ Daas Agent ■ App Volumes Unified Installer ■ App Volume Capture Tool 	
VMware vCenter Server	6.0U2 or higher
VMware ESXi	6.0U2 or higher
Licenses: <ul style="list-style-type: none"> ■ VMware ESXi Licensing ■ VMware vCenter Licensing ■ VSAN Licensing ■ VMware Horizon Hybrid-Mode Licensing 	In this project Enterprise plus version is used
Microsoft® Active Directory® Domain	
Microsoft KMS Server	
A file share to store desktop images and AppStacks	

Table 2. Hardware Requirements

Hardware	Version
1 × Hitachi Unified Compute Platform HC appliance with at least 3 nodes having 2 × 10 GB uplink per node	V1.1.0 or higher
Network Switch 10G	6740
Network Switch 10/100 or 10/100/1000	Fast Iron

Table 3. Network Configuration Requirements

VLAN	Type	Network	Prefix	Router	Use
790	Routed	172.17.252.X	/24	172.17.252.1	Infrastructure
168	Routed	172.17.168.x	/24	172.17.168.1	Desktop, tenant appliances
250	Private	192.168.20.x	/24	none	vMotion
251	Private	192.168.30..x	/24	none	VSAN
253	Private	169.254.0.0	/24	none	Appliance backbone

Table 4. Service Requirements

Service	Version used in this Project
Microsoft® Active Directory® Domain Controller	2012
DNS Server	MS DNS 2012
DHCP Server	MS DHCP
NTP Server	N/A

High-level View of Horizon Air Hybrid-Mode Deployment

Configuring Hitachi UCP HC

The first step in deploying Horizon Air Hybrid-Node is to configure Hitachi UCP HC. Figure 4 shows the network schema that describes how the appliance is connected to top-of-rack (ToR) switches.

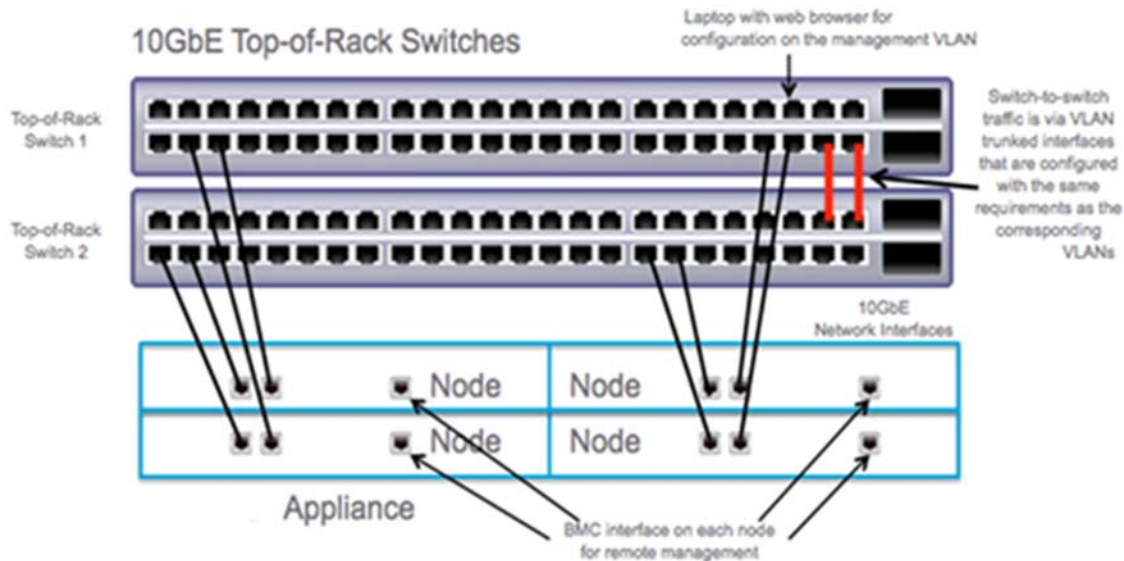


Figure 4

Install and Configure VSAN Cluster

Horizon Air Hybrid-Mode collaborates with VSAN, therefore the second step is to create a VSAN cluster on top of Hitachi UCP HC. To have a single VSAN datastore following all VSAN prerequisites is necessary:

- A VLAN needs to allow IPV6 and IPV4 traffic.
- A VLAN needs to have both IGMP snooping and IGMP querier enabled.
- Each UCP HC requires a minimum of two 10GBASE ports on each switch.
- UCP HC ports on the physical switch need to be in trunk mode with all VLANs.
- UCP HC ports on the physical switch must not have LACP enabled.
- UCP HC out-of-band IMPI NICs may require a dedicated switch port in access mode.

Deploy the Horizon Air Link

Horizon Air Link appliance orchestrates the initial setup and pairing with the cloud control plane for ongoing management and communication. Deploy Horizon Air Link appliance via the OVF file in the VSAN cluster. After deploying, you can do basic configuration.

Pair the UCP HC Appliance with the Cloud and Basic Configuration

To connect UCP HC appliance to Cloud Control Panel you should use the following link to configure the following:

- <https://cloud.horizon.vmware.com>
- Hardware Description
- Backbone Network
- Management Network
- Desktop Network
- DNS & NTP Servers

Register Active Directory

To assign desktops and applications to users, registration of Active Directory (AD) is necessary. To register AD you should have:

- NETBIOS Name
- DNS Domain Name
- Protocol is LDAP/LDAPS
- Bind Username and Password
- Configured Ports
- Domain Controller IP

Role and Permission

In this section, you can assign users/groups that have access to the start page in order to change the configuration.

Create Image

- You can export, configure, and optimize your master VM as an .ova file to file share and be introduced as a gold image in the cloud control panel.

Desktop Assignment

Desktop assignment gives you the ability to assign different desktop types to different users or groups. By taking advantage of this feature, you can manage desktop pools as well. In addition, there are two types of desktop assignment:

- Dedicated desktop assignment
- Floating desktop assignment

App Capture

App Capture is used to create AppStacks for provisioning applications to users. Applications must be captured into AppStacks by using the AppCapture utility, and then manually copying them to a file share. The utility works in Microsoft Windows® platforms (Microsoft's Windows 7 or Windows 10).

App Assignment

App assignment gives you the ability to assign applications to specific desktops and users accordingly. You can create a single App Assignment with multiple applications.

Figure 5 shows that all configuration steps have been done to deploy Horizon Air Hybrid-Mode and work properly.

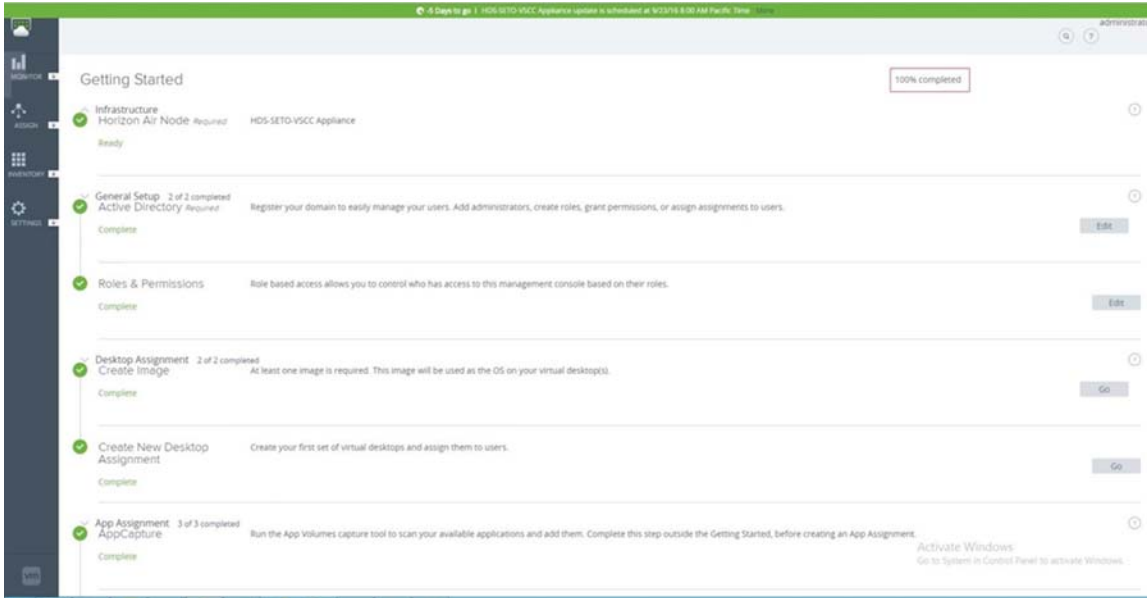


Figure 5

Figure 6 shows application assignments that publish applications to desktops.

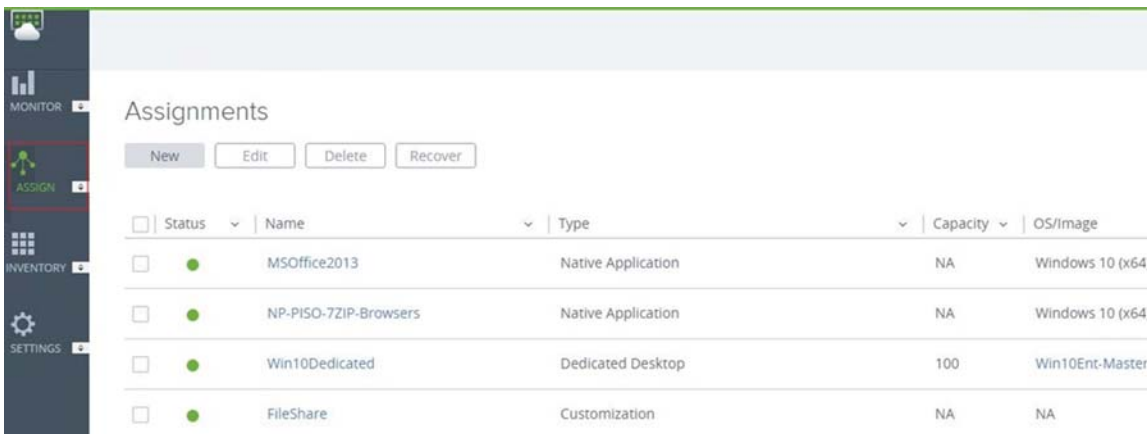


Figure 6

Figure 7 shows a desktop assignment that creates a pool of 100 dedicated desktops.

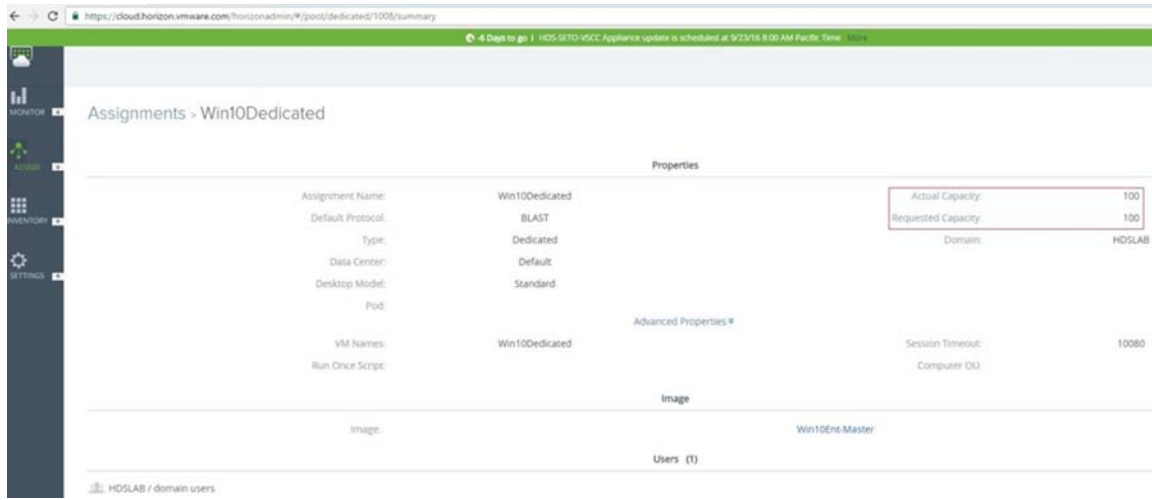


Figure 7

Figure 8 and Figure 9 show 100 desktops that are created by a single desktop assignment.

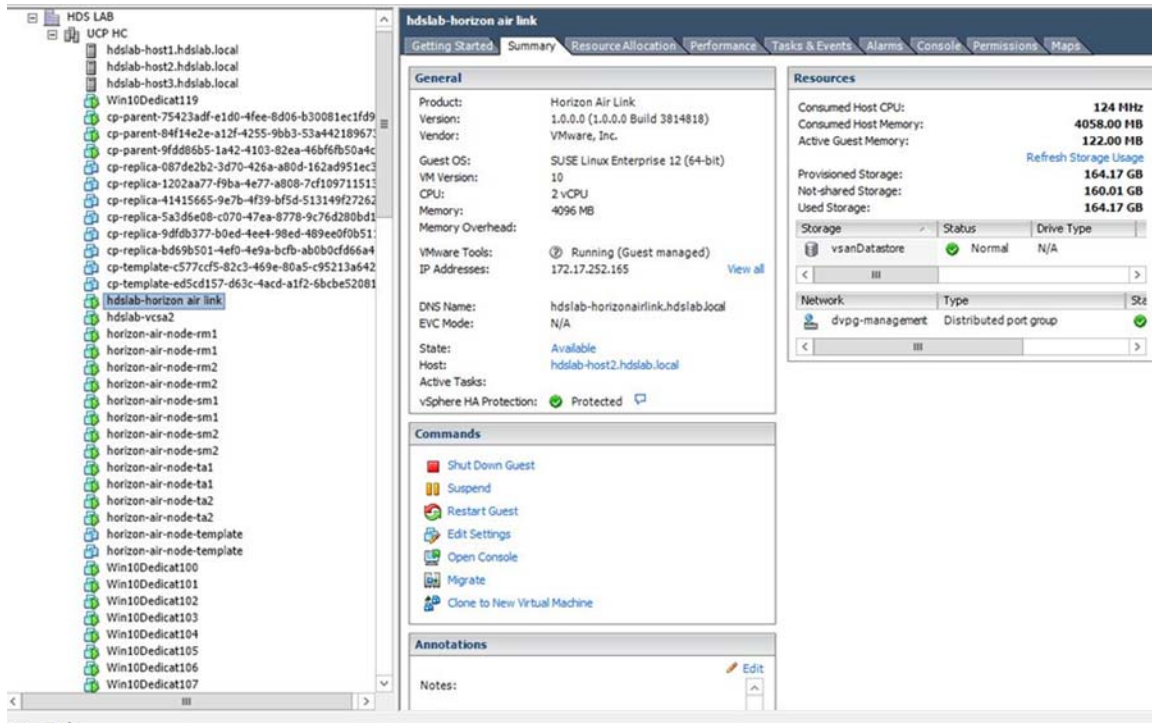


Figure 8

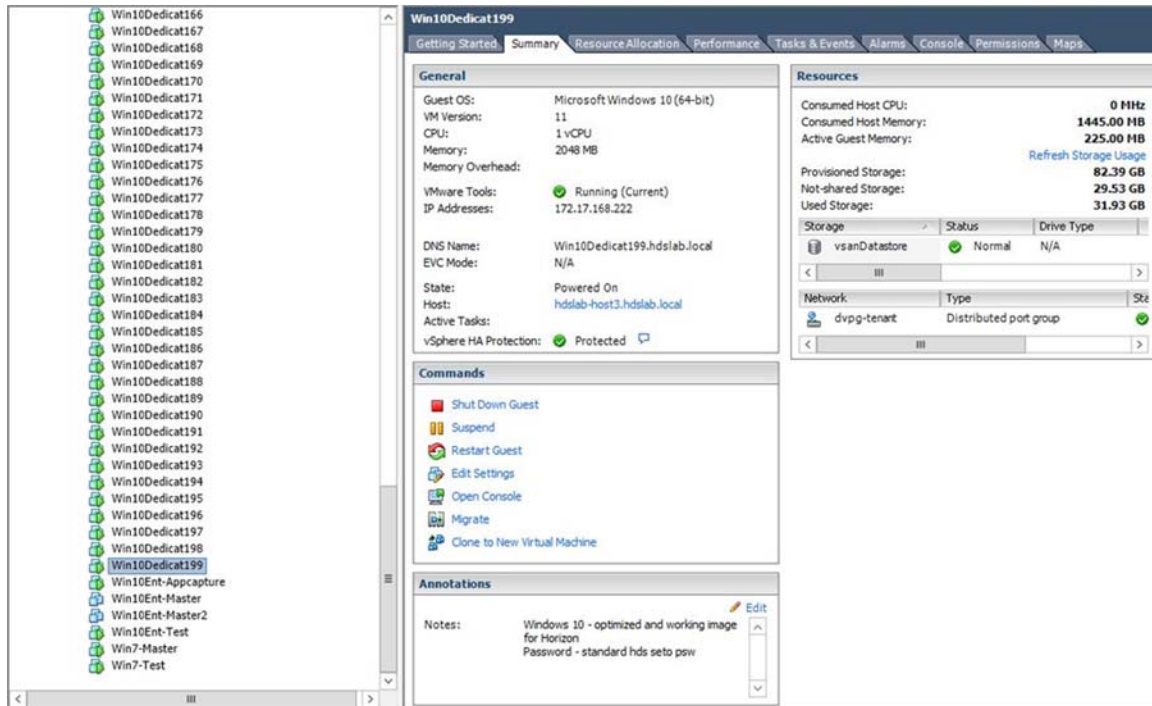


Figure 9

Figure 10 shows dvpg that are created on dvswitch that are prerequisites for deploying Horizon Air Hybrid-Mode.

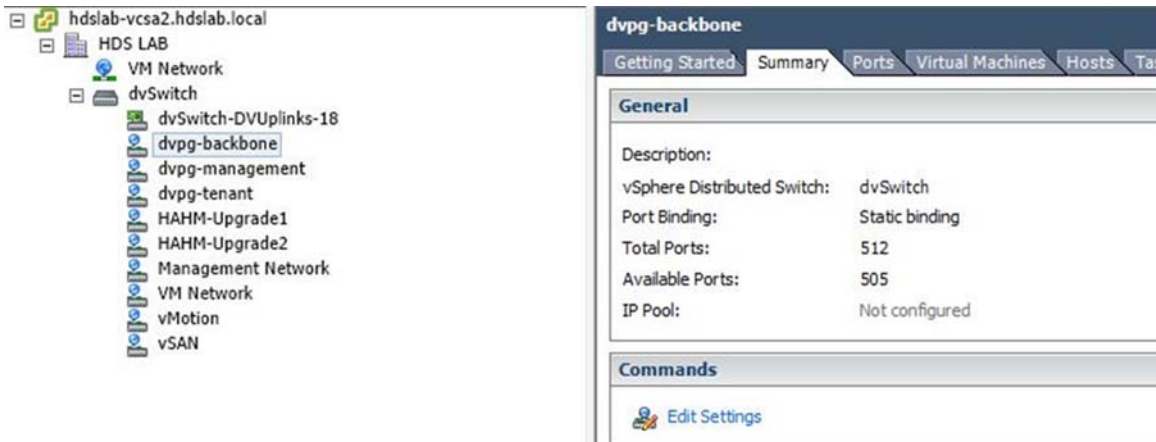


Figure 10

Test Strategy

Scope of the Tests

The tests outlined in this document are designed to allow functional, scale, and performance validation of the VMware Horizon Air Hybrid-Mode 1.0 product on Hitachi UCP HC by creating 100 VMs via different desktop/application assignments.

Assumption

The following assumption are made:

- Hardware meets the test criteria
- Compatible software versions for Horizon Air Hybrid-Mode components are used

Test Area

Functional tests include:

- Setup phase
 - Build out and configure the Virtual SAN Ready Node cluster
 - Deploy VMware Horizon Air Link appliance on the VSAN Cluster
 - Configure VMware Horizon Air Node
 - Complete post-onboarding key configuration steps
 - Register Active Directory
 - Add an external file share
- Usage phase
- Desktop service creation and access
 - Create a desktop image
 - Create a desktop assignment
 - Test desktop access
 - App Stacks and Writable volume creation and access
 - Capture five applications in five separated App Stacks
 - Capture five applications in a single App Stack
 - Test App Stacks and Writable volume
 - See the following link:
<http://pubs.vmware.com/horizon-air-hybrid-mode-11/topic/com.vmware.ICbase/PDF/horizon-air-hybrid-mode-11-install.pdf>

Tested Components

Testing of VMware Horizon Air Hybrid-Mode took place in the Hitachi Data Systems laboratory using Hitachi Unified Computed Platform HC and software that is compliant from VMware and other components.

Software Components

Table 5 describes the details of the software components used for deployment of the environment.

Table 5. Software Components

Software	Version
VMware Horizon Air Hybrid-Mode	1.0
VMware vCenter server	6.0 U2
VMware ESXi	6.0 U2
Server BIOS	S2S_3B06
VSAN	6.2 Enterprise Edition
Server BMC	3.42.00
Server CMC	3.37.0-03
LSI SAS 3008 RAID Controller Mezzanine Card	FW9

Hardware Components

Table 6 describes the details of the hardware components used.

Table 6. Hardware Components

Hardware	Description	Version	Quantity
Hitachi Unified Compute Platform HC V240F	<ul style="list-style-type: none"> ■ 2× CPU Intel Xeon E5-2680 v3 (12C 2.5GHZ) ■ 256 GB Memory ■ Dual port 10GigE Intel 82599ES SFP+ OCP Mezzanine Card ■ 1 × 800 GB SSD 2.5" SFF for VSAN caching tier ■ 5 × 800 GB SSD 2.5" SFF for VSAN capacity tier ■ LSI SAS 3008 RAID Controller 	1.1	1
Brocade Switch 6740	<ul style="list-style-type: none"> ■ 48 Fibre Channel ports for all VSAN and Network Traffic 	N/A	2
Brocade Switch Fast Iron	<ul style="list-style-type: none"> ■ Management Switch 	N/A	1

Test Cases

Table 7 describes multiple test cases that were used to verify and to validate VMware Horizon Air Hybrid-Mode service on UCP HC.

Table 7. Test Cases

Test Reference	Test case	Description	Result
S01	Create Virtual SAN-ready node cluster	Validate VSAN datastore deployment	Passed
S02	Deploy Horizon Air Link	Installation and deployment Horizon Air Link	Passed
S03	Configure Horizon Air Node	Configure the Horizon Air Node	Passed
S04	Register Microsoft® Active Directory® (AD)	Register AD on Cloud Manager	Passed
S05	Add a file share	Verify that it contains AppStacks	Passed
S06	Prepare the gold image	Prepare a virtual machine and install Horizon Air Hybrid-Mode agent on it	Passed
D01	Create a pool of dedicated VMs	Create a new desktop service, setting the desktops to be dedicated and verifying that new VMs are created	Passed
D02	Log in to a dedicated VM with a user from a mapped group	Verify that a user switch is part of a group mapped to the pool can broker a connection to the desktop	Passed
D03	Expand a pool of dedicated VMs	Expand a desktop pool to verify that new VMs are created via the assignment page	Passed
D04	Log out and launch desktop	Disconnect and logoff from View Client to verify deleting the VM that was in use	Passed
D05	Delete VMs from a Pool of Dedicated VMs	Check deleting VMs via the Assignment page	Passed
D06	Delete an empty pool of dedicated VMs	Verify to delete empty Dedicated pool	Passed
D07	Create a large desktop pool	Create bunch of desktop (Floating/Dedicated)	Passed
D08	Deploy an updated desktop image	Make changes to Gold Image, Convert it to new image and push updates to verify that assignments receive the updates	Passed
A01	Create five AppStacks	Create 5 AppStack of different application	Passed
A02	Import new AppStacks	Copy five AppStacks to file share and import those to inventory via the Cloud Manager console	Passed

Table 7. Test Cases (Continued)

Test Reference	Test case	Description	Result
A03	Create App Service with five AppStacks	Create and assign a new App Service consisting of the five AppStacks	Passed
A04	Verify App assignment	Logon as an end user with permissions to the five AppStacks and verify that all applications are present and usable	Passed
A05	Create an app service with five applications and enable writable volumes	Log on as an end user and verify that the file created by the user persists even when the user logs in to different VMs	Passed
A06	Verify user data and settings are persisted	Log on as an end user with a desktop and app service assignment, including writable volume. Save some data and logoff, then log back on to the same desktop service to verify that the user data is present	Passed
A07	Verify persistence of UIA (User Installed Application)	Verify that this is present as a user-installed application	Passed

Use Case Overview

This use case creates 100 VMs via different desktop assignments and multiple application assignments by means of Horizon Air Hybrid-Mode 1.0 on top of a three-node VSAN cluster using UCP HC.

It also creates multiple enabled writable volume AppStacks and assigns them to desktops/users.

The desktops were deployed via instant clone technology.

Figure 11 illustrates the Writable Volume from one of the desktops that considers an application assignment that contains a Writable Volume.

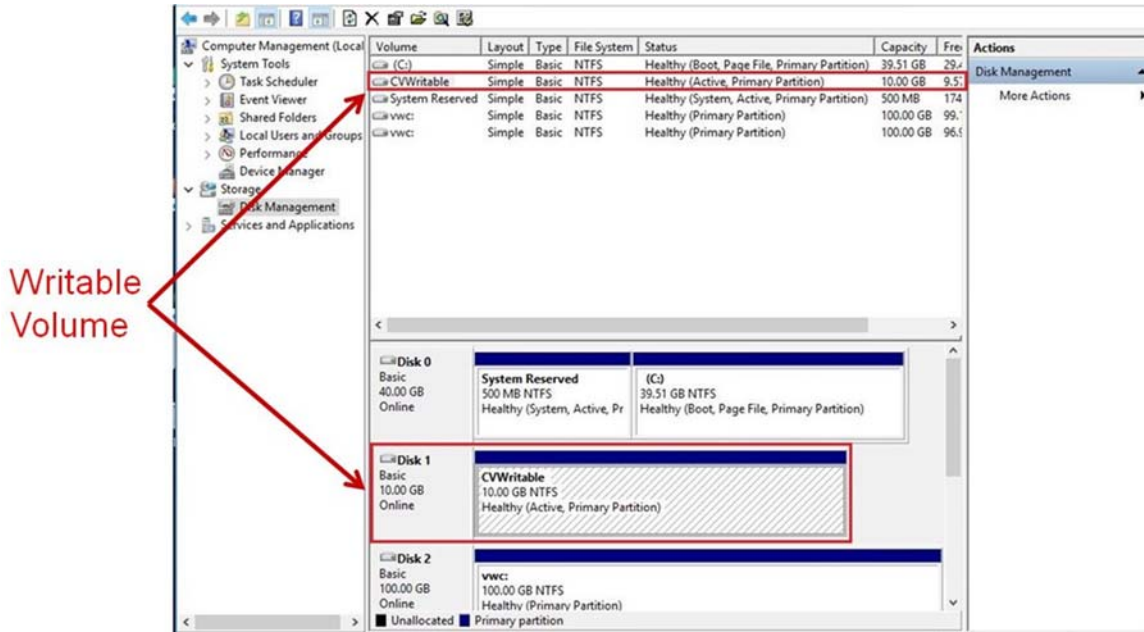


Figure 11

Summary

In this tech note, one hundred VMs were created by taking advantage of instant clone technology. Those VMs were created in approximately five minutes and then all were ready to use.

Also, by means of application assignment, applications such as Microsoft Office, 7Zip, Winscp, Firefox, Google Chrome, Notepad ++, and Power ISO were delivered to those VMs, and were ready to use in approximately five minutes as well. Moreover, some application assignments and desktop assignments were deleted for testing and no issues were observed.

Last but not least, writable volumes were checked. Some application assignments were created with writable volumes that stored user data or user applications in an installation file so that user data and applications installed by user, are kept this volume and were exited even after sign out and sign in or restarting the VM.

For More Information

Hitachi Data Systems Global Services offers experienced storage consultants, proven methodologies and a comprehensive services portfolio to assist you in implementing Hitachi products and solutions in your environment. For more information, see the Hitachi Data Systems [Global Services](#) website.

Live and recorded product demonstrations are available for many Hitachi products. To schedule a live demonstration, contact a sales representative. To view a recorded demonstration, see the Hitachi Data Systems Corporate [Resources](#) website. Click the **Product Demos** tab for a list of available recorded demonstrations.

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AS-548-00. October 2016.