2V0-51.19 Professional VMware Horizon 7.7

# Section 1 - Install and Configure Horizon Server Components

## Objective 1.1 - Describe techniques to prepare environment for Horizon

### Prerequisites

* Requires AD

#### Server Components

* + Connection Server
    - Acts as a broker for client connections by authenticating and then directing incoming user request to appropriate remote desktops and applications
    - Hardware Requirements

|  |  |  |
| --- | --- | --- |
| **Hardware** | **Requred** | **Recommended** |
| Processor | Pentium IV 2.0 or higher | 4 CPUs |
| NIC | 100 Mpbs NIC | 1 GBps NICs |
| Memory Windows 2008 R2 | 4GB RAM | At least 10 GB RAM for deployments of 50 or more |
| Windows 2012 R2 | 4 GB RAM | At least 10 GB RAM for deployments of 50 or more |
|  |  |  |

* + - * Static IP
    - OS
      * Windows 2008 R2 SP1 standard or Datacenter
      * Windows 2012 R2 Standard or Datacenter
      * Windows 2016 Standard or Datacenter
      * Windows 2019 Standard or Datacenter
  + Replica Connection Server
    - For high availability
    - Same as connection server
    - Usually installed in same physical location and connected with high performance LAN
    - To use across WAN or MAN or other non-LAN install to span datacenters you must use Cloud POD Architecture
  + Security Connection Server
    - Same as connection server
    - For external access
  + Administrator
    - Used to
      * Configure Connection server
      * Deploy and manage remote desktops and applications
      * Control user authrentication
      * Initiate and examine system events
      * Cary out analytical activities
    - Web base app installed on connection server
      * Acess with
        + IE 9,10,11
        + Firefox
        + Chrome
        + Safari 6 and later
        + Edge
      * Requres Adobe Flash
  + View Composer
    - Used to deploy multiple linked-clone desktops froma single centralized base image
    - You can install view composer on the saem physical or VM as vCenter Server or on a separate
    - OS
      * Windows 2008 R2 SP1 standard or Datacenter
      * Windows 2012 R2 Standard or Datacenter
      * Windows 2016 Standard or Datacenter
      * Windows 2019 Standard or Datacenter
    - Hardware for standalone

|  |  |  |
| --- | --- | --- |
| **Component** | **Required** | **Recommended** |
| Processor | 1.4 GHz or faster 2CPU | 2GHz or faster 4 CPU |
| Networking | One or more 10/100 MBps | 1 GBps |
| Memory | 4GB or higher | 8 GB for deployments of 50 or more |
| Disk Space | 40 GB | 60 GB |

* + - * Static IP
    - Database requirements
      * SQL DB
      * View can alternately use the vCenters instance

### Guest OS

* OS for Horizon Agent
  + View agent previously
  + Assists with
    - session management
    - SSO
    - Device redirection
    - Other features
  + Must be installed on all
    - VM
    - Physical Systems
    - RDS Hosts
* OS for Standalone Horizon Persona Management
  + Persona management for physical computers and VMs that do not have Horizon Agent installed
  + Profiles are downloaded dynamically from the remote profile repository
* Remote Display Protocol and software support
  + Provie access to remote desktops and applications
  + Types
    - PCoIP
      * PC over IP
      * Optimized desktop experience for the delivery of a published application or remote desktop
      * Can publish apps and desktops for VMs, physical machines that contain teradici host cards or shared RDS sessions
    - MS RDP
    - VMWare Blast Extreme
      * Optimized for mobile cloud
      * Supports broad range of client devices
      * Lowest CPU consumption for longer battery life
      * Publish applications and remote desktops that use VMs or shared session RDS hosts.

## Objective 1.2 - Determine procedures to install Horizon Components

### AD

* Up to windows 2016 AD Domain Functional Level
* You can place Horizon Agent machine, View Composer servers and users and groups in the following AD Domains
  + Connection Server Domain
  + Different domain that has two way trust with Connection Server Domain
  + Domain in a different forest than the connection Server that is trusted by the connection server domain in a on-way external or realm trust relation ship
  + Domain in diff forest than connection server that is trusted by the Connection server domain in a one-way or two-way transitive forest trust relationship
* OU for Remote Desktops
  + This prevents GPOs from
  + Can delegate control to OU
  + You should have a separate OU for linked clone desktops based on remote desktop OU if you you View Composer
* Separate OU for Kiosk thin clients
  + Kiosked thin clients are locked down thin clients

## Objective 1.3 - Determine steps to configure Horizon Components

## Objective 1.4 - Analyze End User Requirements for Display Protocol Performance

* Provides graphical interface to a remote desktop or application that resides in the data center
* Can set policies to control which protocol is used or to allow end users to choose the protocol when they log in
* Some protocols are not available depending on the clients
* To determine what protocol to use
  + What devices will be connecting from
  + What devices will they be connecting to
  + Network bandwidth
  + Remote compute

### VMware Blast Extreme

* Optimized for mobile cloud
* Broad range of devices that are H.264 capable
* Lowest CPU consumption for longer battery life on mobile devices
* Can compensate for increased latency or a reduction in bandwidth
* Leverages both TCP and UDP
* Used for both published applications and remote desktops that use VMs or shared-session desktops on RDS
* Features
  + Can be used with corporate VPN or encrypted connections to DMZ
  + AES 128 bit encryption and enabled by default
  + Can use AES 256
  + Connections from all types of client devices
  + Optimization controls for reducing bandwidth usage on the LAN and WAN
  + Network continuity during momentary network loss on windows clients
  + 32-bit color is supported for virtual displays
  + Audio redirection with dynamic audio quality adjustment for LAN and WAN
  + Real-Time Audio-Video for using webcams and microphones on some client types
  + Copy and paste of text and on some clients images between client and remot desktop
  + Multiple monitors supported on some clients
  + USB redirection for some clients
  + MMR redirection for some windows client OS and some remote desktop OS with Horizon agent installed
* Wake-on-LAN
  + Supported for physical machines running WIN 10
  + Users can wake up physical machines when connecting with Horizon Connection server
  + Prerequisites
    - WOL for IPv4 only
    - Physical machine must be enabled for WOL
    - Destination port 9 is used for WOL packets from Connection Server
    - WOL packets are IP-directed broadcast packets
* Recommended Guest OS
  + 1 GB RAM or more 4GB for high Graphic intensive apps
  + Dual CPU
  + Video
    - Dual vCPU required for 720p or higher
    - 3D rendering using hardware or software accelerated graphics

### PCoIP

* PC over IP
* Optimized desktop experience of published apps and remote desktops
* Can compensate for increase latency or reduction in bandwidth
* Can be used for
  + Published apps
  + Remote desktops that use
    - VM
    - Physical machines with teradici host cards
    - Shared session desktops on RDS Host
* Features
  + Outside users can use company VPN or access point in DMZ
  + AES 128 standard and enabled by default
  + AES 256 available
  + Connections from all types of clients devices
  + Optimized controls for reducing bandwidth usage on LAN and WAN
  + 32 bit color is supported for virtual displays
  + Clear type fonts
  + Audio redirection and dynamic audio adjustments for LAN and WAN
  + Real-Time Audio-Video for webcams an microphones
  + Copy and paste of text and on some clients images between client and remot desktop
  + Multiple monitors supported on some clients
  + USB redirection for some clients
  + MMR redirection for some windows client OS and some remote desktop OS with Horizon agent installed
* Recommended Guest OS
  + 1 GB RAM or more 4GB for high Graphic intensive apps
  + Dual CPU
  + Video
    - Dual vCPU required for 720p or higher
    - 3D rendering using hardware or software accelerated graphics

### Microsoft RDP

* Same as RDP to remote desktop
* Can be used for
  + Remote desktop
    - VM
    - Physical machine
    - Shared desktop on RDS Host
* Features
  + RDP 7 true multiple monitor support for up to 16 monitors
  + You can copy and paste text and system objects such as folders and files between local and remote desktops
  + 32 bit color
  + RDP supports 128 bit encryption
  + Users outside firewall can use this protocol with VPN or connect to DMZ

## Objective 1.5 - Diagnose and solve issues related to connectivity between Horizon

## server Components

### Connection Problems between Machines and Horizon Connection Server Instances

* Problem
  + Provisioning error occurred for machine <machine name>: Customization error due to no network communication between the horizon agent and connection server
  + Provisioning error occurred on pool <Desktop\_ID> because of a networking problem with a Horizon Agent
  + Unable to launch from pool <Desktop\_ID> for user <User\_Display\_Name>: FFailed to connect to machine <MachineName> using <Protocol>
* Cause
  + Lookup failure on the machine for the DNS name of the Connection Server host
  + The ports for JMS, RDP, or AJP13 communication being blocked by firewall rules
  + The failure of the JMS router on the connection server host
* Solution
  + From the machine
    - Nslookup <Connection Server FQDN>
    - Verify TCP port 4001 is open to Connection server
      * telnet <Connection Server FQDN> 4001
  + if security server in DMZ, verify inner firewall rules allow RDP connectivity between the security server and VMs on port 3389
  + if secure server bypassed verify firewall rules for direct RDP connection to VM on RDP 3389 and PCOIP TCP 4172 and UDP 4172
  + verify inner firewall rules to allow connections between security server and its associated Connection server on JMS TCP 4001 and AJP13 TCP 8009

### Connection problems between Horizon Client and the PCoIP secure Gateway

* problems between Horizon Client and security server or Horizon Connection Server host when the PCoIP secure Gateway is configured to authenticate external users
* Problem
  + Clients that use PCoIP cannot connect to or display Horizon Desktops
  + Initial login to security server or connection server instance succeeds but connection fails when the user selects a desktop
  + Issue occurs when PCoIP secure Gateway is configured on a security server or connection server host
* Cause
  + Windows Firewall has closed a port that is required for the PCOIP secure gateway
  + PCoIP Secure Gateway is not enabled o nthe security server or Horizon Connection server instance
  + PCoIP external URL setting is configured incorrectly
  + PCoIP external URL, secure tunnel external URL, Blast external URL or other address is configured to point to a different security server or connection server host
  + Client is connecting through an external web rpoxy that has cloed a port required for PCoIP Secure Gateway
* Solution
  + Check firewall rules for the following

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| --- | --- |
| **Port** | **Description** |
| TCP 4172 | * From Client to Security server or Connection Server Host |
| UDP 4172 | * Between client and the security server or connection server host * From any to 4172 and allow reverse response back |
| TCP 4172 | * From Security Server or Connection server host to Horizon 7 desktop |
| UDP 4172 | * Between Security server or connection server host to horizon 7 desktip |

* + Make sure PCOIP Secure gateway is enabled in Horizon Administrator
  + Make sure that PCoIP External URL is configured correctly in Horizon Administrator

### Connection Problems due to incorrect assignment of IP addreses to cloned machines

* Can’t connect to cloned machines if they have static IP addresses
* Problem
  + Cannot use horizon client to connect to cloned machines
* Cause
  + Cloned machines are incorrectly configured to use a static IP address instead of using DHCP
* Solution
  + Verify template uses DHCP

### Generate and analyze log bundles

# Section 2 - Create and Configure Pools

## Objective 2.1 - Configure and Manage Horizon Pools

### Pools Overview

* Pools give users remote access to VM based desktops one user per VM
* Pools of machines give all machines a common setup

#### Types of virtual Desktop Pools

##### Automated

* Use vCenter VM templates or snapshot to create a pool of identical VMs

##### Manual

* Collection of existing VMs, physical computers, or third party VMs

#### Configuring

##### Stateless desktop image

* Non persistent desktops
* Lower storage costs
* Easier to support
* Limited need to back up the VM
* Folder redirection and roaming profiles can be used to store usdr data
* Create stateless images
  + Floating assignment pools of instant clone VM
  + Dedicated assignment pools of instant clone VM
  + Composer or manually creates the pools

##### Stateful desktop image

* Persistent desktop
* Data resides on image
* Backup and recovery maters
* Create stateful images
  + Full clones or full VMs
  + Pools of instant cloned or linked clone VM and use App Volumes to attach user data and user installed apps

#### Types of worker pools

##### Task workers

* Stateless image
* Keeps the image in well know easily supportable config allowing workers to log into any desktop
* Settings for instant clone desktop pools
  + Optimize resource utilization use on demand provisioning to grow or shrink the pool based on usage
  + Specify enough spare desktops to satisfy the login rate
  + Desktop is deleted whenever a user logs out and a new instan clone is created and ready for the next user to log in
* Settings for horizon composer linked clones
  + Determine what action to take when user logs off.
  + Consider storing desktops on local ESX data stores
    - Inexpensive
    - Fast VM Provisioning
    - High performance power operations
    - Simple
  + Use the persona management feature so that users always have their preferred desktop appearance and app settings
    - Can be used with floating assignment pools
* General pool settings
  + Create an automated pool so that desktops can be created when the pool is created or can be generated on demand based on pool usage
  + Use floating assignment
    - Allowing users to log on to any desktop thus reducing number of VM
  + Instant clone or linked clone to point to base image and less space

##### Knowledge Workers and Power Users

* Knowledge Worker
  + Complex docs that persist
  + Stateless with personal data outside the VM
* PowerUsers
  + Power users install their own apps and persist
  + Stateful
* Settings for instant clone
  + File share, roaming profile or another profile management solution
* Settings for Horizon Composer linked clones
  + Enable space reclamation feature for vCenter Server and the desktop pool
  + Persona management
  + Roaming profiles or another profile management solution
  + Persistent disks allowing the OS disk to be refreshed while retaining this data
* General Pool Settings
  + If user needs the same desktop everytime, use the Dedicated assignment pool
  + Use vStorage thin provisioning
  + To install apps
    - Use full VMs
    - Or pool of linked clones or instant clones and use App Volumes to persist user data across logins

##### Kiosk Users

* Consist of
  + Airline checkin stations
  + Students in classrooms or libraries
  + Medical personnel at data entry stations
  + Customer self service points
  + Etc
* Client device accounts are entitle to use the desktop pools instead of users
* Stateless
* Thin client devices or locked down physical machines
* Best practice
  + Use dedicated Connection server instances to keep things separate
* To enable use vdmadmin CLI
* Instant-Clone desktop settings
  + Clone automatically deleted when user logs out and new one created for next user
* Composer linke-clones
  + Institute refresh policy so desktop is new each log off
  + Store desktop on local ESX datasotes
    - Faster
* General settings for kisosk
  + Automated pool so desktops create when pool is created or as demand
  + Floating assignment so users can access any available desktop
  + Clones so share same base image
  + AD GPO to configure location based printing
  + GPO or spart policies to control local USB devices

### Instant-Clone Desktop Pool

* Provides access to instant-clone desktops
* Based on parent VM knows as master image
* ClonePrep
  + Customizes instant clones during creation process
  + Ensures all clones join AD
  + Can run scripts when clone is created or powered off
* Base image instant clone is derived from
  + You can set base image instant clone uses to any snapshot from any VM
  + vGPU profile cannot be changed once pool is provisioned.
    - Must delete and recreate pool
  + Push image to instant clones
* Instant-clone host maintenance
  + Placing ESXi Host in maintenance mode migrates all instant-clones to another host. The master image is automatically deleted
* Instant Clone Maintenance
  + Commands on the Connection Server
    - IcMaint.cmd
      * Deletes the master images so that the host can be put into maintenance mode
    - IcUnprotected.cmd
      * Unprotect VMs and folders
      * Delete VMs and folders
      * Detect VMs whose master image or snapshot is deleted
    - IcCleanup.cmd
      * Unprotect and delete some or all of the internal VMs created by instant clones
      * Also provides list command to group internal VMs into the hierarchical structure according to their master VM and snapshot

### Automated Desktop Pool containing Full VMs

* Uses a template to create VMs in the pool
* Can use customization specifications to speed up deployments
* Rebuilding a VM in a pool if you want to replace a VM with a new one and use the same name
  + Might need to do this to fix an error state
* Can be encrypted either with same key or different keys

### Linked clone desktop pools

* Composer service creates a linked clone based on parent master image

### Manual Desktop Pools

* Pool of existing machines
  + VMs managed by vCenter
  + VMs that run on other virtualization platforms
  + Physical Servers
* VMs in the pool managed by vCenter maintain a spare powered on so it can be used
* Horizon agent must be installed on all machines

### Configuring Desktop Pools

* User assignments
  + Floating
    - Users get random desktop every login
    - Instant clones desktop is always deleted and recreated between logins
    - May allow software licenses to be reduced
  + Dedicated
    - Each desktop is assigned to a specific user
    - Computer name and MAC are retained between logins nothing else is persistent
* Naming Convention
  + You can provide list of names or a pattern for the pool to use
* Manually customizing machines
  + By starting a machine in maintenance mode you can make changes to test without it being assigned to a user
  + Only for linked-clones
  + Starting in maintenance mode Only if names come from a list not from a pattern
* Timeouts ( GPO )
  + Takes precedence over settings on pool
  + Disconnect Session Time Limit (VDI)
    - Amount of time after a disconnected desktop session will automatically log off
    - Never = disconnected session will never log off
    - Immediately =
  + Idle Time until Disonnect (VDI)
    - Amount of time user session will ldisconnect due to user inactivity
    - If disabled, unconfigured or enabled with Never then the session will never be disconnected
* Power Policies
  + Control how a VM behaves when its associated desktop is not in use
    - Not in use =
      * Before a user ogs in and after a user disconnects or logs off
  + Controls how a VM behaves after
    - Refresh
    - Recompose
    - rebalance
  + Only works for VMs managed by vCenter
  + Does not work for instant clones
  + Does not work for unmanaged machines
  + Power policies for desktop pools

|  |  |
| --- | --- |
| **Policy** | **Description** |
| Take no power action | * + - No action taken after user logs off or after admin task |
| Ensure machines are always powered on | * + - Machine is always on     - If a user shutsdown the machine it is immediately powered on     - Restart after admin task |
| Suspend | * + - Suspend state when user logs off or disconnects |
| Power off | * + - The VM shuts down when user logs off but not when user disconnects |

<https://docs.vmware.com/en/VMware-Horizon-7/7.11/virtual-desktops/GUID-8540E3C2-FCD5-4EA5-877A-F11BB2FD4FAB.html>

## Objective 2.2 - Build and Customize RDSH Server and Desktop Images

# Section 3 – \*Section 3 has been removed from this exam

# Section 4 - Configure and Manage Identity Manager

## Objective 4.1 - Install and Configure VMware Identity Manager

## Objective 4.2 - Manage VMware Identity Manager

# Section 5 - Configure and Manage User Environment Manager

## Objective 5.1 - Install and Configure VMware User Environment Manager

## Objective 5.2 - Manage VMware User Environment Manager

# Section 6 - Configure and Manage App Volumes

## Objective 6.1 - Install and Configure VMware App Volumes

## Objective 6.2 - Manage VMware AppStacks and writeable Volumes

# Section 7 - Configure vRealize Operations for Horizon

## Objective 7.1 - Install and Configure the adapter instance and Horizon Broker Agent