



The science behind the report:

## Give your VDI users the memory they need with server technology from Dell EMC and Intel

This document describes what we tested, how we tested, and what we found. To learn how these facts translate into real-world benefits, read the report [Give your VDI users the memory they need with server technology from Dell EMC and Intel](#).

We concluded our hands-on testing on September 18, 2019. During testing, we determined the appropriate hardware and software configurations and applied updates as they became available. The results in this report reflect configurations that we finalized on August 5, 2019 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

### Our results

The table below presents our findings in detail.

Test case	Max users	Average CPU (%)	Average memory (%)	Max memory (%)
Dell EMC™ PowerEdge™ R730xd	20	50	92	99
Dell EMC PowerEdge R740xd	30	53	83	97
Dell EMC PowerEdge R740xd with Intel Optane DC Persistent Memory	75	92	78	78

## System configuration information

The table below presents detailed information on the systems we tested. We tested two configurations of the R740xd: one with Intel Optane DC persistent memory, and one without. Otherwise, both configurations were the same.

Server configuration information	Dell EMC PowerEdge R730xd	Dell EMC PowerEdge R740xd
BIOS name and version	Dell 2.9.1	Dell 2.2.11
Non-default BIOS settings	N/A	N/A
Operating system name and version/build number	ESXI™ 6.7.0 build- 14320388	ESXI 6.7.0 build- 14320388
Date of last OS updates/patches applied	06/12/2019	06/12/2019
Power management policy	Performance	Performance
<b>Processor</b>		
Number of processors	2	2
Vendor and model	Intel® Xeon® E5-2699 v4	Intel® Xeon® Platinum 8280M
Core count (per processor)	22	28
Core frequency (GHz)	2.20	2.60
Stepping	B1	5
<b>Memory module #1</b>		
Total memory in system (GB)	256	384
Number of memory modules	16	12
Vendor and model	Samsung® M393A2K43BB1	Hynix HMA84GR7AFR4N-VK
Size (GB)	16	32
Type	DDR4	DDR4
Speed (MHz)	2,666	2,666
Speed running in the server (MHz)	2,666	2,666
<b>Persistent memory details</b>		
Total memory in system (GB)	N/A	1,536
Number of memory modules	N/A	12
Vendor and model	N/A	Intel NMA1XBD128GQS
Size (GB)	N/A	128
Type	N/A	DCPMM
Speed (MHz)	N/A	2,666
Speed running in the server (MHz)	N/A	2,666
<b>Storage controller</b>		
Vendor and model	Dell PERC H730P	Dell PERC H730P
Cache size (GB)	2	2
Firmware version	25.5.5.0005	25.5.5.0005
Driver version	7.708.07.00	7.708.07.00

Server configuration information	Dell EMC PowerEdge R730xd	Dell EMC PowerEdge R740xd
Local storage		
Number of drives	8	8
Drive vendor and model	Intel SSDSC2KG960G8	Intel SSDSC2KG960G8
Drive size (GB)	960	960
Drive information (interface, type)	SATA SSD	SATA SSD
Network adapter		
Vendor and model	Intel Ethernet Server Adapter X520 2-port 10GbE	Intel Ethernet Server Adapter X520 2-port 10GbE
Number and type of ports	2 x 1GbE	2 x 1GbE
Cooling fans		
Vendor and model	Nidec® UltraFlo 4VXP3-X30	Nidec UltraFlo 4VXP3-X30
Number of cooling fans	6	6
Power supplies		
Vendor and model	Dell 0PJMDN	Dell 0PJMDN
Number of power supplies	2	2
Wattage of each (W)	750	750

## How we tested

### Physical servers

Host name	Operating system	Role
Infrastructure	VMware ESXi 6.7	ADDS, SQL, DNS, DHCP, NTP, vCenter®, VMware View® connection and Composer™, View Planner harness
Dell EMC PowerEdge R730xd	VMware ESXi 6.7	Legacy server under test
Dell EMC PowerEdge R740xd	VMware ESXi 6.7	Current-generation server under test
Dell EMC PowerEdge R740xd with Intel Optane DC persistent memory	VMware ESXi 6.7	Current-generation server under test with Intel Optane DC persistent memory

### Virtual machines

VM name	OS	vCPU count	Memory size (GB)	Disk size (GB)	Server host
DC1	Windows Server 2016	2	8	40	infrastructure
SQL01	Windows Server 2016 R2	4	8	C:\40 D:\50	infrastructure
vCenter	VMware vCenter Server Virtual Appliance	8	24	Appliance determined	infrastructure
Composer	Windows Server 2016 R2	8	16	C:\40 C:\50	infrastructure
Connection	Windows Server 2016 R2	8	16	40	infrastructure
VP-harness	Virtual Appliance	8	8	12 50	infrastructure
Win10-gold1	Windows 10 x 64	2	16	50	Dell EMC PowerEdge R730xd
Win10-gold2	Windows 10 x 64	2	16	50	Dell EMC PowerEdge R740xd
Win10-gold3	Windows 10 x 64	2	16	50	Dell EMC PowerEdge R740xd with Intel Optane DC persistent memory

## Installing the Dell EMC PowerEdge servers

We set up four servers: one Dell EMC PowerEdge R730 as our infrastructure server, and three servers under test (namely, a Dell EMC PowerEdge R730xd , a Dell EMC PowerEdge R740xd, and a Dell EMC PowerEdge R740xd with Intel Optane DC persistent memory). We used the Lifecycle Controller to perform BIOS and firmware updates on each server. We created local RAID 5 datastores using all available SSDs.

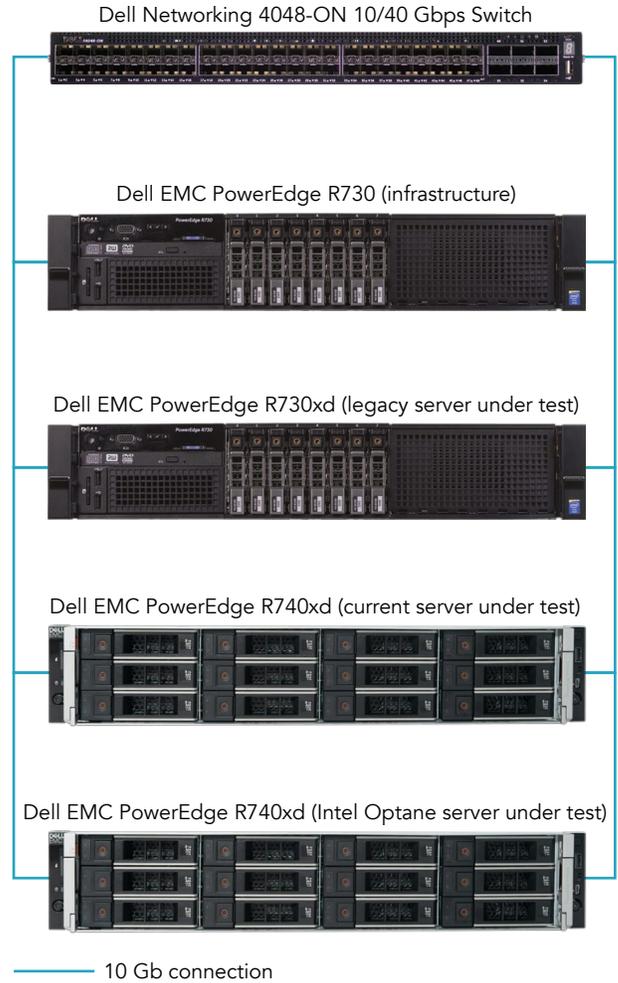
## Installing ESXi 6.7 on the PowerEdge servers

Perform these steps on all four servers:

1. Insert the VMware vSphere installation media.
2. Power on the server, and boot from the DVD drive.
3. Select the standard vSphere installer, and allow the files to copy into memory.
4. At the welcome screen, press F11.
5. At the keyboard language selection screen, press Enter.
6. Enter a password twice for the root user, and press Enter.
7. Choose to install to the local SD card.
8. Allow the installer to finish installing vSphere, and reboot the server.
9. After the server reboots, press F2, and enter root credentials.
10. Select Configure Management Network, and press Enter.
11. Select both 10Gbps adaptors, and select OK.
12. Select IPv4 settings.
13. Enter the desired IP address, subnet mask, and gateway for the server.
14. Select OK, and restart the management network.

## Installing VMware vCenter 6.7

1. On a Windows server or VM, locate the VMware-VCSA installer image.
2. Mount the image, navigate to the vcsa-ui-installer folder, and double-click win32.
3. In the wizard that appears, click Next.
4. Accept the terms of the license agreement, and click Next.
5. Leave the default installation directory, and click Next.
6. Click Install.
7. Click Finish.
8. In the mounted image's top directory, open vcsa-setup.html.
9. When prompted, click Allow.
10. Click Install.
11. Accept the terms of the license agreement, and click Next.
12. Enter the FQDN or IP address of the infrastructure server to which the vCenter Server Appliance will be deployed.
13. Provide a username and password for the system, and click Next.
14. To accept the certificate of the host you chose to connect to, click Yes.
15. Select the appropriate datacenter, and click Next.
16. Select the appropriate resource, and click Next.
17. Provide a name and password for the virtual machine, and click Next.
18. Select Install vCenter Server with an Embedded Platform Services Controller, and click Next.
19. Select Create a new SSO domain.
20. Provide a password, and confirm it.
21. Provide an SSO Domain name and SSO Site name, and click Next.
22. Set the Appliance Size as small, and click Next.
23. Select the local DAS datastore, and click Next.
24. At the Configure Network Settings page, configure the network settings as appropriate for your environment, and click Next.



25. Review your settings, and click Finish.
26. When the deployment completes, click Next.
27. At the Introduction page, click Next.
28. At the Appliance configuration page, select the time synchronization mode and SSH access settings, and click Next.
29. Select Create a new SSO domain.
30. Provide a password, and confirm it.
31. Provide an SSO Domain name and SSO Site name, and click Next.
32. At the CEIP page, click Next.
33. At the Ready to complete page, click Finish
34. Add all four servers to the vCenter

## Installing Active Directory and DNS services on the DC1 VM

1. Log into the vSphere client as administrator@vsphere.local.
2. On the infrastructure server, deploy a Windows Server 2016 VM from the template using the appropriate specs from the table on [page 4](#), named DC1, and log in as an administrator.
3. Launch Server Manager.
4. Click Manage→Add Roles and Features.
5. At the Before you begin screen, click Next.
6. At the Select installation type screen, leave Role-based or feature-based installation selected, and click Next.
7. At the Server Selection Screen, select the server from the pool, and click Next.
8. At the Select Server Roles screen, select Active Directory Domain Services.
9. When prompted, click Add Features, and click Next.
10. At the Select Features screen, click Next.
11. At the Active Directory Domain Services screen, click Next.
12. At the Confirm installation selections screen, check Restart the destination server automatically if required, and click Install.

## Configuring Active Directory and DNS services on the DC1 VM

1. After the installation completes, a screen should pop up with configuration options. If a screen does not appear, click the Tasks flag in the upper-right section of the Server Manager.
2. Click Promote this server to a Domain Controller.
3. At the Deployment Configuration screen, select Add a new forest.
4. In the Root domain name field, type `test.local`, and click Next.
5. At the Domain Controller Options screen, leave the default values, and enter a password twice.
6. Click Next four times to accept default settings for DNS, NetBIOS, and directory paths.
7. At the Review Options screen, click Next.
8. At the Prerequisites Check dialog, allow the check to complete.
9. If there are no relevant errors, check Restart the destination server automatically if required, and click Install.
10. When the server restarts, log on using `test\Administrator` and the password you chose in step 5.

## Configuring the Windows time service on the DC1 VM

To ensure reliable time, we pointed our Active Directory server to a physical NTP server.

1. Open a command prompt.
2. Type the following:
 

```

W32tm /config /syncfromflags:manual /manualpeerlist:"<ip address of a NTP server>"
W32tm /config /reliable:yes
W32tm /config /update
W32tm /resync
Net stop w32time
Net start w32time

```

## Setting up DHCP services on the DC1 VM

1. Open Server Manager.
2. Select Manage, and click Add Roles and Features.
3. Click Next twice.
4. Select DHCP Server, and click Next.
5. At the Introduction to DHCP Server screen, click Next.
6. At the Specify IPv4 DNS Settings screen, type `test.local` for the parent domain.
7. Type the preferred DNS server IPv4 address, and click Next.
8. At the Specify IPv4 WINS Server Settings screen, select WINS is not required for applications on the network, and click Next.
9. At the Add or Edit DHCP Scopes screen, click Add.
10. At the Add Scope screen, enter the a name for the DHCP Scope.
11. Set the following values, and click OK.
  - a. Start IP address = 172.16.10.1
  - b. End IP address = 172.16.100.254
  - c. Subnet mask = 255.255.0.0
12. Check the Activate This Scope box.
13. At the Add or Edit DHCP Scopes screen, click Next.
14. Click the Enable DHCP v6 Stateless Mode radio button, and click Next.
15. Leave the default IPv6 DNS Settings, and click Next.
16. At the Authorize DHCP server dialog box, select Use current credentials.
17. At the Confirm Installation Selections screen, click Next. If the installation is set up correctly, a screen displays saying that DHCP server install succeeded.
18. Click Close.

## Installing and configuring SSL Certificate in Microsoft Active Directory

Before you can configure View Planner, you need to set up the Active Directory server as a certificate authority. To do this, follow the guide at <https://social.technet.microsoft.com/wiki/contents/articles/2980.Ldap-over-ssl-ldaps-certificate.aspx>.

1. Log onto DC1 as `administrator@test.local`
2. Open the server manager.
3. Select Manage, and click add Roles and Features.
4. When the Add roles and Features Wizard begins, click Next.
5. Select Role-based or feature-based installation, and click Next.
6. Select `DC1.test.local`, and click Next.
7. At the Server roles menu, select Active Directory Certificate Services, and click Next.
8. Leave server features as is, and click Next.
9. Select Certificate Authority and Certificate Authority web interface, click Add Features to add the IIS web server, and click Next.
10. Click Install, and close.
11. In the server manager, click the yellow triangle titled Post-deployment configuration.
12. On the destination server, click Configure Active Directory Certificate Services.
13. Leave credentials as `test\administrator`, and click Next.
14. Select Certificate Authority, and select Certificate Authority Web Enrollment. Click Next.
15. Select Enterprise CA, and click Next.
16. Select Root CA, and click Next.
17. Select Create a new private key, and click Next.
18. Select SHA256 with a 2048 Key length, and click Next.
19. Leave the name fields and defaults, and click Next.
20. Change expiration to 10 years, and click Next.
21. Leave Certificate database locations as default.
22. Click Next.
23. Click Configure.
24. Open a command prompt, and type `ldp`
25. Click Connection, and connect.
26. Type `dc1.test.local` for server.
27. Change the port to 636.
28. Check SSL, and click OK.

## Configuring a secure LDAP on DC1.test.local

1. Open Administrative Tools→Certification Authority.
2. Click test-DC1-CA→Certificate Templates.
3. Right-click Manage.
4. Right-click Kerberos Authentication, and select Duplicate Template.
5. Click Request Handling.
6. Check the box for Allow private key to be exported, and click OK.
7. Right-click the new template, and rename it LDAPoverSSL
8. Return to the Certificates console. In the right pane, right-click New→Certificate Template.
9. Select LDAPoverSSL, and click OK.

## Configuring AD GPOs for target VMs

To run the tests correctly, we created an organizational unit named `target` in the `test.local` domain. We then created and assigned group policies objects for the following:

- Autologin as a domain admin user
- Disable windows updates
- Disable screen lock
- Disable firewall
- Accept defaults Windows media player
- Suppress Office first time user messages

You can change these settings individually on the gold Windows 10 VM, but we found it easier to make ad hoc changes by using GPOs. You will need the Office 2016 Administrative Template files (ADMX/ADML) and the Office Customization Tool for Microsoft Active Directory to configure these settings. The software is available at [Microsoft.com](http://Microsoft.com).

## Installing Microsoft SQL Server 2012 for vCenter Server on SQL01

1. Log onto the vSphere client as `administrator@vsphere.local`
2. On the infrastructure server, deploy a Windows Server 2016 VM from template using the appropriate specs in the table on [page 4](#).
3. Name the VM you created `SQL01`
4. Log in as an administrator.
5. Add the .NET Framework 3.5 feature to the server.
6. Mount the installation DVD for SQL Server 2012.
7. Click Run SETUP.EXE. If Autoplay does not begin the installation, navigate to the SQL Server 2012 DVD, and double-click it.
8. In the left pane, click Installation.
9. Click New SQL Server stand-alone installation or add features to an existing installation.
10. Select Enter the product key, and enter the product key. Click Next.
11. To accept the license terms, click the checkbox, and click Next.
12. To check for updates, click Use Microsoft Update, and click Next.
13. To install the setup support files, click Install.
14. If no failures display, click Next.
15. At the Setup Role screen, choose SQL Server Feature Installation, and click Next.
16. At the Feature Selection screen, select Database Engine Services, Full-Text and Semantic Extractions for Search, Client Tools Connectivity, Client Tools Backwards Compatibility, Management Tools – Basic, and Management Tools – Complete.
17. Click Next.
18. At the Installation Rules screen, after the check completes, click Next.
19. At the Instance configuration screen, leave the default selection of Default instance, and click Next.
20. At the Server Configuration screen, choose NT Service\SQLSERVERAGENT for SQL Server Agent, and choose NT Service\MSSQLSERVER for SQL Server Database Engine. Change the Startup Type to Automatic. Click Next.
21. At the Database Engine Configuration screen, select the authentication method you prefer. For our testing purposes, we selected Mixed Mode.
22. Enter and confirm a password for the system administrator account.
23. Click Add Current user. This may take several seconds.
24. Click the Data Directories tab to relocate the system, user, and temp db files.
25. Change the location of the root directory to the `D:\volume`.
26. Click Next.

27. At the Error and usage reporting screen, click Next.
28. At the Installation Configuration Rules screen, check that there are no failures or relevant warnings, and click Next.
29. At the Ready to Install screen, click Install.
30. After installation completes, click Close.
31. Close the installation window.
32. Open SQL Server 2012 Configuration Manager, and expand Protocols for MSSQLSERVER.
33. Right-click Named Pipes, and choose Enabled.
34. Click OK, and restart the SQL service.
35. Add SQL server management studio v18.1.
36. Download and open SSMS-Setup-ENU.exe.
37. At the welcome screen, select the default install location, and click Install.
38. To complete the Microsoft SQL Management Studio setup, click Restart.

## Setting up databases for vCenter and VMware View Composer

1. Log onto SQL01 as TEST\administrator.
2. From the server desktop, open SQL Server Configuration Manager.
3. Click SQL Server Network Configuration→Protocols for MSSQLSERVER.
4. Right-click TCP/IP, and select Enabled.
5. Click SQL Services, right-click SQL Server Browser, and select Properties.
6. In the SQL Server Browser Properties, select the Services tab, change the Start mode to Automatic, and click OK. Repeat this step for the SQL Server Agent service.
7. Start the SQL Server browser service and the SQL Server Agent service.
8. From the SQL Server desktop, open SQL Server Management Studio.
9. Click Connect.
10. Select the Databases folder, right-click, and select New Database.
11. Provide the name vCenter for the new database.
12. Select the Databases folder, right-click, and select New Database.
13. Provide the name composer for the new database.
14. Click Options, change the recovery model from full to simple, and click OK.

## Setting up a database and ODBC DSN for VMware View Composer

1. Deploy a Windows Server 2012 R2 VM, and name it Composer
2. Log onto the composer VM as TEST\administrator
3. From the desktop of the Composer server, select Start.
4. Select Run, and type odbcad32.exe
5. Press Enter.
6. Click the system DSN tab.
7. Click Add.
8. Click SQL Server Native Client 10.0, and click Finish.
9. In the Create a New Data Source to SQL Server text box, type the connection name composer
10. For Server, select SQL, and click Next.
11. Change authentication to With SQL Server authentication using a Login ID and password entered by the user.
12. Type sa as the Login ID, and use the password you defined in SQL Server setup for the SA account.
13. Click Next.
14. Select Change the default database to...
15. Choose Composer from the pull-down menu, and click Next.
16. Click Finish.
17. Click Test Data Source...
18. To create the Composer ODBC connection, click OK.

## Setting up VMware Horizon View Composer 7

1. On the infrastructure server, deploy a Windows Server 2016 VM from template using the appropriate specs from the table on [page 4](#).
2. Name the VM `Composer`
3. Log in as an administrator.
4. Open the View 7 media folder, and run `VMware-viewcomposer-7.9.0-13810618.exe`.
5. At the Welcome screen, click Next.
6. At the Patents screen, click Next.
7. Accept the VMware End User License Agreement, and click Next.
8. Leave the Destination folder as default, and click Next.
9. In the Database information box, type `composer` as the source name, and `sa` as the username. Enter the password, and click Next.
10. Leave the default SOAP port, and click Next.
11. Click Install, and click Finish.
12. Restart the server.

## Installing VMware View Connection Server 7

1. On the infrastructure server, deploy a Windows Server 2016 VM from template using the appropriate specs in the table on [page 4](#).
2. Name the VM `view`
3. Log in as an administrator.
4. Browse to VMware View installation media, and click `VMware-viewconnectionserver-x86_64-7.9.0-13956742.exe`.
5. Click Run.
6. At the Welcome screen, click Next.
7. Agree to the End User License Agreement, and click Next.
8. Keep the default installation directory, and click Next.
9. Select View Standard Server, and click Next.
10. At the Data Recovery screen, enter a backup password, and click Next.
11. Allow View Server to configure the Windows firewall automatically, and click Next.
12. Authorize the local administrator to administer View, and click Next.
13. Choose whether to participate in the customer experience improvement program, and click Next.
14. To finish installing View Connection Server, complete the installation wizard.
15. Click Finish.
16. Reboot server.

## Configuring the VMware Horizon View Connection Server

1. Open a Web browser, and navigate to `http://<view connection1 FQDN>/admin`.
2. Log in as an administrator.
3. Under Licensing, click Edit License...
4. Enter a valid license serial number, and click OK.
5. Open View Configuration → Servers.
6. In the vCenter Servers tab, click Add...
7. Enter vCenter server credentials, and edit the following settings:
  - a. Max concurrent vCenter provisioning operations: 20
  - b. Max concurrent power operations: 50
  - c. Max concurrent View Composer maintenance operations: 20
  - d. Max concurrent View Composer provisioning operations: 20
  - e. Max concurrent Instant Clone Engine provisioning operations: 20
8. Click Next.
9. At the View Composer screen, select View Composer co-installed with vCenter Server, and click Next.
10. At the View Composer domains screen, click Add...
11. Enter full domain name and user credentials. Do not use Reclaim VM disk space or Enable View Storage Accelerator.
12. At the Ready to complete screen, click Finish.

## Deploying the VMware View Planner 4.1 test harness

1. Download the viewplanner-harness-4.1.0.0-13984256\_OVF10.ova file from VMware.
2. From the vCenter client, select the infrastructure host, and right-click Deploy OVF Template...
3. In the deploy OVF Template wizard, select local file, and click Browse...
4. Select viewplanner-harness-4.1.0.0-13984256\_OVF10.ova, click Open, and click Next.
5. Select a DataCenter, and click Next.
6. Select the Infrastructure host, and click Next.
7. Review details, and click Next.
8. Accept the license agreements, and click Next.
9. Select the local DAS datastore, and click Next.
10. Select the priv-net network, and click Next.
11. Click Next. To deploy the harness, click Finish.
12. Power on the new VM, and note the IP address.

## Configuring the VMware View Planner 4.1 test harness

1. Open a browser, and navigate to `http://<ip address of the harness>:3307/vp-ui/`
2. Log in as follows:
  - a. Username = `vmware`
  - b. Password = `viewplanner`
3. Click Log in.
4. Click Servers.
5. Select infrastructure, and click Add New.
6. Enter the following information:
  - a. Name = `vCenter`
  - b. IP = `<ip of vcenter>`
  - c. Type = `vcenter`
  - d. DataCenter = `DataCenter`
  - e. Domain = `vsphere.local`
  - f. Username = `administrator`
  - g. Password = `<SSO password for vcenter >`
7. Click Save.
8. Click Identify server.
9. Click Add new.
10. Enter the following information:
  - a. Name = `test.local`
  - b. IP = `<IP of DC1>`
  - c. Type = `microsoft_ad`
  - d. Username = `administrator`
  - e. Password = `<password for administrator@test.local>`
11. Click Save.

## Deploying the Windows 10 Enterprise (x64) gold image VM

1. Log into vCenter via the VMware Web client.
2. Right-click the Virtual Machines tab, and select New Virtual Machine.
3. Select Create a new virtual machine.
4. Choose Custom, and click Next.
5. Assign the name `View-gold`, and click Next.
6. Select the Dell EMC PowerEdge R730xd, and click Next.
7. Select the local DAS.
8. Choose Virtual Machine Version 14, and click Next.
9. Choose Windows, choose Microsoft Windows 10 (64-bit), and click Next.
10. For CPUs, select one virtual processor socket and two cores per virtual socket, and click Next.
11. Choose 16 GB RAM, and click Next.

12. For the number of NICs, click 1.
13. Select E1000E.
14. Select priv-net, and click Next.
15. Leave the default virtual storage controller, and click Next.
16. Choose to create a new virtual disk, and click Next.
17. Make the OS virtual disk size 50 GB.
18. Choose Thin Provision.
19. Specify the OS datastore on the external storage, and click Next.
20. Keep the default virtual device node (0:0), and click Next.
21. Click Finish.
22. Click the Hardware tab.
23. Click CD/DVD Drive.
24. Select Connect the VM virtual CD-ROM to the Microsoft Windows 10 x64 installation disk.
25. Click OK.
26. Open the Microsoft Windows 10 .vmx file, and add the following text to the end: `monitor_control.pseudo_perfctr = "1"`
27. Power on the Microsoft Windows 10 VM.

## Installing Windows 10 Enterprise (x64) on the ESXi base image VM

1. When the installation prompts you, press any key to begin setup.
2. Enter your language preferences, and click Next.
3. Click Install.
4. Accept the license terms, and click Next.
5. Select Custom, and select the drive that will contain the OS.
6. Click Install.
7. Type `user` for the username, and click Next.
8. Do not enter a password, and click Next.
9. At the system protection screen, select Use recommended settings, and click Next.
10. Enter your time zone, and click Next.
11. Select the Work Network setting, and click Next.
12. Install VMware Tools, and select Complete Installation. For more information, visit [http://kb.vmware.com/selfservice/microsites/search.do?language=en\\_US&cmd=displayKC&externalId=340](http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=340).
13. Reboot the server.
14. Connect the machine to the Internet, and install all available Windows updates. Restart as necessary.
15. Join the domain, and restart the VM.
16. Install Microsoft Office Professional Plus 2016.

## Installing the VMware Horizon View agent

1. Navigate to the VMware Horizon View 6 media, and run the VMware-viewagent file.
2. Click Run.
3. At the Welcome screen, click Next.
4. Accept the VMware end user license agreement, and click Next.
5. Select defaults, and click Next.
6. Click Install.

## Installing Google Chrome version 75

Please note that View Planner 4.1 requires Chrome 75.

1. Download the offline 75.0.3770.80\_chrome\_installer.exe.
2. Double-click the 75.0.3770.80\_chrome\_installer.exe file, and click Run.
3. Close Chrome.

## Installing Adobe Reader

1. Download and install Adobe Reader from <http://acrobat.adobe.com>. Do not install any McAfee add-ons.

## Installing VMware View Planner agent

1. Double-click viewplanner-agent-4.1.0.0-13984256.exe.
2. Click Next.
3. Accept the End User License Agreement.
4. Click Next.
5. Enter the IP address of the View Planner harness, and click Next.
6. Wait for the installer to complete, and click Finish.
7. Reboot the VM.

## Configuring Regedit for QuickPrep

1. Click Start→Run, and type `regedit`
2. Browse to HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\vmware-viewcomposer-ga.
3. Right-click Skip License Activation, and click Modify...
4. Change the value from 0 to 1.

## Optimizing the Windows 10 master image

1. Download the Windows optimization tool from VMware.
2. Extract the zip file, and run VMwareOSOptimizationTool\_b1084.exe.
3. Click Template, and select VMWare\Windows 10.
4. Click Analyze.
5. Select all suggestions, and click Optimize.
6. When settings finish applying, reboot the VM.

## Finalizing the Windows 10 master image

1. In vCenter, shut down the Windows 10 gold image, and copy it to the other two servers under test.
2. For all three gold images, right-click, and select Take a snapshot.
3. Name each snapshot, and click OK.

## Deploying virtual desktops using VMware Horizon View

1. Open View Administrator.
2. Log in as an administrator.
3. Under Inventory, click Pools, and click Add...
4. Select Automatic Pool, and click Next.
5. Select Dedicated.
6. Select Enable automatic assignment, and click Next.
7. Select View Composer linked clones.
8. Select the vCenter and composer, and click Next.
9. Type `pool` for the pool ID and display name, and click Next.
10. Leave the pool settings as defaults, and click Next.
11. Under Naming Pattern, enter an appropriate name pattern for the pool. Note this for the View Planner testing settings in the next section.
12. Under Pool Sizing, type the max number of desktops and the number of spare (power on) desktops. Use these values for each server under test:
  - PowerEdge R730xd = 20
  - PowerEdge R740xd = 30
  - PowerEdge R740xd with Intel Optane DC persistent memory = 75
13. Select Provision all desktops up-front, and click Next.
14. Select the defaults under View Composer Disks, and click Next.
15. Under Storage Optimization, click Next.

16. Under vCenter Settings, select the following depending on where you are deploying virtual machines:
  - a. Parent VM
  - b. Snapshot
  - c. VM folder location
  - d. Host or cluster
  - e. Resource pool
  - f. Data stores (Local DAS)
17. Under Guest customization, select the following:
  - a. Domain: test.local
  - b. AD container: OU=targets
  - c. Use Quick Prep
18. Click Next.
19. Click Finish. (Note: Because this testing is local, you do not need to specify any entitlements.)

## Running the VMware View Planner benchmark

Although View Planner has a user interface, we ran our testing via the command line using the following steps:

1. Open a putty session to the View Planner harness.
2. Log in as follows:
  - a. Username: vmware
  - b. Password: viewplanner
3. Run the following commands for the servers under test:

### PowerEdge R730xd

```
runProfile -a 730_30vms_15thinktime --runMode local --VMcount 30 --iterCount 5 --thinkTime 15
--description local_high_mem_thinktime_15

workGroup -a 730 --runProfile 730_30vms_15thinktime --workProfile highMemoryTestProfile --percent 100

workGroup --addDesk 730 --runProfile 730_30vms_15thinktime --prefix 730- --infrastructureServer
vCenter
```

### PowerEdge R740xd

```
runProfile -a 740_30vms_15thinktime --runMode local --VMcount 30 --iterCount 5 --thinkTime 15
--description local_high_mem_thinktime_15

workGroup -a 740 --runProfile 740_30vms_15thinktime --workProfile highMemoryTestProfile --percent 100

workGroup --addDesk 740 --runProfile 740_30vms_15thinktime --prefix 740- --infrastructureServer
vCenter
```

### PowerEdge R740xd with Intel Optane DC persistent memory

```
runProfile -a Optane_75vms_15thinktime --runMode local --VMcount 75 --iterCount 5 --thinkTime 15
--description local_high_mem_thinktime_15

workGroup -a Optane --runProfile Optane_75vms_15thinktime --workProfile highMemoryTestProfile
--percent 100

workGroup --addDesk Optane --runProfile Optane_75vms_15thinktime --prefix Optane-
--infrastructureServer vCenter
```

Read the report at <http://facts.pt/3iqjmxu> ►

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