The science behind the report:

Boost data center staff productivity with OpenManage Enterprise

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 Boost data center staff productivity with OpenManage Enterprise.

We concluded our hands-on testing on March 24, 2020. 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 March 24, 2020 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our results

Table 1: Detailed time and effort data from our hands-on testing.

	Dell EMC™ OpenManage™ Enterprise 3.4		iDRAC9 only		Win		
	Time (sec)	Steps	Time (sec)	Steps	Percentage less time	Fewer seconds	Fewer steps
New and updated features (single-server testing)							
Server-initiated discovery	15	5					
Multi-homing	245	18					
Resolving a thermal event							
1 server	0	0	42	5	100.00%	42	5
2 servers	0	0	85	10	100.00%	85	10
3 servers	0	0	127	15	100.00%	127	15
250 servers (extrapolation)	0	0	10,625	1,250	100.00%	10,625	1,250
One time setup	97	16					
Initial deployment							
1 server	40	9	334	23	88.00%	294	14
Firmware compliance checking and updating							
1 server	32	4	40	3	20.00%	8	-1
2 servers	32	4	80	6	60.00%	48	2
3 servers	32	4	120	9	73.33%	88	5
1,000 servers (extrapolation)	32	4	40,000	3,000	99.92%	39,968	2,996
Repurposing hardware							
1 server	40	9	70	7	42.86%	30	-2
2 servers	40	9	140	14	71.42%	100	5
3 servers	40	9	280	21	85.71%	240	12
250 servers (extrapolation)	40	9	17,500	1,750	99.77%	17,460	1,741

	Dell EMC™ OpenManage™ Enterprise 3.4		iDRAC9 only		Win		
	Time (sec)	Steps	Time (sec)	Steps	Percentage less time	Fewer seconds	Fewer steps
Reconfiguring hardware and deploying							
1 server	51	15					
2 servers	51	15					
3 servers	51	15					
250 servers (extrapolation)	51	15					
1 server using profile-based method (Method 1)			155	19	67.10%	104	4
2 servers using Method 1			310	38	83.54%	256	23
3 servers using Method 1			465	57	89.03%	411	42
250 servers using Method 1 (extrapolation)			17,585	1,762	99.71%	17,534	1,747
1 server using direct-update method (Method 2)			36	7	-41.67%	-15	-8
2 servers using Method 2			72	14	29.10%	21	-1
3 servers using Method 2			108	21	52.77%	57	6
250 servers using Method 2 (extrapolation)			9,000	1,750	99.43%	8,949	1,735
Completing urgent data center recovery							
1 server	20	3	88	5	77.27%	68	2
2 servers	20	3	176	10	88.64%	156	7
3 servers	20	3	264	15	92.42%	244	12
250 servers (extrapolation)	20	3	88,000	5,000	99.98%	87,980	4,997

System configuration information

Table 2: Detailed information on the systems we tested.

Server configuration information	Dell EMC PowerEdge™ R740xd	Dell EMC PowerEdge R740
Operating system name and version/build number	ESXI™ 6.7.0 build- 14212230	Windows Server 2019
Power management policy	Performance	Performance
Processor		
Number of processors	2	2
Vendor and model	Intel® Xeon® Gold 6130	Intel Xeon Platinum 8168
Core count (per processor)	16	24
Core frequency (GHz)	2.10	2.70
Stepping	4	4
Memory module(s)		
Total memory in system (GB)	64	64
Number of memory modules	4	2
Vendor and model	Hynix® HMA82GR7AFR8N-VK	Samsung® M386A4G40DM0-CPB
Size (GB)	16	32
Type	DDR4	DDR4
Speed (MHz)	2,666	2,133
Speed running in the server (MHz)	2,666	2,133
Storage controller		
Vendor and model	Dell PERC H730P Mini	Dell PERC H740P
Cache size (MB)	2	2
Driver version	7.708.07.00	25.5.6.0009
Local storage (type A)		
Number of drives	2	2, 2
Drive vendor and model	Dell THNSF8960CCSE (Toshiba)	Intel SSD DC S3520 Series, Intel SSDSCKJB120G7
Drive size (GB)	960	240, 120
Drive information (speed, interface, type)	SATA SSD	SATA SSD, M.2 SSD
Network adapter #1		
Vendor / Model	QLogic® Corporation / QLogic 57800 10 Gigabit Ethernet	Broadcom® / LSI NetXtreme E-Series
Number and type of ports	4 x 10GbE	2 x 10GbE 2 x Gigabit
Network adapter #2		
Vendor and model	Broadcom P225p NetXtreme dual port 10/25 Gigabit Ethernet	
Number and type of ports	2 x 10/25GbE	

Server configuration information	Dell EMC PowerEdge™ R740xd	Dell EMC PowerEdge R740
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 N24MJ
Number of power supplies	2	2
Wattage of each (W)	750	495

How we tested

We compared two different workflows for performing common IT administrator tasks via Dell EMC solutions:

- Using Dell EMC OpenManage Enterprise 3.4 with Power Manager and Integrated Dell Remote Access Controller (iDRAC) 9
- Using iDRAC9 only

We used the following infrastructure to test each workflow:

- 1 x PowerEdge R720 server as an infrastructure host for our VMware® vCenter® instance with the following virtual machines:
    - A vCenter Appliance version 6.7.0 build 14070654
    - An active directory service hosted on Windows 2016 Datacenter edition
    - OpenManage Enterprise management application
- 3 x PowerEdge R740xd servers

We measured the time and steps required to complete each task on one server, two servers, and three servers. We then extrapolated our results to estimate the time and steps required for a 250-server data center and a 1,000-server data center.

Discovery and deployment

Server deployment

Configuring Lifecycle Controller

Admin time: 1 min 17 sec

1. Power on the server. At the console, when the prompt appears, hit F10 to enter the Lifecycle Controller.
2. In the left-hand pane, select Settings.
3. In the right-hand pane, select Network Settings.
4. Under NIC Card, select the port that is connected to the network.
5. For IP Address Source, select DHCP, and click Finish.
6. When prompted, click OK.

Configuring the RAID

Admin time: 2 min 48 sec

1. In the Lifecycle Controller, select System Setup.
2. Navigate to Advanced Hardware Configuration→Device Settings→Integrated RAID Controller.
3. Navigate to Main Menu→Configuration management→Create Virtual disk, and configure the following:

- **Select RAID Level:** RAID1
- **Select Physical Disks From:** Unconfigured Capacity
- **Select Physical Disks:** (Select two disks, click Apply Changes, and click "OK")
- **Virtual Disk Name:** OS
- **Virtual Disk Size:** (Use maximum)
- **Strip Element Size:** 256
- **Read Policy:** Read Ahead
- **Write Policy:** Write Back
- **Disk Cache:** Default
- **Default Initialization:** No

4. Click Create Virtual Disk.
5. Check Confirm, and click Yes.
6. Click OK, and click Back until you return to the main menu for the RAID controller.
7. Click Controller Management, and change Select Boot Device to reflect the RAID1 drive you created.
8. Click Back twice, and click Finish.
9. Click Finish until you return to the main menu for Lifecycle Controller.
10. Click System Settings.

Setting BIOS and Server Profile Time

Admin time: 1 min 29 sec

1. Select System BIOS.
2. Select Memory Settings→Memory Operating Mode, and change to Mirror Mode. Click Back.
3. Select Boot Settings→Hard-Disk Drive Placeholder, and change to Enabled. Click Back.
4. Select Integrated Devices→Internal USB Port, and change to Off. Click Back.
5. Select Integrated Devices→iDRAC Direct USB Port, and change to Off. Click Back.
6. Select System Profile Settings→System Profile, and change to Performance. Click Back.
7. Click Finish. To reboot the server, click Exit.

Compliance checking and updating

Installing the Dell repository

We created a shared file to host a Dell repository of firmware updates for our target PowerEdge R740xd server.

1. On the Windows server, create a shared folder. We named ours `\repo.local\share`
2. Navigate to https://www.dell.com/support/driver/us/en/04/DriversDetails?driverid=57CX7, and download Dell EMC Repository Manager v3.2.
3. Install Dell EMC Repository Manager v3.2, and accept all defaults.
4. Open the Dell EMC Repository Manager.
5. Click Add Repository.
6. In the Add Repository Window, name the repository `R740xd`
7. For Base Catalog, select the 19.09.01 catalog.
8. Click Integration, and select iDRAC.
9. In the iDRAC menu, enter the hostname for the target server.
10. Enter the appropriate username and password for the target server.
11. Click Connect.
12. Check the box next to the R740xd repository, and click Export.
13. For the Deployment Tool Type, leave the default selected (Share). For the location, choose Browse, and select the shared folder you created in Step 1. Click Open.
14. Click Export.
15. Verify access to the file at \[10.220.2.82]\share\r740xd_1.00_Catalog.xml.

Configuring the firmware updates

Performing a repository firmware update

Admin time: 1 min 28 sec

1. Log into the iDRAC9 console.
2. Under the Maintenance drop-down menu, select System Update.
3. Under Manual Update, set the following:

   - **Location Type:** Network Share
   - **Catalog Name (optional):** `idracintegration-r740xd_Catalog.xml`
   - **IP Address:** `10.220.2.82`
   - **Share Name:** `repo4`
   - **User Name:** `administrator`
   - **Password:** `Password1!`

4. Click Check Update.
5. Check the box next to Contents, and click Install and Reboot.

Verifying firmware using iDRAC9

Admin time: 0 min 40 sec

1. Log into the iDRAC9 console.
2. At the top of the screen, select the system menu, and click Inventory
3. Under Firmware, you will see a list of Components and Firmware versions.

Verifying the drivers

Admin time: 1 min 21 sec

1. Log into Windows using your credentials.
2. Click the Start button, and type `Device Manager`
3. Select Storage controllers, and double-click PERC H730P Adapter.
4. In the Properties window, select the Driver tab.
5. After verification, click OK.
6. Repeat steps 4 and 5 for the network adapters, processors, and system devices.

Reconfiguring hardware and deploying at scale (multiple nodes)

Capturing the server profile via iDRAC9

Admin time: 1 min 30 sec

1. Log into the iDRAC9 console.
2. In the top row, select Configuration.
3. Select Server Configuration Profile.
4. Click the Export drop-down menu, and configure accordingly:

   - **Location Type:** Local
   - **File Name:** `Profile 1`
   - **Export Components:** All
   - **Export file format:** XML

5. Select Export.
6. On the Information pop-up window, click Save Locally.

Deploying the server profile via iDRAC9

Admin time: 1 min 10 sec

1. Log into the iDRAC9 console.
2. In the top row, select Configuration menu.
3. Select Server Configuration Profile.
4. Click the Import drop-down menu.
5. For the file path, click Choose File, and browse your local disk.
6. Select the XML file you created earlier, and click Open.
7. Click Import.

Configuring SMTP via iDRAC9

Admin time: 1 min 0 sec

1. Log into the iDRAC9 console.
2. In the top row, select Configuration.
3. Under Alert Configuration, set Alerts to Enabled, and click OK.
4. Under Quick Alert Configuration, set the following, and click Apply:

   - **Select the categories you want to receive alerts on:** System Health
   - **Select the issue severity that you want to receive notification on:** Critical, Warning
   - **Select where you want to receive the notifications:** Email

5. In the SMTP (Email) Configuration drop-down menu, enter the destination email.
6. Enter the IP address and credentials for your email server, and click Apply.
7. Under Alerts and Remote System Log Configuration, enable any events you need to monitor, and click Apply.

Performing Urgent Data Center recovery via iDRAC9 only

Capturing the server profile via iDRAC9

Admin time: 1 min 30 sec

1. Log into the iDRAC9 console.
2. In the top row, select Configuration.
3. Select Server Configuration Profile.
4. Click the Export drop-down menu, and configure accordingly:

    - **Location Type:** Local
    - **File Name:** `Profile 1`
    - **Export Components:** All
    - **Export file format:** XML

5. Select Export.
6. On the Information pop-up window, click Save Locally.

Deploying Server Profile via iDRAC9

Admin time: 1 min 10 sec

1. Log into the iDRAC9 console.
2. In the top row, select Configuration.
3. Select Server Configuration Profile.
4. Click the Import drop-down menu.
5. For the file path, click Choose File, and browse your local disk.
6. Select the XML file you created earlier, and click Open.
7. Click Import.

Read the report at http://facts.pt/sq2w04k ▶

This project was commissioned by Dell Technologies.

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