

FASTER, EASIER DEPLOYMENT OF DELL POWEREDGE SERVERS HELPS IT AND YOUR BUSINESS

Save 3 hours per server
with pre-installed
Microsoft® OEM
products from Dell™*

85% **46**
less time steps saved

*versus manually deploying the same server
without pre-installed software



Deploying your infrastructure quickly and with minimal effort keeps IT costs down and reduces potential IT hassles in deployment. Ultimately, this helps get your products and solutions to market quicker. A simple way to ensure server deployment goes quickly and easily is to order pre-installed Microsoft OEM software on your Dell servers, such as the Dell PowerEdge™ R730. You save time because there's less to do, and you ensure repeatability because Dell and Microsoft have already configured many steps.

In the Principled Technologies datacenter, we deployed a Dell PowerEdge R730 with pre-installed Microsoft Windows® Server 2012 R2 Standard and with the Hyper-V® role enabled at the factory. From out of the box to a ready state, the server with pre-installed OEM software saved over 3 hours and needed many fewer steps to deploy than manually configuring the same software.

Because manually adding the software to the server requires extra licensing costs, ordering the server with the software delivers a savings of over \$200. This savings was 24 percent of necessary licensing fees for the Dell server without Windows Server 2012 R2 Standard and with the Hyper-V role enabled. What's more, because Dell and its partners configure licensing and software specifically for your infrastructure when you purchase any Dell PowerEdge server with pre-installed software, you pay for only what you need.

With Dell ProSupport™, Dell offers support for pre-installed software as well as hardware. This creates one point of contact for all your support needs rather than having to reach out to various vendors for specific problems.



JANUARY 2016 (Revised)
A PRINCIPLED TECHNOLOGIES TEST REPORT
Commissioned by Dell Inc. & Microsoft Corp.

It's faster, easier, and less expensive to deploy Dell server hardware with pre-installed Microsoft OEM software than using a tedious manual approach. These savings can scale as your business deploys more servers. Using our data, we'll show you what you can expect if you're deploying 10, 50, or 100 servers.

A COMPETITIVE EDGE WITH PRE-INSTALLED MICROSOFT OEM SOFTWARE ON A DELL POWEREDGE R730

Whether you're buying servers for retail, tech, marketing, or any other line of business, deploying new servers can help deliver quality products and solutions sooner. Deploying these servers into your environment takes time, however, and that time can mean lost productivity. Shaving minutes or hours off the delivery of IT infrastructure and services helps your staff and end users see the benefits of that newer IT infrastructure sooner, and cuts down on hassles and mistakes.

Beyond faster IT delivery, deploying Dell servers with pre-installed Microsoft OEM software offers a number of benefits on individual and business levels:

- Free up IT staff time – faster and easier server implementation means IT can get an environment up and running and can focus on strategic technological initiatives instead of dealing with mundane deployment tasks
- Less chance for error and greater consistency – fewer steps means fewer opportunities to introduce human error
- Targeted licensing costs – purchase only what you need for your environment instead of large and complex volume agreements
- Consolidated support – with the purchase of Dell ProSupport or a higher level of support, Dell serves as a single point of contact for your OEM software and hardware needs. Software support includes license validation issues, configuration and re-installation support, how-to and best practices support, remote assistance, remote deployment of patches and updates, and software issue identification and escalation support¹

How we tested

First, Dell installed Windows Server 2012 R2 Standard with the Hyper-V role enabled on the server. We timed from when we pushed the power button on the server to when it was ready to provision virtual machines (VMs). We also documented the necessary steps between these two points in time. Our timings and steps measurements did not include any unboxing, racking, or cabling steps or times for either approach.

Our OS build, pre-installed from the factory, included some Windows updates. We installed the remaining ones necessary to get the server to a fully updated state.

¹ For more information on Dell ProSupport, contact your local Dell representative as specifics may vary based on location.

We then reconfigured the server to a blank state, with no pre-installed OEM software, to start the manual portion of testing. We manually installed Microsoft Windows Server 2012 R2 Standard and the Hyper-V role while documenting the steps and timing each action. To mimic a business, which would want to keep a static build for deployment, we used the OS build `en_windows_server_2012_r2_with_update_x64_dvd_6052708.iso`.

Our technical team included three people with different levels of server familiarity. For the server with pre-installed OEM software, one team member timed and recorded the necessary steps. We then had the three team members perform the manual method and averaged their times to get the reported time we use in this study for the manual deployment. We then extrapolated our data from single server deployment to a 10-, 50-, and 100-server deployment.²

It's important to note that download times will vary based on your Internet speed, and the number of downloads you'll need to install will depend on the OS image and the number of updates from Microsoft. There are various ways to install an OS, but we chose DVD ISO installation. Times may vary with different installation methods. In addition, the number of drivers you need to download will depend on your configuration. With more components comes the likelihood of needing more updates.

Shorter time to value – Get servers up and running sooner

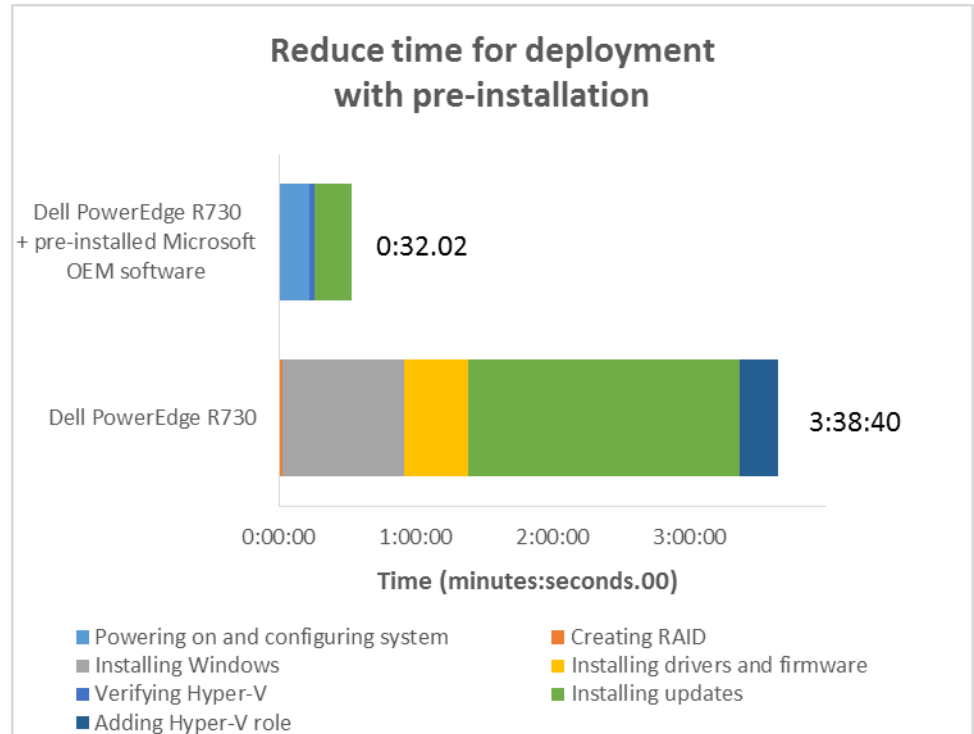
It took less time to deploy the Dell server with pre-installed software than it did to install Windows 2012 R2 Standard manually.

It took just over 32 minutes to deploy the server with pre-installed Microsoft OEM software. It took just over 3.5 hours to deploy the PowerEdge R730 manually. That's saving over 3 hours of hands-on labor—an 85 percent reduction in deployment time simply by choosing to have the necessary Microsoft software installed by Dell before the server arrives at your business. In addition, Dell installs up-to-date drivers to match your OS version on the PowerEdge R730 with pre-installed OEM software. This saves you time and effort, too. Figure 1 breaks down the times.

If your business is deploying more than one server, these times could increase without having pre-installed Windows OEM software. There's potential to save even more time.

² For more information on the PowerEdge R730, Windows Server 2012 R2, and Hyper-V, see [Appendix A](#). For detailed configuration information of the servers, see [Appendix B](#). For detailed information on how we tested, see [Appendix C](#).

Figure 1: Deploying the server with pre-installed Microsoft OEM software saved over 3 hours. Lower numbers are better.

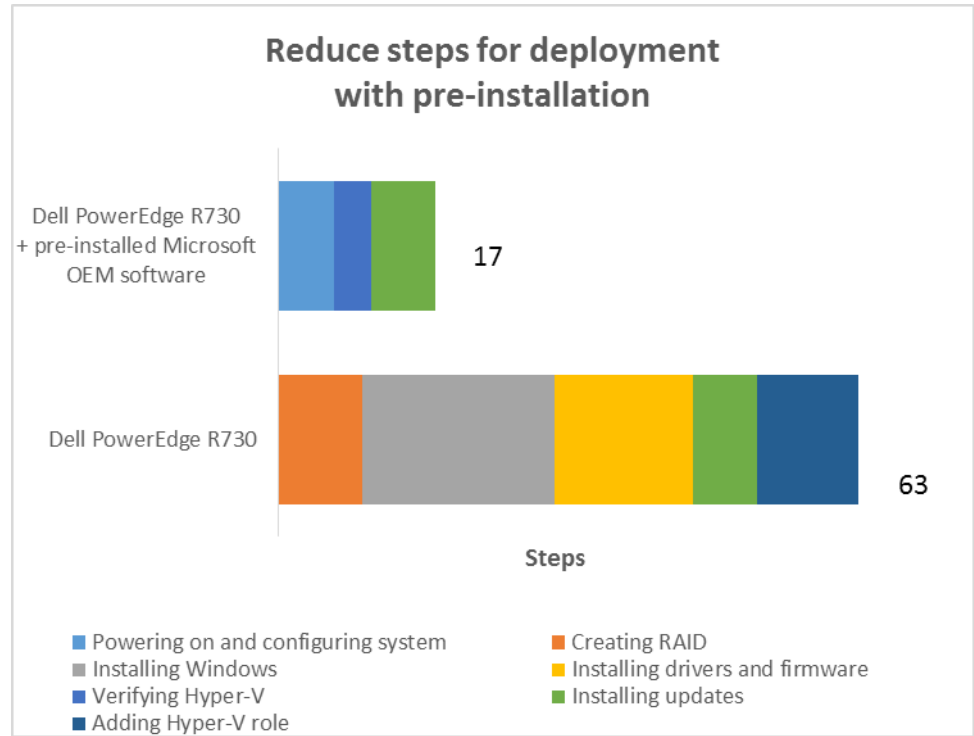


Simpler deployment with fewer steps

Saving time is great, but what about manual effort? We saved 46 steps when using the pre-installed OEM software from Dell and Microsoft. It took 63 steps to set up a single Dell PowerEdge R730 manually. Most of those steps came from updating drivers and firmware as recommended by Dell, Microsoft, and other hardware manufacturers for ideal stability and performance. In contrast, it took only 17 steps to set up a Dell PowerEdge R730 with pre-installed Microsoft OEM software and up-to-date Dell drivers. Having the necessary software and drivers pre-installed and updated upon arrival reduced the number of steps need to update the software components. Figure 2 breaks down the steps.

It's again important to note that if your business is deploying multiple servers, the number of steps could increase without the pre-installed software.

Figure 2: The Dell server with pre-installed Microsoft OEM software took 46 fewer steps to deploy compared to manual deployment. Lower numbers are better.



Save money by reducing licensing fees

Saving money when possible is important for any business. With pre-installed OEM software, you avoid additional licensing fees. We estimated \$883 in licensing costs to install Windows Server 2012 R2 Standard with the Hyper-V role enabled for the Dell server without pre-installed software. After comparing the total cost of both solutions, purchasing the Dell PowerEdge R730 with pre-installed Microsoft OEM software can save you up to \$212.54 per server. That’s 24 percent of the licensing cost necessary to create the same software environment. Figure 3 breaks down the costs. All amounts are in USD. Your licensing cost will depend on your choice of software and version, so savings can vary.

	Dell PowerEdge R730	Dell PowerEdge R730 + pre-installed Microsoft OEM software	Savings with pre-installed Microsoft OEM software
Initial hardware cost	\$2,176.60	\$2,847.06	
Additional licensing cost	\$883.00		\$883.00
Total	\$3,059.60	\$2,847.06	\$212.54

Figure 3: The total cost of the Dell PowerEdge R730 included licensing fees. Lower numbers are better.

SCALING SAVINGS FOR YOUR BUSINESS

If your IT staff is deploying multiple servers, doing the job manually can involve many steps and many hours. Deploying 10 servers, for example, would require 630 manual steps in 36 hours and 26 minutes. Putting two IT folks on the job could get the task finished sooner, but would also make it more likely for inconsistencies between the deployments and naturally require the same number of person-hours anyway.

By having Microsoft OEM software pre-installed on each of your servers when they arrive, you can ensure each server has the same settings and updates necessary for your applications.

Using our results, Figure 4 compares times for a 10-, 50-, and 100-server deployment with both solutions.

	Dell PowerEdge R730		Dell PowerEdge R730 + pre-installed Microsoft OEM software		Savings with pre-installed Microsoft OEM software	
	Steps	Time (hh:mm:ss)	Steps	Time (hh:mm:ss)	Steps	Time (hh:mm:ss)
Deploying 10 servers (Baseline × 10)	630	36:26:40	170	05:20:22	460	31:06:18
Deploying 50 servers (Baseline × 50)	3,150	182:13:20	850	26:41:52	2,300	155:31:28
Deploying 100 servers (Baseline × 100)	6,300	364:26:41	1,700	53:23:44	4,600	311:02:57

Figure 4: Labor and time savings scale when deploying many servers. Lower numbers are better.

IN CONCLUSION

Saving IT deployment time has a number of benefits, including reducing setup hassle and complexities, freeing up time of administrators, and reducing costs. By choosing Dell PowerEdge servers with pre-installed OEM software, specifically Microsoft Windows Server 2012 R2 and Hyper-V, you're saving time and effort compared to buying the server without the software. We found you could save over 3 hours by purchasing the server with pre-installed software. Deploying more servers can save time too, as our findings can scale up to meet IT resource needs of your business. What's more, choosing the Dell server with pre-installed software can save you 24 percent of additional licensing costs per server.

APPENDIX A – ABOUT THE COMPONENTS

About the Dell PowerEdge R730

The 2U Dell PowerEdge R730 rack server is powered by two Intel Xeon E5-2600 v3 processors and is designed for functional flexibility in the datacenter. The PowerEdge R730 has 24 DIMM slots to support up to 1.5 TB of memory, supports up to two optional internal GPU processing accelerators, and can support up to four optional NVM Express™ Flash PCIe® SSDs to reduce storage bottlenecks.

With redundant power supply units, hot-swappable hardware, and Dual SD™ card for Failsafe Hypervisors, the Dell PowerEdge R730 supports hardware high availability. The PowerEdge R730 comes standard with iDRAC8 with Lifecycle Controller and Dell OpenManage, which all work to streamline management. For more details on the Dell PowerEdge R730, visit www.dell.com/us/business/p/poweredge-r730/pd.

About Microsoft Windows Server 2012 R2

Windows Server 2012 R2, the latest release of this server OS from Microsoft, includes many new features and enhancements. According to Microsoft, Windows Server 2012 R2 focuses on four core areas:

- **Beyond virtualization.** Windows Server 2012 R2 provides a robust and dynamic virtualization platform through Hyper-V, and includes new features that provide flexible options for delivering cloud services.
- **The power of many servers, the simplicity of one.** Windows Server 2012 R2 offers improvements in its features that allow for better-than-ever high availability and ease of management for multiple-server infrastructures.
- **Every app, any cloud.** Windows Server 2012 R2 delivers a scalable and flexible Web and application platform by providing a consistent and open set of tools and frameworks that apply to applications on-premises, in the cloud, or in a hybrid environment.
- **Modern work style, enabled.** Microsoft Windows Server 2012 R2 empowers users and IT staff with remote access to data, applications, and simpler management tools while strengthening security and compliance.

About Microsoft Hyper-V

The server OS platform Microsoft Windows Server 2012 R2 includes the Hyper-V hypervisor to create virtual infrastructures. By allowing you to run multiple operating systems on a single physical machine, Hyper-V can help consolidate workloads to reduce costs. Hyper-V management tools include Hyper-V Manager, Microsoft Management Console (MMC) and Virtual Machine Connection. Microsoft Hyper-V has many practical applications with the potential to help businesses meet their cost and productivity goals, including establishing cloud environments, increasing hardware virtualization, improving business continuity, and more. To learn more about Microsoft Hyper-V, visit <https://www.microsoft.com/en-us/server-cloud/solutions/virtualization.aspx>.

APPENDIX B – SYSTEM CONFIGURATION INFORMATION

Figure 5 provides detailed configuration information for the test systems.

System	Dell PowerEdge R730
Power supplies	
Total number	1
Vendor and model number	Dell E495E-S1
Wattage of each (W)	495
Cooling fans	
Total number	6
Vendor and model number	Sunon® VF60381B1-Q000-S99
Volts	12
General	
Number of processor packages	1
Number of cores per processor	6
Number of hardware threads per core	6
System power management policy	Default
CPU	
Vendor	Intel®
Name	Xeon®
Model number	E5-2603 v3
Socket type	FCLGA2011-3
Core frequency (GHz)	1.6
Bus frequency	6.4 GT/s
L1 cache	32KB + 32KB
L2 cache	256KB
L3 cache	15MB
Platform	
Vendor and model number	Dell PowerEdge R730
BIOS name and version	1.5.4
BIOS settings	Default
Memory module(s)	
Total RAM in system (GB)	4
Vendor and model number	Hynix HMA451R7MFR8N-TF
Type	PC4-2133P
Speed (MHz)	2,133
Speed running in the system (MHz)	2,133
Timing/Latency (tCL-tRCD-tRP-tRASmin)	11-11-11-27
Size (GB)	4
Number of RAM module(s)	1
Chip organization	Double-sided
Rank	Single

System	Dell PowerEdge R730
Operating system	
Name	Windows Server 2012 R2 Standard
Build number	6.3.9600
File system	NTFS
Kernel	NT
Language	English
RAID controller	
Vendor and model number	Dell PERC S130
Firmware version	4.0.0-0037
Driver version	4.0.0.37
Cache size (MB)	N/A
Local storage	
Vendor and model number	Western Digital® WD5003ABYX
Number of drives	2
Size (GB)	500
Type	SATA
Speed (RPM)	7,200
Ethernet adapters	
Vendor and model number	Broadcom® BCM5720
Type	NDC
Driver	7.10.64

Figure 5: Detailed configuration information for the test systems.

APPENDIX C – HOW WE TESTED

Deploying the Dell PowerEdge R730 with pre-installed Microsoft Windows Server 2012 R2 and Hyper-V role

Configuring the system

1. Power on the system.
2. Accept the default language.
3. Accept the User Agreement.
4. Enter a password for the administrator.
5. Choose the default 60GB OS partition.
6. Setup is complete when the Windows splash screen appears.

Verifying Hyper-V

1. Log in to Windows with the administrator password.
2. Choose Cancel to leave downgrade ISOs in the default location.
3. When Windows finishes booting (we timed until Server Manager had opened), click Start.
4. Search for `Hyper-V Manager` and launch it.

Installing updates

1. Click Start, and search for `update`.
2. Click Windows Updates to open the update window.
3. Click Let me choose my own settings, and change the options to Never check for Windows updates.
4. Click Check for updates.
5. Choose Important updates, and click Install.
6. Reboot the server when prompted.
7. Repeat steps 1 through 6 until all important updates have been installed.

Deploying the Dell PowerEdge R730 with no pre-install software

Creating the RAID

1. Power on the system.
2. Hit CTRL+R when prompted to enter the RAID controller configuration utility.
3. Choose Create a new volume.
4. Select the two OS drives, and hit Enter.
5. Select RAID 1, and hit Enter.
6. Hit Enter to choose the default Virtual Disk size (All available space).
7. Choose Read Ahead/Write Through, and hit Enter.
8. Hit C to confirm disk creation.
9. Exit the configuration when the volume creation finishes.

Installing Windows Server 2012 R2 Standard

1. Log in to the iDRAC for the server and find your service tag number.
2. Navigate to Dell's site, navigate to the Support page, and enter the service tag number.
3. Navigate to Drivers and downloads, and download the PERC S130 RAID controller driver to a USB drive.
4. Insert the USB drive into the USB port on the server.
5. Insert the Windows installation disk into the optical drive, and restart the server.
6. Enter the Boot Manager.
7. Select BIOS Boot Menu.
8. Select the optical drive, and press Enter.
9. Hit Enter for Windows setup.
10. Click Install Now.

11. When prompted to load a media driver, click Browse.
12. Navigate to the RAID driver in the USB drive you prepared earlier.
13. Choose the driver, and click Next.
14. When the installation screen appears, leave language, time/currency format, and input method as default, and click Next.
15. When the installation prompts you, enter the product key.
16. Select Windows Server 2012 Standard Edition (Server with a GUI), and click Next.
17. Check I accept the license terms, and click Next.
18. Click Custom: Install Windows only (advanced).
19. Select Drive X Unallocated Space, and click Next, at which point Windows begins automatically and restarts automatically after completing.
20. When the Settings page appears, fill in the Password and Reenter Password fields with the same password.
21. Log in with the password you set up previously.

Installing Drivers and Firmware

1. Open Server Manager and turn off IEESC.
2. Using Microsoft Internet Explorer, navigate to Dell's support page, as in the previous section, and download the chipset driver, BIOS, iDRAC firmware, and NIC firmware files.
3. Double-click the chipset installation file, and click Install.
4. On the Welcome to the Setup Program window, click Next.
5. Accept the license agreement.
6. On the Readme File Information window, click Next.
7. When the installation is complete, click Finish.
8. Double-click the iDRAC file, and click Install.
9. Click OK on the successful install window.
10. Double-click the Network firmware installation file, and click Install.
11. Click Yes on the version update request window.
12. Click Yes to reboot the server.
13. Double-click the BIOS installation file, and click Install.
14. Choose Yes to continue the update.
15. Click Finish, and reboot when finished installing.

Installing Windows Updates

1. Click the Start button, and search for update.
2. Click Windows Updates to open the update window.
3. Click Let me choose my own settings, and change the options to Never check for Windows updates.
4. Click Check for updates.
5. Choose Important updates, and click Install.
6. Reboot the server when prompted.
7. Repeat steps 1 through 6 until all important updates have been installed.

Adding the Hyper-V role

1. Open Server Manager, and click Manage→Add Roles and features.
2. At the Before You Begin screen, click Next.
3. At the Installation Type screen, click Next.
4. At the Server Selection screen, select one of the servers in the failover cluster.
5. At the Server Roles screen, check the Hyper-V checkbox. At the prerequisite pop-up, click Add Features. Click Next.
6. At the Features screen, click Next.
7. At the Hyper-V screen, click Next.

8. At the Virtual Switches screen, click Next.
9. At the Migration screen, click Next.
10. At the Default Stores screen, click Next.
11. At the Confirmation screen, check to automatically restart the server after installation, and click Install.

ABOUT PRINCIPLED TECHNOLOGIES



Principled Technologies, Inc.
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We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

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Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.

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