

Streamlined OS deployment using bootable USB devices and Lifecycle Controller

Simplify OS installation on Dell EMC PowerEdge servers by using USB devices.

Abstract

This Dell EMC Technical White Paper provides detailed information about the capabilities of Lifecycle Controller to deploy operating systems via bootable USB devices on Dell EMC PowerEdge servers. Lifecycle Controller provides a quick and easy way to install an operating system using a CD, DVD, or an ISO image. Operating system installation is now further simplified by adding support for USB devices.

October 2018

Revisions

Date	Description
October 2018	Initial release

Acknowledgements

This paper was produced by the following members of the Dell EMC engineering team:

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Executive summary

Operating System (OS) deployment on a bare metal system can be challenging for IT administrators. Dell EMC Lifecycle Controller (LC) simplifies OS installation with step-by-step guidance, built-in OS drivers, and support for a range of OS media sources. OS installation options are now further expanded with support of Bootable USB devices.

LC, providing a Pre-boot environment accessed from the PowerEdge BIOS by selecting F10 at boot, supports multiple sources for OS installation including CD, DVD, and network-accessed ISO images. To support the growing use of high capacity USB media by IT personnel, LC has been enhanced to support OS installation using a USB device.

This whitepaper provides detailed information about OS installation from a bootable USB device using LC. This feature is present in iDRAC7/8 firmware version 2.60.60.60 and later for 12th and 13th generation of PowerEdge servers and will be supported in a future update for iDRAC for 14th generation servers.

1 Operating System installation via Bootable USB

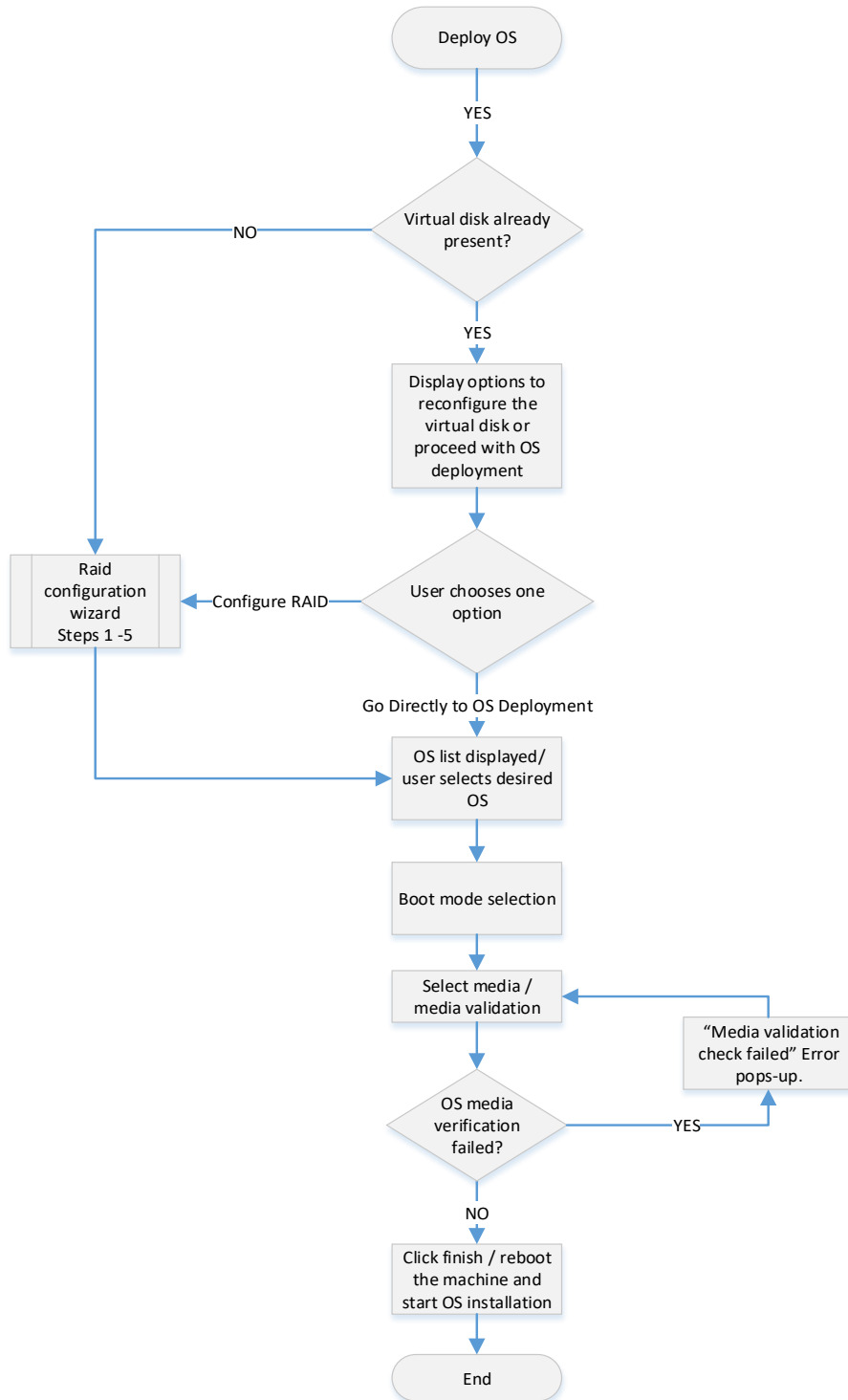
Dell EMC Lifecycle Controller (LC) enables Dell EMC PowerEdge configuration management including inventory of server hardware and firmware, configuration of server attributes, firmware update, guided OS deployment, and server repurposing and retirement. These functions are supported via a UEFI-based graphical interface, and via the iDRAC GUI, APIs and RACADM command line interface.

The OS deployment feature in LC helps to install an OS and the relevant drivers in a few easy steps. Using the OS deployment wizard, you can deploy:

- Dell EMC-supported operating systems such as Microsoft Windows Server, Red Hat Enterprise Linux and SuSe Enterprise Linux with optionally automated installation of Dell EMC drivers
- Any other operating system with required drivers manually installed.

Previous versions of LC allow OS installation only through directly-attached CD, DVD, or iDRAC virtual media-mounted ISO images. LC now further simplifies OS installation by providing a mechanism to install the OS from bootable USB devices attached to the server.

1.1 Flow Chart of LC OS Deployment Process via USB Devices



1.2 USB Device OS Deployment and configuration guide

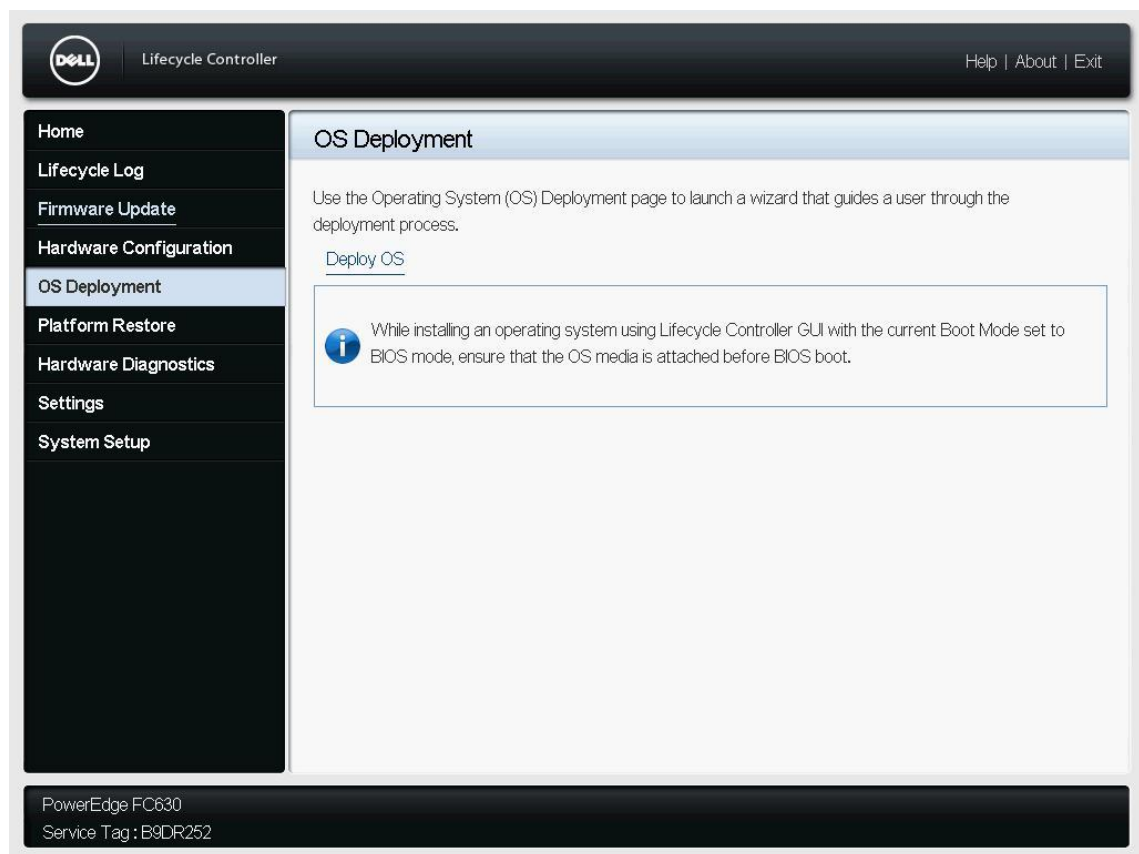
Before installing the operating system, make sure that the following prerequisites are met:

- USB device is properly formatted and contains OS deployment software
- USB device is connected to the server
- Software RAID controller is enabled, or PERC controller is installed, and minimum number of physical disks are available for creating the virtual disk.

To perform an OS installation:

1. Power on or restart the server.
2. During BIOS POST, press F10.
The Lifecycle Controller GUI is displayed.
3. In the left pane, click **OS Deployment**.
4. In the right pane, click **Deploy OS**.

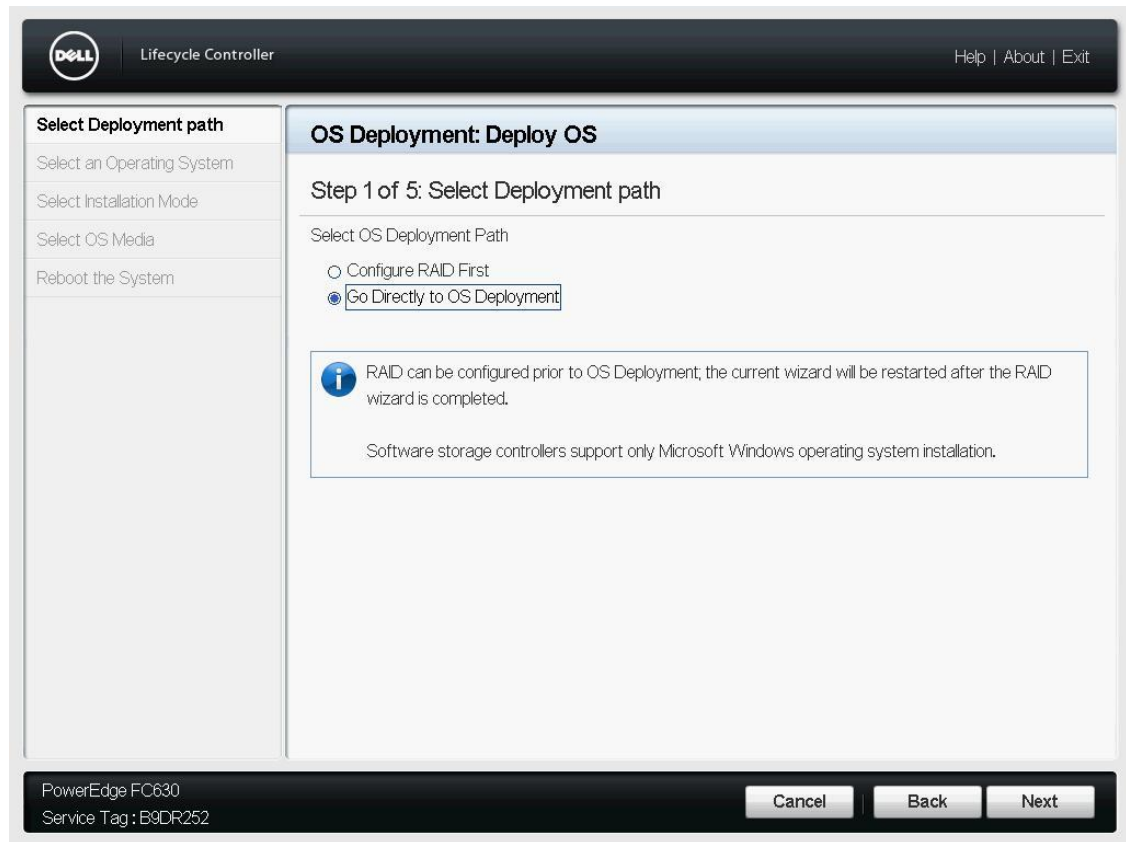
Figure 1 OS Deployment Home Page



5. If driver pack is already installed, **Step 1 of 5: Select Deployment Path** page is displayed (Figure 2). Otherwise, you are prompted to install the latest driver pack.

Note: To use LC Driver Pack for the operating systems listed on Step 2 of 5 of the OS deployment process, update the appropriate Driver Pack before proceeding with the installation.

Figure 2 OS Deployment — Step 1: Select Deployment Path



6. If you want to configure RAID, select **Configure RAID First** and click **Next**. After RAID is configured, continue installing the operating system.

7. If the virtual disk is already configured, select **Go Directly to OS Deployment** and click **Next**. The **Step 2 of 5: Select an Operating System** page is displayed (Figure 3).

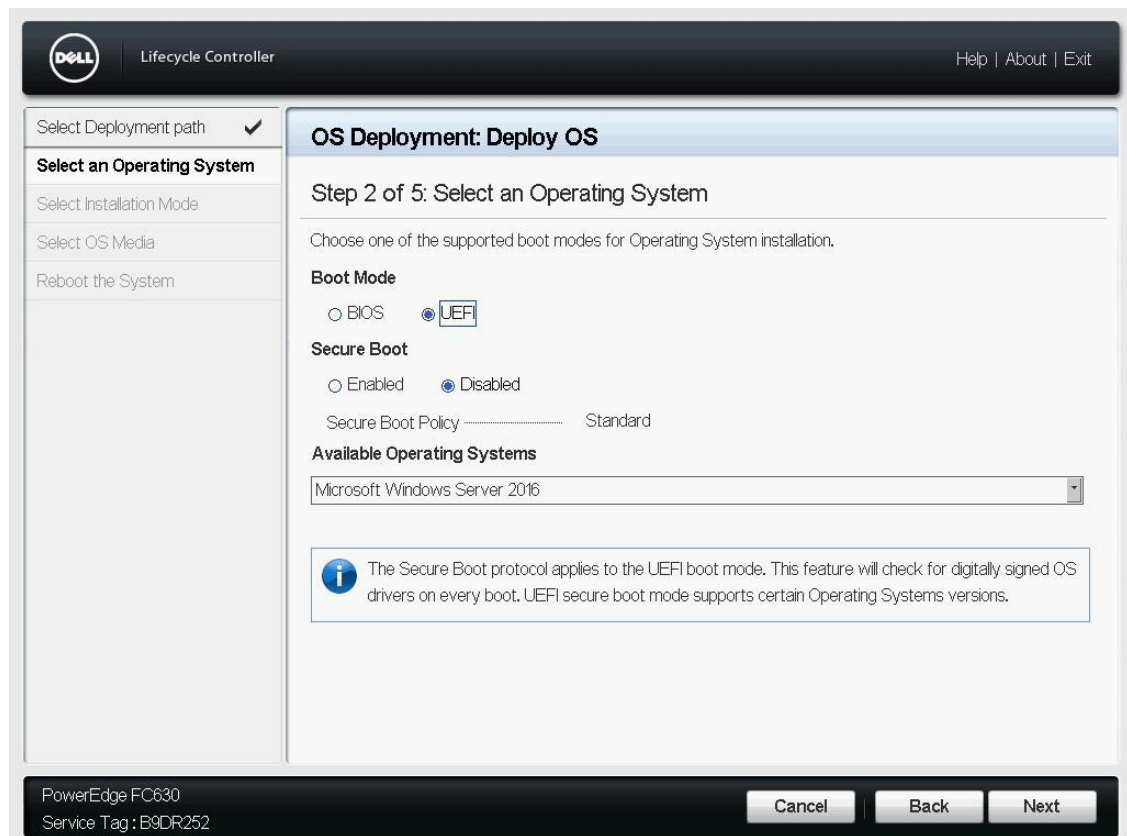
Note: At least one Virtual disk must exist to proceed with OS deployment. To create a virtual disk, follow these steps:

- a. Select **Configure RAID** and click **Next**.
The RAID Configuration wizard is displayed and the storage controllers available for configuration are listed.
- b. Select the desired storage controller and click **Next**.
Depending on the available physical disks and the capability of the selected RAID controller, the supported RAID levels are displayed.
- c. Select the appropriate RAID level, click **Next**, and complete the RAID configuration.

The RAID configuration is applied to the disks and the OS Deployment wizard navigates to the page that displayed the supported operating systems. For more information, see the *Lifecycle Controller User's Guide* available at www.dell.com/idracmanuals.

8. Select the desired options for **Boot Mode** and **Secure Boot**.
9. From the **Available Operating Systems** list, select the required OS and Click **Next**.

Figure 3 OS Deployment — Step 2: Select OS



10. The **Step 3 of 5: Select installation mode** page is displayed (Figure 4).

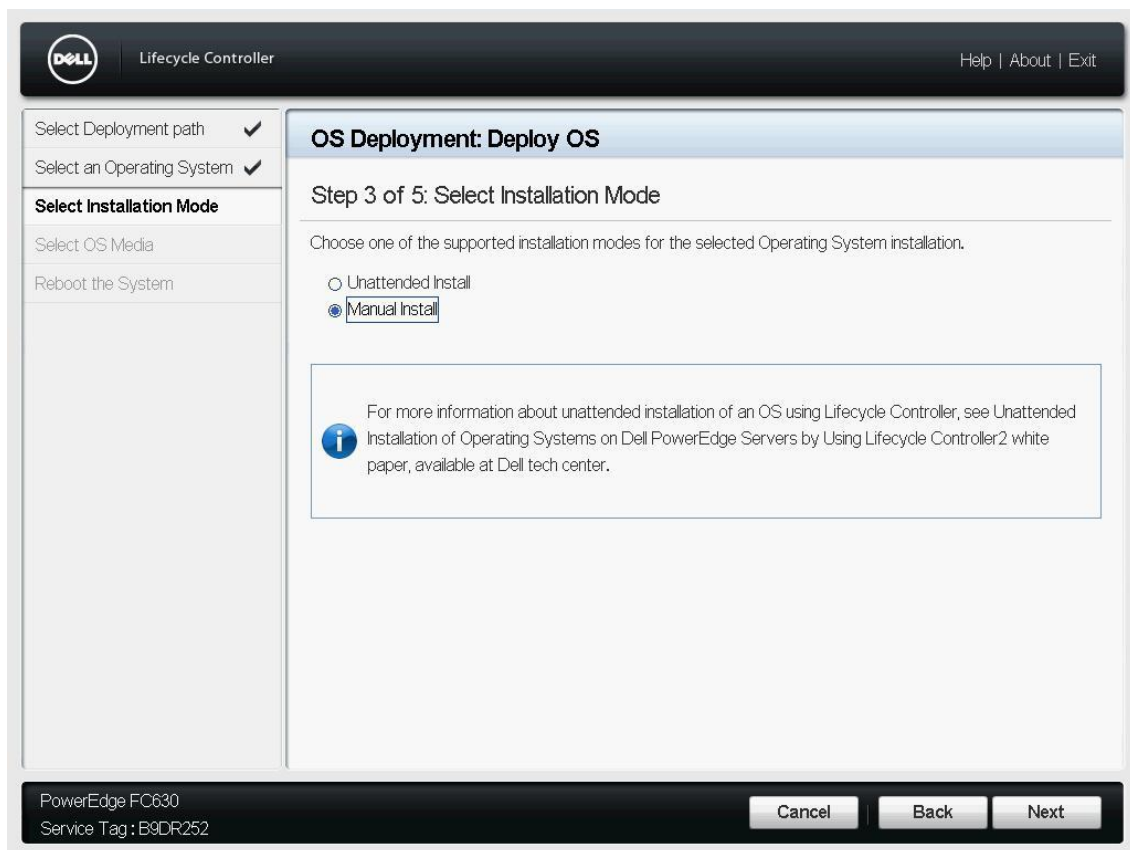
Note: This list displays only Dell EMC-supported operating systems. If the selected OS does not support UEFI mode, the UEFI option for Boot Mode is grayed-out.

11. Select one of the supported modes for OS installation and click **Next**.

Notes:

- a) The **Unattended install** option is enabled only for Microsoft Windows OS.
- b) If you select **Manual install** and click next, the **Step 4 of 5: Select OS Media** page is displayed. If you select **Unattended install**, the **Step 3a of 5: Select installation mode** page is displayed. This page provides the option to import an OS configuration file from a USB device or a network share.

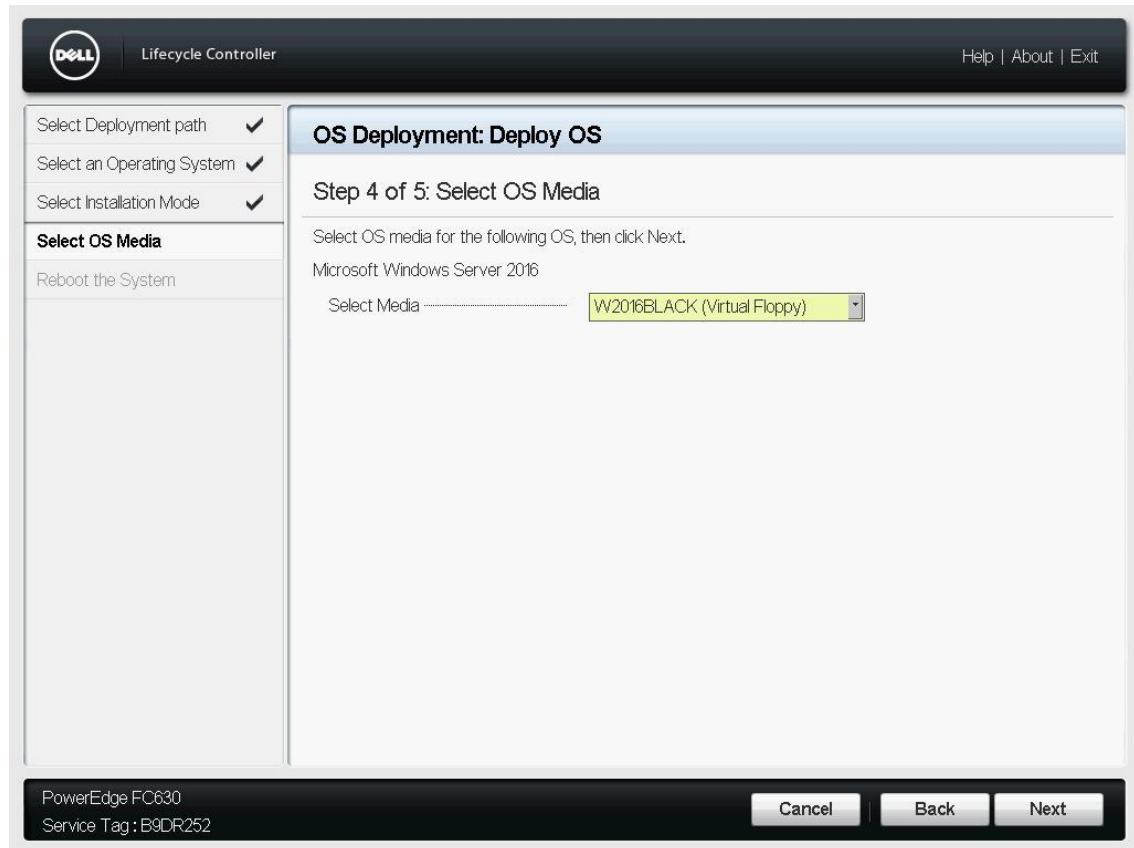
Figure 4 OS Deployment — Step 3: Select Installation Mode



12. The **Step 4 of 5: Select OS Media** page is displayed (Figure 5). This page displays all the OS media connected to the system. Select the USB device media from which you want to install the selected OS and click **Next**.

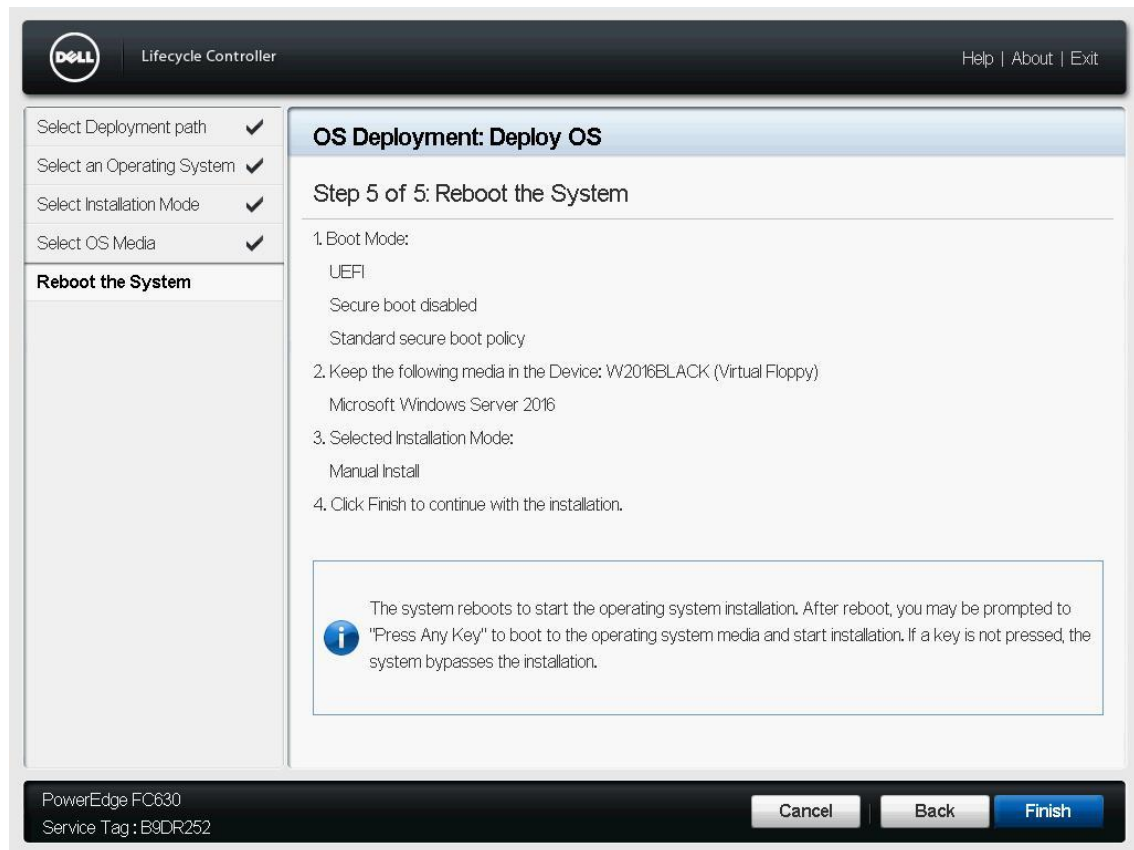
Note: When you attached a USB drive using the virtual media tab of virtual console, the USB drive is displayed as **Virtual Floppy** on the LC page. If the USB drive is connected directly to one of the USB ports on the front of the server, the drive is displayed as **W2016BLACK (front usb 1)** or **W2016BLACK (front usb 2)**.

Figure 5 OS Deployment — Step 4: Select OS Media



13. The **Step 5 of 5: Reboot the System** page is displayed (Figure 6). This page displays the final list of configuration options selected to deploy the OS. To restart the server and continue with OS installation, click **Finish**.

Figure 6 OS Deployment — Step 5: Summary Page



14. After the system reboots, follow the instructions on the screen to complete the OS installation.

1.3 USB Device OS installation best practices

To create the bootable USB device, it is required that

- The USB device is formatted with FAT32 filesystem
- HDD is used as the write method.

The following illustration shows an example using the PowerISO tool with the settings used to create a bootable USB device using an ISO file:

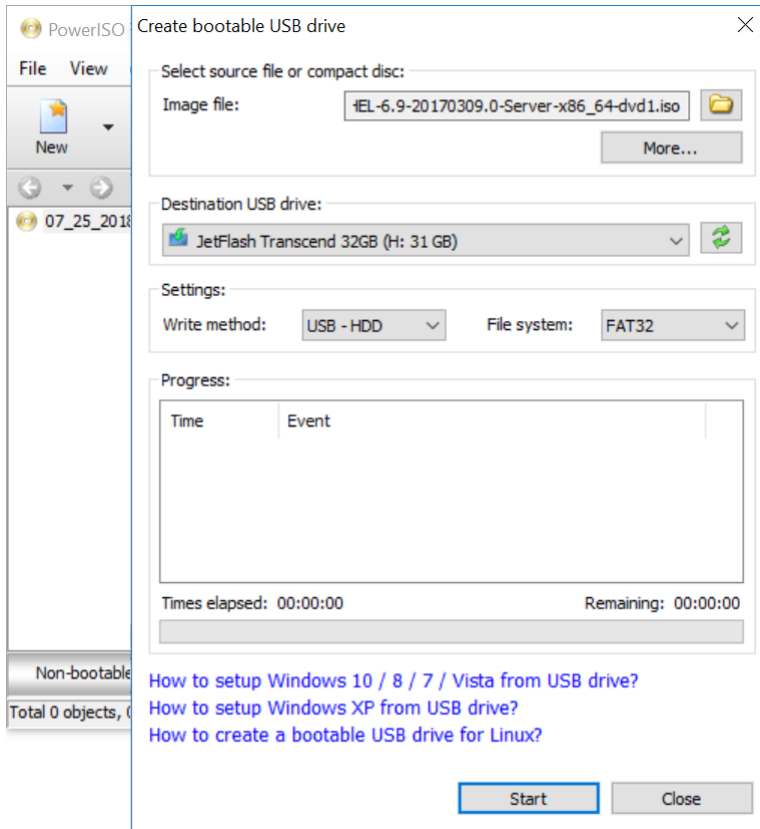


Table 1 USB Device best practice definition

Is	Is not
<ul style="list-style-type: none"> • Supported on a USB device formatted with FAT32. • The USB device partition is GPT if boot mode is set to UEFI. • Tested with PowerISO tool. • Supported only on iDRAC7/8 firmware version 2.60.60.60 or later. 	<ul style="list-style-type: none"> • Supported on a USB device formatted with NTFS filesystem. • Expected to work with non-bootable USB device. • Tested with RUFUS tool for creating the bootable USB device.

Most of the current OS images contain an installation file (.wim) larger than 4 GB. FAT32 limits the maximum single file size to 4 GB. If the installation file is 4 GB or more, split the file into multiple files and then flash onto the USB device. For more details about flashing ISO images that contain files of size 4 GB or larger, see Appendix A.1.

A Configuration details

Table 2 Component table example

Component	Description
Operating system	<ul style="list-style-type: none">• Microsoft Windows Server 2016 and 2019• Red Hat Enterprise Linux 6 and 7• SuSe Enterprise Linux 15
Driver version	Any version of LC OS driver pack
Firmware version	iDRAC7/8 2.60.60.60 or later
Application	Lifecycle Controller
Server	12th and 13th generation of Dell EMC PowerEdge servers
Storage	USB device, including USB drives and external USB HDDs

A.1 Splitting .wim file larger than 4 GB

Sometimes during windows OS installation, the file copy operation fails with the following error:



This error may occur when the Windows image file is over the FAT32 file size limit of 4 GB. If you see this error, follow these steps to deploy the OS using a USB drive.

1. Format the drive using *diskpart* tool and make the primary partition.
For more details, see Section A.2.
2. Copy everything except the Windows image file (sources\install.wim) to the USB drive. You can either drag and drop, or use the following command:
`robocopy D: E: /s /max:3800000000`
D: is the mounted ISO
E: is the USB flash drive
3. Split the Windows image file into smaller files and place the smaller files on the USB drive:
`DisM /Split-lage /ImageFile D:\sources\install.wim /SWMFile:E:\sources\install.swm /FileSize:3800`

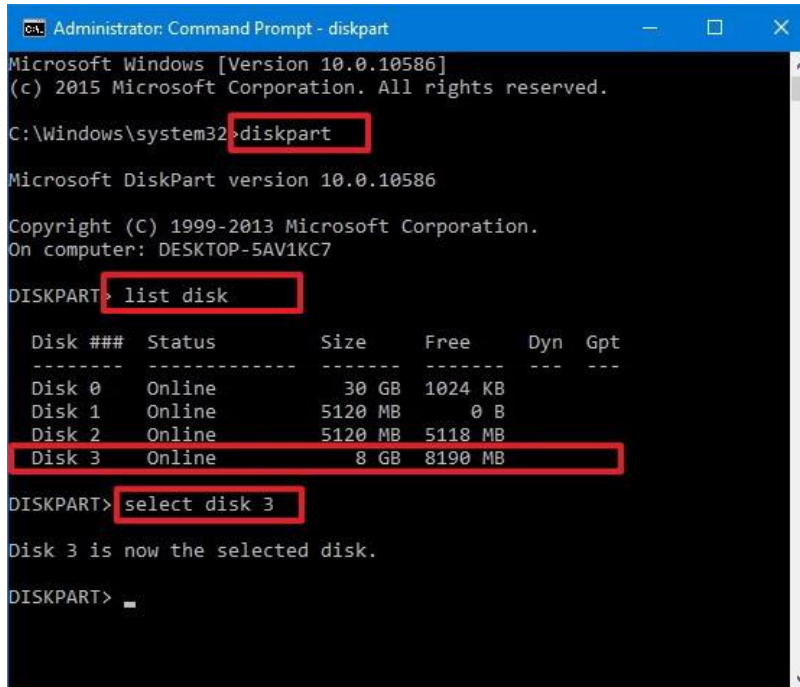
For more information about Step 2 and Step 3, see <https://docs.microsoft.com/en-us/windows-hardware/manufacture/desktop/install-windows-from-a-usb-flash-drive>

A.2 Using DiskPart to clean and format a USB drive

1. Press Windows key+X to open the Power User menu and select Command Prompt (Admin).
2. Connect the drive you want format to your computer.
3. Type `diskpart` and press Enter.
4. Type `list disk` and press Enter. A list of all the available drives is displayed.

Caution: The following steps result in data loss on the selected drive. Ensure that you select the correct drive to format.

5. Identify the desired drive.
Example: In the screenshot below, four drives are listed. Disk 0 is 30 GB and we can identify it has the primary system drive. In this example, we want to clear and format the 8 GB drive, we can see that Disk 3 is the drive we need to select.
6. To select the drive, type `select disk 3` and press Enter.
Change the number 3 to the number of the drive you want to clean. You must enter the correct number to avoid erasing all the data from the wrong drive.



```
Administrator: Command Prompt - diskpart
Microsoft Windows [Version 10.0.10586]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Windows\system32>diskpart

Microsoft DiskPart version 10.0.10586

Copyright (C) 1999-2013 Microsoft Corporation.
On computer: DESKTOP-5AV1KC7

DISKPART> list disk

   Disk ###    Status         Size      Free      Dyn  Gpt
   -----    -
   Disk 0      Online         30 GB     1024 KB
   Disk 1      Online         5120 MB      0 B
   Disk 2      Online         5120 MB    5118 MB
   Disk 3      Online          8 GB     8190 MB

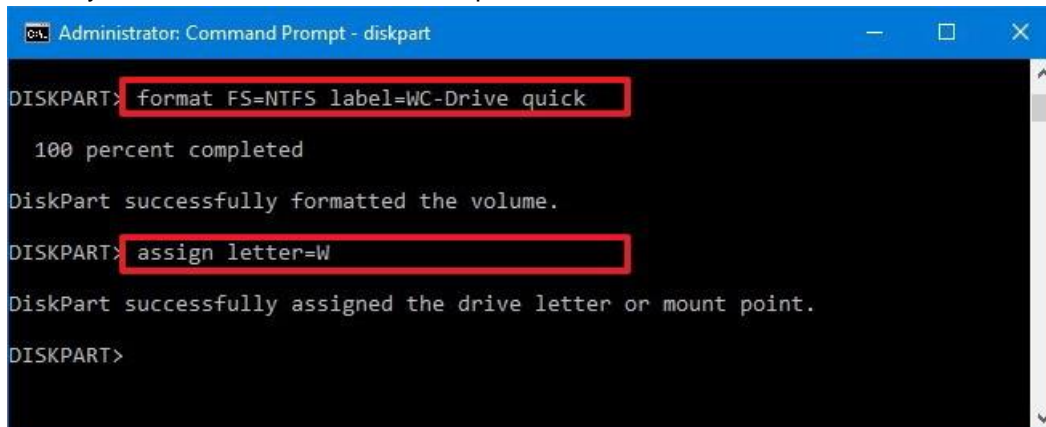
DISKPART> select disk 3

Disk 3 is now the selected disk.

DISKPART> _
```

7. To clean the drive, type `Clean` and press Enter.
8. To confirm that the desired drive is still selected, type `list disk` and press Enter.
If the drive still selected, an asterisk (*) is displayed next to the disk.
9. To create a partition, type `create partition primary` and press Enter.
10. To select the partition you just created, type `select partition 1` and press Enter.
11. To set the partition active, type `active` and press Enter.
12. To format the partition using FAT32 and to set a label, type `format FS=FAT32 label=WC-Drive quick` and press Enter.
Change WC-Drive in the command with the drive name you want to use.

13. To assign a drive letter, type `assign letter=W` and press Enter. Change W in the command with the letter you want to assign to the drive. Ensure to use a letter that is not used by another drive on the same computer.



```
Administrator: Command Prompt - diskpart
DISKPART> format FS=NTFS label=WC-Drive quick
100 percent completed
DiskPart successfully formatted the volume.
DISKPART> assign letter=W
DiskPart successfully assigned the drive letter or mount point.
DISKPART>
```

14. To close DiskPart type `exit` and press Enter.

B Technical support and resources

Detailed information, documentation, and other technical whitepapers about Lifecycle Controller can be found at <https://www.dell.com/support/article/sln311809>.

The [Dell EMC Knowledge Base](#) is an online technical community where IT professionals have access to numerous resources for Dell EMC software, hardware and services. This link takes you directly to the iDRAC page.

The [Dell EMC Support website](#) is focused on meeting customer needs with proven services and support.

B.1 Related resources

For more information about OS deployment, see the following URLs:

Installing Windows OS using USB flash device

<https://docs.microsoft.com/en-us/windows-hardware/manufacture/desktop/install-windows-from-a-usb-flash-drive>

More information about using the PowerISO tool

<https://www.poweriso.com/tutorials/how-to-make-win7-bootable-usb-drive.htm>