



RAPID OPERATING SYSTEM RECOVERY

Tech Note by:
Rui Shi

SUMMARY

A new BIOS Feature introduced in Dell EMC 14th generation of PowerEdge servers offers quick OS recovery options in case of disk corruption.

Specific features outlined are:

- Rapid OS Recovery

This feature enables customers to set up a physical recovery disk and perform remote disk recovery in case of OS corruption or hard drive failure.

Dell EMC 14th generation of PowerEdge servers introduces the Rapid Operating System (OS) Recovery feature that enables rapid recovery from corrupted OS image state, reducing system downtime when OS corruption occurs, possibly due to disk failure or malware attacks. The Rapid OS Recovery is achieved via a BIOS setup menu called Redundant OS Control. In case of OS corruption on the main boot disk, customers can quickly switch to boot from the recovery disk either via the BIOS menu options directly or via Out-of-Band (OOB) commands. Customers can then use the recovery disk to recover the corrupted OS and server. This feature is beneficial in scenarios where no one is available to perform a physical drive swap for systems in remote locations, and there are no additional redundancies implemented.

Today, because of Dell EMC BIOS innovations and partnerships with OS vendors, corruption rate on the OS level are low. However, due to an increase in malware attacks, some customers may experience OS corruption or lock-out. This can cause extremely costly downtime during critical junctures. For this reason, Rapid OS Recovery feature was implemented.

Selecting a Recovery Disk

The Redundant OS Control settings can be found in the F2 BIOS menu (or accessed remotely via iDRAC web GUI or SSH console detailed below).

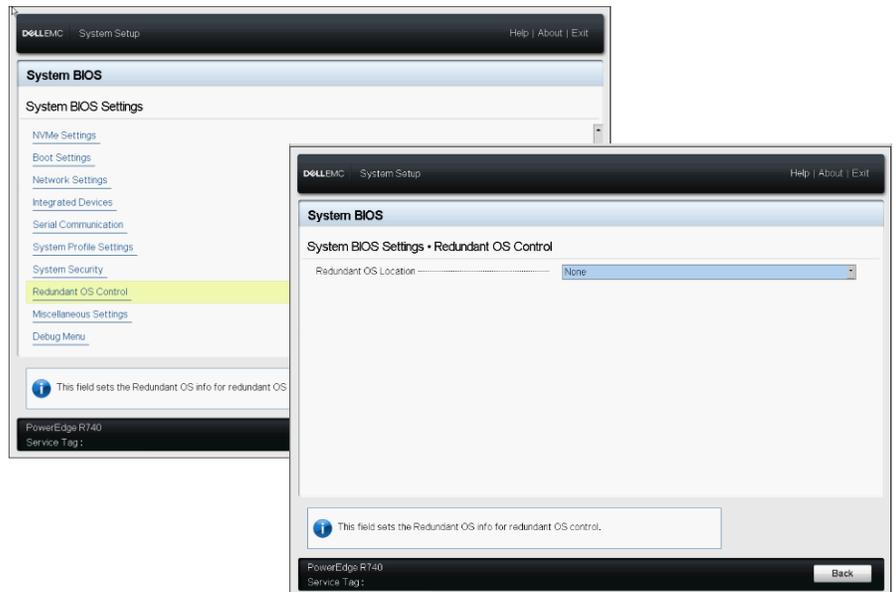


Figure 1: Redundant OS Control Settings in the BIOS Menu

The Redundant OS Location specifies the devices that are supported to be the recovery disk. The drop down list is dynamically populated based on the devices plugged into the server. It is up to the user to populate the recovery device with the needed recovery media. The below devices are currently supported:

- None (No devices selected)
- Internal SD Cards
- SATA Ports in AHCI mode
- Internal M.2 Drives
- Internal USB

Once the recovery device is selected, two more options are revealed: Redundant OS State and Redundant OS Boot.

Redundant OS State has two options (these options are hidden if Redundant OS Location is set to None):

- Visible - The backup disk is visible to the boot list and OS



Figure 2: Redundant OS State and Boot Options

- Hidden - The backup disk is disabled and not visible to the boot list and OS. BIOS will disable the device in HW so it cannot be accessed by the OS. This is to ensure that the recovery disk cannot be affected in case of corruption on the main boot disk

Redundant OS Boot has two options (these options are hidden if Redundant OS Location is set to None or if Redundant OS State is set to Hidden):

- Enabled –force the BIOS to boot to the device specified in Redundant OS Location (i.e. move it to top of boot list)
- Disabled – preserve current boot list settings

Configuring Rapid OS Recovery Remotely

The aforementioned settings can all be configured remotely with the 9th generation of Integrated Dell Remote Access (iDRAC) with Lifecycle Controller, which is a feature on all Dell EMC 14th generation of PowerEdge servers. The settings can be accessed via either the web GUI or the SSH command line console

Web GUI: Users can access the iDRAC web GUI by entering its IP address in a web browser. Enter the user name and password to log in. Once the user has logged in, he or she can access the BIOS settings by selecting the Configuration drop down list on the top menu and clicking on BIOS settings. In the BIOS setting, the user will find the option to change Redundant OS Control as stated in the previous section.



Figure 3: iDRAC Web GUI login screen

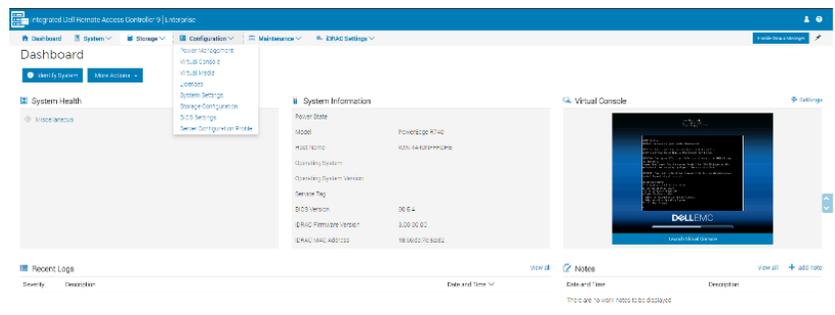


Figure 4: iDRAC Web GUI dashboard

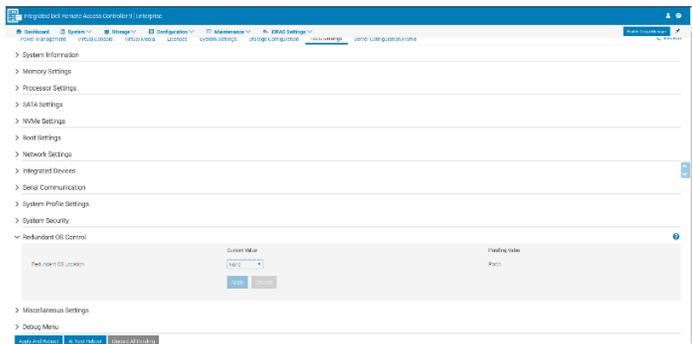


Figure 5: iDRAC Web GUI BIOS setting

Changes to the settings will be added to the iDRAC job queue and will take effect upon the next restart.

SSH Command Line: Users can access the iDRAC command line interface by SSH'ing into the iDRAC's IP address. The console will prompt the user for the iDRAC's username and password. Once the user have access to the command line, he or she can use the below commands to view and set the Redundant OS settings.

Get commands:

racadm get BIOS.RedundantOsControl.RedundantOsLocation

racadm get BIOS.RedundantOsControl.RedundantOsState

racadm get BIOS.RedundantOsControl.RedundantOsBoot

Set commands:

racadm set BIOS.RedundantOsControl.RedundantOsLocation <value>

- values: None; InternalSd; PortX (X = A – N for SATA ports); SlotX (X = 1 – 14 for Internal M.2 Drives); Internal USB

racadm set BIOS.RedundantOsControl.RedundantOsState <value>

- values: Visible; Hidden

racadm set BIOS.RedundantOsControl.RedundantOsBoot <value>

- values: Enabled; Disabled

Note: If the current value RedundantOsLocation is set to None, RedundantOsState and RedundantOsBoot will not be visible for reading/writing until RedundantOsLocation is set to a valid device followed by a system reset.

Conclusion:

This feature within the PowerEdge 14th generation servers offers customers different mediums to use as recovery devices. Use cases for this feature would be the 4 following scenarios:

1. To provision a backup OS on one of the listed recovery mediums on the Redundant OS Location option.
2. Once the OS is in place, the customer would then move the recovery drive to Hidden on the Redundant OS State option. Since this drive will be hidden, it will not be affected in case the primary drive gets corrupted.
3. In the case that the primary drive gets corrupted, the customer can then move the backup drive to be Visible on the Redundant OS State option and then "Enable" one the Redundant OS Boot option to force BIOS to boot into the backup drive.
4. Once in the backup drive, the customer can then recover the primary drive or perform other actions.

The Dell EMC 14th generation of PowerEdge servers contain innovative features such as Redundant OS Control to provide customers the flexibility to configure an added layer of security in case of critical OS failures.

```
login as: root
root@10.210.125.79's password:
/admin1-> racadm get BIOS.RedundantOsControl.RedundantOsLocation
[Key=BIOS.Setup.1-1#RedundantOsControl]
RedundantOsLocation=PortB
/admin1-> racadm get BIOS.RedundantOsControl.RedundantOsState
[Key=BIOS.Setup.1-1#RedundantOsControl]
RedundantOsState=Visible (Pending Value=Visible)
/admin1-> racadm get BIOS.RedundantOsControl.RedundantOsBoot
[Key=BIOS.Setup.1-1#RedundantOsControl]
RedundantOsBoot=Disabled
/admin1->
```

Figure 6: iDRAC console GET commands

```
/admin1-> racadm set BIOS.RedundantOsControl.RedundantOsLocation PortB
[Key=BIOS.Setup.1-1#RedundantOsControl]
RAC1017: Successfully modified the object value and the change is in
pending state.
To apply modified value, create a configuration job and reboot
the system. To create the commit and reboot jobs, use "jobqueue"
command. For more information about the "jobqueue" command, see RACADM
help.
/admin1-> racadm set BIOS.RedundantOsControl.RedundantOsState Visible
[Key=BIOS.Setup.1-1#RedundantOsControl]
RAC1017: Successfully modified the object value and the change is in
pending state.
To apply modified value, create a configuration job and reboot
the system. To create the commit and reboot jobs, use "jobqueue"
command. For more information about the "jobqueue" command, see RACADM
help.
/admin1-> racadm set BIOS.RedundantOsControl.RedundantOsBoot Enabled
[Key=BIOS.Setup.1-1#RedundantOsControl]
RAC1017: Successfully modified the object value and the change is in
pending state.
To apply modified value, create a configuration job and reboot
the system. To create the commit and reboot jobs, use "jobqueue"
command. For more information about the "jobqueue" command, see RACADM
help.
/admin1->
```

Figure 7: iDRAC console SET commands