DELL EMC

PowerEdge Product Group

Direct from Development

Workload Profile based Automated Server Configuration for PowerEdge Servers

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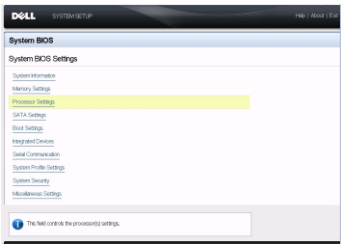
SUMMARY

As Server technology evolves, new capabilities emerge to optimize workload performance to meet the differing needs of customers. Some customers require maximum performance; others require minimal latency while others desire optimized performance/watt. These optimizations often require fundamental differences in BIOS configuration. Further complicating the challenges for IT Administrators is that optimized settings change over time and can differ between Server models and generations. Dell EMC Engineers have worked to dramatically simplify the process of BIOS tuning with the availability "Workload Profile" based Server Configuration automation.

The emergence of new technologies creates the opportunity for customers to better optimize workload efficiency for their unique environments but to achieve this optimization, BIOS tuning is often required.



In the past, BIOS tuning was a time consuming task requiring multiple iterations of setup→reboot→test to determine the optimized settings. Over time, this challenge has increased with the addition of new tuning parameters. As an example, the chart below highlights the number of settings available to achieve optimization for "low latency" operation in different generations of PowerEdge Servers:

	BIOS settings that affect Latency
PowerEdge 11G	5
PowerEdge 12G	22
PowerEdge 13G	31

An additional challenge is that optimized tunings are machine specific and can change between models, generations and even through the introduction of processor speedbumps.

Removing the complexity

To eliminate this complexity, Dell EMC PowerEdge Engineering teams worked to embed "Profile" based tuning capabilities in all PowerEdge 14G servers. Since these profiles are embedded within the server, updates are automatically implemented when system firmware is updated and standard profile naming ensures consistent application across server models and generations.

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Workload Profile based tuning

Profile based tuning implements Dell EMC "best practices" which are created based on thousands of hours of lab testing by Dell EMC Solutions teams. Customers can choose from a variety of different workload optimizations many of which offer options for "Performance" optimized; tuned for maximum performance or, "Performance/Watt" which is tuned to reduce power consumption.

Implementation steps

Customers can implement workload tuning in two simple steps:

1) Set the desired profile by opening an SSH session on the iDRAC controller and setting the profile using RACADM
    a. ***racadm set bios.sysprofilesettings.WorkloadProfile <Profile name>***
        i. E.g ***racadm set bios.sysprofilesettings.WorkloadProfile VtPerWattOptimizedProfile***
2) Submit the new job and reboot the server - This should be accomplished by using the following racadm command
    i. ***racadm jobqueue create BIOS.Setup.1-1 -r pwrcycle -s TIME_NOW***
1) Optionally
    a. Before rebooting the server, the user can make any other attribute changes desired including changes to settings implemented by the workload profile they chose.

Note: Unlike other "Attributes", the WorkloadProfile command does not set a "state". As such, the "current value" will always report "Not Available". This behavior is correct since the process simply acts similar to a batch job that sets a number of different attributes.

In addition, customers can implement this command as part of their OpenManage Essentials deployment script to automate these changes across multiple servers at once with a minimum of mouse clicks.

The table below highlights the new profiles available with the launch of the PowerEdge 14G family of servers as well as the profiles available with select 13G servers.

PowerEdge Server Generation		BIOS Settings Optimized for:	Profile Name
14G	13G	High Performance Computing Environments	***HpcProfile***
		Low Latency Computing Environments	***LowLatencyOptimizedProfile***
		Performance Optimized Virtualization	***VtOptimizedProfile***
		Power Optimized Virtualization	***VtPerWattOptimizedProfile***
		Performance Optimized Database	***DbOptimizedProfile***
		Power Optimized Database	***DbPerWattOptimizedProfile***
		Performance Optimized Software Defined Storage	***SdsOptimizedProfile***
		Power Optimized Software Defined Storage	***SdsPerWattOptimizedProfile***

Conclusion

Workload Profile based optimization dramatically reduces the time required to achieve optimized Workload tuning while ensuring consistency across server models, generations and feature enhancements over time. Unique to Dell PowerEdge Servers, this new capability streamlines the deployment process and increases customer agility by allowing for the confident rapid deployment, or redeployment, of their server assets.