PowerEdge Product Group

Direct from Development

Enabling Sound Cap in PowerEdge 14G Servers

Tech Note by
Chris E. Peterson
Paul Waters
Victor Chen
Scott Lin

SUMMARY
For noise-sensitive environments, Sound Cap can limit acoustical output during high utilization of a server's CPUs, at the expense of some performance. It will not have an impact when a server is in idle state or under moderate CPU utilization.

Sound Cap is a custom thermal profile available in the iDRAC interface of 14th generation of Dell EMC rack servers.

Sound Cap may be appropriate for re-deployment or evaluation of a server in an occupied space, but it should not be used where peak performance is the primary criterion, for example benchmarking or performance-sensitive applications.

Sound Cap is a custom thermal profile that is new in the 14th generation of Dell EMC rack servers. Designed for scenarios in which the server is redeployed from a data center into a noise-sensitive environment, Sound Cap results in limits to acoustical output by applying a power-capping percentage to the CPU(s). The power cap reduces heat generated by the CPUs during high utilization, which reduces fan speed needed for CPU cooling, which in turn reduces acoustical output.

Customer Driven Design

Dell EMC engineers documented responses in customer studies to quantify tradeoffs of CPU performance to acoustical benefit. Results of these studies were taken as input for product specific thermal-acoustical design processes to develop Sound Cap profiles for each 14th generation Dell EMC rack server.

Applications

Sound Cap may be useful in the following scenarios:

- Deployment of data center rack servers to quieter environments such as lab or office areas.
- Equipment setup when hardware or software is being loaded.
- Equipment demonstrations or tours in which presenters wish to minimize fan noise from the server.
- When limiting acoustics is consciously prioritized over CPU performance.

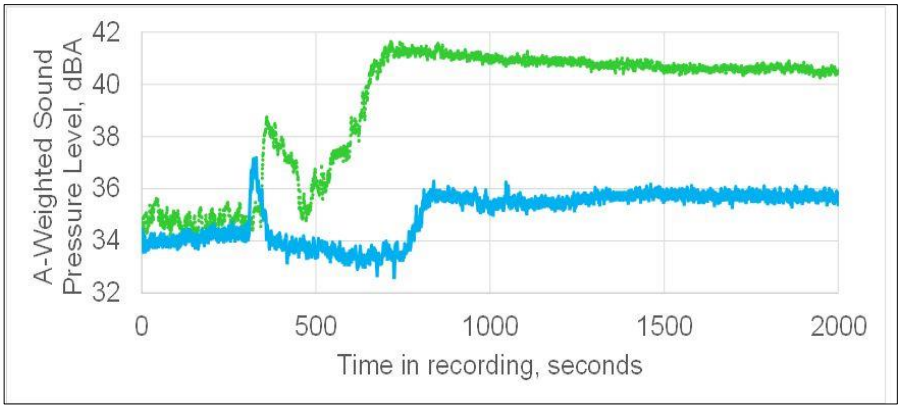

***Figure 1**: Sound Cap can effectively limit acoustical output in noise-sensitive environments. Example shown is the observed front bystander ISO7779 A-weighted sound pressure level vs. time, for Sound Cap Off (upper green line) and On (lower blue line) in a Dell EMC PowerEdge R740 under 100% CPU loading in 25°C ambient temperature.*

Resulting Behaviors

Sound Cap applies a percentage-based power cap to the CPU(s) in the server. An example of the limiting effect on acoustics for Sound Cap Off vs. Sound Cap On may be seen in Figure 1 above. While Sound Cap can limit acoustical output, it does not impact system cooling performance or any component thermal reliability. It also will not impact fan speeds in moderate CPU workloads or when the system is in idle state.

Sound Cap should *not* be used or may be ineffective in the following scenarios:

- Benchmarking or performance-sensitive applications.
- Trying to reduce idle fan speeds or make a quiet server even quieter.
- Using PCIe-based or VDI workloads.

Supported Servers

Table 1 below lists Dell EMC PowerEdge servers that support Sound Cap, respective limitations, and acoustical reduction for example configurations under high performance CPU load.

Product	Sound Cap Support	Sound Power Level Reduction*	Sound Pressure Level Reduction*
R640	Available	0.4 bels	4 dBA
R740	Available	0.7 bels	7 dBA
R740XD	Available	0.8 bels	8 dBA
R940	4Q-2017		

Table 1: *Acoustical reductions observed for some typical configurations with Sound Cap enabled.*
*Maximum acoustical reductions observed for CPU TDP workload in typical system configuration operating at 25°C ambient. Additional metric details are reviewed in the white papers linked below.

Enabling/Disabling Sound Cap

Sound Cap is enabled in the System Settings of the iDRAC GUI, as shown in Figure 2 below, or in iDRAC settings within the BIOS setup.

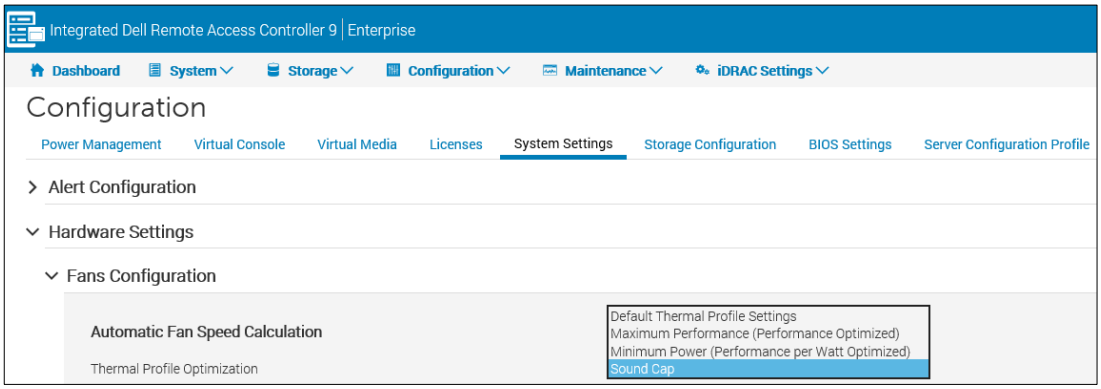

Figure 2: *Enabling Sound Cap via the System Settings in iDRAC GUI.*

Conclusion

Sound Cap was developed for customers whose requirement for limiting acoustical output is prioritized over CPU performance, e.g. when re-deploying data center servers to quieter environments such as labs or offices. It will not impact acoustics in idle or moderate workloads but will cap acoustical output and spikes for high CPU workloads. The Sound Cap selection option is available on iDRAC GUI, BIOS setup, and RACADM interfaces.