PowerEdge Product Group

Direct from Development

Thermal Design Tenets of PowerEdge 14G Servers

Tech Note by:

Hasnain Shabbir

Robert Curtis

Tad Walsh

SUMMARY

The new chassis architecture of PowerEdge 14G servers enables cooling of denser, higher power configurations.

Server thermal design however, is about more than just temperature and cooling.

This brief Tech Note describes the six key tenets of PowerEdge thermal design and how these tenets benefit users.

The task of cooling DellEMC PowerEdge 14th-generation servers builds on the features and capabilities of previous PowerEdge servers and now expands support for higher power processors, enhanced PCIe cooling capability, and increased GPU and NVMe count. A new chassis mechanical architecture enables increased airflow capability for cooling of higher power and dense system configurations and results in fewer system restrictions and increased feature density. State of the art thermal controls then manage these complex configurations to provide optimal thermal, acoustics and power management for customers. Dell Server Thermal, Mechanical, and Thermal Control designs are based on the following key tenets and order of priority:

Table 1: Six key tenets of PowerEdge 14G Thermal Design

1. Reliability	• Component hardware reliability remains the top thermal priority. • System thermal architectures and thermal control algorithms are designed to ensure that there are no tradeoffs in system-level hardware life.
2. Performance	• Performance and uptime are maximized through the development of cooling solutions that meet the needs of even the densest of hardware configurations.
3. Capability	• Industry-leading thermal and mechanical design for best in class cooling and maximum airflow capability enabling support of dense configurations, extreme environments, high power CPUs, NVMe, NVDIMMs, GPUs and FPGAs.
4. Efficiency	• 14G servers are designed with an efficient thermal solution to minimize power and airflow consumption, and/or acoustics for acoustical deployments. • Dell's advanced thermal control algorithms enable minimization of system fans speeds while meeting the above Reliability and Performance tenets.
5. Management	• System management settings are provided such that customers have options to customize for their unique hardware, environments, and/or workloads.
6. Forward Compatibility	• Forward compatibility means that thermal controls and thermal architecture solutions are robust to scale to new components that historically would have otherwise required firmware updates to ensure proper cooling. This benefits the customer by reducing the frequency of required firmware updates.

For more information about PowerEdge 14G Thermal Design, see for example ***PowerEdge Multi-Vector Cooling*** on dell.com/TechCenter: *http://en.community.dell.com/techcenter/extras/m/white_papers/20444244*