Dell PowerEdge Servers: New PSU Layout Delivers Improved Airflow and PCIe Feature Set

Tech Note by

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Summary

The next generation of PowerEdge servers brings a new Power Supply layout that allows for improved system cooling and helps enable support for Gen4 PCIe cards.

Purchase with confidence, knowing that these system improvements help ensure that the next generation PowerEdge server continues to deliver best-in-class features.

Split Power Supplies

The layout of previous generations of Dell PowerEdge rack servers utilized two power supplies grouped on one side of the chassis. Dell's next generation of PowerEdge servers improves the mechanical design with the two power supplies split – one on each side of the chassis. This new system and power supply layout offers several tangible benefits over the older system design.

Balanced Airflow

In prior generations, the location of the inner power supply was near the CPU exhaust airflow. Due to the proximity to the CPU, the PSU was continually exposed to air that is heated to high temperatures from moving through the CPU heatsink. With each new CPU refresh, power continues to increase and PSU cooling becomes exponentially more challenging. Additionally, the PSU location compounded the thermal challenges because it was also an obstruction to airflow moving freely through the CPU heatsink.

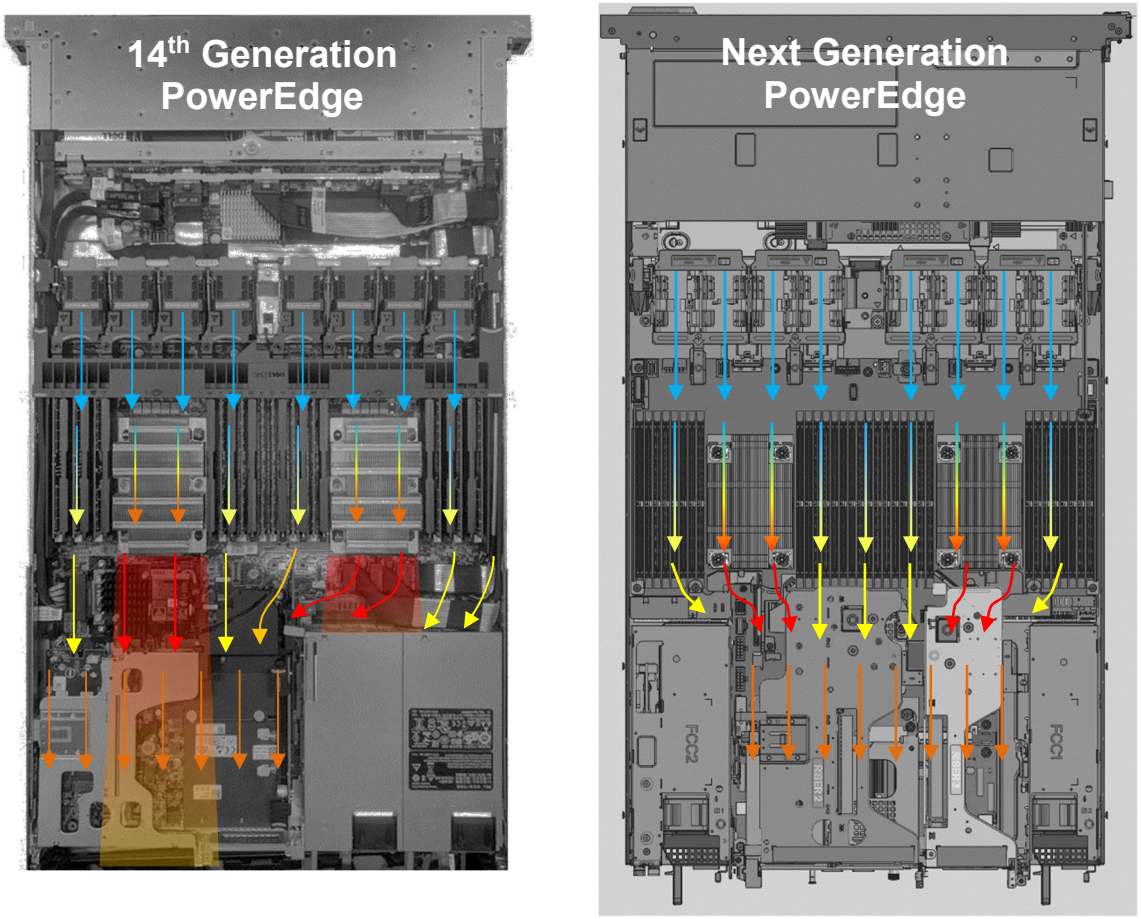
The split power supply placement in the next generation of PowerEdge servers allows for both low temperature airflow for PSU cooling and less obstruction for cooling high power CPUs. The result is that system airflow is balanced across the width of the system providing more uniform airflow for CPU, Memory, and PCIe cards in the rear of the chassis.

Support for Gen4 PCIe

One of the goals of the new architectures in the next generation of PowerEdge servers is to support faster I/O speeds, such as PCIe Gen 4, and beyond. PCIe Gen 4 doubles the lane speed to 16GT/s from the previous generation. A key element in PCIe performance is the length of PCIe traces. With the new system layout, a main goal was to shorten the overall PCIe trace lengths in the topology, including traces in the motherboard. By positioning PSU's at both edges, the I/O traces to connectors can be shortened for both processors. This is the optimal physical layout for PCIe Gen 4 and will enable even faster speeds for future platforms. The shorter PCIe traces translate into better system costs and improved Signal Integrity for more reliable performance across a broad variety of customer applications.

Balanced Airflow Illustration

The illustration below shows the 14G Generation Server layout (left image) with PSUs located on one side of the chassis. In this layout it is evident that system airflow and PSU cooling are not optimized. In the 15th Generation layout on the right, the dual power are split, one on each side of the chassis. The split PSU layout helps to balance the system airflow, reduce PSU operating temperatures, and allows for PCIe Gen4 card support and thus an overall more optimal system design layout.



In Conclusion

PowerEdge servers continue to deliver best-in-class features. The new PowerEdge servers have the PSUs on both rear sides of the server, improving chassis airflow, overall thermal efficiency and allows for Gen4 PCIe card support.

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