



The Dell Enterprise Infrastructure Planning Tool

New Dell EMC Power Estimation Software

Technical Note by:

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Benefits:

Eliminate the guess-work for determining power requirements

- EIPT is a new robust power estimation utility that provides precise outputs for data center planning purposes.

Power and Cooling Guidance based on Real-World Workloads

- The power and cooling estimation mathematical model is based on measurements across multiple workloads of hundreds of configurations.

Maximize operational efficiency

- Effectively size your compute infrastructure while managing the current and future power and cooling requirements.
- Determine the most efficient system configurations based on a range of workloads/scenarios.

When designing and expanding data centers or even planning rack deployments, you need to be able to accurately estimate your power and cooling requirements. For power, this will ensure you have enough power delivery to comfortably support your desired workload at runtime. In addition, you can confirm that your solution fits within the chosen power supply and that you have sufficient infrastructure protection to support transient load conditions. For cooling, you must ensure you can provide enough airflow top to bottom in the rack to keep all solutions cooled for best efficiency. Within a solution, there can be advantages to customizing the slots in which hardware is placed to optimize airflow. Finally, you may need to consider the ambient temperature you can support and how it relates to the density you want to achieve.

Dell has created a new power guidance utility that provides accurate and meaningful estimates of the power and cooling needs for Dell EMC enterprise products. This technology brief explains the key ingredients that go into Dell's point-of view on the topic of power and cooling guidance with an emphasis on PowerEdge servers.

How Estimation Tools Have Evolved

Dell has been providing power estimation guidance all the way back to 8th generation servers. However, our modern approach to estimation originated with Dell EMC PowerEdge 11G server products. At that time we essentially used fixed configurations. New hardware was very hard to consume and power and cooling estimation was heavily weighted around the CPU. All other component sub-systems had fairly coarse non-dynamic values which made it difficult to customize your outcomes to a very specific configuration of hardware.

In Dell PowerEdge 12G servers, we continued to focus around the CPU, but the overall methodologies significantly improved. In particular, we began to scale all other power contributing sub-systems and moved away from fixed configurations. The net result was a much more dynamic response to user configuration changes and the ability to rapidly respond to newly added product options.

In 13G, we fundamentally changed our power and cooling characterization strategy. We use proprietary software which automatically configures all systems settings, runs the workloads, and collects sub-system power and cooling information. This drove test and data consistency across the portfolio. It made comparisons across products much easier and exposed new trends. In addition, we added dynamic scaling to new subsystems and increased the granularity of fan power estimation in our modular infrastructure products. Both of which significantly improved estimation accuracy.



Dell EMC's Methodology

One of the great aspects of PowerEdge products is that they are extremely versatile and can support a vast array of applications. Unlike others, we provide a variety of workloads instead of a self-defined “typical” loading. If we chose just one workload to display, we might significantly underestimate the power consumption of some applications and leave customers with a false sense of power efficiency.

New workloads are developing all the time and we could not possibly characterize all possible workload applications. So instead, we provide generalized workload estimates that emphasize key subsystems. Does your application saturate the compute subsystem like solving a matrix of linear equations? Use the Computational workload. Is your application, for example, heavy on memory requiring a lot of caching? Use the Memory-Intensive workload. Unclear or a little bit of everything? Use the Transactional workload and calibrate the loading to your desire.

To generate these workloads, we take data across corners of a particular product’s multitude of configurations. We solicit guidance based on customer buying patterns to bias the configuration tested towards the mainstream use of that product. Care is also taken to ensure we have good visibility to critical technologies of the product under test. For example, we want visibility to differences in RDIMMs and LRDIMMs or high core count versus high frequency CPUs.

This rigor pays dividends for our customers. It means you get granular detail to the power and cooling impacts of adding for example 8 more cores or 128GB more memory. That can make or break your solution, and we want to enable you to calibrate your best density while fitting in your power and cooling budgets.

A word of caution when comparing power and cooling estimation tools across vendors. There is no industry and cooling estimation software that assists with the sizing of Dell servers, storage, and networking hardware. Note that for existing EMC solutions you should still seek information through the Dell EMC Power Calculator [here](#). Ultimately our approach for developing this tool was to provide accurate estimation guidance to get in the ballpark of an actual configured solution.

On the front end EIPT offers a variety of UI enhancements that solve pain points of the past. Here are just a few of the improvements. Work is now cached, so effort invested will no longer be jeopardized by momentary distractions of everyday office environments. We have added catalog and option searching so more experienced users can jump right to their choice rather than scrolling through the full catalogs. Finally, we have adjusted our database philosophy so that we are aligned to the product lifecycle. Going forward, products and options within service life will display in the tool even if they are no longer offered for sale.

There are many more improvements coming both to the UI and calculation methodology with the launch of new products on the near horizon. We are looking at creative new ways to offer customized power and cooling advisement to users. Continuous improvement efforts are always under way to review and reinvent calculations to be more granular and accurate. This means that user choices have more impact and the outcomes remain relevant to real world conditions. Stay tuned as we continue to invest in this exceptional technology.

Conclusion

We consider our power and cooling toolset to be a differentiating capability that we bring as a solution provider. We understand that customers need information to plan out their data center and size out the hardware for their chosen applications. We invest in these capabilities to guide that journey and let you focus on getting the job done.

To access EIPT and other supporting information, go to www.dell.com/calculator