

SWaP™

The new standard for calculating server efficiency before you buy.



Introducing an innovative metric that allows you to calculate the impact of a server in your data center.

The challenge: The “Participation Age” is putting increasing demands on your data center.

Evaluating a new server for your data center is no longer simply a matter of measuring raw performance. With today’s increasing demands, you also need to consider how much power, air conditioning and space a server consumes. While traditional metrics are good for calculating throughput, they don’t consider these new power and space demands in the equation.

What’s driving this new challenge? We call it the Participation Age. Buyers and sellers want to participate in new ways. They want to be connected and access more services and information in many different ways. With the explosion of wireless devices, voice and data convergence and the increasing use of web applications, data centers are under pressure to deliver more services, transactions and data to more devices. And it’s just the beginning. Demand for these new services is growing exponentially.

That’s why Sun created SWaP—the Space, Watts and Performance (SWaP) metric.

$$\text{SWaP} = \frac{\text{Performance}}{\text{Space} \times \text{Power Consumption}}$$

- **Performance:** Using industry-standard benchmarks.
- **Space:** Measuring the height of the server in rack units (RUs).
- **Power:** Determining the watts consumed by the system, using data from actual benchmark runs or vendor site planning guides.

This innovative metric gives you an effective cross-comparison and total view of a server’s overall efficiency. Armed with this information, you’ll be able to accurately compare the performance of different servers and determine which ones deliver the optimum performance for your needs. SWaP will help you better plan for current and future needs and control your datacenter costs. It’s the perfect tool for accurately evaluating horizontally scaled deployments for the delivery of web and transaction services.

Measuring Performance

Use numbers provided by a recognized benchmark body or actual in-house, real-world workloads. One word of caution: estimates from competitive vendors often use workloads and configuration parameters that aren’t within the platform’s optimum design.

Determining Power Consumption

Use a power meter that records the total watts used by the system during the test run. Be sure to use the same configuration used to produce the benchmark results. To avoid inaccurate measurements, it’s important to take the “steady-state” power measurement that calculates usage over the duration of the entire run. If you don’t have a power meter, check with your vendor. If they don’t publish the numbers be sure to ask them why the numbers are not more obvious.

Calculating Space Needs and Total Cost

Datacenter racks are expensive real estate, filled with an assortment of servers, switches, communication equipment, storage arrays, wireless routers, WAN switches, backup

power supplies and more. All these devices compete for available space and contribute to the cost of powering and cooling the data center. That's why the true economic value of a server is determined by the performance it delivers per unit size and the power it consumes.

The SWaP metric effectively and accurately projects and calculates server efficiency in rack dense deployments, which impacts data center capacity, performance and costs, while providing imperial proof points for the new generation of servers. As the industry continues to demand higher performance, better price/performance and performance per watt or per Rack Unit, over total cost, the SWaP metric will give you the tool you need to accurately and efficiently scale your network infrastructure to meet your datacenter's growing needs.

With the SWaP metric you'll have a quick and easy way to accurately predict the efficiency of a server and the impacts of deploying that server over your project lifecycle. It gives you the freedom to do more with less by choosing power and space efficient servers that reduce overhead cost. The bottom line: it can help save millions of dollars that can be better used to increase your company's business value and competitive advantage.

How SWaP Works

	Server A	Server B	Server A Difference
Performance	500 operations	500 operations	Equal
Space	2RU	4RU	x2 smaller
Power	300 Watts	800 Watts	x2.7 less
SWaP Rating	0.83	0.16	x5.2 more

In the example above, Server A and Server B produce equal performance, however Server A is half the size and less than half the power of Server B.

Using the SWaP formula, it is revealed that Server A is over 5X more efficient than Server B - providing a huge impact to rack dense deployments in your data center.

Need more proof? Check the WSJ

On November 14, 2005, the Wall Street Journal ran an article. "Power-Hungry Computers Put Data Centers in Bind. Newer Hardware Guzzles Electricity and Spews Heat, Requiring Costly Alterations." After installing a new \$2.3 million supercomputer, the University at Buffalo discovered they only had enough electrical power to run two-thirds of the system. "The calculations that were done fell slightly short," said Bruce Holm, a senior vice provost at the school. "The bottom line was that they missed."

The article went on to say that even more misses are likely. In the effort to boost performance, the computer industry has hit a barrier. The newest hardware, particularly servers, consumes too much power and generates too much heat.

Power hungry servers combined with rising energy prices are creating enormous utility bills for customers. Bringing in more electricity and cooling is expensive and difficult as well. Organizations face painful choices such as building new facilities, deferring server purchases or simply not using expensive computer room space to avoid overwhelming air-conditioning systems.

Sun is taking the initiative with CoolThreads and x64 technologies

In recognition of this growing performance, power and space challenge, Sun has introduced a new family of servers that have completely revolutionized the market. Sun's breakthrough CoolThreads™ technology and Sun Fire x64 servers are setting a new industry standard for performance, space and energy efficiency.

Get the details.

Learn more about SWaP by visiting: sun.com/swap

With CoolThreads technology we put an entire server rack into a single chip for higher throughput, cooler running and greater energy savings. Likewise, Sun Fire x64 servers are some of the most energy efficient x64 servers in their class, with up to 56% greater power and cooling savings than competitive servers. In fact, why not run a SWaP metric on our new servers, and those of alternative vendors and see for yourself?

Accolades for SWaP from a Leading Industry Analyst

"Users of rack-optimised servers deployed into today's data centers to provide web and application services need to be concerned about more than just performance. They have to assess performance while taking into account how much space the systems will occupy, and how much power they'll consume. SWaP is an objective, three-dimensional metric that provides a more comprehensive and realistic way to assess today's servers, because it evaluates performance within the real constraints of space and power consumption."

Get the details.

For more information on SWaP, please contact your Sun representative or visit sun.com/swap.