Datacenter or Server Room BTU calculator

Contributed by Mike Lavrik
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There is not much out there to explain proper cooling calculations for a server room. I have gathered some information and broke down the calculations into a few simple steps.

Common terms for cooling:

BTU: A Btu is defined as the amount of heat required to raise the temperature of one pound avoirdupois of water by one degree Fahrenheit.
- 1 watt is approximately 3.4 BTU/h [1]
- 1000 BTU/h is approximately 293 W
- 1 horsepower is approximately 2540 BTU/h
- 12,000 BTU/h is referred to as a ton in most North American air conditioning applications.

The simplest way to start the calculation is to know how much power your servers will be drawing. Per server or total. A typical single cpu server will draw 1amp or 120 watt (1 amp x 120 volt = 120 watt). Dual cpu server such as Xeon or AMD will draw 2 amps or 240 watt.

A server drawing 120 watts will require 408 BTU of cooling (120 x 3.4).

If you know the total amps your servers will be drawing you can use (amps x 120 x 3.4) to get total BTU required.

From experience i have found that on average each server uses 150 watts of power. To estimate cooling load of 100 servers multiple 100 x 150 x 3.4. 51000 BTW or 4.5 Tons (12,000 BTU in every TON). This is a bit of an over estimate but it is sufficient to cool not only the servers but UPS/Transformer and anything else typically found in a server room.

*Note all numbers are based on estimates. The totals you receive will be close to what you expect but not exact.