Running Head: AC POWER IN THE DATA CENTER

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When building the electrical infrastructure for PPI’s data center, the primary focus should be on the cost effectiveness of the construction in the long run. In this regard, choosing between AC and DC power supply for the data center is one of choosing between a known working and effective electrical supply method, and one that is really untested in the larger data center ecosystem. Alternating Current has been used in data centers since the earliest days of computing, and will likely be used into the future. This mostly has to do with the portability and given supply of AC from power companies, but also with the increased efficiencies and longevity that AC delivers.

AC is the de-facto standard when it comes to electricity supply. That is, given an AC source, hardware plugged into the infrastructure is more likely to be compatible over a competing DC supply. More often than not, power supplies in a hardware platform are built to take in AC power and transform it to DC for internal usage. Yes a DC power supply could be installed in the given hardware, but this would require a special purchase and may not portable to a different data center if it were ever required to move.

In any case, AC is the de-facto standard because it has been around for so long. Hardware manufacturers expect their systems to be plugged into AC power, and as such, build their systems with this in mind. This ensures that their products are able to be used in any viable environment, into the future.

In the past, AC/DC transformation was quite inefficient, and was DC to have been introduced as a standard around the dot-com bust it would likely have gained great popularity in terms of cost effectiveness. However, technological advances and governmental regulation have pushed AC/DC transformation efficiency to the near par with simply having DC run from the UPS (Rasmussen & Spitaels, 2012). Effectively, AC is now as efficient, or more so in some test, than moving to a DC system.

A primary consideration which should be thought through before moving to a DC platform, if so set on this course, is the fact that DC cannot be transformed. Once the current is set to DC, it is set to DC. That is not to say that it cannot be converted to AC, only that an inverter will need to be used, along with a transformer (efficiencies lost) in place of a transformer. Therefore, if a piece of equipment comes in which requires AC power, then the entire point of moving the data center to DC will have been for naught.

With this theme in mind, the viability of DC is in question, as well. As stated earlier, hardware manufacturers build their equipment with AC supply in mind. In most cases, requesting a purely DC power unit within the hardware is not possible and only AC is supplied. This will require specialty re-engineering of the hardware in-house, if PPI has the skillset on hand. If not, then the hardware will need to have AC supplied regardless of the given DC standard.

Reference

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