

IBM BladeCenter E Power Planning Guide

BladeCenter E refers to the original IBM BladeCenter (model 8677), renamed BladeCenter E in spring 2007

Terms within this document:

Front End PDU (FEPDU) – generally refers to a high amperage power distribution unit to which other, lower amperage distribution units will cascade, or high amperage devices such as a blade chassis will directly connect

Universal PDU (PDU) – lower amperage distribution unit which will generally plug into a FEPDU

UL – Underwriter Laboratories, a US certification group

1ph – single phase power, consisting of an A and B leg in the case of 208v power

3ph – 3 phase power, consisting of A, B, and C legs

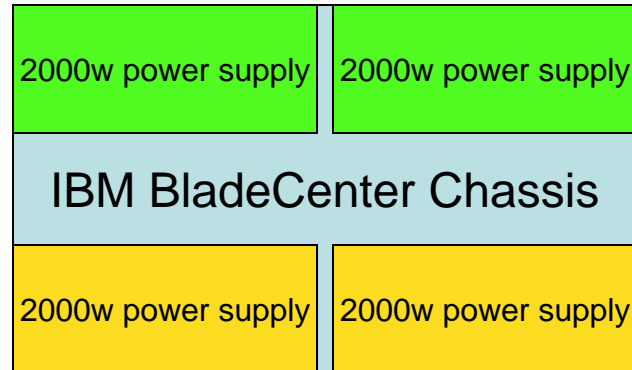
208v power – While available power could range from 200v thru 240v, all calculations are at 208v

This is a paper intended to help folks with power planning. It is not an official document of any sort.

It may well become dated. Use this at your own risk.

PDU models and details intentionally left out to be as generic as possible. Be aware the IBM, APC, and many others have various models with various plug counts and other features. It is not the intent of this document to perform 100% of your power planning, just to be a guide towards what you need.

Chassis Power Overview



A single 8677-xxx chassis has 4 power supplies.

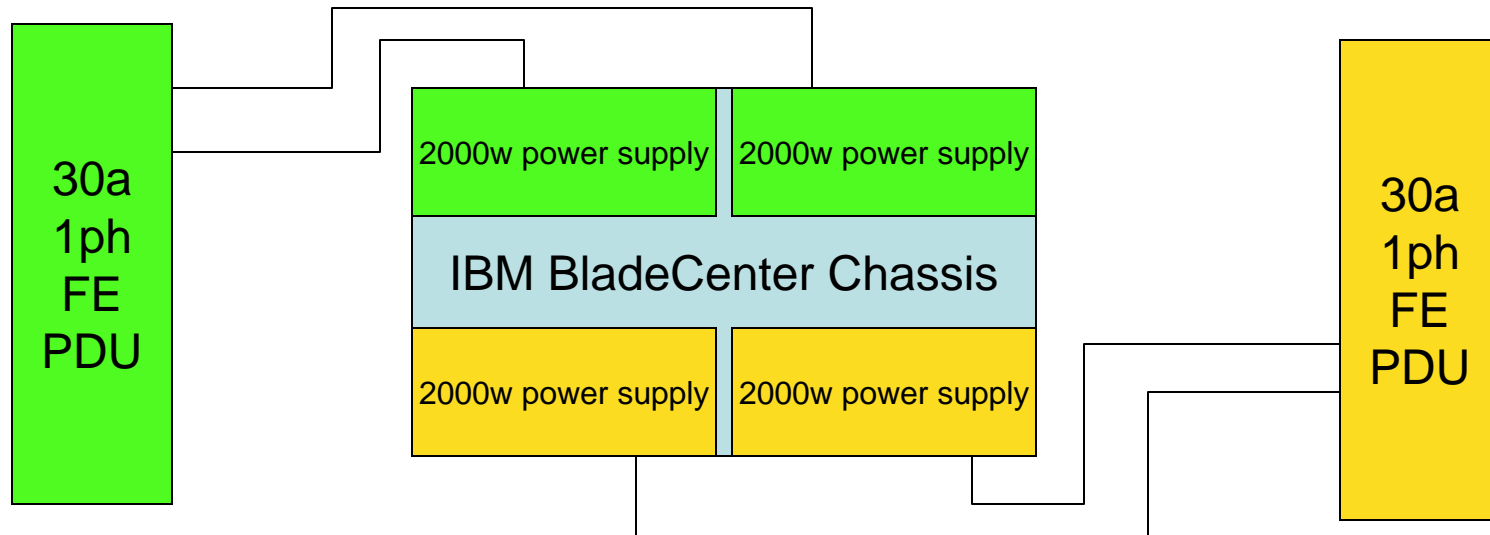
As of this writing, each power supply can pull as much as 2000 watts.

Each chassis can pull as much as 5250 watts total across all 4 power supplies, but no more than 4000 watts per (colored) pair.

Use 5250w for UPS and building power capacity planning, use 4000w for circuit planning. Power throttling features from Intel and AMD help insure that the entire chassis can continue running at 4000w or less (see IBM's literature for details)

A power supply on the left and a power supply on the right must be powered for the full chassis to function. While they don't have to both be on the top or bottom, color coding is used here to represent minimal circuit redundancy.

Single chassis example



Per chassis:

2x 30amp, 1 phase FE PDUs

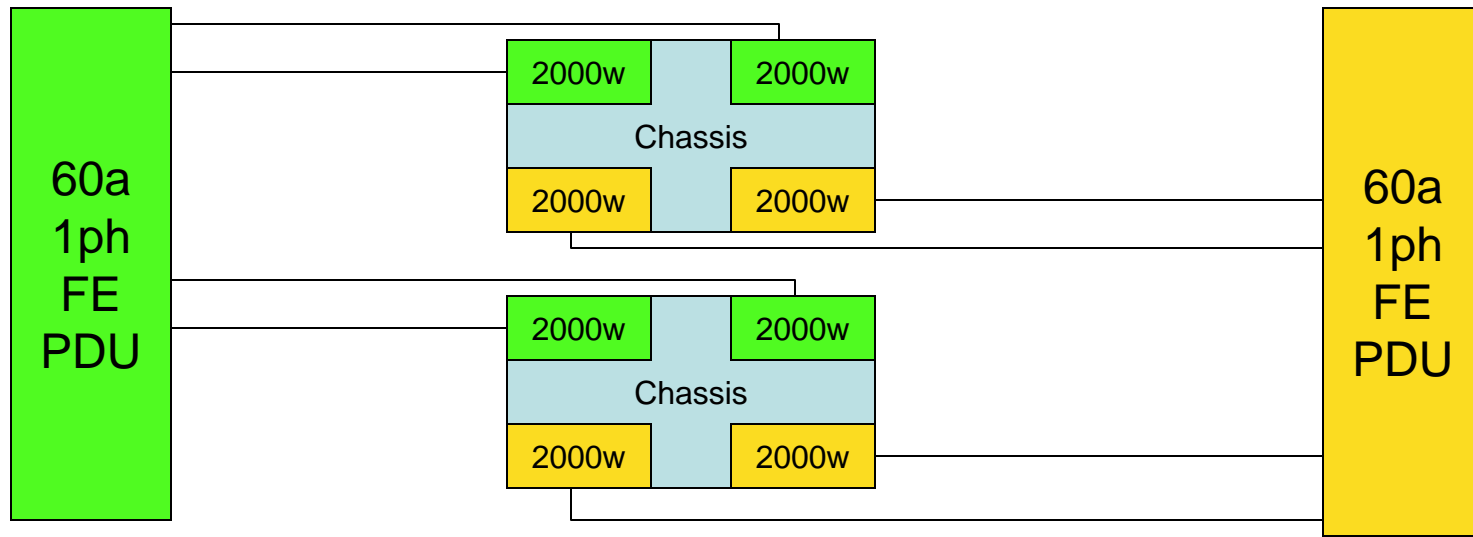
All device power connections are IEC-320-C19/C20 connectors

Assuming 208v power, there is a draw of approx 9.62amps per power supply, or a total of approx 19.24 amps per chassis. Figuring 24amp capacity per FEPDU, there is still some left over. In this arrangement, a universal PDU could be added for additional devices.

If no other devices are present, these PDUs could support power supply upgrades to 2500 watts at 208vac.

As always, UL derates all PDUs in the US by 20%

Two chassis example – 1phase



Per chassis pair:

2x 60amp, 1 phase FE PDUs

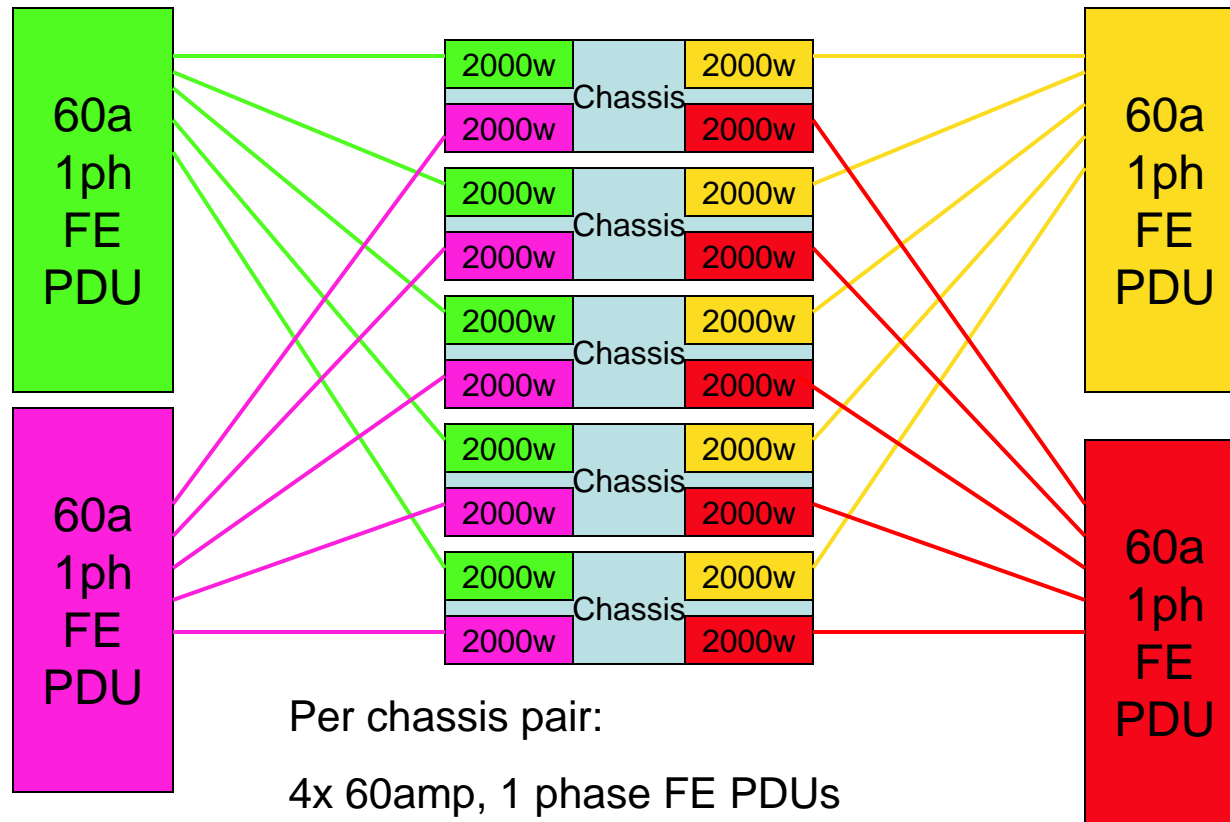
All device power connections are IEC-320-C19/C20 connectors

Assuming 208v power, there is a draw of approx 9.62amps per power supply, approx 19.24 amps per chassis, or a total of approx 38.48 amps. Figuring 48amp capacity per FE PDU, there is still some left over. In this arrangement, a universal PDU could be added for additional devices.

If no other devices are present, these PDUs could support power supply upgrades to 2500 watts at 208vac.

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Five chassis example – 1phase



Per chassis pair:

4x 60amp, 1 phase FE PDUs

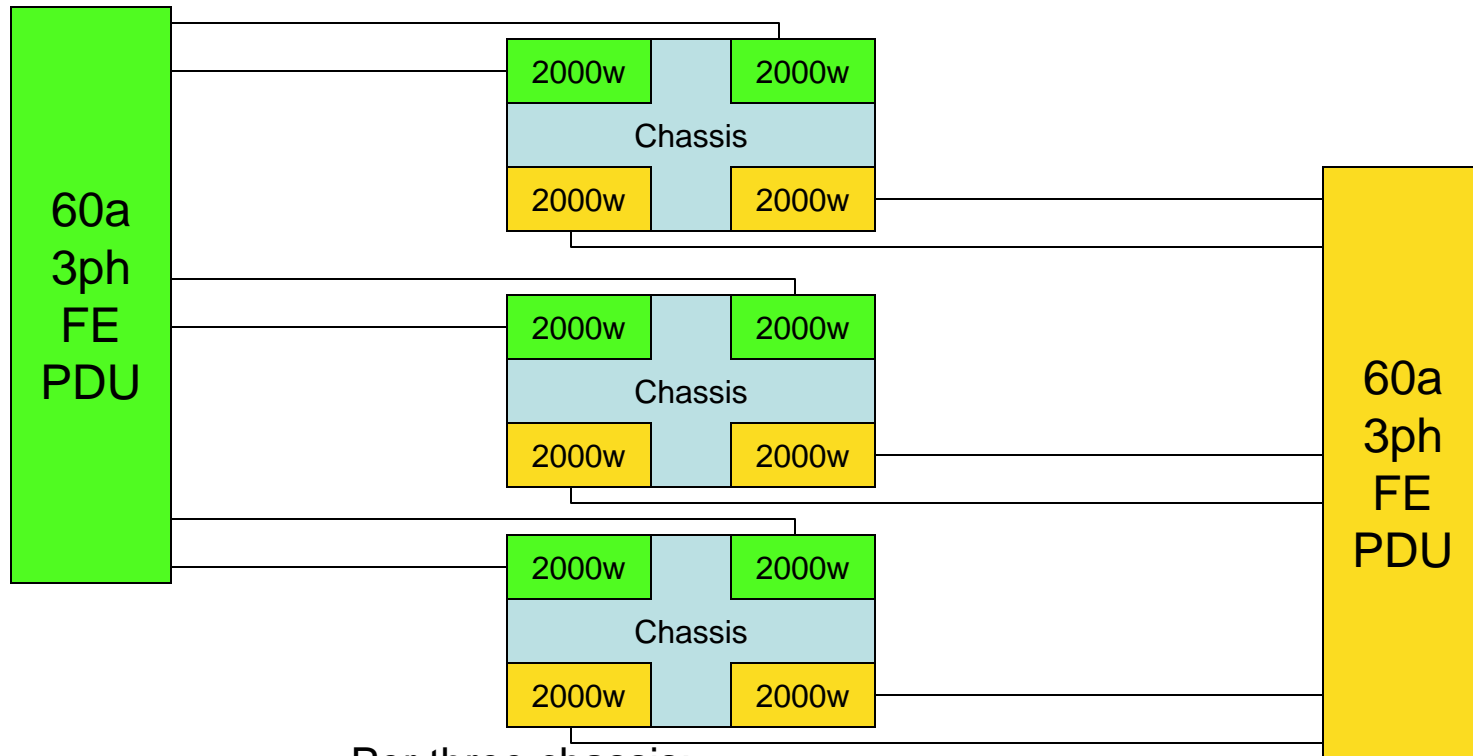
All device power connections are IEC-320-C19/C20 connectors

Assuming 208v power, there is a draw of approx 9.62amps per power supply. 5 chassis plugged into a single PDU would be a total of about 48.1amps, assuming 208vac and 100% loading of all power supplies. Figuring 48amp capacity per FEPDU, this is the very edge of the limits for each PDU.

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Most blade combos won't actually push to 2000 watts. Check actual load limits for your configuration to see how far within the 48amp range you really are. Power zone 1 (right side of the chassis, when viewed from the back) should pull less than zone 2, so you can always make it under 48a if you move one or two of those power supplies to the other side... makes for more complex cabling, but there will be room for error if that .1amp concerns you.

Three chassis example – 3phase



Per three chassis:

2x 60amp, 3 phase FE PDUs

All device power connections are IEC-320-C19/C20 connectors

Assuming 208v power, there is a draw of approx 9.62amps per power supply, approx 19.24 amps per chassis, or a total of approx 57.72 amps. Figuring 72amp capacity per FE PDU, there is still some left over. In this arrangement, a universal PDU could possibly be added for additional devices. However, the remaining power is distributed over 3 circuits.

If no other devices are present, these PDUs could support power supply upgrades to 2500 watts at 208vac.

As always, UL derates all PDUs in the US by 20%

Full Rack example – 3phase

