Formula list

Formula 1:

$$Number\ of\ cores\ required\ =\ Requests\ Per\ Second\ (RPS)\ *\ Avg\ task\ duration$$

Formula 2:

$$Total\ Number\ of\ Processors\ required\ *= (\frac{Number\ of\ Cores\ Required}{Core\ count\ for\ each\ processor})$$

$$Number\ of\ servers\ required\ =\ \frac{Total\ Number\ of\ processors\ required}{Number\ of\ processors\ on\ each\ server\ **}$$

*We must round it up such that total number of processors is a whole number.
**We assume one server hosts 2 Processors

Formula 3:

$$Average\ Power\ Draw\ per\ server(W)\ =\ Pn\ =\ (Pmax\ -\ Pidle) \times (\frac{n}{100}) + P_{idle}$$

$$Convert\ Watt\ to\ kWh = (W * 24)/1000$$

Formula 4:

$$Total\ Number\ of\ racks\ reqd\ =\frac{Total\ number\ of\ servers\ reqd}{Number\ of\ servers\ per\ rack*}$$

$$Floor\ space\ reqd\ by\ Racks = Number\ of\ racks * volume\ of\ a\ single\ 42U\ rack\ unit$$

$$Floor\ space\ reqd\ by\ Racks(w\ cooling = Floor\ space\ reqd\ by\ Racks * cooling\ multiplier\ **$$

$$Storage\ capacity\ per\ rack = number\ of\ racks * 4^{**}$$

*Cooling multiplier will depend on cooling solution used. Industry average figure can be used.
** 4 is used for storage/server ratio for storage capacity