CLAIMS

1. A method comprising:

by a controller,

acquiring status information of at least one resource of a data center, the data center including a server rack coupled to a power supply, wherein one or more service level agreements associated with the server rack include one or more contracts for power at respective power levels and respective levels of availability;

estimating, based on the status information, whether load on the power supply will exceed a threshold value at a time subsequent to a time of the estimating;

identifying, in response to the estimating and based at least on the one or more service level agreements associated with the server rack, the server rack for a reduction in load based on the one or more contracts for power; and

in response to identifying the server rack for the reduction in load, transmitting a command signal to the server rack to configure equipment of the server rack to operate at a reduced power supply level that is reduced from a power supply level at the time of the estimating and that is based on the one or more service level agreements associated with the server rack.

2. The method of claim 1, further comprising:

obtaining, from a management system of the data center, online/offline status of the at least one resource of the data center,

wherein the estimating further comprises estimating, based on the online/offline status, whether load on the power supply will exceed the threshold value at the time subsequent to the time of the estimating.

3. The method of claim 1, further comprising:

obtaining, from a management system of the data center, mechanical cooling efficiency status of the at least one resource of the data center

wherein the estimating further comprises estimating, based on the mechanical cooling efficiency status, whether load on the power supply will exceed the threshold value at the time subsequent to the time of the estimating.

4. The method of claim 1, further comprising:

obtaining, from a management system of the data center, status of at least one other server rack of the data center that is configured according to a different technical specification than the server rack,

wherein the estimating further comprises estimating, based on the status of the at least one other server rack, whether load on the power supply will exceed the threshold value at the time subsequent to the time of the estimating.

5. The method of claim 1, further comprising:

obtaining, from a management system of the data center, status of at least one other server rack of the data center that is configured according to a same technical specification as the server rack,

wherein the estimating further comprises estimating, based on the status of at least one other server rack, whether load on the power supply will exceed the threshold value at the time subsequent to the time of the estimating.

6. The method of claim 1, wherein the estimating comprises periodically or intermittently estimating whether load on the power supply will exceed the threshold value at a time subsequent to the time of the estimating.

7. The method of claim 1, further comprising:

evaluating the one or more service level agreements that are associated with the server rack, wherein the one or more contracts for power include a first tier contract for power at a first level of availability and a second tier contract for power at a second level of availability that is different than the first level of availability; and

calculating a magnitude of the reduced power supply level based on the second level of availability.

8. The method of claim 1, further comprising:

evaluating the one or more service level agreements that are associated with the server rack and a service level agreement that is associated with at least one other server rack of the data center, wherein the one or more contracts for power include a first tier contract for power at a first level of availability and a second tier contract for power at a second level of availability that is different than the first level of availability, and wherein the service level agreement that is associated with the at least one other server rack includes a third tier contract for power at a third level of availability that is different than the first level of availability and the second level of availability; and

calculating a magnitude of the reduced power supply level based on the one or more service level agreements that are associated with the server rack and the service level agreement that is associated with the least one other server rack.

9. The method of claim 1, further comprising:

calculating a magnitude of the reduced power supply level by:

querying a structured database that is configured to store the one or more service level agreements that are associated with the server rack and a plurality of other service level agreements each associated with at least one of a plurality of other server racks of the data center, and

calculating a ratio of a first parameter that represents a reduction to running load to prevent load on the power supply from exceeding the threshold value and a second parameter that represents a number of server racks of the data center, selected from among the server rack and the plurality of other server racks, that are associated with a service level agreement having a lowest service level agreement priority to obtain the magnitude of the reduced power supply level, wherein the server rack is associated with a service level agreement associated with the lowest service level agreement priority.

10. The method of claim 1, wherein the server rack and at least one of a plurality of other server racks of the data center are associated with a service level agreement associated with a lowest service level agreement priority, and wherein the transmitting comprises:

transmitting the command signal to the server rack and to the at least one of the plurality of other server racks to configure equipment of the server rack and the at least one of the plurality of other server racks to operate at the reduced power supply level.

11. A controller comprising:

at least one processor coupled to a communication unit, wherein the at least one processor is configured to:

activate the communication unit to receive, from a system of the data center, status information of at least one resource of the data center, the data center including a server rack coupled to a power supply, wherein one or more service level agreements associated with the server rack include one or more contracts for power at respective power levels and respective levels of availability;

perform a calculation, based on the status information, to estimate load on the power supply at a time subsequent to a time of the calculation;

identify, based at least on the one or more service level agreements associated with the server rack, the server rack for a reduction or increase in load based on the one or more contracts for power; and

activate the communication unit to transmit, to the server rack,, a command signal to self-configure equipment to operate at a power supply level, at the time subsequent to the time of the calculation, that is based on the calculation and the one or more service level agreements associated with the server rack to realize the reduction or increase in load.

12. The controller of claim 11, wherein the power supply level subsequent to the time of the calculation is reduced in magnitude from a power supply level of the server rack at the time of the calculation.

13. The controller of claim 11, wherein the power supply level subsequent to the time of the calculation is increased in magnitude from a power supply level at the time of the calculation.

14. The controller of claim 11, wherein the at least one processor is configured to:

determine online/offline status of the at least one resource of the data center from the status information; and

perform the calculation to estimate load on the power supply at the time subsequent to the time of the calculation based on the online/offline status of the at least one resource.

15. The controller of claim 11, wherein the at least one processor is configured to:

determine mechanical cooling efficiency status of the at least one resource of the data center based from the status information; and

perform the calculation to estimate load on the power supply at the time subsequent to the time of the calculation based on the mechanical cooling efficiency status of the at least one resource.

16. The controller of claim 11, wherein the at least one processor is configured to:

determine status of at least one other server rack of the data center that is configured according to a different technical specification than each one of a plurality of other server racks based from the status information; and

perform the calculation to estimate load on the power supply at the time subsequent to the time of the calculation based on the status of the at least one other server rack.

17. The controller of claim 11, wherein the at least one processor is configured to:

determine status of at least one other server rack of the data center that is configured according to a same technical specification as each one of a plurality of other server racks based from the status information; and

perform the calculation to estimate load on the power supply at the time subsequent to the time of the calculation based on the status of the at least one other server rack.

18. The controller of claim 11, wherein the at least one processor is configured to:

evaluate one or more service level agreements for each one of a plurality of server racks including the server rack; and

control an order by which command signals, including the command signal, are transmitted to each one of the plurality of server racks based on respective priorities that are assigned to the one or more service level agreements for each one of the plurality of server racks.

19. A system comprising:

a plurality of server racks in a data center each coupled to a power supply and configured according to a same technical specification, wherein each of the plurality of server racks is associated with one or more service level agreements that include one or more contracts for power at respective power levels and respective levels of availability; and

a controller configured to:

acquire status information of at least one resource of the data center;

perform a calculation, based on the status information, to determine whether load on the power supply will exceed a threshold value at a time subsequent to a time of the calculation;

identify, in response to the calculation and based at least on the one or more service level agreements associated with each of the plurality of server racks, at least one server rack of the plurality of server racks for a reduction or increase in load based on the one or more contracts for power of the one or more service level agreements associated with each server rack of the at least one server rack; and

transmit, in response to the identification of the at least one server rack, a command signal to each server rack of the at least one server rack to self-configure equipment to operate at a power supply level that is different from a power supply level at the time of the calculation and that is based on the one or more service level agreements associated with each server rack of the at least one server rack.

20. The system of claim 19, wherein the controller is further configured to:

signal a management system of the data center to acquire online/offline status and mechanical cooling efficiency status of the at least one resource of the data center; and

perform the calculation to determine, based on at least one of the online/offline status and the mechanical cooling efficiency status, whether load on the power supply will exceed the threshold value at the time subsequent to a time of the calculation.

21. The system of claim 19, wherein the controller is further configured to:

evaluate the one or more service level agreements for each one of the plurality of server racks; and

control an order by which the command signal is transmitted to each server rack of the at least one server rack based on a priority that is assigned to and by a level that is a function of the one or more service level agreements for each server rack of the at least one server rack so that power availability as defined by the one or more service level agreements for each server rack of the at least one server rack is met over a particular time interval.

22. The system of claim 19, wherein each one of the plurality of server racks is configured according to a same technical specification that supports equipment to self-configure equipment to operate at power supply level that is different from the power supply level at the time of the calculation.

23. The system of claim 19, wherein each one of the plurality of server racks includes at least one power distribution unit and at least one bank of batteries to supply power to equipment incorporated thereon.