WHAT IS CLAIMED IS:

1. A computer-implemented method of allocating power to computing machines, the method comprising:

receiving, at a computing allocation system and from a plurality of computing machines, electronic communications that include: i) a power value that represents a first request for a first power allotment that is expected to be used by the first computing machine during a predetermined period of time; and ii) one or more first priority values that represent priorities of one or more tasks expected to be executed by the first computing machine during the predetermined period of time;

determining, at the computing allocation system, a plurality of scores associated with the particular computing machines, using priority values for the particular computing machines as inputs to a scoring function;

granting, with the computing allocation system and to the plurality of computing machines, power allotments for the plurality of computing machines in accordance with determined scores for the plurality of computing machines, a higher score corresponding to a relatively larger power allotment for a computing device; and

sending an electronic communications to the plurality of computing machines, the communications formatted to cause particular ones of the plurality of computing machines to take a power allotment in accordance with their granted allotments.

2. The method of claim 1, wherein the particular ones of the plurality of computing machines send electronic communication to the computing allocation system after determining that the one or more tasks expected to be executed during a predetermined period of time will require more power than an available amount of power assigned to the particular computing machine.

3. The method of claim 2, wherein the particular ones of the computing machines limit their power consumption to an available amount of power assigned to particular ones of the computing machines while their requests for a power allotment are pending at the computing allocation system.

4. The method of claim 1, wherein the scores are maintained in an ordered electronic list of scores, and wherein granting power allotments comprises determining an appropriate position within the ordered electronic list of scores for a calculated first score and placing the calculated first score within the ordered electronic list of scores at the appropriate position.

5. The method of claim 1, further comprising maintaining, at the computing allocation system, an electronic reserve list of computing machines that are each operating below a respective power limit assigned to the respective computing machine.

6. The method of claim 5, wherein the computing allocation system sends a subsequent communications to the plurality of computing machines from the electronic reserve list, the subsequent communications providing a new power limit for particular ones of the computing machines, the new power limit being lower than the power limit previously assigned to particular ones of the computing machines.

7. The method of claim 6, wherein a difference between the power limit previously assigned to a particular computing machine and a new power limit for the particular computing machine is substantially equal to a power allotment granted to a computing machine associated with a top score of the scores.

8. The method of claim 5, wherein the power allotment requested by a computing machine associated with a top-ranked score exceeds an amount of reserve power associated with the computing machines in the electronic reserve list, and wherein one or more of the plurality of computing devices sends an electronic communication to others of the plurality of computing devices, the electronic communication comprising a subsequent power value that represents a request for a power allotment and one or more priority levels.

9. The method of claim 8, wherein the subsequent power value represents a difference between the power allotment requested by a computing machine associated with a top score and an amount of reserve power associated with the computing machines in the electronic reserve list.

10. The method of claim 1, wherein the computing allocation system controls power allocation to a plurality of computing machines repeatedly at a periodic frequency.

11. The method of claim 10, wherein the periodic frequency is about 60 Hz.

12. The method of claim 1, wherein the particular ones of the plurality of computing devices source the granted power allotment from an excess capacity of a single computing machine.

13. The method of claim 1, wherein particular ones of the plurality of computing devices source the granted power allotment from excess capacities of two or more computing machines.

14. A computer-implemented system for allocating power among a plurality of computing machines in a distributed system of computing machines, the device comprising:

an interface arranged to receive electronic requests from computing machines for power allotments, the electronic requests each including a power value and one or more priority values, wherein the power value represents a request for a power allotment that is expected to be used by the requesting computing machine during a period of time and the one or more priority values represent priorities of one or more tasks expected to be executed by the requesting computing machine during the period of time;

a scoring module, executable on a processor of the device, programmed to calculate scores for each of the requesting computing machines using the power values and priority values;

a power allotment module, executable on the processor, and programmed to compare scores generated by the scoring module and assign power allotments for each of the computing machines using the scores by providing an allotment message to each of the computing machines.

15. The system of claim 14, wherein the interface is programmed to provide to a plurality of distributed computing machines messages formatted to cause

16. The system of claim 14, wherein scoring module maintains the scores in an ordered electronic list of scores, and wherein assigning power allotments comprises determining an appropriate position within the ordered electronic list of scores for a calculated first score and placing the calculated first score within the ordered electronic list of scores at the appropriate position.

17. The system of claim 14, wherein the power allotment module is programmed to maintain an electronic reserve list of computing machines that are each operating below a respective power limit assigned to the respective computing machine.

18. The system of claim 17, wherein the interface is programmed to send a subsequent communications to the plurality of computing machines from the electronic reserve list, the subsequent communications providing a new power limit for particular ones of the computing machines, the new power limit being lower than the power limit previously assigned to particular ones of the computing machines.

19. A computer-implemented method of allocating power among a plurality of computing machines in a distributed system of computing machines, the method comprising:

receiving, at a first power allocation unit in a hierarchical arrangement of power allocation units, an electronic communication from a second power allocation unit requesting a change in a power level allocated to the second power allocation unit at a level in the hierarchical arrangement below the first power allocation unit;

sending, from the first power allocation unit to the second power allocation unit a message defining a level of power allocated to the second power allocation unit; and

controlling power use of a computing device whose power is managed by the second power allocation unit so as to maintain power draw of the computing device below the power allocation level during a power allocation period.

20. The method of claim 19, wherein the second power allocation unit is implemented as a daemon application on the computing device.

21. The method of claim 19, further comprising inferring the power draw of the computing device based on a computing load for the computing device.

CLAIMS

1. A computer-implemented method of allocating power to computing machines, the method comprising:

receiving, at a computing allocation system and from a plurality of computing machines, electronic communications comprising:

i) a first request, comprising a power value, that represents a first power allotment that is expected to be used by a first computing machine during a predetermined period of time; and

ii) one or more first priority values that represent priorities of one or more tasks expected to be executed by the first computing machine during the predetermined period of time;

determining, using a scoring function at the computing allocation system, a plurality of scores associated with the plurality of computing machines, the scoring function comprising the first priority values, where the plurality of scores are maintained in an ordered electronic list;

granting, with the computing allocation system and to the plurality of computing machines, power allotments for the plurality of computing machines in accordance with a comparison of the determined scores for the plurality of computing machines, a higher score corresponding to a relatively larger power allotment for a computing machine, the power allotments granted based on a determination of an appropriate position within the ordered electronic list of scores for a determined first score and placing the determined first score within the ordered electronic list of scores at the appropriate position;

sending responsive electronic communications to the plurality of computing machines, the responsive electronic communications formatted to cause particular ones of the plurality of computing machines to take a power allotment in accordance with their granted allotments;

determining, by at least one particular computing machine of the plurality of computing machines, an excess power capacity; and

reporting, by the at least one particular computing machine, the excess power capacity,

wherein the computing allocation system controls power allocation to the plurality of computing machines repeatedly at a periodic frequency.

2. The method of claim 1, wherein one or more computing machines of the particular ones of the plurality of computing machines send more electronic communications to the computing allocation system after determining that the one or more tasks expected to be executed during a predetermined period of time will require more power than an available amount of power assigned to the one or more computing machines of the particular ones of the plurality of computing machines.

3. The method of claim 2, wherein the one or more computing machines of the particular ones of the computing machines limit their power consumption to an available amount of power assigned to the one or more computing machines of the particular ones of the computing machines while their requests for a power allotment are pending at the computing allocation system.

4. The method of claim 1, further comprising maintaining, at the computing allocation system, an electronic reserve list of underutilized computing machines that are each operating below an initial respective power limit assigned to the respective underutilized computing machine.

5. The method of claim 4, wherein the computing allocation system sends subsequent communications to the plurality of computing machines from the electronic reserve list, the subsequent communications providing new power limits for the underutilized computing machines, each respective new power limit being lower than the initial respective power limit previously assigned to the respective underutilized computing machines.

6. The method of claim 5, wherein a difference between the initial respective power limits previously assigned to a particular computing machine of the underutilized computing machines and the new power limit for the particular computing machine of the underutilized computing machines is substantially equal to a power allotment granted to a computing machine associated with a top score of the scores.

7. The method of claim 4, wherein the power allotment requested by a computing machine associated with a top-ranked score exceeds an amount of reserve power associated with

the underutilized computing machines in the electronic reserve list, and wherein one or more of the plurality of computing machines sends subsequent electronic communications to others of the plurality of computing machines, the subsequent electronic communications comprising a subsequent request comprising a subsequent power value that represents a power allotment, the subsequent request also comprising one or more priority levels.

8. The method of claim 7, wherein the subsequent power value represents a difference between the power allotment requested by a computing machine associated with a top score and an amount of reserve power associated with the computing machines in the electronic reserve list.

9. The method of claim 1, wherein the periodic frequency is about 60 Hz.

10. The method of claim 1, wherein the particular ones of the plurality of computing machines source the granted power allotment from an excess capacity of a single computing machine.

11. The method of claim 1, wherein particular ones of the plurality of computing machines source the granted power allotment from excess capacities of two or more computing machines.

12. A computer-implemented system for allocating power among a plurality of computing machines in a distributed system of computing machines, the system comprising:

an interface arranged to receive electronic requests from one or more requesting computing machines of the plurality of computing machines for power allotments, the electronic requests each including a power value and one or more priority values, wherein the power value represents a power allotment that is expected to be used by the requesting computing machine during a period of time and the one or more priority values represent priorities of one or more tasks expected to be executed by the requesting computing machine during the period of time;

a scoring module, executable on a processor, programmed to calculate scores for each of the requesting computing machines using the power values and priority values, where the scores are maintained in an ordered electronic list; and

a power allotment module, executable on the processor, and programmed to compare scores in the ordered electronic list that are generated by the scoring module and assign power allotments for each of the one or more computing machines using the scores by providing an allotment message to each of the one or more computing machines, the power allotments granted based on a determination of an appropriate position within the ordered electronic list of scores for a calculated first score and placing the calculated first score within the ordered electronic list of scores at the appropriate position, wherein a higher score corresponds to a relatively larger power allotment for a computing machine,

wherein at least one of the plurality of computing machines determines and reports an excess power capacity, and

at least a first computing machine of the plurality of computing machines adjusts current consumption when notified of an occurrence of a current interruption, overcurrent condition, or maximum load condition.

13. The system of claim 12, wherein the interface is programmed to provide messages to the plurality of computing machines, the messages formatted to cause particular ones of the plurality of computing machines to take a power allotment in accordance with the assigned power allotments.

14. The system of claim 12, wherein the power allotment module is programmed to maintain an electronic reserve list of computing machines that are each operating below a respective power limit assigned to the respective computing machine.

15. The system of claim 14, wherein the interface is programmed to send subsequent communications to the plurality of computing machines from the electronic reserve list, the subsequent communications providing a new power limit for particular ones of the plurality of computing machines from the electronic reserve list, the new power limit being lower than the power limit previously assigned to particular ones of the plurality of computing machines from the electronic reserve list.

16. The method of claim 1, further comprising:

sending to at least one particular computing machine of the plurality of computing machines an electronic notification during an occurrence of a current interruption, overcurrent condition, or maximum load condition; and

adjusting current consumption by the at least one particular computing machine as a response to the electronic notification.

17. The method of claim 1, further comprising:

determining that the one or more tasks expected to be executed during a predetermined period of time requires more power than an available amount of power assigned to the first computing machine; and

based on the determination, sending, by the first computing machine, an electronic communication to other ones of the plurality of the computing machines.

18. The system of claim 12, wherein the interface, the scoring module, and the power allotment module are all parts of a first computing machine, the system further comprising:

a second interface, a second scoring module, and a second power allotment module on a second computing machine,

wherein the interface is configured to transmit requests to and receive requests from the second interface, and the second interface is configured to transmit requests to and receive requests from the first interface.