

CLAIMS:

1. A method of controlling a datacentre comprising a plurality of servers to execute a plurality of jobs, the method comprising:
 - 5 receiving a request to execute a job from a user;
 - determining an allocated server on which to execute the job; and
 - executing the job on the allocated server,
 wherein the determining comprises:
 - classifying the job according to its resource requirement;
 - 10 selecting a subset of the servers that fulfil the resource requirements of the job;
 - determining the allocated server that can execute the job with highest energy efficiency,
 and wherein a total resource estimate for all jobs running on the server from time to time exceeds the resources of at least one of the servers, wherein the determining the server which can execute the job with the highest energy efficiency comprises:
 - 15 calculating an overallocation rate, OAR, of each server in the subset of servers;
 - determining if each server has available resources to execute the job given the OAR;
 - determining estimated energy efficiency of each server if the job is assigned to the server; and
 - executing the job on the server which has available resources and the highest estimated
 - 20 energy efficiency,
 - wherein the OAR is varied based on overestimation patterns of the user.
2. The method of claim 1, wherein the calculating the OAR comprises:
 - calculating an overselling profit rate (P) of the server;
 - 25 establishing a category of the user;
 - calculating the OAR from a statistical distribution describing overestimation patterns of the category of the user, using the overselling profit rate.
3. The method of claim 2, wherein the overselling profit rate is calculated according to the
 - 30 formula:
$$P = \frac{R}{R + C}$$

wherein R is a difference in energy efficiency (EE) caused by allocating the job to the server, and

wherein C is the EE after allocation multiplied by the estimated change in EE.

- 35 4. The method of any preceding claim, wherein the classifying the job comprises:
 - training a decision tree classifier on a training set of historical tracelog data;
 - classifying the job with the decision tree classifier.

5. The method of any preceding claim, wherein the selecting the subset of the servers comprises:
 - calculating a similarity level between a set of server features and a set of job constraints, and
 - selecting the servers having the similarity level equal to or greater than a predetermined minimum similarity value.
6. The method of any preceding claim, wherein the method further comprises:
 - detecting an overload event in at least one of the plurality of servers;
 - resolving the detected overload event by evicting, pausing or migrating jobs having a lowest priority and a shortest running time.
7. The method of claim 3, wherein the estimated change in EE is calculated using an estimated performance interference.
8. The method of claim 7, wherein the estimated performance interference is an estimated aggregate of a performance interference produced by the plurality of jobs co-located on the server, based on a class of each job located on the server.
9. A computer management system, CMS, for managing a computer datacentre comprising a plurality of servers, each comprising at least one virtual container, VC, the CMS comprising:
 - a co-ordinator service module configured to receive a request to execute a job from a user , to control the CMS to determine a server on which the job will be executed and to control the CMS to execute the job;
 - a job classification service module operable to classify the job according to its resource requirements;
 - a resource description reasoner module operable to select a subset of servers which fulfil a set of constraints of the job;
 - a dynamic status host monitor module operable to record the status of each server in the datacentre;
 - a datacentre communication module operable to communicate with the plurality of servers, and
 - an overallocation policy service module operable to determine the server which can execute the job with highest energy efficiency from the subset of servers and the class of the job,
 wherein the overallocation policy service is operable to:
 - calculate an overallocation rate, OAR, of each server in the subset of servers;

determine if each server has available resources to execute the job given the OAR;

determine estimated energy efficiency of each server if the job is assigned to the server,

5 wherein the overallocation policy service is operable to vary the OAR based on overestimation patterns of the user.

10. The system of claim 9, wherein the system additionally comprises an overload manager operable to detect an overload event in at least one of the plurality of servers and resolve the
10 detected overload event by evicting, pausing or migrating jobs having a lowest priority and a shortest running time.

11. The system of claim 9 or 10, further comprising:
a user classification service module operable to establish a category of a user and
15 determine a statistical distribution describing overestimation patterns of the category of the user.

12. The system of claim 11, wherein the overallocation policy service is further operable to:
calculate an overselling profit rate (P) of the server;
20 calculate the OAR from the statistical distribution describing overestimation patterns of the category of the user, using the overselling profit rate (P).

13. The system of claim 12, wherein the overallocation policy service is operable to calculate the overselling profit rate according to the formula:

25
$$P = \frac{R}{R + C}$$

wherein R is a difference in energy efficiency (EE) caused by allocating the job to the server, and

wherein C is the EE after allocation multiplied by the estimated change in EE.

30 14. The system of any of claims 9 to 13, wherein the resource description reasoner is operable to:

calculate a similarity level between a set of server features and a set of job constraints,
and

select the servers having the similarity level equal to or greater than a predetermined
35 minimum similarity value.

15. A computer datacentre comprising a plurality of servers, each comprising at least one virtual container, VC, wherein the computer datacentre incorporates a computer management system, CMS, as claimed in any one of claims 9 to 14.
- 5 16. A computer-readable storage medium having computer-executable components which when executed cause a computing device to perform the method of any of claims 1-8.