CLAIMS

1. A system for supervising operation of at least one machine (121-125, 500) of an industrial installation or for supervising such operation and actuating the at least one machine (121-125, 500) based on such supervision, the system comprising:

a network (100-102) comprising a server (10-12) and a plurality of devices (20-27) forming a computing cluster, at least some devices of the plurality of devices (20-27) being connectable to a machine (121-125, 500) of the industrial installation for receiving sensor data from the machine, each device (20-27) of the at least some devices comprising:

a first processor (61) configured to compute in real-time, with data acquirable from the machine (121-125, 500) to which the device (20-27) is connectable, a first processing task (1501) for solving a first query (1500) related to the operation of a machine or a component thereof to which a device is connectable; and

a second processor (62) configured to share its processing power with the network (100-102), and to compute, when assigned by the server (10-12), at least one thread (1510a-1510n) of a second processing task (1501) for solving a second query (1500) related to the operation of at least one machine or a component thereof to which at least one device is connectable;

the server (10-12) being configured to:

control the computing cluster;

partition the second processing task (1501) into a plurality of threads (1510a-1510n); and

assign one or more threads (1510a-1510n) of the plurality of threads to the second processor (62) of at least some devices of the plurality of devices (20-27).

2. The system of claim 1, wherein the at least some devices comprise each device (20-27) of the plurality of devices (20-27).

3. The system of any preceding claim, wherein the first processing task (1501) comprises:

preprocessing the data to form a data set, and selecting a subset of data, from the data set, for solving the first query (1500); or

preprocessing the data to form a data set for solving the first query (1500).

4. The system of any preceding claim, wherein the first processor (61) is further configured to derive an instruction after solving the first query (1500), and to transmit the instruction to the second processor (62) of a same device or the machine (121-125, 500) connectable to the device (20-27).

5. The system of any preceding claim, wherein the second processor (62) is further configured to locally compute a third processing task (1501) for solving a query (1500).

6. The system of claim 5, wherein the third processing task (1501) comprises processing data obtainable from the server (10-12) or any device of the plurality of devices (20-27) to form a data set for solving the query (1500).

7. The system of any preceding claim, wherein the server (10-12) is further configured to:

receive outputs of the one or more threads (1510a-1510n) from the at least some devices of the plurality of devices (20-27);

process the outputs to compute the second processing task (1501); and

provide a solution to the second query (1500).

8. The system of any preceding claim, wherein the second processor (62) is further configured to send data to the server (10-12) for generating the second processing task (1501), the data sent to the server (10-12) being data acquirable from the machine (121-125, 500) to which the device (20-27) is connectable (1501) and/or a solution for the first query (1500).

9. The system of any preceding claim, wherein each device of the at least some devices is configured to perform data acquisition, from the machine (121-125, 500) to which the device is connectable, synchronized with data acquisition performed by other devices of the at least some devices, from the machine (121-125, 500) each of the other devices is connectable to.

10. The system of any preceding claim, further comprising a networking device (200) for transmitting data within the network (100-102) to a computing device external to the network (100-102), the computing device being preferably configured to perform fog computing or cloud computing.

11. The system of any preceding claim, wherein the server (12) comprises:

a processor configured to run a first instruction set architecture different from a second instruction set architecture run by the second processor (62) of each device of the at least some devices; and

a network interface (19) connectable to a device (27) of the plurality of devices (20-27), the network interface (19) being configured to convert instructions from the first instruction set architecture to the second instruction set architecture and vice versa.

12. A device (20-27) for supervising operation of at least one machine (121-125, 500) of an industrial installation or for supervising such operation and actuating the at least one machine (121-125, 500) based on such supervision, the device (20-27) comprising:

a first processor (61) configured to compute in real-time, with data acquirable from the at least one machine (121-125, 500) to which the device (20-27) is connectable, a first processing task (1501) for solving a first query (1500) related to the operation of a machine or a component thereof to which a device is connectable; and

a second processor (62) configured to share its processing power with a computing cluster network (100-102) to which the device (20-27) is connectable, and to compute, when assigned by a device of the network (100-102), at least one thread (1510a-1510n) of a second processing task (1501) for solving a second query (1500) related to the operation of at least one machine or a component thereof to which at least one device is connectable.

13. The device of claim 12, wherein the second processor (62) is further configured to send data to a server (10-12) of the network (100-102) for generating the second processing task (1501), the data sent to the server (10-12) being data acquirable from the machine (121-125, 500) to which the device (20-27) is connectable (1501) and/or a solution for the first query (1500).

14. The device of any of claims 12-13, wherein the first processor (61) and/or the second processor (62) comprises a multiprocessor system-on-chip.

15. The device of any of claims 12-14, wherein the second processor (62) is further configured to locally compute a third processing task (1501) for solving a query (1500).

16. The device of any of claims 12-15, wherein the first processing task (1501) comprises:

preprocessing the data to form a data set, and selecting a subset of data, from the data set, for solving the first query (1500); or

preprocessing the data to form a data set for solving the first query (1500).

17. The device of any of claims 12-16, wherein the first processor (61) is further configured to derive an instruction after solving the first query (1500), and to transmit the instruction to the second processor (62) of a same device or the machine (121-125, 500) connectable to the device (20-27).

18. An industrial installation comprising:

a plurality of machines (121-125, 500); and

a network (100-102) for supervising operation of at least one machine (121-125, 500) of the plurality of machines or for supervising such operation and actuating the at least one machine (121-125, 500) based on such supervision, the network (100-102) comprising a server (10-12) and a plurality of devices (20-27) forming a computing cluster;

at least some devices of the plurality of devices (20-27) are connectable to a machine (121-125, 500) of the plurality of machines for receiving sensor data from the machine, each device (20-27) of the at least some devices comprising:

a first processor (61) configured to compute in real-time, with data acquirable from the machine (121-125, 500) to which the device (20-27) is connectable, a first processing task (1501) for solving a first query (1500) related to the operation of a machine or a component thereof to which a device is connectable; and

a second processor (62) configured to share its processing power with the network (100-102), and to compute, when assigned by the server (10-12), at least one thread (1510a-1510n) of a second processing task (1501) for solving a second query (1500) related to the operation of at least one machine or a component thereof to which at least one device is connectable;

the server (10-12) is configured to:

control the computing cluster;

partition the second processing task (1501) into a plurality of threads (1510a-1510n); and

assign one or more threads (1510a-1510n) of the plurality of threads to the second processor (61) of at least some devices of the plurality of devices (20-27).

19. The industrial installation of claim 18, wherein the at least some devices comprise each device (20-27) of the plurality of devices (20-27).

20. The industrial installation of any of claims 18 and 19, wherein the server (10-12) is further configured to:

receive outputs of the one or more threads (1510a-1510n) from the at least some devices of the plurality of devices (20-27);

process the outputs to compute the second processing task (1501); and

provide a solution to the second query (1500).

21. A method for supervising operation of at least one machine (121-125, 500) of an industrial installation or for supervising such operation and actuating the at least one machine (121-125, 500) based on such supervision, by means of a network (100-102) comprising a server (10-12) and a plurality of devices (20-27) forming a computing cluster, wherein at least some

devices of the plurality of devices (20-27) are connectable to a machine (121-125, 500) of the industrial installation, the method comprising:

acquiring, each device of the at least some devices, sensor data from the machine to which the device is connectable to;

computing in real-time, at a first processor of each device (20-27) of the at least some devices, a first processing task for solving a first query (1500) with the data acquired;

receiving, each device of the at least some devices, at least one thread of a second processing task for solving a second query when assigned by the server;

computing, at a second processor of each device of the at least some devices, the at least one thread received, the second processor being configured to share its processing power with the network;

at the server (10-12), controlling the computing cluster, partitioning the second processing task (1501) into a plurality of threads (1510a-1510n), and assigning one or more threads (1510a-1510n) of the plurality of threads to the second processor (62) of at least some devices of the plurality of devices (20-27).

22. The method of claim 21, wherein the at least some devices comprise each device (20-27) of the plurality of devices (20-27).

23. The method of any of claims 21-22, wherein computing the first processing task (1501) comprises: preprocessing the data to form a data set, and selecting a subset of data, from the data set, for solving the first query (1500); or preprocessing the data to form a data set for solving the first query (1500).

24. The method of any of claims 21-23, further comprising, at the first processor (61), deriving an instruction after solving the first query (1500), and transmitting the instruction to the second processor (62) of a same device or the machine (121-125, 500) connectable to the device (20-27).

25. The method of any of claims 21-24, further comprising, at the second processor (62), locally computing a third processing task (1501) for solving a query (1500).

26. The method of claim 25, wherein computing the third processing task (1501) comprises processing data obtainable from the server (10-12) or any device of the plurality of devices (20-27) to form a data set for solving the query (1500).

27. The method of any of claims 21-26, further comprising, at the server (10-12): receiving

outputs of the one or more threads (1510a-1510n) from the at least some devices of the plurality of devices (20-27); processing the outputs to compute the second processing task (1501); and providing a solution to the second query (1500).

28. The method of any of claims 21-27, wherein each device of the at least some devices perform data acquisition, from the machine (121-125, 500) to which the device is connectable, synchronized with data acquisition performed by other devices of the at least some devices, from the machine (121-125, 500) each of the other devices is connectable to.

29. The method of any of claims 21-28, further comprising, by means of a networking device (200), transmitting data within the network (100-102) to a computing device external to the network (100-102).