

What is claimed is:

1. A method implemented in a computer system, the method comprising:

executing, in a computer system that comprises multiple processing resources, a job that receives as input a data stream, wherein the amount of data in the data stream is unbounded;

iteratively determining, for the job:

a backlog growth over a first period of time, wherein the backlog growth is a measure of a growth of unprocessed data in the received data stream that is to be input into the job, and wherein the backlog growth is measured in terms of a change to a data size;

a backlog volume that is a measure of unprocessed data in the received data stream that is to be input into the job, and wherein the backlog volume is measured in terms of a data size;

determining, based on the backlog growth and the backlog volume, whether to adjust a quantity of processing resources allocated to the job, wherein, for an iteration of the determination the backlog growth is determined to be zero or negative and the backlog volume is determined to be at a target;

determining that the quantity of processing resources allocated to the job are determined not to be adjusted in response to the backlog growth being determined to be zero or negative and the backlog volume determined to be at a target;

for each iteration for which the quantity of processing resources allocated to the job are determined to be adjusted, adjusting the quantity of processing resources allocated to the job, wherein adjusting the quantity of processing resources further comprises determining whether to reduce the processing resources and if it is determined to reduce said processing resources determining how far to reduce the allocation of processing resources, wherein processor utilization is used as a proxy of whether the system can handle a next lower level of allocated processing resources; and

for each iteration for which the quantity of processing resources allocated to the job are determined not to be adjusted, maintaining the quantity of processing resources allocated to the job.

2. The method of claim 1, wherein, for an iteration of the determination: the backlog growth is determined to be zero or negative; the backlog volume is determined to be below a target;

determining that the quantity of processing resources allocated to the job are determined to be adjusted in response to the backlog growth being determined to be zero or negative and the backlog volume determined to be below a target; and wherein adjusting the quantity of processing resources allocated to the job comprises reducing the quantity of processing resources allocated to the job in response to the backlog growth being determined to be zero or negative and the backlog volume determined to be below a target.

3. The method of claim 1, wherein, for an iteration of the determination: the backlog growth is determined to be zero or negative; the backlog volume is determined to be above a target; determining that the quantity of processing resources allocated to the job are determined to be adjusted in response to the backlog growth being determined to be zero or negative and the backlog volume determined to be above a target; and wherein adjusting the quantity of processing resources allocated to the job comprises increasing the quantity of processing resources allocated to the job in response to the backlog growth being determined to be zero or negative and the backlog volume determined to be above a target.

4. The method of claim 1, wherein, for an iteration of the determination: the backlog growth is determined to be positive; the backlog volume is determined to be below a target; determining that the quantity of processing resources allocated to the job are determined not to be adjusted in response to the backlog growth being determined to be positive and the backlog volume determined to be below a target.

5. The method of claim 1, wherein, for an iteration of the determination: the backlog growth is determined to be positive; the backlog volume is determined to be not below a target; determining that the quantity of processing resources allocated to the job are determined to be adjusted in response to the backlog growth being determined to be positive and the backlog volume determined to be not below a target; and wherein adjusting the quantity of processing resources allocated to the job comprises increasing the quantity of processing resources allocated to the job in response to the backlog growth being determined to be positive and the backlog volume determined to be not below a target.

6. The method of claim 1, wherein units of the data size are at least one of the group consisting of bits, bytes, megabytes, gigabytes, records, and cardinality.

7. The method of claim 1, wherein units of the data size are at least one of the group consisting of bits, bytes, megabytes, gigabytes, records, and cardinality.
8. The method of claim 1, the method further comprising: iteratively determining, for the job, a processor utilization; wherein iteratively determining whether to adjust a quantity of processing resources allocated to the job is further based on the processor utilization.
9. The method of claim 8, wherein: wherein, for an iteration of the determination: the processor utilization is below a value; determining that the quantity of processing resources allocated to the job are determined to be adjusted in response to the processor utilization being determined to be below a value; and wherein adjusting the quantity of processing resources allocated to the job comprises reducing the quantity of processing resources allocated to the job in response to the processor utilization being determined to be below a value.
10. The method of claim 9, where in reducing the quantity of processing resources allocated to the job in response to the processor utilization being determined to be below a value comprises reducing a discrete number of resources allocated to the job, the discrete number being based on the processor utilization.
11. The method of claim 10, wherein the discrete number is a number of computer memory disks.
12. The method of claim 1, wherein determining, based on the backlog growth and the backlog volume, whether to adjust a quantity of processing resources allocated to the job comprises smoothing the determining that results in oscillation of quantity of processing resources allocated to the job.
13. The method of claim 12, wherein smoothing the determining comprises waiting for a second period of time.
14. The method of claim 12, wherein smoothing the determining comprises averaging a plurality of determinations whether to adjust a quantity of processing resources allocated to the job.

15. A system comprising:

one or more processors configured to execute computer program instructions; and
one or more computer storage media encoded with computer program instructions
that, when executed by one or more processors, cause a computer device to perform
operations comprising:

executing, in a computer system that comprises multiple processing resources,
a job that receives as input a data stream, wherein the amount of data in the data
stream is unbounded;

iteratively determining, for the job:

a backlog growth over a first period of time, wherein the backlog
growth is a measure of a growth of unprocessed data in the received data
stream that is to be input into the job, and wherein the backlog growth is
measured in terms of a change to a data size;

a backlog volume that is a measure of unprocessed data in the received
data stream that is to be input into the job, and wherein the backlog volume is
measured in terms of a data size;

determining, based on the backlog growth and the backlog volume, whether to adjust
a quantity of processing resources allocated to the job, wherein, for an iteration of the
determination the backlog growth is determined to be zero or negative and the backlog
volume is determined to be at a target;

determining that the quantity of processing resources allocated to the job are
determined not to be adjusted in response to the backlog growth being determined to be zero
or negative and the backlog volume determined to be at a target;

for each iteration for which the quantity of processing resources allocated to the job
are determined to be adjusted, adjusting the quantity of processing resources allocated to the
job, wherein adjusting the quantity of processing resources further comprises determining
whether to reduce the processing resources and if it is determined to reduce said processing
resources determining how far to reduce the allocation of processing resources, wherein a
processor utilization is used as a proxy of whether the system can handle a next lower level of
allocated processing resources; and

for each iteration for which the quantity of processing resources allocated to the job
are determined not to be adjusted, maintaining the quantity of processing resources allocated
to the job.

16. The system of claim 15, wherein, for an iteration of the determination: the backlog growth is determined to be zero or negative; the backlog volume is determined to be below a target; determining that the quantity of processing resources allocated to the job are determined to be adjusted in response to the backlog growth being determined to be zero or negative and the backlog volume determined to be below a target; and wherein adjusting the quantity of processing resources allocated to the job comprises reducing the quantity of processing resources allocated to the job in response to the backlog growth being determined to be zero or negative and the backlog volume determined to be below a target.

17. The system of claim 15, wherein, for an iteration of the determination: the backlog growth is determined to be zero or negative; the backlog volume is determined to be above a target; determining that the quantity of processing resources allocated to the job are determined to be adjusted in response to the backlog growth being determined to be zero or negative and the backlog volume determined to be above a target; and wherein adjusting the quantity of processing resources allocated to the job comprises increasing the quantity of processing resources allocated to the job in response to the backlog growth being determined to be zero or negative and the backlog volume determined to be above a target.

18. The system of claim 15, wherein, for an iteration of the determination: the backlog growth is determined to be positive; the backlog volume is determined to be below a target determining that the quantity of processing resources allocated to the job are determined not to be adjusted in response to the backlog growth being determined to be positive and the backlog volume determined to be below a target.

19. The system of claim 15, wherein, for an iteration of the determination: the backlog growth is determined to be positive; the backlog volume is determined to be not below a target determining that the quantity of processing resources allocated to the job are determined to be adjusted in response to the backlog growth being determined to be positive and the backlog volume determined to be not below a target; and wherein adjusting the quantity of processing resources allocated to the job comprises increasing the quantity of processing resources allocated to the job in response to the backlog growth being determined to be positive and the backlog volume determined to be not below a target.

20. The system of claim 15, wherein units of the data size are at least one of the group consisting of bits, bytes, megabytes, gigabytes, records, and cardinality.
21. The system of claim 15, wherein units of the data size are at least one of the group consisting of bits, bytes, megabytes, gigabytes, records, and cardinality.
22. The system of claim 15, the operations further comprising: iteratively determining, for the job, a processor utilization; wherein iteratively determining whether to adjust a quantity of processing resources allocated to the job is further based on the processor utilization.
23. The system of claim 22, wherein: wherein, for an iteration of the determination: the processor utilization is below a value; determining that the quantity of processing resources allocated to the job are determined to be adjusted in response to the processor utilization being determined to be below a value; and wherein adjusting the quantity of processing resources allocated to the job comprises reducing the quantity of processing resources allocated to the job in response to the processor utilization being determined to be below a value.
24. The system of claim 23, where in reducing the quantity of processing resources allocated to the job in response to the processor utilization being determined to be below a value comprises reducing a discrete number of resources allocated to the job, the discrete number being based on the processor utilization.
25. The system of claim 24, wherein the discrete number is a number of computer memory disks.
26. The system of claim 15, wherein determining, based on the backlog growth and the backlog volume, whether to adjust a quantity of processing resources allocated to the job comprises smoothing the determining that results in oscillation of quantity of processing resources allocated to the job.
27. The system of claim 26, wherein smoothing the determining comprises waiting for a second period of time.

28. The system of claim 26, wherein smoothing the determining comprises averaging a plurality of determinations whether to adjust a quantity of processing resources allocated to the job.