

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;
 - a backlog volume that is a measure of unprocessed data in the received data stream that is to be input into the job;
 - determining, based on the backlog growth and the backlog volume, whether to adjust a quantity of processing resources allocated to the job;
 - 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; 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 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.
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 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.

4. 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.

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 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.

6. 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 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 below a target.

7. The method of claim 1, wherein the backlog growth is a measure of data size.
8. The method of claim 7, wherein units of the data size is at least one of the group consisting of bits, bytes, megabytes, gigabytes, records, and cardinality.
9. The method of claim 1, wherein backlog growth is a measure of time to process.
10. The method of claim 9, wherein units of the time to process is at least one of the group consisting of microseconds, seconds, minutes, hours, and days.
11. The method of claim 1, wherein the backlog volume is a measure of data size.
12. The method of claim 11, wherein units of the data size is at least one of the group consisting of bits, bytes, megabytes, gigabytes, records, and cardinality.
13. The method of claim 1, wherein backlog volume is a measure of time to process.
14. The method of claim 13, wherein units of the time to process is at least one of the group consisting of microseconds, seconds, minutes, hours, and days.
15. 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.

16. The method of claim 15, 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.
17. The method of claim 16, 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.
18. The method of claim 17, wherein the discrete number is a number of computer memory disks.
19. 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.
20. The method of claim 19, wherein smoothing the determining comprises waiting for a second period of time.
21. The method of claim 19, wherein smoothing the determining comprises averaging a plurality of determinations whether to adjust a quantity of processing resources allocated to the job.
22. A system comprising:
 - one or more processors configured to execute computer program

instructions; and

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;

a backlog volume that is a measure of unprocessed data in the received data stream that is to be input into the job;

determining, based on the backlog growth and the backlog volume, whether to adjust a quantity of processing resources allocated to the job;

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; 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.

23. The system of claim 22, wherein, for an iteration of the determination:

the backlog growth is determined to be zero or negative;

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.

24. The system of claim 22, 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.

25. The system of claim 22, 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.

26. The system of claim 22, 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.

27. The system of claim 22, 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 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 below a target.

28. The system of claim 22, wherein the backlog growth is a measure of data size.

29. The system of claim 28, wherein units of the data size is at least one of the group consisting of bits, bytes, megabytes, gigabytes, records, and cardinality.

30. The system of claim 22, wherein backlog growth is a measure of time to process.

31. The system of claim 30, wherein units of the time to process is at least one of the group consisting of microseconds, seconds, minutes, hours, and days.

32. The system of claim 22, wherein the backlog volume is a measure of data size.

33. The system of claim 32, wherein units of the data size is at least one of the group consisting of bits, bytes, megabytes, gigabytes, records, and cardinality.

34. The system of claim 22, wherein backlog volume is a measure of time to process.

35. The system of claim 34, wherein units of the time to process is at least one of the group consisting of microseconds, seconds, minutes, hours, and days.

36. The system of claim 22, 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.

37. The system of claim 36, 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.
38. The system of claim 37, 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.
39. The system of claim 38, wherein the discrete number is a number of computer memory disks.
40. The system of claim 22, 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.
41. The system of claim 40, wherein smoothing the determining comprises waiting for a second period of time.
42. The system of claim 40, wherein smoothing the determining comprises averaging a plurality of determinations whether to adjust a quantity of processing resources allocated to the job.