

WHAT IS CLAIMED IS:

1. A method for data transmission based on asynchronous response, comprising:

an extraction step of both extracting data from a first data terminal and storing the data in a cycle;

a throughput regulation step of determining, based on a loading result fed back by a second data terminal in a previous cycle of said cycle and a first throughput of data transmission in the previous cycle, a second throughput for transmitting the data in said cycle; and

a loading step of loading, in said cycle, the data into the second data terminal according to the second throughput,

wherein the loading result comprises the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle and the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle,

wherein the throughput regulation step further comprises:

counting the amount of timed-out historical data for which no feedback is received from the second data terminal within a predetermined period of time in the previous cycle, and

calculating a success rate of loading historical data based on the feedback received from the second data terminal in the previous cycle, the success rate being used to determine the second throughput and calculated by a following formula:

$$S = \frac{C_s}{C_s + C_f + C_t} * 100\%$$

wherein S is the success rate, C_s is the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle, C_f is the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle, and C_t is the amount of time-out historical data for which no feedback is received from the second data terminal within the predetermined period of time in the previous cycle.

2. The method as claimed in claim 1, wherein the extraction step comprises:

(a) extracting the data from the first data terminal and transforming the data into a predetermined format;

5 (b) determining whether a queue is full, and if the queue is not full, storing the transformed data into the queue and returning to step (a); otherwise, proceeding to step (c); and

10 (c) incrementing the number of failed transmissions by 1 for the transformed data, and if the number of failed transmissions does not exceed a maximum number of failed transmissions, returning to the step (b) after waiting for a predetermined period of time; otherwise, discarding the transformed data and returning to the step (a).

~~3. The method as claimed in claim 1, wherein the loading result comprises the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle and the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle,~~

15 ~~wherein the throughput regulation step further comprises:~~

~~counting the amount of timed-out historical data for which no feedback is received from the second data terminal within a predetermined period of time in the previous cycle, and~~

20 ~~calculating a success rate of loading historical data based on the feedback received from the second data terminal in the previous cycle, the success rate being used to determine the second throughput and calculated by a following formula:~~

$$\text{S} = \frac{C_s}{C_s + C_f + C_t} * 100\%$$

25 ~~wherein S is the success rate, C_s is the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle, C_f is the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle, and C_t is the amount of time-out historical data for which no feedback is received from the second data terminal within the predetermined period of time in the previous cycle.~~

43. The method as claimed in claim 31, wherein the throughput regulation step

comprises:

(a) decreasing the first throughput by a first predetermined value to acquire the second throughput if the success rate is less than or equal to a minimum success rate and the first throughput is greater than a minimum throughput, and taking the minimum
5 throughput as the second throughput if the decreased first throughput is less than the minimum throughput;

(b) taking the minimum throughput as the second throughput if the success rate is less than or equal to the minimum success rate and the first throughput is equal to the minimum throughput;

10 (c) increasing the first throughput by a second predetermined value to acquire the second throughput if the success rate is greater than a success rate regulation threshold and the first throughput is less than a maximum throughput, and taking the maximum throughput as the second throughput if the increased first throughput is greater than the maximum throughput;

15 (d) taking the maximum throughput as the second throughput if the success rate is greater than the success rate regulation threshold and the first throughput reaches the maximum throughput; or

(e) taking the first throughput as the second throughput if the success rate falls between the minimum success rate and the success rate regulation threshold.

20 54. The method as claimed in claim 43, wherein the throughput regulation step further comprises:

increasing the maximum throughput and the second throughput by the second predetermined value when the second throughput remains at the maximum throughput and the success rate is greater than the success rate regulation threshold for a first
25 predetermined number of cycles.

65. The method as claimed in claim 54, wherein if the success rate decreases in a next cycle of said cycle after increasing the maximum throughput and the second throughput by the second predetermined value, the increased maximum throughput and the increased second throughput are restored to the maximum throughput and the second
30 throughput prior to the increasing and the maximum throughput is no longer increased for a second predetermined number of cycles.

76. The method as claimed in claim 43, further comprising:

determining that the maximum throughput is set incorrectly and issuing an alarm message if the following operations are repeated in a plurality of cycles for a preset number of times:

- 5 performing the step (a) directly after performing the step (c), or
- performing the step (c) directly after performing the step (a).

87. The method as claimed in claim 31, wherein the loading step comprises:

generating a token for loading the data in said cycle based on the second throughput and the success rate;

- 10 extracting data in the queue based on the token; and
- loading the data extracted from the queue into the second data terminal.

98. A method for data transmission based on asynchronous response, comprising:

an extraction step of both extracting first data from a first data terminal and storing the first data into a first queue in a cycle;

- 15 a throughput regulation step of determining, based on a first loading result fed back by a second data terminal in a previous cycle of said cycle and a first throughput of data transmission in the previous cycle, a second throughput for data transmission in said cycle; and

- 20 a loading step of loading, in said cycle, the first data of the first queue and second data of a second queue into the second data terminal according to the second throughput,

wherein the first loading result comprises the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle and the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle,

- 25 wherein the throughput regulation step comprises:

counting the amount of timed-out historical data for which no feedback is received from the second data terminal within a predetermined period of time in the previous cycle, and

calculating a success rate of loading historical data based on the feedback received

from the second data terminal in the previous cycle, the success rate being used to determine the second throughput and calculated by a following formula:

$$S = \frac{C_s}{C_s + C_f + C_t} * 100\%$$

wherein S is the success rate, C_s is the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle, C_f is the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle, and C_t is the amount of timed-out historical data for which no feedback is received from the second data terminal within the predetermined period of time in the previous cycle,

wherein the second data refers to data which has failed to be loaded or for which no feedback has been received from the second data terminal in said cycle.

409. The method as claimed in claim 98, further comprising:

storing the first data and the second data into a data structure as candidate data.

410. The method as claimed in claim 409, further comprising:

determining whether the candidate data in the data structure is successfully loaded based on a second loading result fed back by the second data terminal in said cycle or at least one cycle after said cycle; if the candidate data is successfully loaded, deleting the candidate data in the data structure; if the candidate data fails to be loaded, determining whether the candidate data has been loaded more than a predetermined number of times; deleting the candidate data in the data structure if the predetermined number of times is exceeded; and transmitting the candidate data to the second queue as the second data if the predetermined number of times is not exceeded.

411. The method as claimed in claim 98, wherein the extraction step comprises:

(a) extracting the first data from the first data terminal and transforming the first data into a predetermined format;

(b) determining whether the first queue is full, and if the first queue is not full, storing the transformed first data into the first queue and returning to step (a); otherwise, proceeding to step (c); and

(c) incrementing the number of failed transmissions by 1 for the transformed first

data, and if the number of failed transmissions does not exceed a maximum number of failed transmissions, returning to step (b) after waiting for a predetermined period of time; otherwise, discarding the transformed data and returning to the step (a).

5 ~~13. The method as claimed in claim 9, wherein the first loading result comprises the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle and the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle,~~

~~wherein the throughput regulation step comprises:~~

10 ~~counting the amount of timed-out historical data for which no feedback is received from the second data terminal within a predetermined period of time in the previous cycle, and~~

~~calculating a success rate of loading historical data based on the feedback received from the second data terminal in the previous cycle, the success rate being used to determine the second throughput and calculated by a following formula:~~

$$15 \quad S = \frac{C_s}{C_s + C_f + C_t} * 100\%$$

20 ~~wherein S is the success rate, C_s is the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle, C_f is the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle, and C_t is the amount of timed-out historical data for which no feedback is received from the second data terminal within the predetermined period of time in the previous cycle.~~

1412. The method as claimed in claim 138, wherein the throughput regulation step comprises:

25 (a) decreasing the first throughput by a first predetermined value to acquire the second throughput if the success rate is less than or equal to a minimum success rate and the first throughput is greater than a minimum throughput, and taking the minimum throughput as the second throughput if the decreased first throughput is less than the minimum throughput;

(b) taking the minimum throughput as the second throughput if the success rate is

less than or equal to the minimum success rate and the first throughput is equal to the minimum throughput;

5 (c) increasing the first throughput by a second predetermined value to acquire the second throughput if the success rate is greater than a success rate regulation threshold and the first throughput is less than a maximum throughput, and taking the maximum throughput as the second throughput if the increased first throughput is greater than the maximum throughput;

10 (d) taking the maximum throughput as the second throughput if the success rate is greater than the success rate regulation threshold and the first throughput reaches the maximum throughput; or

(e) taking the first throughput as the second throughput if the success rate falls between the minimum success rate and the success rate regulation threshold.

4513. The method as claimed in claim 4412, wherein the throughput regulation step further comprises:

15 increasing the maximum throughput and the second throughput by the second predetermined value when the second throughput remains at the maximum throughput and the success rate is greater than the success rate regulation threshold for a first predetermined number of cycles.

20 4614. The method as claimed in claim 4513, wherein if the success rate decreases in a next cycle of said cycle after increasing the maximum throughput and the second throughput by the second predetermined value, the increased maximum throughput and the increased second throughput are restored to the maximum throughput and the second throughput prior to the increasing and the maximum throughput is no longer increased for a second predetermined number of cycles.

25 4715. The method as claimed in claim 4412, further comprising:

determining that the maximum throughput is set incorrectly and issuing an alarm message if the following operations are repeated in a plurality of cycles for a preset number of times:

performing the step (a) directly after performing the step (c), or

30 performing the step (c) directly after performing the step (a).

4816. The method as claimed in claim 438, wherein the loading step comprises:

(a) generating in said cycle a first token for loading the first data and a second token for loading the second data based on the second throughput and the success rate;

(b) extracting the first data in the first queue based on the first token and extracting the second data in the second queue based on the second token; and

5 (c) loading the extracted first data and the extracted second data into the second data terminal.

14917. The method as claimed in claim 4816, wherein the step (a) comprises:

when the success rate is less than 100%, obtaining a throughput for loading the first data by multiplying the success rate with the second throughput, obtaining a throughput
10 for loading the second data by subtracting the throughput for loading the first data from the second throughput, updating a ratio of the throughput for loading the second data to the second throughput, and generating the first token based on the throughput for loading the first data and generating the second token based on the throughput for loading the second data; or

15 when the success rate is equal to 100%, taking, as the throughput for loading the second data, the minimum value between the amount of data in the second queue and a product of said ratio and the second throughput, obtaining a throughput for loading the first data by subtracting the throughput for loading the second data from the second throughput, updating said ratio, and generating the first token based on the throughput
20 for loading the first data and generating the second token based on the second token for loading the second data.

2018. A computer-readable medium having computer-readable instructions stored thereon, wherein the computer-readable instructions, when executed by a computer, can cause the method as claimed in any one of claims 1-4917 to be implemented.

25 2419. A system for data transmission based on asynchronous response, comprising:

a data extraction module configured to both extract data from a first data terminal and store the data in a cycle;

a throughput regulation module configured to determine, based on a loading result fed back by a second data terminal in a previous cycle of said cycle and a first throughput
30 of data transmission in the previous cycle, a second throughput for transmitting the data in said cycle; and

a data loading module configured to load, in said cycle, the data into the second data terminal according to the second throughput,

wherein the loading result comprises the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle and the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle,

wherein the system further comprises a cyclic scanning module configured to: count the amount of timed-out historical data for which no feedback is received from the second data terminal within a predetermined period of time in the previous cycle, calculate a success rate of loading historical data based on the feedback received from the second data terminal in the previous cycle, and transmit the success rate to the throughput regulation module, wherein the success rate is calculated by a following formula:

$$S = \frac{C_s}{C_s + C_f + C_t} * 100\%$$

wherein S is the success rate, C_s is the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle, C_f is the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle, and C_t is the amount of timed-out historical data for which no feedback is received from the second data terminal within the predetermined period of time in the previous cycle.

2220. The system as claimed in claim 2419, wherein the data extraction module is further configured to execute following operations:

(a) extracting the data from the first data terminal and transforming the data into a predetermined format;

(b) determining whether a queue is full, and if the queue is not full, storing the transformed data into the queue and returning to step (a); otherwise, proceeding to step (c); and

(c) incrementing the number of failed transmissions by 1 for the transformed data, and if the number of failed transmissions does not exceed a maximum number of failed transmissions, returning to step (b) after waiting for a predetermined period of time; otherwise, discarding the transformed data and returning to the step (a).

23. The system as claimed in claim 21, wherein the loading result comprises the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle and the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle,

5 wherein the system further comprises a cyclic scanning module configured to: count the amount of timed-out historical data for which no feedback is received from the second data terminal within a predetermined period of time in the previous cycle, calculate a success rate of loading historical data based on the feedback received from the second data terminal in the previous cycle, and transmit the success rate to the throughput regulation module, wherein the success rate is calculated by a following formula:

$$S = \frac{C_s}{C_s + C_f + C_t} * 100\%$$

15 wherein S is the success rate, C_s is the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle, C_f is the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle, and C_t is the amount of timed-out historical data for which no feedback is received from the second data terminal within the predetermined period of time in the previous cycle.

2421. The system as claimed in claim 2319, wherein the throughput regulation module further comprises:

20 a first module configured to decrease the first throughput by a first predetermined value to acquire the second throughput if the success rate is less than or equal to a minimum success rate and the first throughput is greater than a minimum throughput, and take the minimum throughput as the second throughput if the decreased first throughput is less than the minimum throughput;

25 a second module configured to take the minimum throughput as the second throughput if the success rate is less than or equal to the minimum success rate and the first throughput is equal to the minimum throughput;

30 a third module configured to increase the first throughput by a second predetermined value to acquire the second throughput if the success rate is greater than a success rate regulation threshold and the first throughput is less than a maximum throughput, and take the maximum throughput as the second throughput if the increased

first throughput is greater than the maximum throughput;

a fourth module configured to take the maximum throughput as the second throughput if the success rate is greater than the success rate regulation threshold and the first throughput reaches the maximum throughput; and

5 a fifth module configured to take the first throughput as the second throughput if the success rate falls between the minimum success rate and the success rate regulation threshold.

| 2522. The system as claimed in claim 2421, wherein the throughput regulation module further comprises:

10 a sixth module configured to increase the maximum throughput and the second throughput by the second predetermined value when the second throughput remains at the maximum throughput and the success rate is greater than the success rate regulation threshold for a first predetermined number of cycles.

| 2623. The system as claimed in claim 2522, wherein after increasing the maximum
15 throughput and the second throughput by the second predetermined value, the throughput regulation module is further configured to, if the success rate decreases in a next cycle of said cycle, restore the increased maximum throughput and the increased second throughput to the maximum throughput and the second throughput prior to the increasing and no longer increase the maximum throughput for a second predetermined
20 number of cycles.

| 2724. The system as claimed in claim 2421, wherein the throughput regulation module is further configured to determine that the maximum throughput is set incorrectly and issue an alarm message if the following operations are repeated in a plurality of cycles for a preset number of times:

25 executing the first module directly after executing the third module; or

executing the third module directly after executing the first module.

| 2825. The system as claimed in claim 2319, wherein

the throughput regulation module further comprises:

a module configured to generate a token for loading the data in said cycle based on
30 the second throughput and the success rate;

the data loading module further comprises:

a module configured to extract data in the queue based on the token; and

a module configured to load the data extracted from the queue into the second data terminal.

5 2926. A system for data transmission based on asynchronous response, comprising:

a data extraction module configured to both extract first data from a first data terminal and store the first data into a first queue in a cycle;

10 a throughput regulation module configured to determine, based on a first loading result fed back by a second data terminal in a previous cycle of said cycle and a first throughput of data transmission in the previous cycle, a second throughput for data transmission in said cycle; and

a data loading module configured to load, in said cycle, the first data of the first queue and second data of a second queue into the second data terminal according to the second throughput,

15 wherein the first loading result comprises the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle and the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle,

20 wherein the system further comprises a cyclic scanning module configured to count the amount of timed-out historical data for which no feedback is received from the second data terminal within a predetermined period of time in the previous cycle, calculate a success rate of loading historical data based on the feedback received from the second data terminal in the previous cycle, and transmit the success rate to the throughput regulation module, wherein the success rate is calculated by a following formula:

$$S = \frac{C_s}{C_s + C_f + C_t} * 100\%$$

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wherein S is the success rate, C_s is the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle, C_f is the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle, and C_t is the amount of timed-out historical data for which no feedback

is received from the second data terminal within the predetermined period of time in the previous cycle.

wherein the second data refers to data which has failed to be loaded or for which no feedback has been received from the second data terminal in said cycle.

5 ~~3027~~. The system as claimed in claim ~~2926~~, wherein the data loading module is further configured to store the first data and the second data into a data structure as candidate data.

~~3428~~. The system as claimed in claim ~~3027~~, further comprising:

10 an asynchronous response processing module configured to: determine whether
the candidate data in the data structure is successfully loaded based on a second loading
result fed back by the second data terminal in said cycle or at least one cycle after said
cycle; if the candidate data is successfully loaded, delete the candidate data in the data
structure; if the candidate data fails to be loaded, determine whether the candidate data
15 has been loaded more than a predetermined number of times; delete the candidate data
in the data structure if the predetermined number of times is exceeded, and transmit the
candidate data to the second queue as the second data if the predetermined number of
times is not exceeded.

~~3229~~. The system as claimed in claim ~~2926~~, wherein the data extraction module is further configured to execute following operations:

20 (a) extracting the first data from the first data terminal and transforming the first data into a predetermined format;

 (b) determining whether the first queue is full, and storing the transformed first data into the first queue and returning to step (a) if the first queue is not full; otherwise, proceeding to step (c); and

25 (c) incrementing the number of failed transmissions by 1 for the transformed first data, and if the number of failed transmissions does not exceed a maximum number of failed transmissions, returning to step (b) after waiting for a predetermined period of time; otherwise, discarding the transformed data and returning to the step (a).

~~33. The system as claimed in claim 29, wherein the first loading result comprises the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle and the amount of historical data for which loading failure~~

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is fed back by the second data terminal in the previous cycle,

wherein the system further comprises a cyclic scanning module configured to count the amount of timed-out historical data for which no feedback is received from the second data terminal within a predetermined period of time in the previous cycle, calculate a success rate of loading historical data based on the feedback received from the second data terminal in the previous cycle, and transmit the success rate to the throughput regulation module, wherein the success rate is calculated by a following formula:

$$S = \frac{C_s}{C_s + C_f + C_t} * 100\%$$

wherein S is the success rate, C_s is the amount of historical data for which loading success is fed back by the second data terminal in the previous cycle, C_f is the amount of historical data for which loading failure is fed back by the second data terminal in the previous cycle, and C_t is the amount of timed-out historical data for which no feedback is received from the second data terminal within the predetermined period of time in the previous cycle.

3430. The system as claimed in claim 3326, wherein the throughput regulation module further comprises:

a first module configured to decrease the first throughput by a first predetermined value to acquire the second throughput if the success rate is less than or equal to a minimum success rate and the first throughput is greater than a minimum throughput, and take the minimum throughput as the second throughput if the decreased first throughput is less than the minimum throughput;

a second module configured to take the minimum throughput as the second throughput if the success rate is less than or equal to the minimum success rate and the first throughput is equal to the minimum throughput;

a third module configured to increase the first throughput by a second predetermined value to acquire the second throughput if the success rate is greater than a success rate regulation threshold and the first throughput is less than a maximum throughput, and take the maximum throughput as the second throughput if the increased first throughput is greater than the maximum throughput;

a fourth module configured to take the maximum throughput as the second

throughput if the success rate is greater than the success rate regulation threshold and the first throughput reaches the maximum throughput; and

a fifth module configured to take the first throughput as the second throughput if the success rate falls between the minimum success rate and the success rate regulation threshold.

3531. The system as claimed in claim 3430, wherein the throughput regulation module further comprises:

a sixth module configured to increase the maximum throughput and the second throughput by the second predetermined value when the second throughput remains at the maximum throughput and the success rate is greater than the success rate regulation threshold for a first predetermined number of cycles.

3632. The system as claimed in claim 3531, wherein after increasing the maximum throughput and the second throughput by the second predetermined value, the throughput regulation module is further configured to, if the success rate decreases in a next cycle of said cycle, restore the increased maximum throughput and the increased second throughput to the maximum throughput and the second throughput prior to the increasing and no longer increase the maximum throughput for a second predetermined number of cycles.

3733. The system as claimed in claim 3430, wherein the throughput regulation module is further configured to determine that the maximum throughput is set incorrectly and issue an alarm message if the following operations are repeated in a plurality of cycles for a preset number of times:

executing the first module directly after executing the third module; or

executing the third module directly after executing the first module.

3834. The system as claimed in claim 3326, wherein

the throughput regulation module further comprises:

a module configured to generate a first token for loading the first data and a second token for loading the second data in said cycle based on the second throughput and the success rate;

the data loading module further comprises:

a module configured to extract the first data in the first queue based on the first token and extract the second data in the second queue based on the second token; and

a module configured to load the extracted first data and the extracted second data into the second data terminal.

5 3935. The system as claimed in claim 3834, wherein the module configured to generate the first token for loading the first data and the second token for loading the second data in said cycle based on the second throughput and the success rate further comprises:

10 a module configured to, when the success rate is less than 100%, obtain a throughput for loading the first data by multiplying the success rate with the second throughput, obtain a throughput for loading the second data by subtracting the throughput for loading the first data from the second throughput, update a ratio of the throughput for loading the second data to the second throughput, and generate the first token based on the throughput for loading the first data and generate the second token based on the throughput for loading the second data; or

15 a module configured to, when the success rate is equal to 100%, take, as the throughput for loading the second data, the minimum value between the amount of data in the second queue and a product of said ratio and the second throughput, obtain a throughput for loading the first data by subtracting the throughput for loading the second data from the second throughput, update said ratio, and generate the first token based on the throughput for loading the first data and generate the second token based on the
20 second token for loading the second data.