

METHOD FOR GENERATING CN VALUE BY GMP MAPPING IN OTN

BACKGROUND OF THE INVENTION

[0001] Technical Field

[0002] The present invention relates to the field of communications, in particular to a method for generating a Cn value by a GMP mapping in an OTN.

[0003] Description of Related Art

[0004] The optical transport network (OTN) technique has gradually become one of the main techniques in the optical communication field in recent years, and the key technique for OTN services is mapping low-order optical channel data units (ODUs) into high-order ODUs.

[0005] At present, as for most methods for generating a Cn value by a generic mapping procedure (GMP) mapping, a rough Cn (number of n-bit client data entities) value is given through a judgment on the horizontal position of a data path first input first output (FIFO) controller. With the appearance of new client signals, the adjustment range of the GMP mapping, namely the rate difference between client signals and server signals, becomes greater and greater. For generating a Cn value with the precision reaching one byte by the GMP mapping, the specification and number of required FIFO become larger and larger, more and more resources are consumed by circuits, the circuit structure significantly changes due to changes to the mapping object, and thus the generated Cn value severely jitters inevitably

BRIEF SUMMARY OF THE INVENTION

[0006] To overcome the defects of the prior art, the present invention aims to

provide a method for generating a Cn value by a GMP mapping in an OTN. By adoption of the method for generating a Cn value by the GMP mapping in the OTN, the precision of the Cn value is within one byte, the circuit consumes a small amount of resource, the circuit structure will not change due to changes to the mapping object, and thus jittering of the Cn value is reduced.

[0007] To realize the above aim, the method for generating a CN value by the GMP mapping in the OTN comprises the steps: S1, in each cycle, counting a rate information statistical value of an opposite-end low-order ODU signal and a rate information statistical value of a local low-order ODU signal, respectively; starting from the second cycle, producing a difference value in each cycle, wherein the difference value is the difference between the rate information statistical value of the local low-order ODU signal and the rate information statistical value of the opposite-end low-order ODU signal in the previous cycle; S2, conducting low-pass filtering processing on the difference value of each cycle, namely, starting from the second cycle, comparing the difference of each cycle and a filter result of the previous cycle to obtain a filter difference; amplifying the filter difference to a pre-configured filter coefficient times to acquire an adjustment value; accumulating the adjustment value of each cycle and the adjustment value of the previous cycle to acquire an integral value; when the integral value of one cycle is greater than 255, the filter value is 1; otherwise, the filter value is 0; S3, when the filter value of one cycle is 1, the Cn value of the cycle = nominal Cn value + filter value; when the filter value of one cycle is 0, the Cn value of the cycle = nominal Cn value.

[0008] Based on the above technical scheme, all the cycles are fixed cycles with identical time durations, and the fixed cycles depend on rate information of high-order ODUs of the GMP mapping.

[0009] Based on the above technical scheme, the comparison standard of rate

information of the opposite-end low-order ODU signal is consistent with the comparison standard of rate information of the local low-order ODU signal.

[0010] Based on the above technical scheme, in step S2, the adjustment values are accumulated through an integral circuit to acquire the integral value.

[0011] Based on the above technical scheme, in step S2, the adjustment value of the first cycle is 0.

[0012] Based on the above technical scheme, in step S2, the filter value is determined through a decision circuit, and the decision circuit is used for judging whether the integral value of each cycle is greater than 255 or not.

[0013] Based on the above technical scheme, in step S2, a pre-configured filter coefficient ranges from 1 to 255, the lower a filter coefficient, the smoother a filter result, and the greater a filter coefficient, the higher the filter tracking speed.

[0014] Based on the above technical scheme, when the OTN starts to be powered on or services are switched, a greater filter coefficient is configured, and in the long-term tracking process of the OTN, a low filter coefficient is configured.

[0015] The present invention has the beneficial effects: the difference value between the rate information statistical value of the local low-order ODU signal and the rate information statistical value of the opposite-end low-order ODU signal is obtained firstly, low-pass filtering processing is then conducted, and as a difference value signal is smoothened, the total data size does not change, and jittering of the Cn value is reduced accordingly. Meanwhile, the Cn value is obtained based on the algorithm, the whole operation is simplified through the algorithm for the difference value, the precision of the Cn value is within one byte, the circuit consumes a small amount of resource, and the circuit structure will not change due to changes to the mapping object.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0016] FIG. 1 is a flow diagram of a method for generating a CN value by a GMP mapping in an OTN of the present invention;

[0017] FIG. 2 is a schematic diagram for low-pass filtering processing in the embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0018] A further detailed description of the present invention is given with the accompanying drawings and embodiments as follows.

[0019] As is shown in FIG. 1, a method for generating a CN value by a GMP mapping in an OTN comprises the following steps:

[0020] S1, in each cycle, extracting a rate information value of an opposite-end low-order ODU signal and locally generating a rate information value of a standard low-order ODU signal; in each cycle, counting a rate information statistical value of the opposite-end low-order ODU signal and a rate information statistical value of the local low-order ODU signal, respectively; starting from the second cycle, producing a difference value in each cycle, wherein the difference value is the difference between the rate information statistical value of the local low-order ODU signal and the rate information statistical value of the opposite-end low-order ODU signal in the previous cycle. That is, the difference value of the first cycle is generated in the second cycle, and no difference value is generated in the first cycle.

[0021] Specifically, all the cycles are fixed cycles with identical time durations, and the fixed cycles depend on rate information of high-order ODUs of the GMP mapping. Specifically, according to the content of the protocol G.709, as for high-order ODUs such as ODU4 and ODU5, the two ODUs separately correspond to different cycles in the

protocol. The comparison standard of rate information of the opposite-end low-order ODU signal is consistent with the comparison standard of rate information of the local low-order ODU signal, and thus the rate difference between the local low-order ODU signal and the opposite-end low-order ODU signal in fixed time cycles can be truly reflected. In the same system time, the number of bytes transmitted by the opposite-end low-order ODU signal and the number of bytes transmitted by the local low-order ODU signal are obtained, and as the system time is constant for the local end and the opposite end, the measurement mechanism of the opposite end is consistent with the measurement mechanism of the local end.

[0022] S2, as is shown in FIG. 2, conducting low-pass filtering processing on the difference value in each cycle, namely, starting from the second cycle, comparing the difference $X[n]$ of each cycle and a filter result $Y[n]$ of the previous cycle to obtain a filter difference.

[0023] Amplifying the filter difference of each cycle to a pre-configured filter coefficient times to acquire an adjustment value, as is shown in FIG. 2, $coeff$ refers to the filter coefficient, and Adj refers to adjustment for amplifying the filter difference of each cycle to the pre-configured filter coefficient times. Wherein a pre-configured filter coefficient ranges from 1 to 255, the closer to 1 a filter coefficient is, the lower the filter coefficient is, and the smoother a filter result showing the filter performance is after configuration; the closer to 255 a filter coefficient is, the greater the filter coefficient is, and the higher the filter tracking speed showing the filter performance is after configuration. Different filter coefficients can meet different filter conditions. When the OTN starts to be powered on or services are switched, the filter coefficient needs to be rapidly adjusted, a greater filter coefficient is configured, and a generated C_n value fluctuates severely. In the long-term tracking process of the OTN, a smooth adjustment

mode is adopted, a low filter coefficient is configured, and a generated C_n value is relatively stable. The C_u value in the embodiment is obtained in the long-term tracking process.

[0024] Accumulating the adjustment value of each cycle and the adjustment value of the previous cycle to acquire an integral value, wherein, the adjustment values are accumulated through an integral value sum, and the adjustment value of the first cycle is 0.

[0025] The filter value is then determined through a decision circuit quantizer, a decision value is given by the decision circuit according to the result of the integral circuit and used for judging whether the integral value of each cycle is greater than 255 or not, and the decision value is the filter value of the current filter cycle. Specifically, when the integral value of one cycle is greater than 255, the filter value is 1; otherwise, the filter value is 0.

[0026] S3, starting from the second cycle, generating the C_n value of each cycle according to the filter value, specifically, when the filter value of one cycle is 1, the C_n value of the cycle = nominal C_n value + filter value; when the filter value of one cycle is 0, the C_n value of the cycle = nominal C_n value.

[0027] The present invention is not limited to the above embodiment, for those ordinarily skilled in the field, various improvements and embellishments can be made without deviating from the principle of the present invention, and all these improvements and embellishments are also within the protection scope of the present invention. The content, not illustrated in detail, in the description belongs to the prior art known by those skilled in the field.

What is claimed is:

1. A method for generating a Cn value by a GMP mapping in an OTN, characterized by comprising the steps:

S1, in each cycle, counting a rate information statistical value of an opposite-end low-order ODU signal and a rate information statistical value of a local low-order ODU signal, respectively; starting from the second cycle, producing a difference value in each cycle, wherein the difference value is the difference between the rate information statistical value of the local low-order ODU signal and the rate information statistical value of the opposite-end low-order ODU signal in the previous cycle;

S2, conducting low-pass filtering processing on the difference value of each cycle, namely, starting from the second cycle, comparing the difference of each cycle and a filter result of the previous cycle to obtain a filter difference; amplifying the filter difference to a pre-configured filter coefficient times to acquire an adjustment value; accumulating the adjustment value of each cycle and the adjustment value of the previous cycle to acquire an integral value; when the integral value of one cycle is greater than 255, the filter value is 1; otherwise, the filter value is 0;

S3, when the filter value of one cycle is 1, the Cn value of the cycle = nominal Cn value + filter value; when the filter value of one cycle is 0, the Cn value of the cycle = nominal Cn value.

2. The method for generating a Cn value by the GMP mapping in the OTN according to Claim 1, characterized in that all the cycles are fixed cycles with identical time durations, and the fixed cycles depend on rate information of high-order ODUs of the GMP mapping.

3. The method for generating a Cn value by the GMP mapping in the OTN according to Claim 2, characterized in that the comparison standard of rate information of the

opposite-end low-order ODU signal is consistent with the comparison standard of rate information of the local low-order ODU signal.

4. The method for generating a Cn value by the GMP mapping in the OTN according to Claim 1, characterized in that in step S2, the adjustment values are accumulated through an integral circuit to acquire the integral value.

5. The method for generating a Cn value by the GMP mapping in the OTN according to Claim 4, characterized in that in step S2, the adjustment value of the first cycle is 0.

6. The method for generating a Cn value by the GMP mapping in the OTN according to Claim 1, characterized in that in step S2, the filter value is determined through a decision circuit, and the decision circuit is used for judging whether the integral value of each cycle is greater than 255 or not.

7. The method for generating a Cn value by the GMP mapping in the OTN according to Claim 1, characterized in that in step S2, a pre-configured filter coefficient ranges from 1 to 255, the lower a filter coefficient, the smoother a filter result, and the greater a filter coefficient, the higher the filter tracking speed.

8. The method for generating a Cn value by the GMP mapping in the OTN according to Claim 7, characterized in that when the OTN starts to be powered on or services are switched, a greater filter coefficient is configured, and in the long-term tracking process of the OTN, a low filter coefficient is configured.