time data Tb as a time in the local apparatus.

[0003]

PTL 2 discloses a time synchronization processing apparatus which enables times to be synchronized. The time synchronization processing apparatus includes a packet receiving unit, an arrival time recording unit, a clock rate estimation unit, and an offset estimation unit. The packet receiving unit receives a time synchronization packet transmitted from a master computer at a predetermined interval. The arrival time recording unit stores an arrival time when the time synchronization packet is received. The clock rate estimation unit gains an arrival time when the time synchronization packet transmitted at a predetermined interval arrives, and estimates a clock rate from an interval of the arrival time. The offset estimation unit calculates an offset value for correcting a time, based on the estimated clock rate.

[Citation List]

[Patent Literature]

[0004]

PTL 1: Japanese Laid-open Patent Publication No. H05(1993) -298268

PTL 2: Japanese Patent Publication No. 4931108

[Summary]

[0005]

However, even when the apparatus disclosed in either PTL 1 or PTL 2 is used, both apparatuses sometimes have a difficulty of arranging an order of historical log of processing (e.g., communication processing) executed in a plurality of information

processing apparatuses, in accordance with an order of occurrence of the processing. A reason for this is that, even when times in respective information processing apparatuses are synchronized by use of the apparatus disclosed in either PTL 1 or PTL 2, times in the respective information processing apparatuses are not necessarily synchronized in the case where certain processing is executed.

[0006]

Thus, one embodiment is to provide a log information generation apparatus and the like that generate log information which enables a correct arrangement of an order of logs related to communication processing executed in a communication network in accordance with an order of occurrence of the communication processing.

[0006a]

According to an aspect, an information processing system comprising:

a log information generation apparatus; and

a difference a calculation apparatus; wherein

the log information generation apparatus including:

time provision means for providing, in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, time information including a second time related to the log information generation apparatus and an apparatus identifier included in the communication start information to the difference calculation apparatus, the difference calculation apparatus calculating a difference between a input first

time and a reference time, and

log information generation means for generating log information associating arranged time with an content of the communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated, by the difference calculation apparatus, for the second time, wherein

the time information associates the second time with the communication start information, and

the difference calculation apparatus calculates the difference from the reference time based on the time information provided by the log

information generation apparatus, and sets minimum second time to the reference time, the minimum second time being minimum in the second time included in the time information associated with certain communication start information.

[0006b]

According to an aspect, an information processing system comprising:

a log information generation apparatus; and

a difference a calculation apparatus; wherein

the log information generation apparatus including:

time provision means for providing, in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, time information including a second time related to the log

information generation apparatus and an apparatus identifier

included in the communication start information to the difference calculation apparatus, the difference calculation apparatus calculating a difference between a input first time and a reference time, and

log information generation means for generating log information associating arranged time with an content of the communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated, by the difference calculation apparatus, for the second time, wherein

the time information associates the second time with the communication start information, and

the difference calculation apparatus calculates the difference from the reference time based on the time information provided by the log information generation apparatus, and sets second time to the reference time, the second time included in the time information earliestly input in the time information associated with certain communication start information.

[0006c]

According to an aspect, an information processing method by a calculation processing apparatus comprising:

providing, in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, time information including a second time related to the log information generation apparatus and an apparatus identifier included in the communication start information to the difference calculation apparatus, the difference calculation apparatus

calculating a difference between a input first time and a reference time, and

generating log information associating arranged time with an content of the communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated, by the difference calculation apparatus, for the second time, wherein

the time information associates the second time with the communication start information, and

the difference calculation apparatus calculates the difference from the reference time based on the provided time information, and sets minimum second time to the reference time, the minimum second time

being minimum in the second time included in the time information associated with certain communication start information.

[0006d]

According to an aspect, An information processing program causing a computer to achieve:

a log information generation function; and

a difference calculation function; wherein

the log information generation function includes:

a time provision function for providing, in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, time information including a second time related to the log information generation function and an apparatus identifier included in the communication start

information to the difference calculation function, the difference calculation function calculating a difference between a input first time and a reference time, and

a log information generation function for generating log information associating arranged time with an content of the communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated, by the difference calculation function, for the second time, wherein

the time information associates the second time with the communication start information; and

the difference calculation function calculates the difference from the reference time based on the time information provided by the log information generation function, and sets minimum second time to the reference time, the minimum second time being minimum in the second time included in the time information associated with certain communication start information.

[0007]

As an embodiment of the present invention, a log information generation apparatus including:

time provision means for providing time information including a second time in the log information generation apparatus to a difference calculation apparatus in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, the difference calculation apparatus calculating a difference between a input first time and a reference time; and

log information generation means for generating log information associating arranged time with an content of

communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated for the second time by the difference calculation apparatus.

[0008]

In addition, as another embodiment of the present disclosure, a log information generation method including:

providing time information including a second time in an information processing apparatus to a difference calculation apparatus in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, the difference calculation apparatus calculating a difference between a input first time and a reference time; and

generating log information associating arranged time with a content of communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated for the second time by the difference calculation apparatus.

[0009]

In addition, as another embodiment of the present disclosure, a program conversion program including:

a time provision function for providing time information including a second time in the log information generation apparatus to a difference calculation apparatus in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a

communication network at a start of communication processing via

the communication network, the difference calculation apparatus calculating a difference between a input first time and a reference time; and

a log information generation function for generating log information associating arranged time with an content of communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated for the second time by the difference calculation apparatus.

[0010]

Furthermore, the embodiment is also achieved by a computer-readable recording medium that records the program.

[Advantageous effects of Invention]

[0011]

A log information generation apparatus and the like according to the present disclosure can generate log information which enables a correct arrangement of an order of logs related to communication processing executed on a communication network in accordance with an order of occurrence of the communication processing.

[Brief Description of Drawings]

[0012]

[Fig. 1] Fig. 1 is a block diagram illustrating a configuration of a log information generation apparatus according to a first example embodiment of the present invention.

[Fig. 2] Fig. 2 is a flowchart illustrating a flow of processing in the log information generation apparatus according to the first example embodiment.

[Fig. 3] Fig. 3 is a diagram conceptually illustrating an

CLAIMS

[Claim 1]

An information processing system comprising:

a log information generation apparatus; and

a difference a calculation apparatus; wherein

the log information generation apparatus including:

time provision means for providing, in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, time information including a second time related to the log information generation apparatus and an apparatus identifier included in the communication start information to the difference calculation apparatus, the difference calculation apparatus calculating a difference between a input first time and a reference time, and

log information generation means for generating log information associating arranged time with an content of the communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated, by the difference calculation apparatus, for the second time, wherein

the time information associates the second time with the communication start information, and

the difference calculation apparatus calculates the difference from the reference time based on the time information provided by the log

information generation apparatus, and sets minimum second time to the reference time, the minimum second time being minimum in the second time included in the time information associated with certain communication start information.

[Claim 2]

The information processing system according to claim 1 further comprising:

time calculation means for calculating a time; and

time arrangement means for arranging time calculated by the time calculation means based on the difference calculated by the difference calculation apparatus, wherein

the log information generation means sets the time calculated by the time calculation means to be the arranged time after the time arrangement means arranges a time calculated by the time calculation means.

[Claim 3]

The information processing system according to claim 1 or claim 2 further comprising:

determination means for determining whether or not communication information received via the communication network is the communication start information, wherein

the time provision means outputs the time information when it is determined that the communication information is the communication start information.

[Claim 4]

The information processing system according to claim 3, wherein

the determination means determines whether or not the communication information is broadcast information whose destination is a plurality of information processing apparatuses communicably connecting to the communication network, and

the time provision means outputs the time information when it is determined that the communication information is the broadcast information.

[Claim 5]

The information processing system according to any one of claims 1 to 4, wherein

the time information further includes a type of processing executed for the communication start information.

[Claim 6]

An information processing system comprising:

a log information generation apparatus; and

a difference a calculation apparatus; wherein

the log information generation apparatus including:

time provision means for providing, in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, time information including a second time related to the log

information generation apparatus and an apparatus identifier included in the communication start information to the difference calculation apparatus, the difference calculation apparatus calculating a difference between a input first time and a reference time, and

log information generation means for generating log information associating arranged time with an content of the communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated, by the difference calculation apparatus, for the second time, wherein

the time information associates the second time with the communication start information, and

the difference calculation apparatus calculates the difference from the reference time based on the time information provided by the log information generation apparatus, and sets second time to the reference time, the second time included in the time information earliestly input in the time information associated with certain communication start information.

[Claim 7]

The information processing system according to any one of claims 1 to 6 further comprising:

a network switch for relaying communication executed via the network switch among the plurality of information processing apparatuses, wherein

the communication start information is transmitted to the plurality

of the information processing apparatuses communicably connected via the network switch.

[Claim 8]

An information processing method by a calculation processing apparatus comprising:

providing, in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, time information including a second time related to the log information generation apparatus and an apparatus identifier included in the communication start information to the difference calculation apparatus, the difference calculation apparatus calculating a difference between a input first time and a reference time, and

generating log information associating arranged time with an content of the communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated, by the difference calculation apparatus, for the second time, wherein

the time information associates the second time with the communication start information, and

the difference calculation apparatus calculates the difference from the reference time based on the provided time information, and sets minimum second time to the reference time, the minimum second time

being minimum in the second time included in the time information associated with certain communication start information.

[Claim 9]

An information processing program causing a computer to achieve:

a log information generation function; and

a difference calculation function; wherein

the log information generation function includes:

a time provision function for providing, in accordance with communication start information transmitted to a plurality of information processing apparatuses communicably connecting to a communication network at a start of communication processing via the communication network, time information including a second time related to the log information generation function and an apparatus identifier included in the communication start information to the difference calculation function, the difference calculation function calculating a difference between a input first time and a reference time, and

a log information generation function for generating log information associating arranged time with an content of the communication processing, the arranged time obtained by arranging a time of the communication processing based on the difference calculated, by the difference calculation function, for the second time, wherein

the time information associates the second time with the communication start information; and

the difference calculation function calculates the difference from

the reference time based on the time information provided by the log information generation function, and sets minimum second time to the reference time, the minimum second time being minimum in the second time included in the time information associated with certain communication start information.