

NETWORK MONITOR SYSTEM

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to a network monitor system for displaying network resources, which are monitor targets, on a map of a network monitoring screen.

This application is based on Japanese Patent Application No. Hei 10-237772, the contents of which are incorporated herein by reference.

Background Art

A network monitor system, for monitoring the occurrence of a trouble in target monitored resources, which are dispersed over a wide area, through communication devices using a personal computer and a centralized monitoring system, is known. This system must accurately indicate the positions of the monitored resources and trouble information on a graphic display. In general, on a displayed map representing an entire country, the presence or absence of the trouble in each area is indicated by changing colors.

The conventional network monitor system, however, must display all the monitored resources on one display, which cannot clearly specify the position of the trouble in the area where the monitored resources are

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concentrated or where the indications of the trouble information are concentrated. Thus, the conventional network monitor system lacks accuracy. The monitored resources may be divided in a hierarchical structure by unit (for example, by prefecture, city, or store), and the trouble may be indicated in each display by prefecture, city, or store. This technique, however, increases the number of operations and displays, and makes the monitoring inefficient. To search the trouble information in, for example, Green Store, West City, Tokyo, an operator must initially display the prefectures, then display Tokyo, and then display West city. These three displays consume machine resources, and increase the number of operations.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a network monitor system which accurately specifies the position of trouble occurring in the monitored resources on one display, and which allows an operator to easily and efficiently recognize and confirm the occurrence of the trouble, eliminating the hierarchical structure.

In one aspect of the present invention, the network monitor system comprises: a display processor for displaying a map on a network monitoring screen of a display and for marking monitored resources on the map, information of the monitored resources being input through a communicator; a trouble analyzing processor for determining whether the trouble occurring

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in the monitored resources is registered beforehand; and an alarm processor for directing the display processor to change a color of the mark of the monitored resource, in which the trouble occurs, to another color indicating the occurrence of the trouble, when the trouble analyzing processor determines that the trouble is registered.

In another aspect of the present invention, the display processor can enlarge or reduce a part of the network monitoring screen in response to an operator instruction.

When the trouble in the monitored resource is settled, the display processor restores the color of the mark.

When a trouble occurs in the monitored resources out of the enlarged or reduced area, the display processor enlarges the size of the mark in which the trouble occurs.

After the trouble is confirmed by the enlarged mark, the display processor restores the size of the mark to the normal size in response to an operator instruction.

According to the present invention, the display processor displays a map on the network monitoring screen of the display, and marks the monitored resources on the map, the trouble analyzing processor determines whether the trouble occurring in said monitored resources is registered beforehand, and the alarm processor directs the display processor to change the color of the mark of the monitored resource, in which the trouble occurs, to another color indicating the occurrence of the trouble, when said trouble



analyzing processor determines that the trouble is registered. Thus, the present invention eliminates the hierarchical structure and allows the operator to easily and efficiently recognize and confirm the occurrence and position of the trouble on the single display. When a part of the network monitoring display is enlarged, or the mark is enlarged, the occurrence of the trouble can be recognized more clearly and accurately. When the mark is displayed in a part of the network monitoring screen, the part is reduced on the display so that the existence of the mark is securely confirmed.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram showing the network monitor system the first embodiment of the present invention.

Figures 2A to 2C are diagrams showing the process for displaying trouble in monitored resources in the network monitoring screen of the embodiment of the present invention.

Figures 3A to 3D are diagrams showing the process for displaying trouble in monitored resources in the network monitoring screen of the other embodiment of the present invention.

Figures 4A to 4D are diagrams showing the process for displaying trouble in monitored resources in the network monitoring screen of the other embodiment of the present invention.

Figure 5 is a diagram showing the process for moving the enlarged



part on the monitoring screen of the present invention.

Figure 6 is a monitored resource control status table of the present invention.

Figures 7A to 7C are diagrams showing the changes of the marks when the trouble occurs, when an operator confirms the trouble, and when the trouble is settled.

Figure 8 is a flowchart showing the process for displaying the alarm of the present invention.

Figure 9 is a flowchart showing the process of the present invention when the operator confirms the occurrence of the trouble.

Figure 10 is a flowchart showing the process of the present invention when the trouble is eliminated.

Figure 11 is a flowchart showing the process of the present invention for enlarging a part of the monitoring screen.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the Figures, the best mode of the network monitor system according to the present invention will be explained.

Referring to Figure 1, reference numeral 1 denotes a communication controller for controlling sending and receiving information to and from a monitored resources which are the target to be monitored. Reference numeral 2 denotes a database which is a storage device for storing

information such as map data. Reference numeral 3 denotes a display processor for displaying a map of a monitored area on a network monitoring screen of a display and for marking the monitored resources, which are specified through a communicator, on the map. Reference numeral 4 denotes a trouble analyzing processor for determining whether a trouble occurring in the monitored resources is registered beforehand. Reference numeral 5 denotes an alarm processor for changing the color of the displayed marks to a trouble indication color when the trouble analyzing processor 4 determines that the trouble is registered beforehand. Reference numeral 6 denotes an input and output controller for specifying a range on the map, enlarging and reducing the specified range, and outputting and displaying the map information on a CRT display. Reference numeral 7 denotes a work memory for temporarily storing the information and the trouble analysis data extracted from the database 2 and the alarm process data. Reference numeral 8 denotes a microprocessor (hereinafter referred to as "CPU") for controlling the operations of all the above devices which include the communication controller 1 and the work memory 7 according to a computer program. Reference numeral 9 denotes a data bus connecting from the communication controller 1 to the CPU 8.

The operation of the present invention will be explained. On the network monitoring screen, the map of the area whose network is to be monitored is extracted from the database 2, and the display processor 3 directs the CRT display to display the map through the input and output

controller 6. The communication controller 1 receives the information of the monitored resources to be monitored through the network and displays marks on the map as shown in Figure 2A. In Figure 2A, the dark color mark indicates the monitored resource in which trouble occurs, and the other light color marks indicate the monitored resources which have no trouble. When the trouble analyzing processor determines that a trouble occurs in a area A, the alarm processor 6 directs the display processor 3 to change the color of the mark in the area A to the trouble indication dark color as shown in Figure 2B. On the other hand, when the trouble in the monitored resource is settled, the alarm processor 6 directs the display processor 3 to change the color of the mark to the non-trouble indication light color on the CRT display.

Figure 3 shows the network monitoring screen of another embodiment of the present invention. The marks on the screen correspond to the monitored resources, but the monitored resources are concentrated in an area B. Therefore, the marks for indicating troubles are also concentrated, and the occurrences of the trouble cannot be easily distinguished. Then, an operator specifies a range (area) to be enlarged and an enlargement ratio (above 100%) by a mouse. The display processor 3 enlarges the specified range within the same screen as shown in Figure 3B. In this situation, when trouble occurs, for example, in another monitored resource in an area C other than the enlarged area, the non-trouble indication color of the mark of the monitored resource in the area C is changed to the trouble indication color, and the size of the mark is increased.

The operator can easily recognize the trouble in the area C.

Then, the operator, who has recognized the trouble, clicks the large mark with the mouse, the size of the mark is reduced to the normal while maintaining the trouble indication color, as shown in Figure 3D. When a trouble occurs in one of the monitored resources in the area B, only the mark of the monitored resource in which the trouble occurs is changed from the light color to the dark color. That is, only the color is changed while the size of the mark is not changed.

Figure 4 shows the network monitoring screen of another embodiment of the present invention. The monitored resources correspond to the marks displayed on the map as shown in Figure 4A. To easily recognize the position of the mark in a wide area, the operator specifies a range to be reduced, and inputs the reduction ratio (below 100%) through the input and output controller 6. Then, the display processor 3 reduces the part of the network monitoring screen, as shown in Figure 4B. When the trouble analyzing processor 4 determines that trouble occurs in the monitored resource in the area A, the alarm processor 5 directs the display processor 3 to change the non-trouble indication color of the mark to the trouble indication color, and to increase the size of the mark, as shown in Figure 4C.

The operator confirms the occurrence of the trouble in the monitored resource by the enlarged mark, and clicks the mark with the mouse. Then, the size of the mark is reduced while the mark maintains the dark color

indicating the trouble, as shown in Figure 4D. Thus, it is checked that the operator recognized the monitored resource. In this situation, when trouble occurs in the areas which are not reduced, the corresponding mark is changed from the light color to the dark color. Further, the enlarged or reduced area in the monitoring screen can be moved by dragging the mouse.

Figure 6 shows a control status table for the monitored resources, which is stored in the database 2. This table includes a display position pointer (corresponding to the monitored resources) and the presence or absence of the operation by the operator, and the presence or absence of the trouble for each monitored resource ID.

The process for indicating the occurrence of the trouble according to the control status table will be explained. Figure 7A shows the shapes of the marks before and after the occurrence of the trouble. The alarm indication is conducted under control of the CPU 8 according to the order of the flowchart of Figure 8. Initially, when the occurrence of the trouble in the monitored resource is notified through the communication controller 1 (step S1), the corresponding record is searched for, based on the monitored resource ID in the control status table as a key (step S2). Then, a determination is made whether the corresponding record exists (step S3). When it is determined that the corresponding record exists, a determination is made whether the notified trouble exists in the troubles registered for the corresponding record (step S4). When it is determined that the trouble is not registered (step S5), the monitored resource control status table is

updated by adding the new trouble thereto (step S6). Subsequently, a display position pointer is obtained (step S7), and the process for displaying the trouble alarm is performed (step S8).

Figure 7B shows the change of the mark when the operator confirms the occurrence of the trouble, and the flowchart of Figure 9 shows the trouble alarm process thereof. When the operator confirms the occurrence of the trouble on the network monitoring screen, the operator clicks the dark enlarged mark with the mouse as shown in Figure 7A (step S11). Then, the display pointer is obtained (step S12), and the corresponding record is searched for in the monitored resource control status table (step S13). A determination is made whether the corresponding record exists and when it is determined that the record exists (step S14), the operation in the record is checked (step S15). When it is determined that the operation does not exist (step S16), the monitored resource control status table is updated (step S17), the display position pointer is obtained (step S18), and the process for displaying the trouble alarm is performed (step S19).

Figure 7C shows the change of the mark when the trouble is eliminated, and the flowchart of Figure 10 shows the trouble alarm process thereof. When the notification of the recovery from the trouble in the monitored resource is received through the communication controller 1 (step S21), the corresponding record is searched for in the monitored resource control status table (step S22). When it is determined that the corresponding record exists (step S23), a determination is made whether a

trouble is registered (step S24). When there is no registered trouble (step S25), the monitored resource control status table is updated (step S26), the display position pointer is obtained (step S28), and the process for displaying the trouble alarm is performed (step S28). Further, Figure 11 is a flowchart showing the process for enlarging a part of the monitoring screen of Figure 3B (step S31). According to the instruction from the operator (step S31), the enlargement ratio and the pointer are obtained (step S22), and a range to be enlarged is determined (step S33). Then, the display image corresponding to the range to be enlarged is prepared (step S34), and the specified range is enlarged and displayed at the specified enlargement ratio.

This invention may be embodied in other forms or carried out in other ways without departing from the spirit thereof. The present embodiments are therefore to be considered in all respects illustrative and not limiting, the scope of the invention being indicated by the appended claims, and all modifications falling within the meaning and range of equivalency are intended to be embraced therein.

What is claimed is:



1. A network monitor system comprising:

a display processor for displaying a map on a network monitoring screen of a display and for marking monitored resources on the map, information of said monitored resources being input through a communicator;

a trouble analyzing processor for determining whether trouble occurring in said monitored resources is registered beforehand; and

an alarm processor for directing said display processor to change a color of the mark of the monitored resource, in which the trouble occurs, to another color indicating the occurrence of the trouble, when said trouble analyzing processor determines that the trouble is registered.
2. A network monitor system according to claim 1, wherein said display processor enlarges or reduces a part of the network monitoring screen in response to an operator instruction.
3. A network monitor system according to claim 1, wherein, when the trouble in the monitored resource is settled, said display processor restores the color of the mark.
4. A network monitor system according to claim 2, wherein, when a

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trouble occurs in the monitored resources out of the enlarged or reduced area, said display processor enlarges the size of the mark in which the trouble occurs.

5. A network monitor system according to claim 4, wherein, after the trouble is confirmed by the enlarged mark, the display processor restores the size of the mark to a normal size in response to an operator instruction.

6. A computer-readable memory containing computer-readable instructions, comprising:

displaying a map on a network monitoring screen of a display and marking monitored resources on the map;

determining whether trouble occurring in said monitored resources is registered beforehand; and

said display processor changing a color of the mark of the monitored resource in which the trouble occurs, to another color indicating the occurrence of the trouble, when it is determined that the trouble is registered.

7. A computer-readable memory according to claim 6, said instructions further comprising: enlarging or reducing a part of the network monitoring screen in response to an operator instruction.

8. A computer-readable memory according to claim 6, said instructions

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further comprising: restoring the color of the mark when the trouble in the monitored resource is settled.

9. A computer-readable memory according to claim 7, said instructions further comprising: when a trouble occurs in the monitored resources out of the enlarged or reduced area, enlarging the size of the mark in which the trouble occurs.

10. A computer-readable memory according to claim 7, said instructions further comprising: after the trouble is confirmed by the enlarged mark, restoring the size of the mark to a normal size in response to an operator instruction.

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