Chap. 3

Management Item and Operation Procedures of NEC ESMPRO

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3.2 Monitoring of Memory
3.3 Monitoring of Temperature
3.4 Monitoring of Fan
3.5 Monitoring of Chassis Power
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3.8 Monitoring of Chassis Cover
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3.11 Monitoring of Disk Array
3.12 Monitoring of network (LAN)
3.13 Reference of System Information
3.14 Reference of Error Information detected by HW Level
3.15 Monitoring of Event
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3.1 Monitoring of CPU

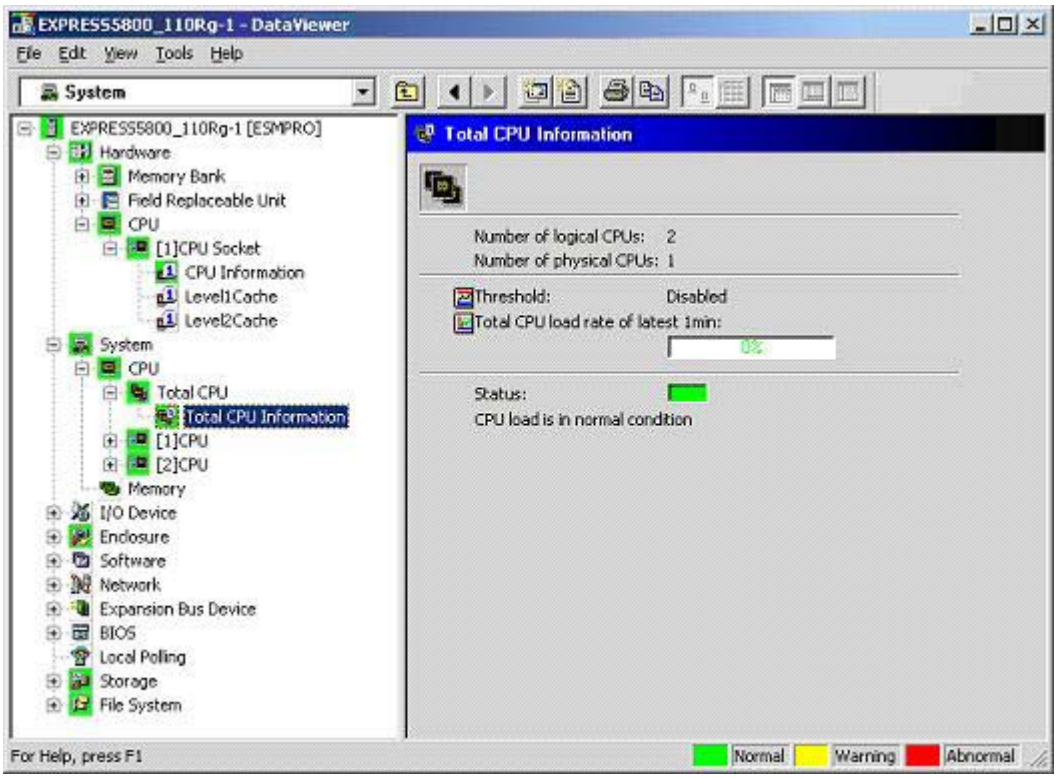
You can monitor CPU on server by utilizing NEC ESMPRO Manager and NEC ESMPRO Agent. By CPU Monitoring you detect degenerate state of CPU and heavy load of at an early stage.

3.1-1 Function of CPU Monitoring

When NEC ESMPRO Agent detects CPU in degenerate state and high load status, it reports alert to NEC ESMPRO Manager and changes the status color of relevant CPU by DataViewer of NEC ESMPRO Manager. By referring to DataViewer, you can confirm malfunction status of CPU.
The load status monitoring can monitor the load status of CPU on a basis of the 2 types of "each CPU" and " server 1unit".. Thus, regardless of each CPU, you can monitor CPU load status of server1 unit as one package.
You can confirm the monitoring the load status of CPU from [System]-[CPU].

CAUTION The contents to be monitored of CPU Monitoring function may be different by model.

About Total Information Monitoring Function
CPU information is displayed on a basis of " server1 unit".
You can confirm the status of CPU about quantity of logical CPU, quantity of physical CPU, total CPU monitoring status, total CPU load factor and load Factor by selecting [Total CPU Information].



[Total CPU Information] of DataViewer

About CPU Information Monitoring Function

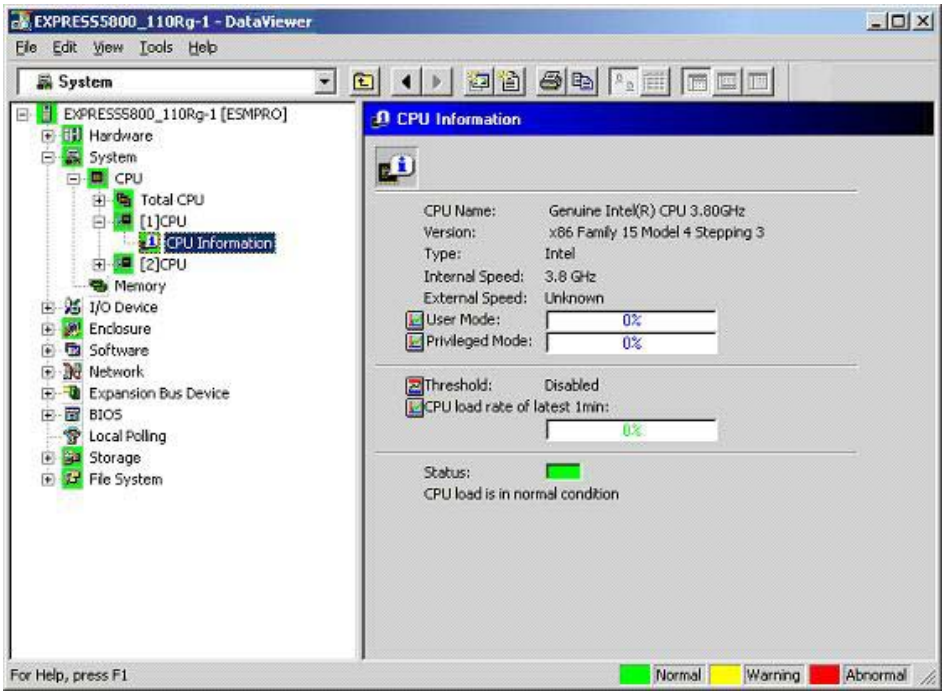
CPU information is displayed on a basis of " each CPU".
By selecting [CPU information], you can confirm the status of CPU about CPU name, version information, CPU type, interal clock number, external clock number, load rate of user mode, load rate of privileged mode, each CPU monitoring status, load rate of each CPU and load rate.

CAUTION

- When you make the function valid by hyper threading compatible model, logical CPU quantity is displayed in multiples of quantity of physical CPU.
- When you make the function valid by Dual-Core compatible model, logical CPU quantity is displayed in multiples of quantity of physical CPU.
- When you make the function valid by Quad-Core compatible model, logical CPU quantity is displayed in 4 multiples of quantity of physical CPU.

KEYWORD

Intel's hyper threading technology is that single physical processor enables to execute multiple threads (instruction stream) simultaneously and as such throughput can increase and performance can enhance.



[System]-[CPUInformation] of DataViewer

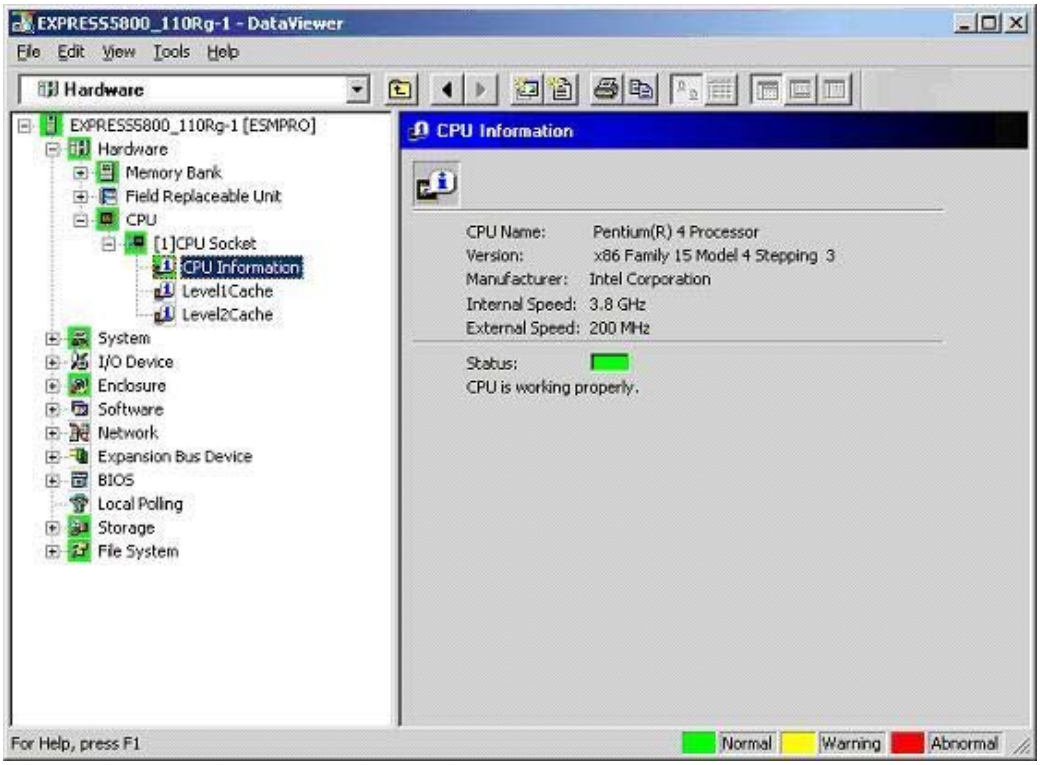
About Status Color

The LED of [status] Item of CPU information displays CPU load factor and the status of CPU load by monitoring function.

(Normal color) : Rate of CPU load is within normal range.
(Warning color) : Rate of CPU load rate exceeds warning value.
(Abnormal color) : Rate of CPU load exceeds abnormal value[status] Item.

CAUTION

External clock is displayed as Unknown.



[Hardware]-[CPU Information] of DataViewer

In case you select [CPU information] of each CPU of [Hardware], you can confirm CPU name, version information, type of CPU, internal clock speed and external clock speed. In case you select [Level1 cache], [Level2 cache] and [Level3 cache], you can confirm cache size of each CPU and level type method.

3.1-2 Operation of CPU Monitoring

describes operation procedures such as validation method of failure about CPU monitoring and modification method of setting.

1. How to confirm CPU failure

In case CPU failure happens, alert to Manager is reported. Confirm whether alert concerning CPU is not reported on AlertViewer.

Contents of alert at the time of CPU degenerate

CPU subsystem is running in a reduced capacity.
Cpu Number:1

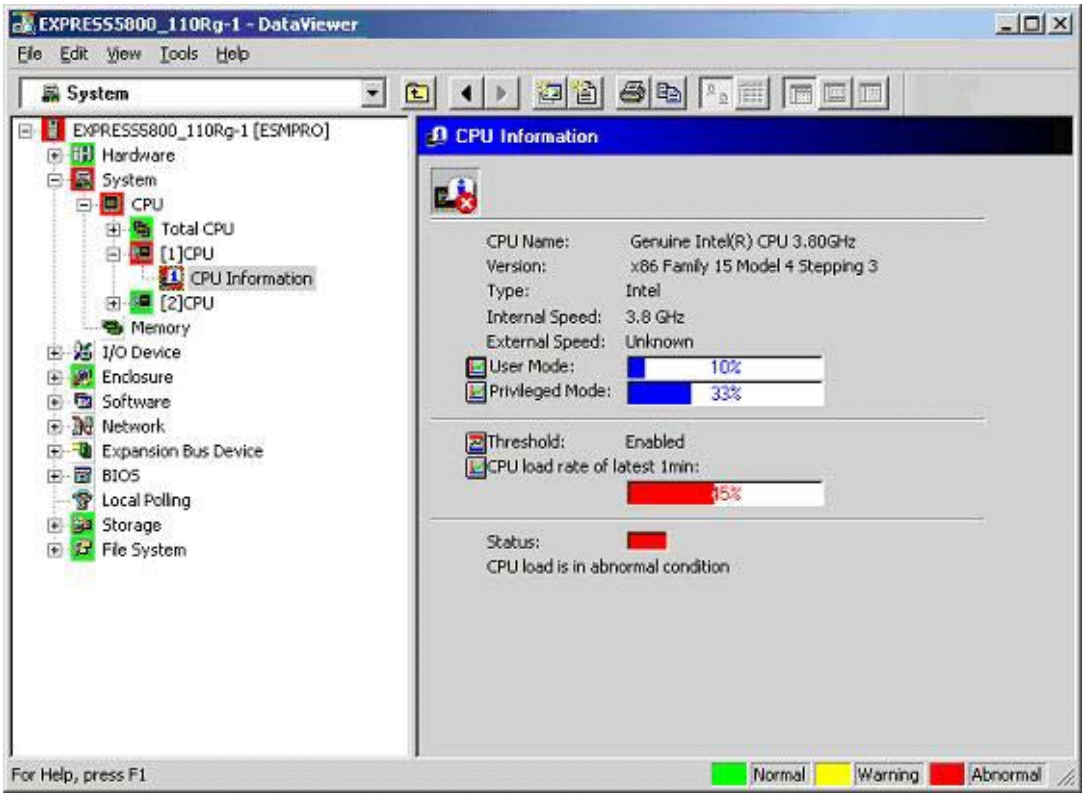
NEC ESMPRO Agent detects CPU degenerate at the time of start-up of system. In case it detects CPU degenerate, alert is reported. Check CPU degenerate by[Hardware]-[CPU] of DataViewer.

CAUTION

The alert report just after start-up of system may fail to be sent. In case of the failure of sending, the alert report may delay by retry interval designated by Alert Manager setting tool.

Contents of alert at the time of high load of CPU

CPU xx load has exceeded the upper threshold (Error)



[CPU Information] of DataViewer (at time of abnormal condition)

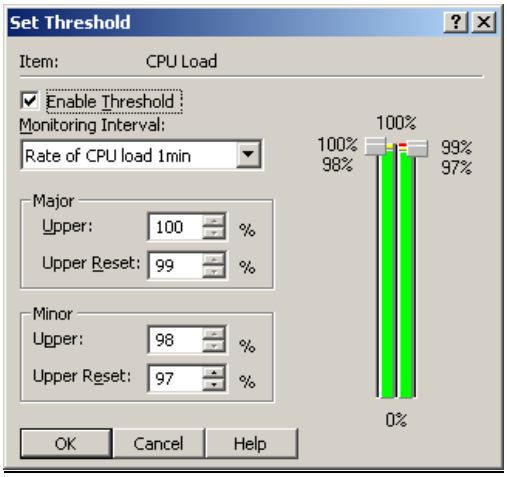
2. Setting of CPU monitoring function

By default, CPU load rate is not monitored. In case of monitoring of load rate, change the setting so that you can monitor CPU load rate.
The threshold of CPU load rate is not required to change. Though you can change the setting to optional value, the alert of CPU load by the changed threshold may be frequently reported. In case you change threshold of CPU load rate, please set up the threshold so that the alert by system load can not be frequently reported.

2.1 Change of CPU monitoring threshold

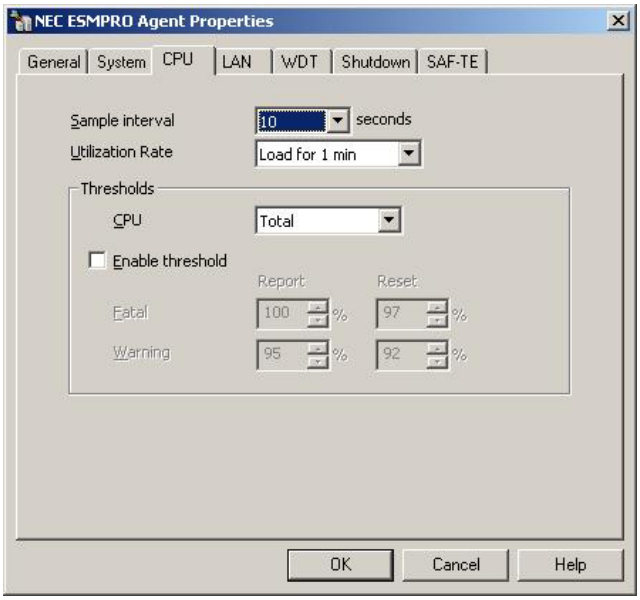
Threshold can be changed by both DataViewer of NEC ESMPRO Manager and control panel of NEC ESMPRO Agent.

[Threshold Setting] Dialog Box of NEC ESMPRO Manager



[Set Threshold] Dialog Box(CPU)

Control Panel of NEC ESMPRO Agent [CPU]



Control Panel of NEC ESMPRO Agent [CPU]

Default of Threshold

Monitoring Operation: does not monitor
Utilization Rate: loads for 1min
CPU Load Rate refers to the table below (unit: %)
Monitoring Information:

Monitoring Item Name	Threshold (Abnormal Condition)	Threshold (Abnormal Condition Restoration)	Threshold (Warning)	Threshold (Warning Restoration)
CPU Load Rate	100	97	95	92

3.2 Monitoring of Memory

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor memory on server. By status monitoring function of memory, you can detect failure about hardware such as memory degenerate, correctable, error repetition, uncorrectable error and others.

3.2-1 Function of memory monitoring

By memory monitoring function, you can refer to memory information mounted on system (Memory capacity mounted on bank unit, total capacity of memory, capacity enabling to use, usage, usage rate, total capacity of page file, capacity enabling to use, usage, usage rate, etc.).

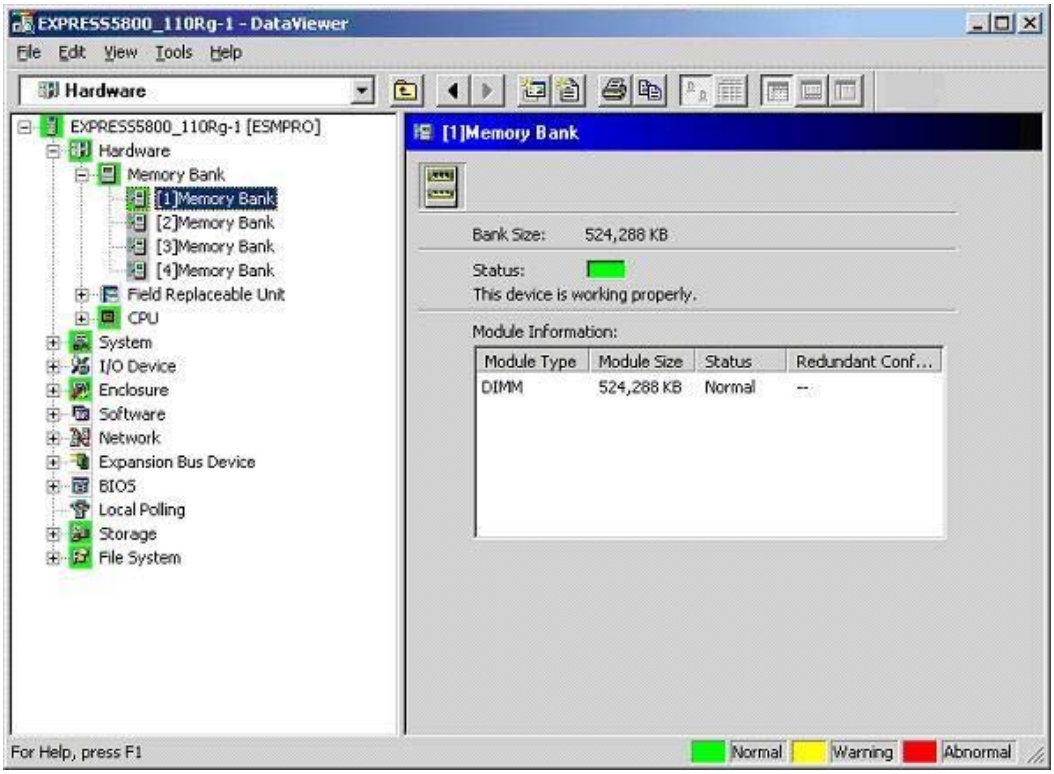
When NEC ESMPRO Agent detects failure of memory, it reports it to NEC ESMPRO Manager (yellow color). By referring to DataViewer, you can check memory detected failure.

CAUTION

The contents to be monitored of memory monitoring function may be different by model.

About Memory Monitoring Function

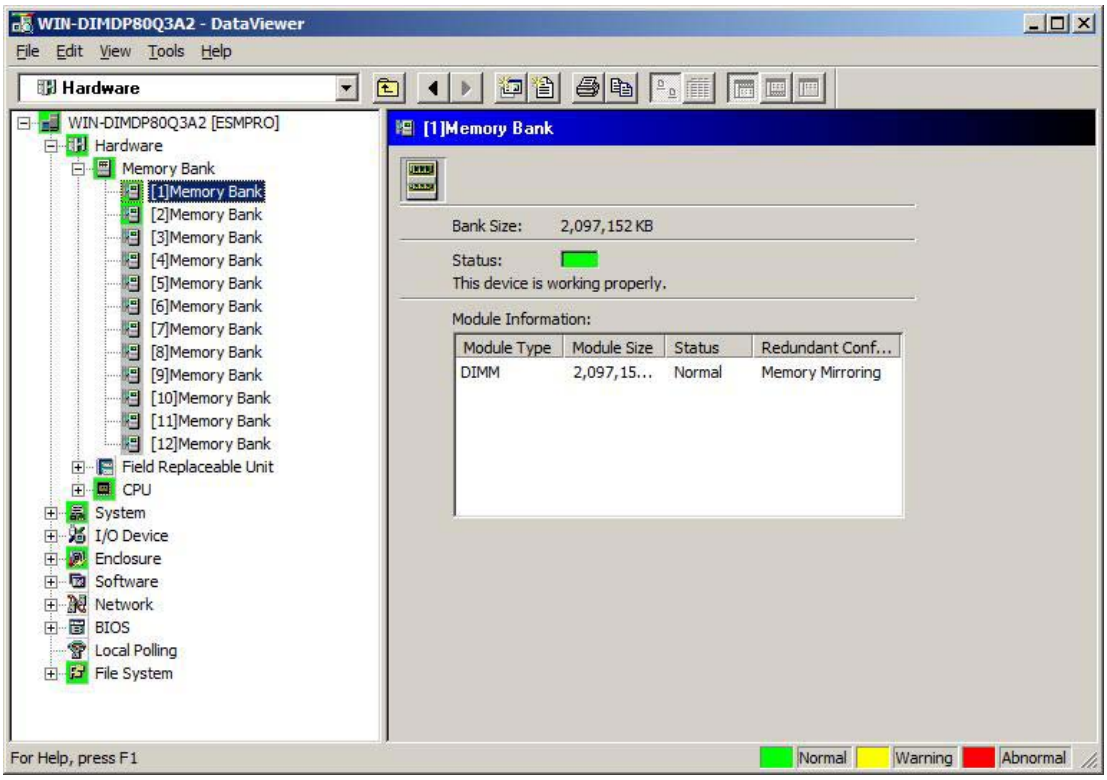
In case you refer to information of memory from NEC ESMPRO Manager, open DataViewer and select [Hardware]-[Memory Bank]-"Memory Bank you want to refer to" .You can check memory status, redundant status and memory capacity mounted in bank unit.



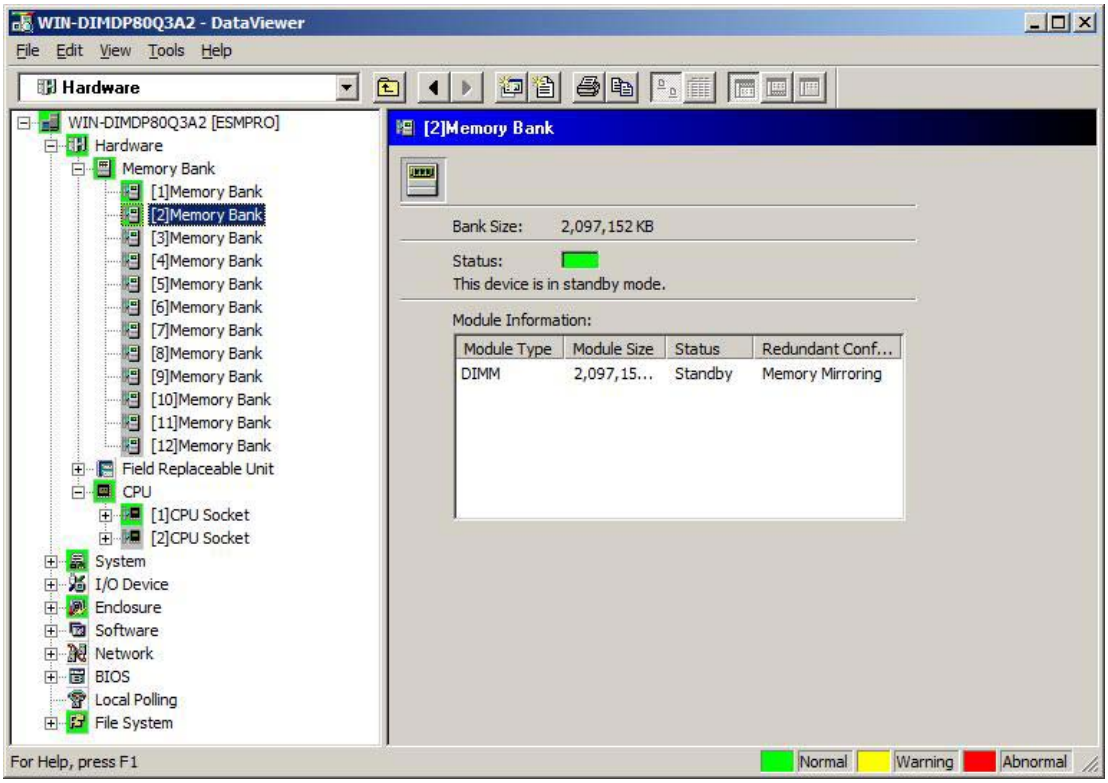
[Memory Bank] of DataViewer

Memory Mirroring

The memory mirroring feature writes the same data into two groups of DIMMs corresponding with each other between memory branches (mirror set) to provide data redundancy.



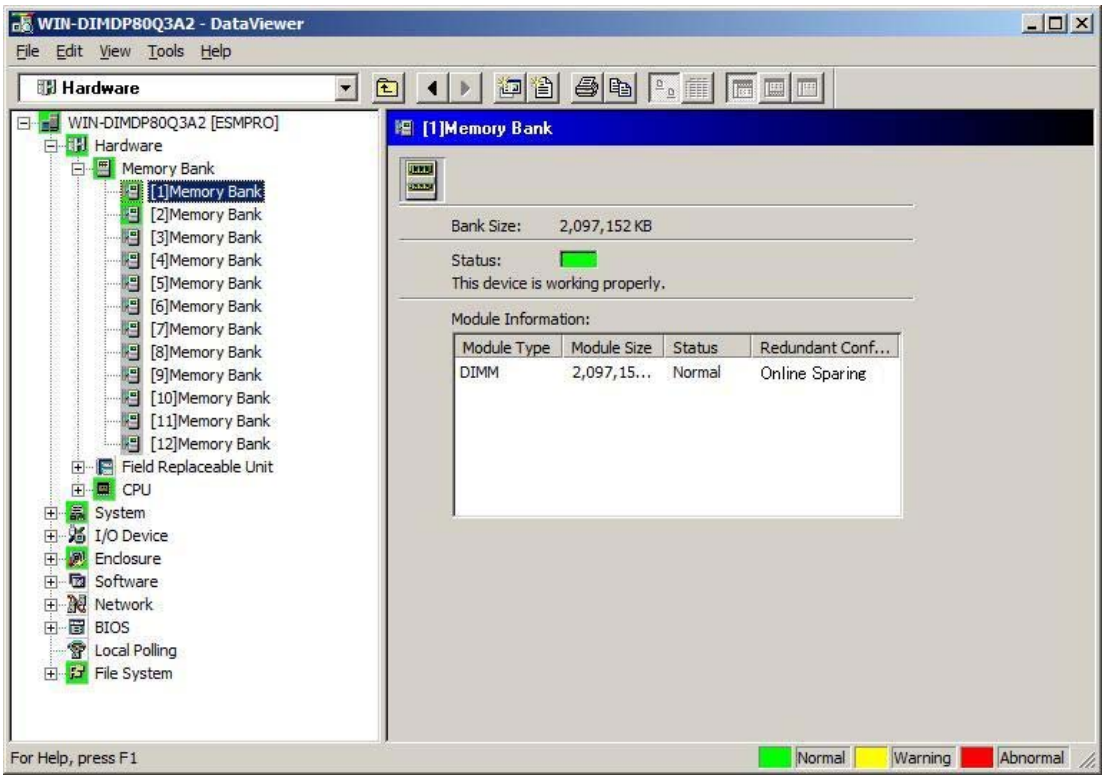
[Memory Bank] (Memory Mirroring) of DataViewer



[Memory Bank] (Memory Mirroring,standby) of DataViewer

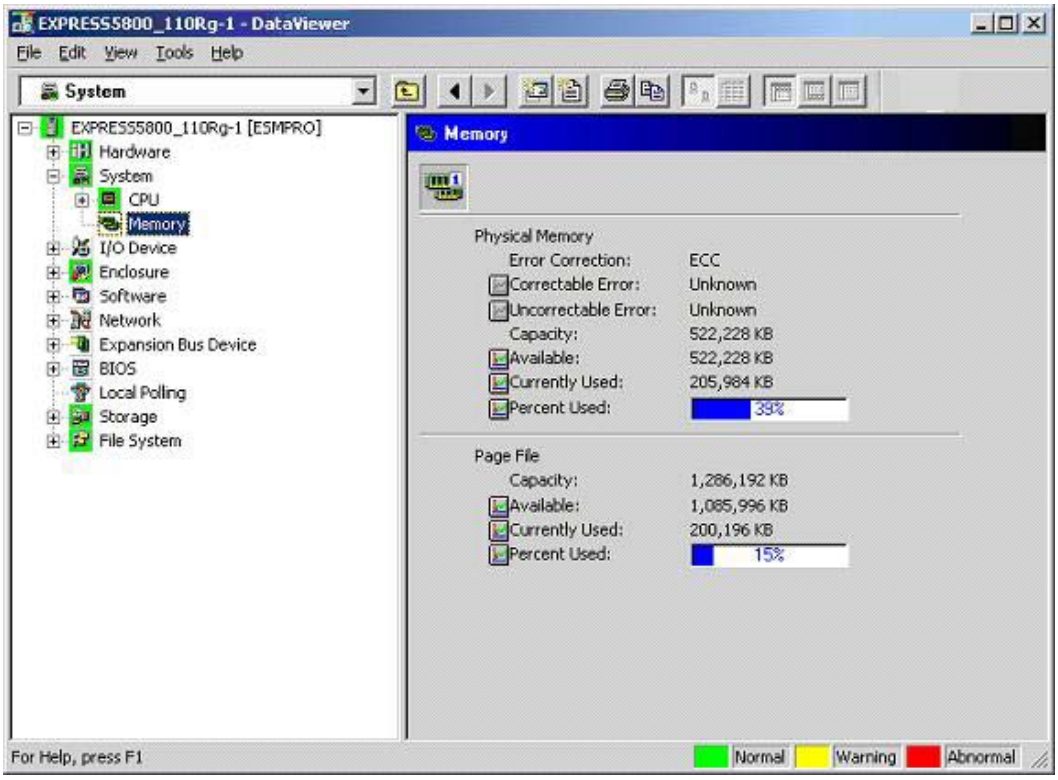
Online Spare Memory

The online memory spare feature puts a group of memory devices within a memory branch into standby status as spare devices. If an unrecoverable error occurs in a DIMM of the running group, the feature automatically changes the running DIMM from the failed one to a DIMM in the standby group to continue the processing.



[Memory Bank]（Online Spare Memory） of DataViewer

In case you refer to total capacity of memory, its capacity enabling to use, its usage, its usage rate and total capacity of page file, its capacity enabling to use, its usage and its usage rate, select [System]-[Memory].



[Memory] of DataViewer

3.2-2 Operation of Memory Monitoring

Describes operation procedures such as validation method of failure for memory monitoring and modification method of setting.

1. Confirmation of memory failure

In case of memory failure, alert is reported to NEC ESMPRO Manager. Confirm whether alert concerning memory is not report by AlertViewer. As occurrence of memory degenerate and uncorrectable error system start-up, alert is reported to NEC ESMPRO Manager after system start-up.

Alert contents at the time of memory degenerate (Example.)

A memory is a degenerate state.
Date:2006/10/26 17:45:12
Memory ID:1

Alert contents at occurrence of correctable error (Example.)

Too many ECC Correctable Errors.

Alert contents at occurrence of Uncorrectable Error (Example.)

ECC Uncorrectable error occurred.

CAUTION

Alert report just after system start-up may fail to send. In case of failure of sending, it may delay by retry interval designated by Alert NEC ESMPRO Manager setting tool.

In case memory degenerate is reported, confirm ”which memory is degenerate?” by DataViewer of NEC ESMPRO Manager You can easily recognize the failed memory because [Memory Bank] is displayed as ” Warning” status. Memory unit for ” Warning” status may be either all the Memory Bank or Memory 2 unit This depends on server model.

2. Confirmation of cache failure

In case cache degenerate is detected, alert is reported to NEC ESMPRO Manager after system start-up. Confirm whether alert concerning cache is not reported on AlertViewer.

Alert contents of Cache Degenerate (Example.)

A cache is a degenerate state.
Date:00/04/26 17:45:12
DIMM ID:0x01
Site Original Size:0x80
Site Current Size:0x40

CAUTION

Alert report just after system start-up may fail to send. In case of failure of sending, It may delay by retry interval designated by Alert Manager setting tool.

NEC ESMPRO Agent detects cache degenerate at the time of system start-up. In case cache degenerate is detected, NEC ESMPRO Agent reports it to NEC ESMPRO Manager but at that time as system operates in such a status that failed cache does not exist, you can not confirm ”occurrence of cache degenerate” on DataViewer of NEC ESMPRO Manager. In case Aler of cache degenerate is reported, confirm ”occurrence of cache degenerate” by log of DataViewer ESRAS utility.

3. Setting of memory monitoring function

During operation of server, NEC ESMPRO Agent always monitors memory. You can not set up so that memory is not monitored.

3.3 Monitoring of Temperature

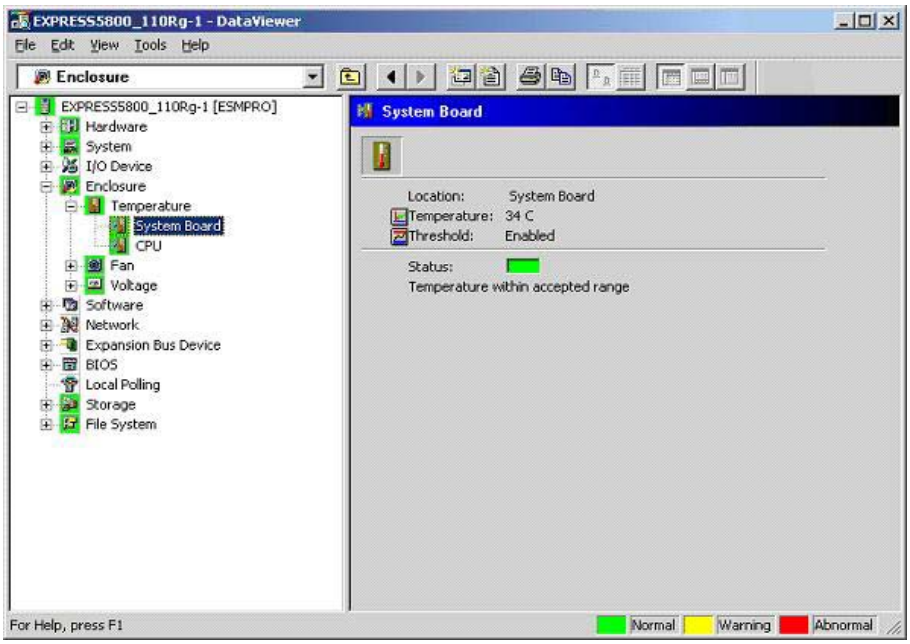
By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor temperature in server. By temperature monitoring, you can detect temperature abnormal condition status (high temperature/low temperature) in server at an early stage.

3.3-1 Function of Temperature Monitoring

When NEC ESMPRO Agent detects temperature malfunction, it reports it to NEC ESMPRO Manager and change status color of temperature sensor relevant to DataViewer of NEC ESMPRO Manager. By referring to DataViewer, you can confirm the failed sensor.
In addition, in case continuous operation is risky based on degree of failure server is shut down.

About Temperature Monitoring Function

Select by DataViewer, [Enclosure]-[Temperature]-" sensor you want to refer to temperature" of tree. You can refer to location of sensor, present temperature, monitoring status and sensor status.



[Temperature]-[System Board] of DataViewer

LED of [status] Item of "sensor you want to refer to temperature" displays the status of temperature sensor detected by temperature monitoring function.

(Normal color) : Temperature is within accepted range.
(Warning color) : Temperature exceeds warning value.
(Abnormal color) : Temperature exceeds abnormal value.

3.3-2 Operation of Temperature Monitoring

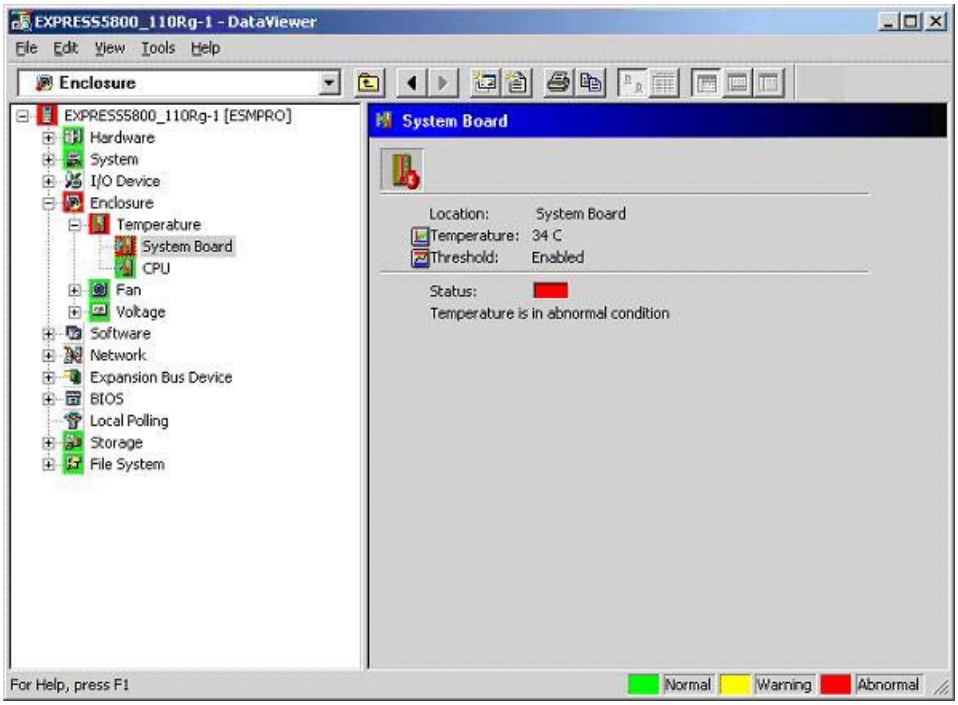
Describes operation procedure such as validation method of failure concerning temperature monitoring and modification method of setting.

1. Confirmation of temperature malfunction

In case temperature failure occurs, alert is reported to NEC ESMPRO Manager. Confirm whether alert concerning temperature is not reported on AlertViewer.

Alert contents at the time of high temperature malfunction (Example.)

The temperature has exceeded the upper threshold setting (Error).
Location : system board 1
Temperature : 80 C



[Temperature]-[System Board] (At the time of high temperature malfunction) of DataViewer

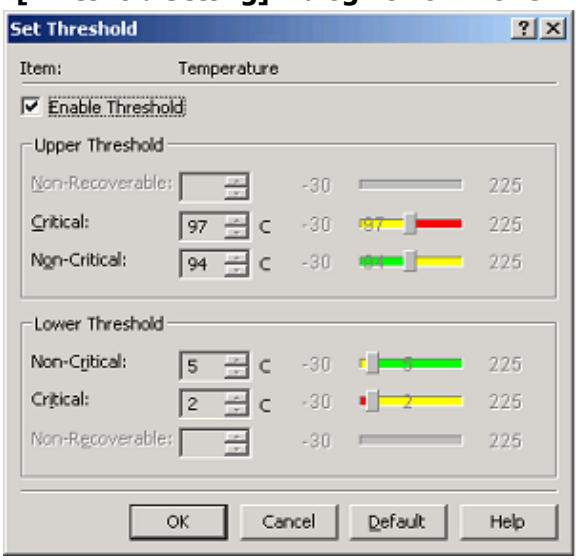
2. Setting of temperature monitoring function

During operation of server, NEC ESMPRO Agent always monitors the temperature of server.
The most suitable value for the threshold of temperature monitoring is set up for each equipment and shipped to customer. Therefore, you can not change the threshold. However, you can change the setting of "Monitor/Not monitor temperature". In addition, in case of IPMI incompatible model, you can change monitoring interval. Please note that the default of temperature monitoring is set up as "Enable to monitor" and the specified vale of monitoring interval for IPMI incompatible model is set up as "60 sec.". During normal operation, you do not need to change temperature monitoring status nor temperature monitoring interval.

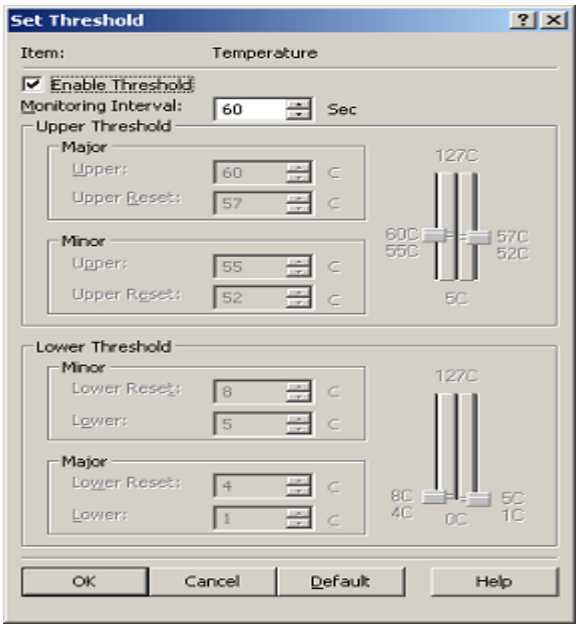
2.1 Temperature monitoring status

In case of monitoring temperature, open Threshold Setting Dialog Box of temperature from NEC ESMPRO Manager and tick the checkbox of [Enable Threshold] .In case of not monitoring, untick the checkbox.

[Threshold Setting] Dialog Box of NEC ESMPRO Manager



IPMI Compatible Model



IPMI Incompatible Model

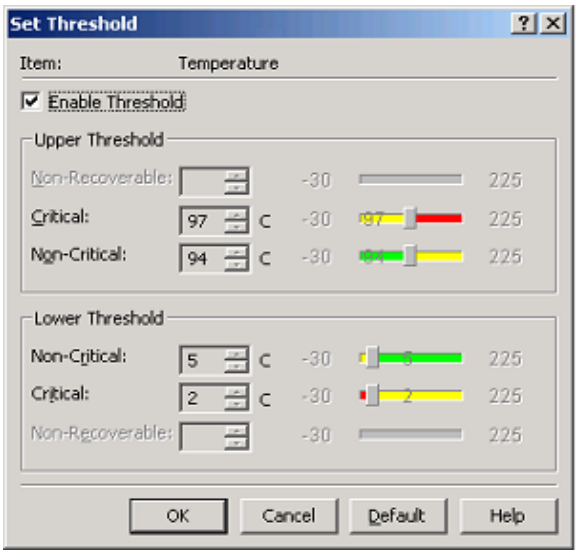
CAUTION

For some IPMI incompatible models, threshold setting] Dialog Box for IPMI compatible model is displayed but you can not change the setting of [Monitor/Not monitor].

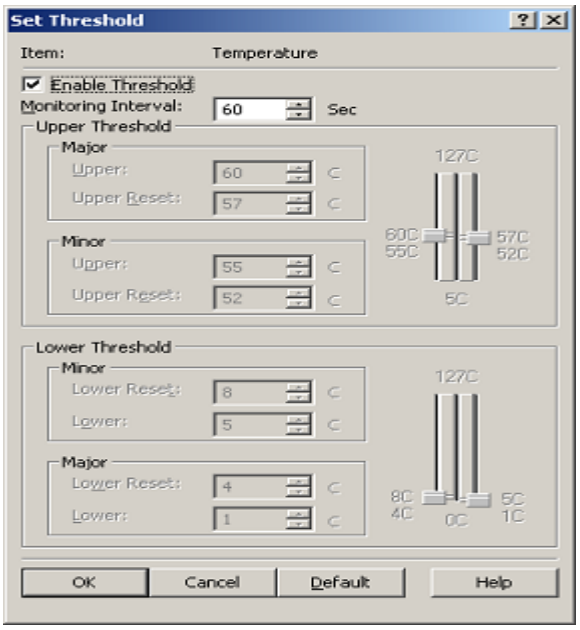
2.2 Temperature monitoring threshold

You can refer to the threshold of temperature monitoring. However, you can not change the threshold.

[Threshold Setting] Dialog Box of NEC ESMPRO Manager



IPMI Compatible Model



IPMI Incompatible Model

CAUTION For some IPMI incompatible models, [threshold setting] Dialog Box for IPMI compatible model Is displayed.

Default of Threshold

Monitoring Operation:	monitors.
Monitoring Interval:	IPMI incompatible model → 60 sec. IPMI compatible model → none
Threshold:	depending on each equipment.

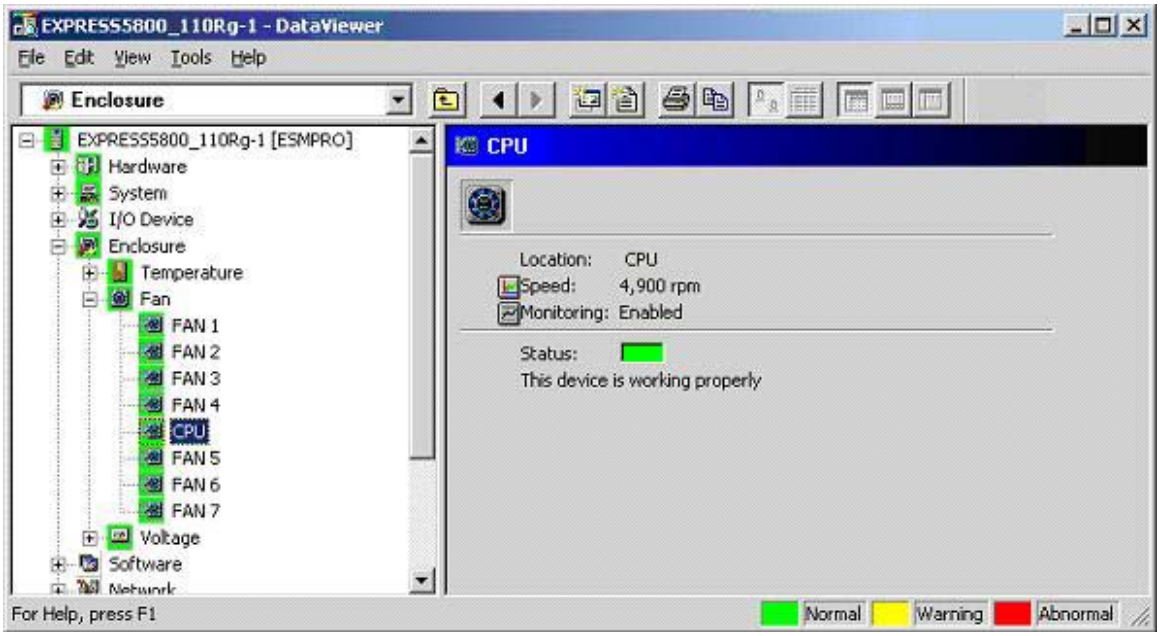
3.4 Monitoring of Fan

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor fan installed in chassis of server. By fan monitoring, you can prevent fan stop and temperature malfunction in chassis due to deterioration of rotation speed.

3.4-1 Function of fan monitoring

When NEC ESMPRO Agent detects fan failure and reports alert to NEC ESMPRO Manager and changes the status color of relevant fan by DataViewer of NEC ESMPRO Manager. By referring to DataViewer, you can confirm the fan where failure occurs.
In addition, In case continuous operation is risky, server is shut down based on degree of failure.

About Fan Information
By selecting [Enclosure]-[Fan]-"Fan you want to refer to", you can confirm the location and status of fan installed in chassis.



[Fan]-[CPU] of DataViewer

The LED of [status] Item of "Fan you want to refer to" displays fan status detected by fan monitoring function.

(Normal color) : Fan is in normal condition.
(Warning color) : Fan is in warning condition.
(Abnormal color) : Fan is inabnormal condition.

3.4-2 Operation of Fan Monitoring

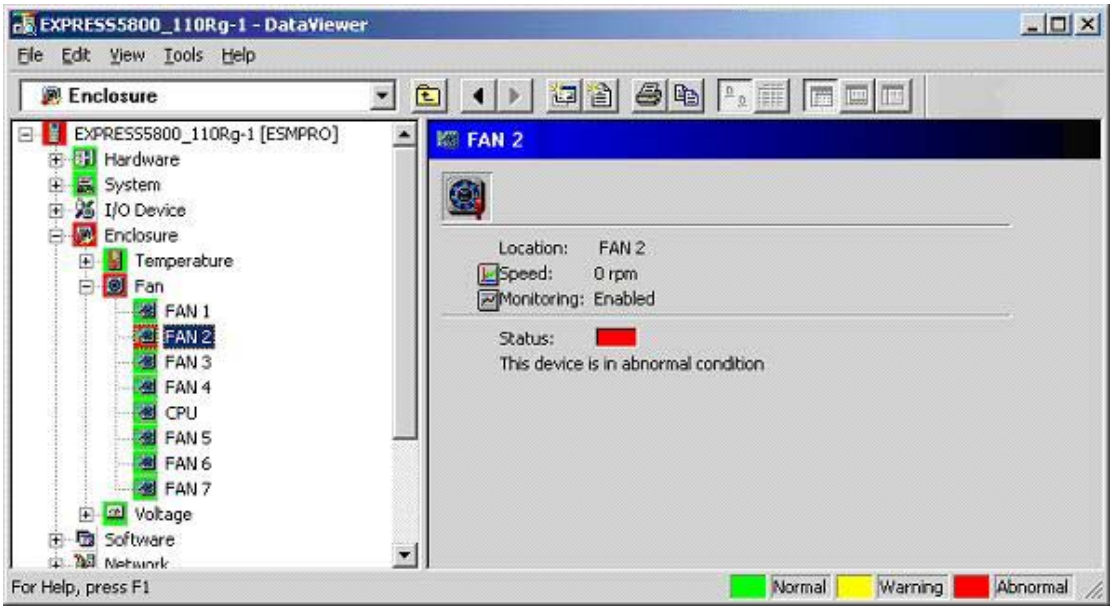
Describes about operation procedures such as validation method of failure concerning fan monitoring and modification method of setting.

1. Confirmation of fan failure

In case failure concerning fan occurs, alert is reported to NEC ESMPRO Manager. Confirm whether alert concerning fan is not reported on AlertViewer

Alert contents at the time of fan malfunction (Example.)

System board 1fan speed has fallen below the lower limit. (Warning).



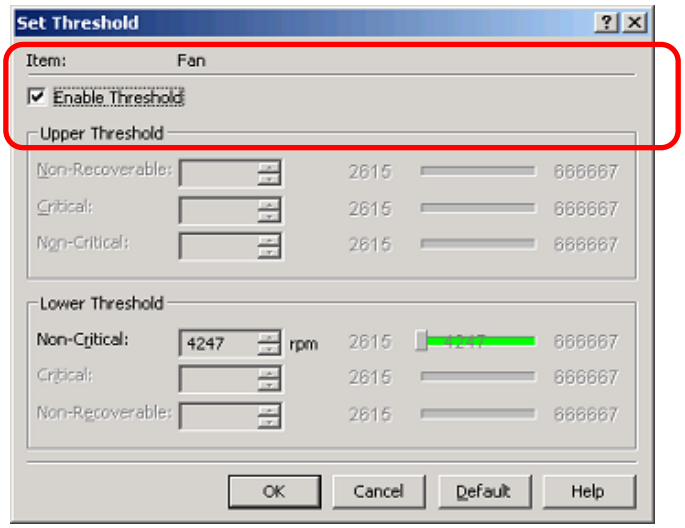
[FAN] DataViewer (At occurrence of Fan Abnormal Condition)

2. Setting of fan monitoring function

During operation of server, NEC ESMPRO Agent always monitors fan.
Only for IPMI compatible model, you can change the setting of "Enable/No enable to monitor fan". Please note that the default of fan monitoring is set up as "Enable to monitor". During normal operation, you do not need to change fan monitoring status.

2.1 Fan monitoring status

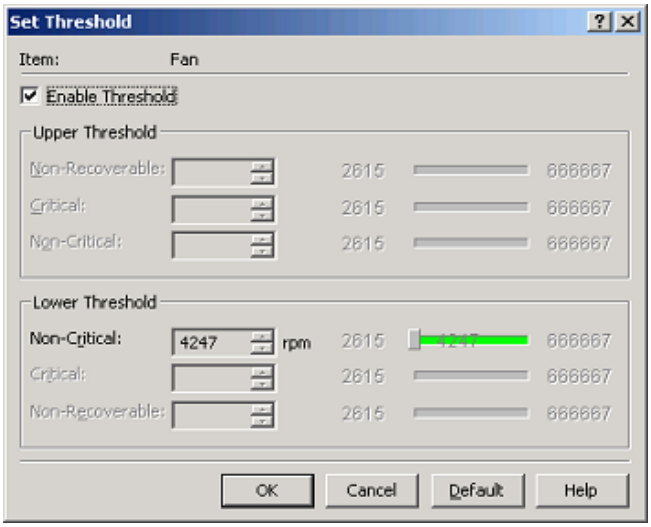
In case you monitor fan, open Set Threshold Dialog Box for fan from NEC ESMPRO Manager and tick the checkbox of [Enable Threshold] .In case you do not monitor, untick the checkbox.



[Set Threshold] Dialog Box (IPMI compatible model) of Dataviewer

2.2 Fan monitoring threshold

In case of IPMI compatible model, you can refer to threshold of fan monitoring. However, you can change threshold.



[Set Threshold] Dialog Box of Dataviewer (IPMI Compatible Model)

Default of Threshold

MonitoringOperaton: monitors

Threshold: depending on equipment.

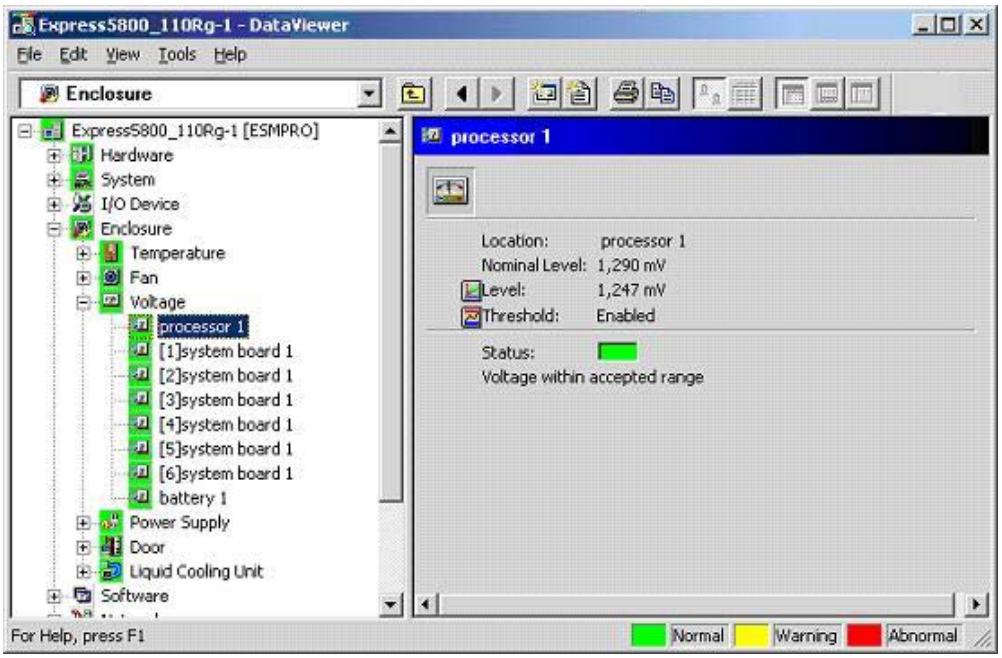
3.5 Monitoring of Chassis Power Voltage

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor power voltage of server. Thanks to power voltage monitoring, you can rapidly cope with such a problem that server is in abnormal condition such as voltage variation.

3.5-1 Function of chassis power voltage

When NEC ESMPRO Agent detects voltage malfunction and reports alert to NEC ESMPRO Manager and changes the status color of relevant voltage by DataViewer of Manager. By referring to DataViewer, you can confirm which voltage abnormal condition is.
In addition, in case continuous operation is risky, server is shut down based on degree of failure.

About Power Voltage Information Display Function
By selecting [Enclosure]-[Voltage]-"system board", you can confirm power voltage type, voltage value, standard voltage value, monitoring status and voltage status.



[Voltage]-[Processor1] of DataViewer

The LED of [status] Item of "Voltage you want to refer to" displays the status of chassis voltage detected by chassis voltage monitoring.

(Normal color) : Power voltage is in normal condition.
(Warning color) : Power voltage is in warning condition.
(Abnormal color) : Power voltage is in abnormal condition.

3.5-2 Operation of Chassis Power Voltage

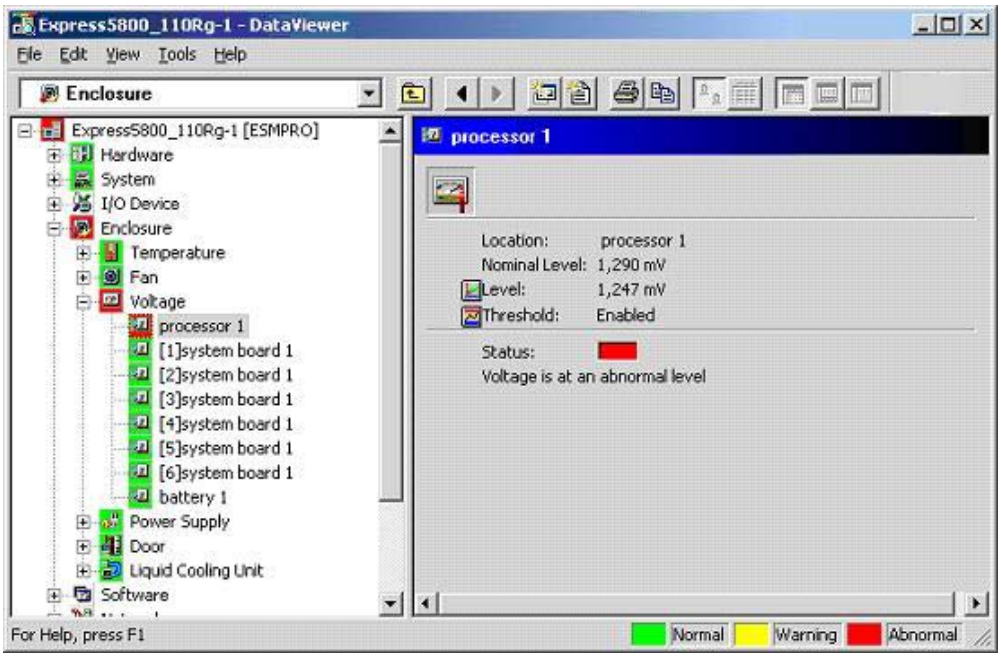
Describes about operation procedures such as validation method of failure concerning chassis voltage monitoring and modification method of setting.

1. Confirmation of chassis power voltage failure

In case failure concerning voltage occurs, alert is reported to NEC ESMPRO Manager. Confirm whether alert concerning voltage is not reported on AlertViewer.

Alert contents of power voltage value upper limit error (Example.)

The voltage has exceeded the upper limit (Error).
Nominal Level : ,12９０ mv
Voltage : 2,240 mv



[processor1] of DataViewer(At occuremce of Power Voltage Malfunction)

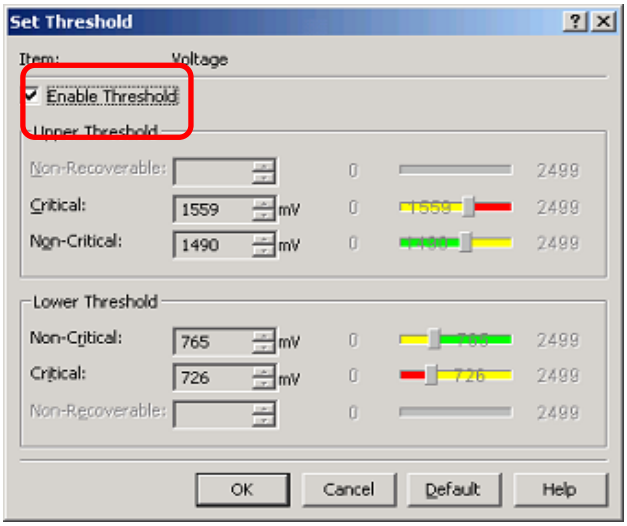
2. Setting of chassis power voltage monitoring function

During operation of server, NEC ESMPRO Agent always monitors voltage of chassis.
The most suitable value of the threshold of chassis voltage monitoring is set up for each equipment and shipped to customer. Therefore, you can not change the threshold.
However, for IPMI compatible model, you can change the setting of "Enable/Not enable to monitor temperature".
The chassis voltage monitoring is set up as "Enable to monitor" by default In normal operation, you do not need to change the monitoring status.

2.1 Chassis power voltage monitoring status

In case you monitor chassis voltage for IPMI compatible model, open Set Threshold Dialog Box of temperature from NEC ESMPRO Manager and tick the checkbox of [Enable Threshold] In case you do not monitor, untick the checkbox.

[Set Threshold] Dialog Box of NEC ESMPRO Manager

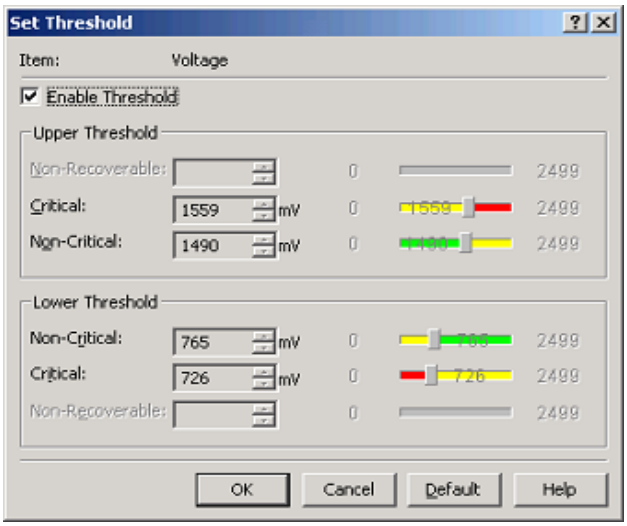


IPMI Compatible Model

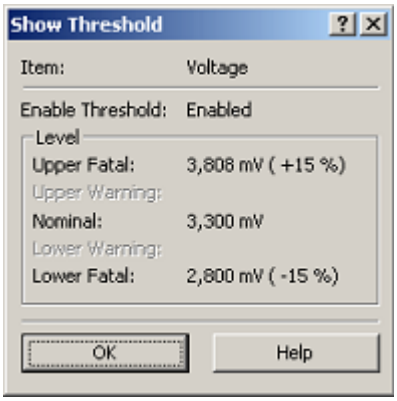
CAUTION For some IPMI incompatible models, [Set Threshold] Dialog Box for IPMI compatible model is displayed but you can not change the setting of [Enable/Not enable Threshold]

2.2 Chassis power voltage monitoring threshold

You can refer to the threshold of chassis voltage monitoring. However, you can not change the threshold.



IPMI Compatible Model



IPMI Incompatible Model

CAUTION For some IPMI incompatible models, [Set threshold] Dialog Box for IPMI compatible model.

Default of Threshold

MonitoringOperation: monitors.

Threshold: depending on equipment..

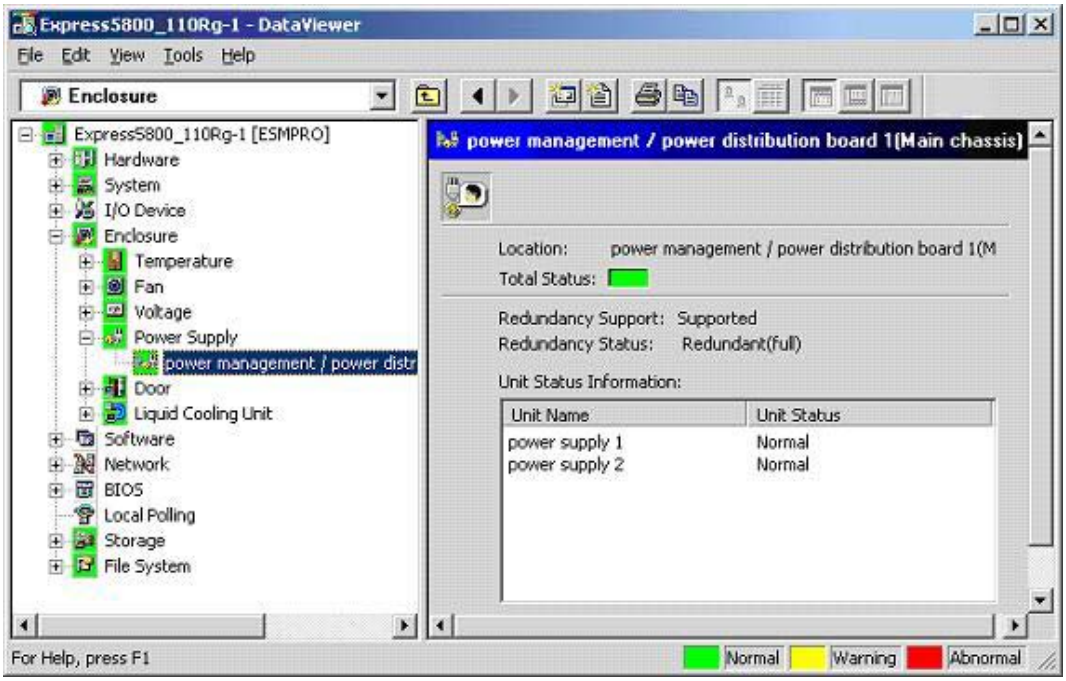
3.6 Monitoring of Power Unit

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor power unit on server. Thanks to power unit monitoring, you can rapidly cope with such a problem that power unit is in abnormal condition.

3.6-1 Function of power unit monitoring

In case NEC ESMPRO Agent detects failure of power unit, it reports alert to NEC ESMPRO Manager and changes the status color of relevant power unit on DataViewer of NEC ESMPRO Manager. By referring to DataViewer you can confirm at a glance power unit where malfunction occurred.
In addition, by referring to each status of power unit, you can easily confirm defective unit.

About Power Unit Information Display Function
By selecting [Enclosure]-[Power Supply]-[Each Power], you can confirm all the status of power unit, support status of redundant power, status of redundant power, status and name of unit for each power unit.



[Power Supply] of DataViewer

3.6-2 Operation of power unit monitoring

describes about operation procedure such as validation method of failure concerning Power Unit Monitoring and modification method of setting.

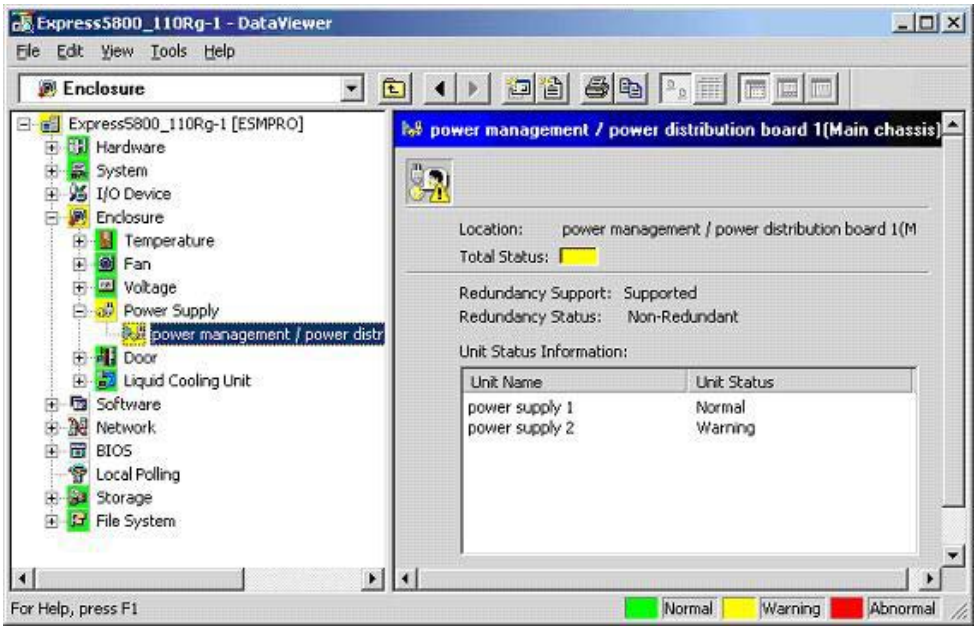
1. Confirmation of power unit failure

In case failure concerning power unit occurs, alert is reported to NEC ESMPRO Manager. Confirm whether alert concerning power unit is not reported on AlertViewer.

Alert contents at the time of power unit failure (Example.)

Power Supply 2 is in fatal state.

Powerunit is in reduced capacity state.



[Power Supply] of DataViewer (At occurrence of Power Unit Warning)

You can confirm the power unit where failure ocurrs, by referring to Power Unit and its number alert is reported or the item of [Each Status] of [System Environment]-[Power]-[Each Power] on DataViewer.

2. Setting of power unit monitoring function

During operation of server, NEC ESMPRO Agent always monitors power unit. You can not change so that Power Unit is not monitored.

3.7 Monitoring of Water Cooling Unit

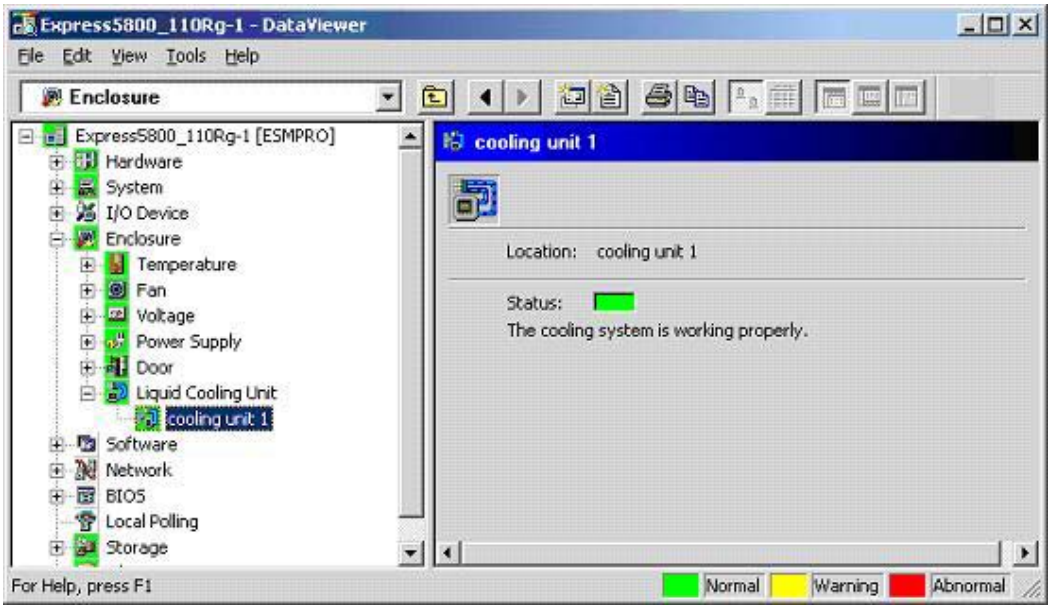
By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor Water Cooling Unit installed in server chassis. By monitoring of Water Cooling Unit, you can prevent temperature malfunction in chassis due to water cooling liquid leakage and device failure.

3.7-1 Function of water cooling unit monitoring

When NEC ESMPRO Agent detects liquid leakage of Water Cooling Unit, it reports it to NEC ESMPRO Manager and changes the status color of relevant Water Cooling Unit by DataViewer of NEC ESMPRO Manager. By referring to DataViewer, you can confirm the Water Cooling Unit where failure occurs.
In addition, in case continuous operation is risky, it shuts down the server based on degree of failure.

About Water Cooling Unit Information

By selecting [Enclosure]-[Liquid Cooling Unit]-"Water Cooling Unit you want to refer to ", you can confirm the location and status of Water Cooling Unit installed in the chassis.



[Liquid Cooling Unit]-[Liquid Leak] of DataViewer

The LED of [Status] Item of "Water Cooling Unit you want to refer to" displays the status of Water Cooling Unit detected by Water Cooling Unit Monitoring Function.

(Normal color) : Liguid leak does not happen.
(Abnormal color) : Liquid leak has happened.

3.7-2 Operation of Water Cooling Unit Monitoring

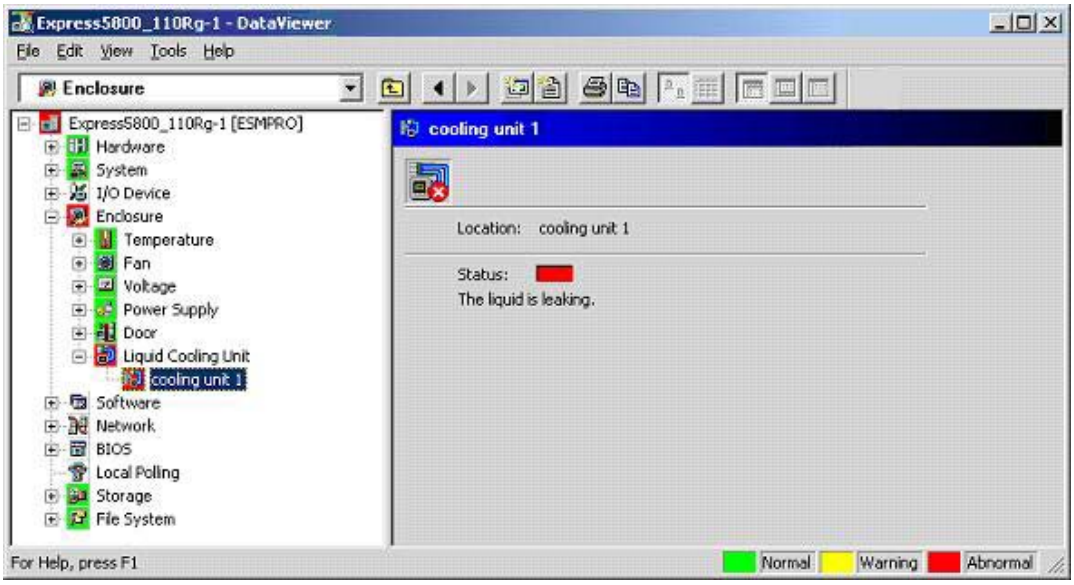
Describes about operation procedures such as validation method of failure concerning Water Cooling Unit Monitoring and modification method of setting.

1. Confirmation of water cooling unit failure

In case failure concerning Water Cooling Unit occurs, alert is reported to NEC ESMPRO Manager Confirm whether alert concerning Water Cooling Unit on AlertViewer.

Alert Contents at Occurrence of Water Cooling Unit Liquid Leak Malfunction (Example.)

Liquid Leak has happened.



Liquid Leak] of DataViewer (At Occurrence of Water Cooling Unit Liquid Leak Malfunction)

2. Setting of water cooling unit monitoring function

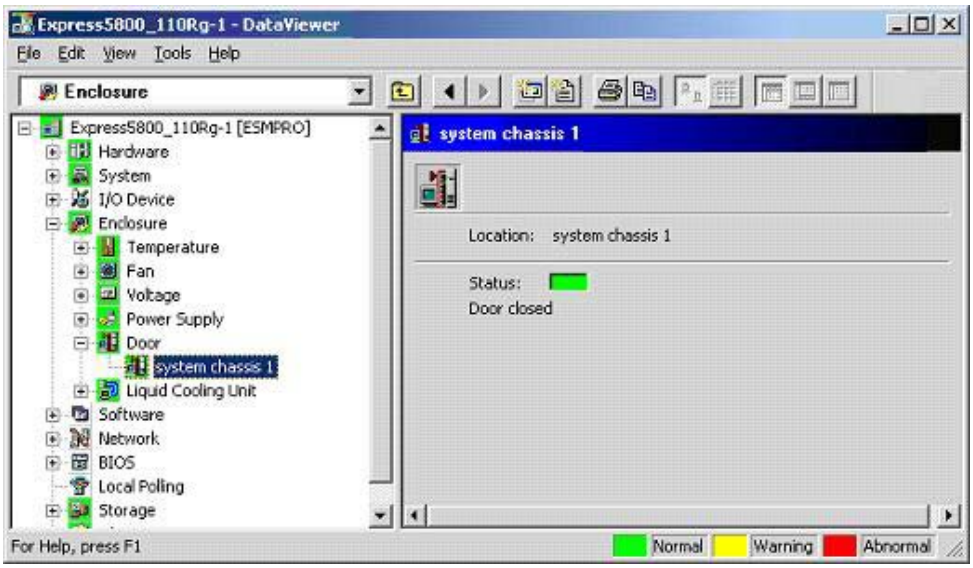
During operation of server, NEC ESMPRO Agent always monitors Water Cooling Unit. You can not change so that Water Cooling Unit is not monitored.

3.8 Monitoring of Chassis Cover

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor chassis on server. By monitoring of chassis cover, you can prevent unauthorized access of server.

3.8-1 Function of chassis cover monitoring

Chassis cover has front cover, side cover, top cover, PCI cover and others. When NEC ESMPRO Agent detects that chassis cover is opened, it registers Event to EventLog of system and changes the status color of relevant chassis cover on DataViewer of NEC ESMPRO Manager to Warning (Yellow color). By referring to DataViewer, you can confirm which chassis cover is opened.



[Door]-[system chassis 1] of DataViewer

The LED of Status] Item of "Cover you refer to" displays the status of open-shut of cover detected by Chassis Cover Monitoring.

(Normal color) : Chassis cover is shut.
(Warning color) : Chassis cover is open

CAUTION

Depending on chassis cover, there is a possibility that power may be shut down for safe operation of system when cover is opened.

3.8-2 Operation of Chassis Cover Monitoring

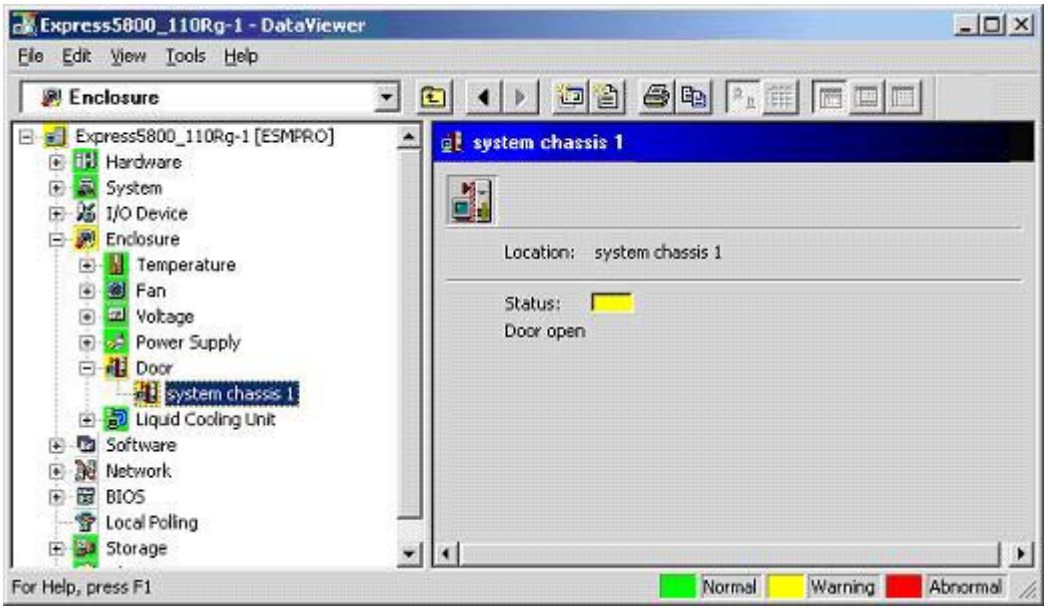
Describes about operation procedures such as validation method of failure concerning Chassis Cover Monitoring and modification method of setting.

1. Confirmation of chassis cover failure

In case failure concerning chassis cover occurs, the following Event is registered to "system" of EventViewer Confirm whether Event concerning chassis cover is not registered by EventViewer.

EventLog Contents when Front cover is open

General Chassis was opened.



[system chassis 1] of DataViewer(at occurrence of Chassis Cover Warning)

CAUTION For alert report, setting of alert report is required.

2. Setting of chassis cover monitoring function

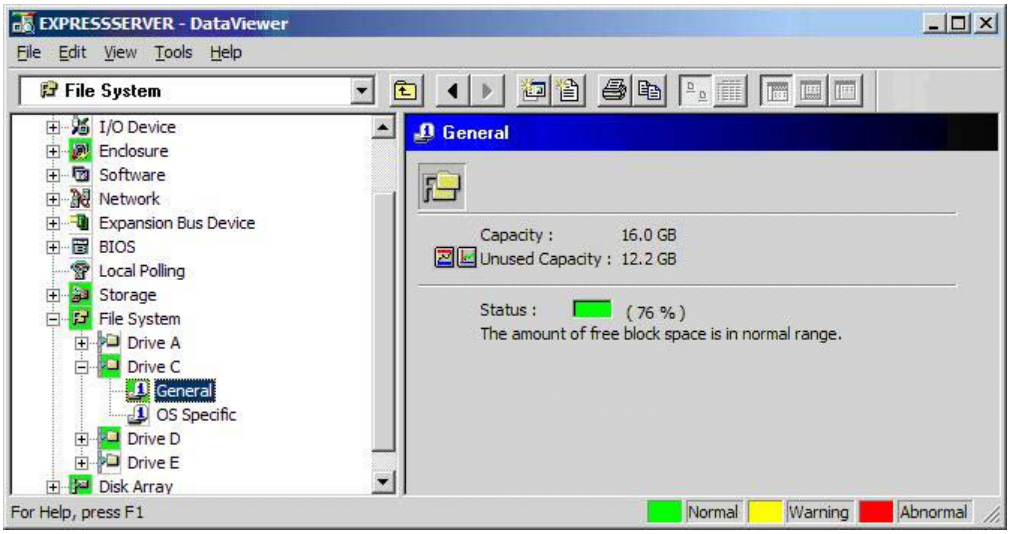
During operation of server, NEC ESMPRO Agent always monitors chassis cover. You can not change so that chassis cover is not monitored.

3.9 Monitoring of File System

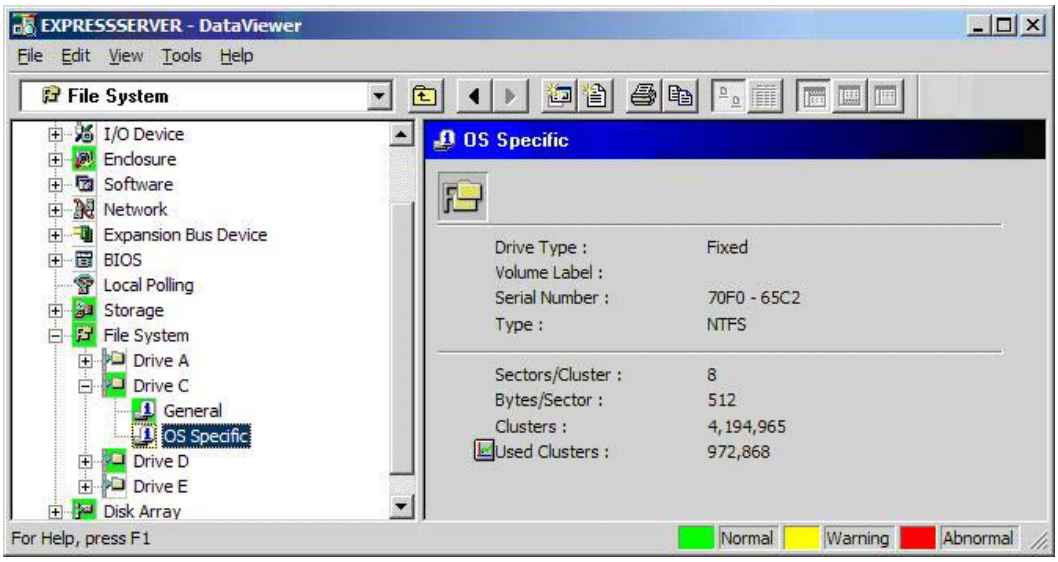
By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can manage file system of server.

3.9-1 Function of file system monitoring

File system monitoring function manages file system allocated drive name being constructed in system. You can refer to configuration and information by DataViewer of NEC ESMPRO Manager. The information to be managed has general information such as capacity and unused capacity, and additional information such as drive type , file system type and others.



[File System]-[General] view of DataViewer



[File System]-[OS Specific] view of DataViewer

About free space monitoring function

By monitoring free space of file system, you can detect lack of free space at an early stage. When NEC ESMPRO Agent detects the drive which lacks free space, it reports it to NEC ESMPRO Manager and changes the status color of relevant drive on DataViewer of NEC ESMPRO Manager to abnormal condition (red color) and warning (yellow color). By referring to DataViewer, you can confirm the drive which lacks free space.

As the threshold for free space of file system can set optional value, you can monitor by the setting to

meet system environment.
Free space monitoring function monitors only for file system on hard disk.

About File System for Management
File system monitoring function manages file system to which drive name is allocated. It does not manage file system to which drive name is not allocated.
For instance, for Windows 2000, you can mount to optional folder without allocating drive name to file system and use it. NEC ESMPRO Agent excludes this kind of file system from the target of monitoring function.
In addition, NEC ESMPRO Agent excludes the file system on removable media such as floppy disk from target of free space monitoring function.

About composition information that the filesystem monitoring function manages
Configuration information that the file system monitoring function manages is different according to the file version of monitoring service (ESMFSService).
Please confirm the file version of ESMFSService in the property of the execution file "Esmfs.exe" of ESMFSService.

- A file version is earlier than 4.1.0.2.
  Information on the cluster of the file system is managed.
- A file version is 4.1.0.3 or later
  Information on the cluster of the file system is not managed.
  In the data viewer of NEC ESMPRO Manager, information is not displayed in the ollowing item.
  "Secters/Cluster", "Bytes/Sector","Clusters", "Used Clusters"

About displaying graph view of monitoring items without value
For monitoring item without value on screen, if you select [Add graph data] by [Edit] menu of GraphViewer, graph item name is displayed and can be selected but graph is not displayed.

About monitoring of a remote drive
The item that can manage the file system of the drive type "Remote" is different depending on operating system used.

- When you use OS before Windows 2000
  Only the management item of the drive type is displayed in data viewer of NEC ESMPRO Manager.

- When you use OS since Windows Server 2003
  A remote drive is not managed. In the data viewer of NEC ESMPRO Manager, the tree of a remote drive is not displayed.

3.9-2 Operation of file system monitoring

Describes about operation procedures such as validation method of failure concerning file system monitoring and modification method of setting.

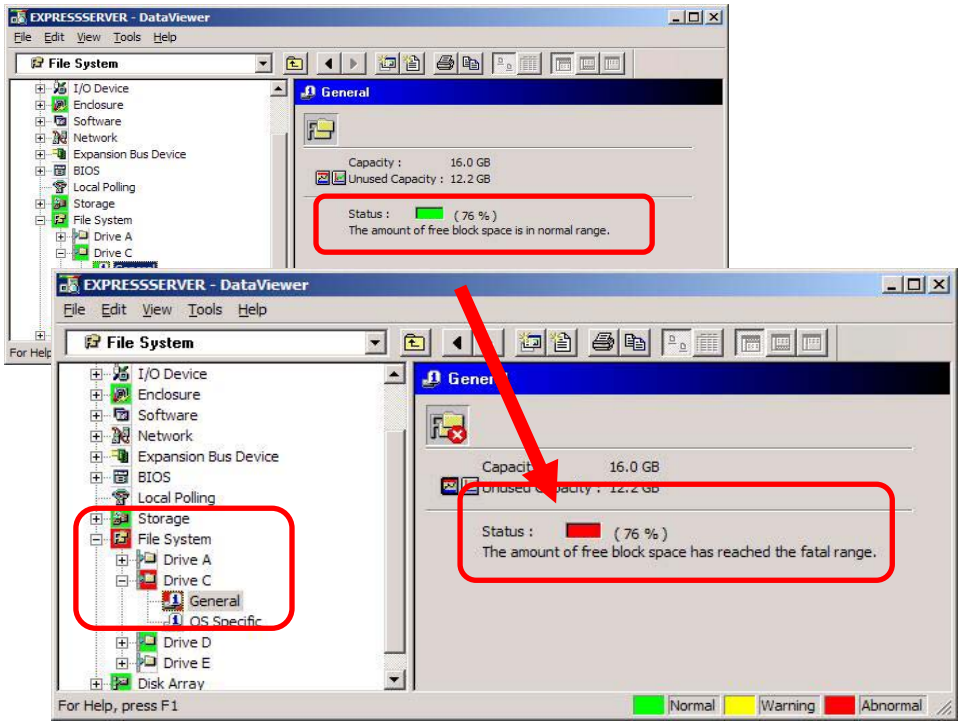
1. Confirmation of lack of free space

In case free space of file system lacks, alert is reported to NEC ESMPRO Manager. Confirm whether alert concerning file system is not reported on AlertViewer of NEC ESMPRO Manager.

Alert contents in case free space of file system lacks (Example.)

The free capacity of this file system is less than "Fatal" level.
File System : C (Index 1)
Free Space / Capacity : 328 / 4194 MB
Threshold (Fatal): 419 MB

As for free space of file system, you can confirm it not only by alert report but also on DataViewer.
In case free space of file system is less than threshold, the status color of [Status] of [File System]-[General] view changes to abnormal (red color) and warning (yellow color).



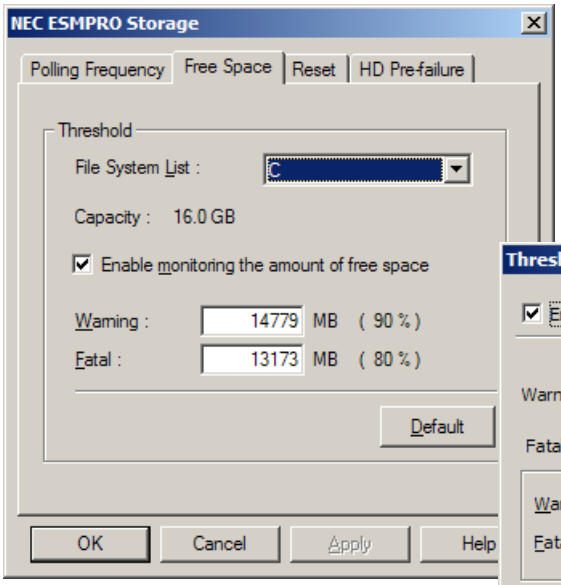
[File System]-[General] of DataViewer

The LED of [Status] of [File System]-[General] view displays the result of free space monitoring of file system.

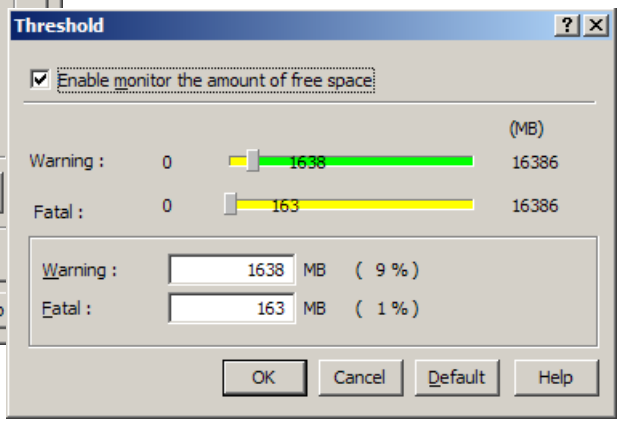
(Normal color) : Normal
(Warning color) : less than value threshold of warning level
(Abnormal color) : less than value threshold of fatal level

2. Setting of File System monitoring function

The setting of file system monitoring function can be performed by DataViewer of NEC ESMPRO Manager or control panel of NEC ESMPRO Agent.



Control Panel of NEC ESMPRO Agent



[Threshold] dialog box of DataViewer

PLUS 1 Please confirm the property setting of the SNMP service needed to operate NEC ESMPRO Agent is correct when it takes time to start "NEC ESMPRO Storage" or the item is displayed gray out.

2.1 Change of threshold for free space monitoring

You can change threshold of file system free space monitoring function to optional value by [Threshold] dialog box of DataViewer or control panel of NEC ESMPRO Agent.

Monitoring of free space of file system is set up as "Enable" by default. In case you do not want to monitor free space of file system, do not select "Enable monitor the amount of free space"
The default of threshold for file system free space monitoring is as follows:

Monitoring Item Name	Threshold (Abnormal)	Threshold (Warning)
Free Space(unit : MB)	ca. 1% of whole space	ca. 10% of whole space

POINT In case alert indicating lack of free space of file system is frequently reported and it can be judged that actual free space is sufficient for customer's environment, change threshold so that criteria of free space becomes stricter.

POINT In case you monitor free space not at 2 levels of abnormal and warning but only at 1 level of abnormal, set up threshold of warning to the same value of abnormal and warning (The setting of 1 level of warning only is not possible.)

POINT There are the following limitations when NEC ESMPRO Agent is used in the cluster environment by CLUSTERPRO.
When fail over is generated, the threshold of the free space monitoring function set with the operation system server is not succeeded to the standby system server. Please set a threshold the same on the standby system server.

POINT

The new threshold of free space monitoring is not reflected soon. After changing the threshold, the setting of change by monitoring interval following monitoring service becomes valid.

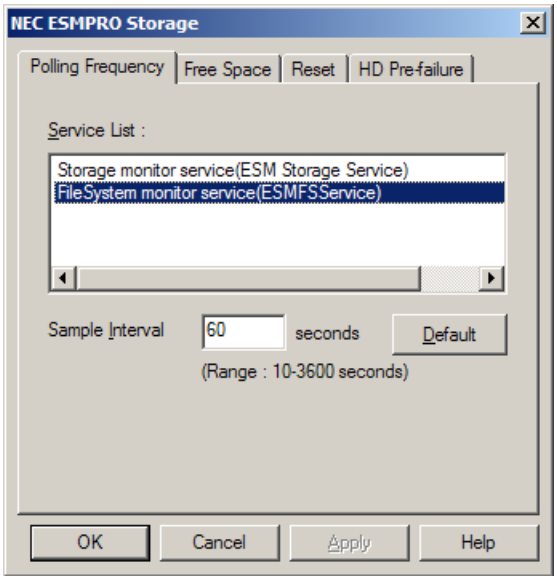
POINT

Please go after ending "NEC ESMPRO Storage" without fail when you change the configuration of the file system while starting the control panel of NEC ESMPRO Agent.
Please restart "NEC ESMPRO storage" when you do the composition change in the file system while "NEC ESMPRO storage" is opening.

2.2 Change of monitoring interval

You can change monitoring interval of file system free space monitoring function to optional value. Monitoring interval can be changed by NEC ESMPRO Agent control panel.

	Default	Setting Coverage
File System Monitoring Interval	60 sec.	10~3,600 sec.



Contorl Panel of NEC ESMPRO Agent [NEC ESMPRO Storage]-[Polling Frequency] tab

CAUTION

While service stops, it is not displayed on "Service List".

3.10 Monitoring of SCSI/IDE device

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can manage configuration information of hard disk , CD-ROM and others connected to server by SCSI/IDE interface. Also, you can perform hard disk pre-failure prediction function.

3.10-1 Function of SCSI/IDE device monitoring

SCSI/IDE device monitoring function manages configuration information of SCSI/IDE device (hard disk, CD-ROM, tape device and others) connected to server and performs preventive maintenance by hard disk pre-failure prediction function. You can refer to configuration of SCSI/IDE device and diagnosis information of hard disk pre-failure prediction function by DataViewer of NEC ESMPRO Manager. Please note that the status of SCSI/IDE device (operating status of device) can not be monitored.

Type of Device	Configurtion Management	Status Monitoring	Preventive Maintenance
Hard Disk	✓		✓
CD-ROM(DVD-ROM)	✓		
Tape Device	✓		
Optical Memory Device	✓		
Other Devices	✓		

CAUTION

In case of disk array even if it is SCSI/IDE interface, monitoring function of NEC ESMPRO Manager and NEC ESMPRO Agent provide is different from stand-alone device. For disk array, refer to "3.11 Monitoring of Disk Array ".

CAUTION

Tape device monitoring function of NEC ESMPRO Agent
The tape monitoring function is not supported since NEC ESMPRO Agent Ver4.0.
Please use the trouble monitoring function of the backup application to observe the trouble of the tape device.

CAUTION

About monitoring of devices other than SCSI/IDE connection
Storage monitoring does not monitor storage device such as USB other than SCSI/IDE connection.

CAUTION

About the monitoring function of the DVD-ROM device
The DVD-ROM device is displayed under the control of the storage tree of the data viewer as CD-ROM.

1. Hard disk information

You can refer to detailed information about hard disk. It has specification of Cylinders/Unit, performance information such as Read Sectors and diagnosis information of hard disk pre-failure prediction function.

CAUTION

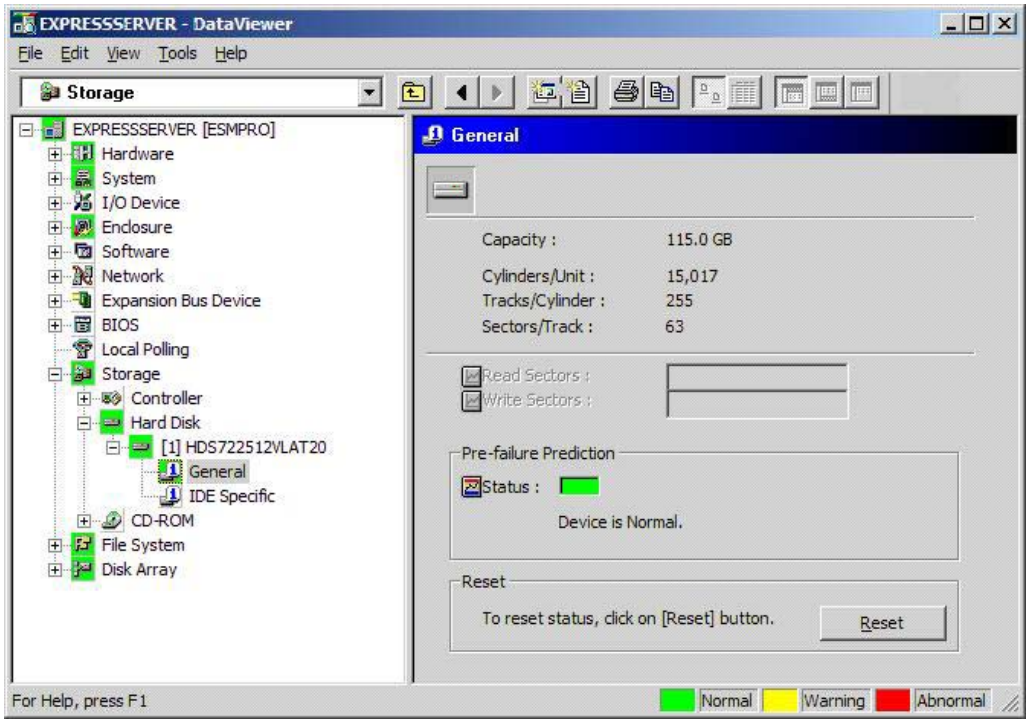
Information on the number of read sectors and the number of wright sectors is not displayed since Windows Server 2003 OS.

Hard disk pre-failure prediction funtion

Hard disk pre-failure prediction function is to determine whether there is no problem that you continuously use hard disk. By this function, it detects problem of hard disk and it reports alert to NEC ESMPRO Manager. Thanks to this function, as you can identify hard disk which has frequent error occurrence before the hard disk actually fails, you can take measures such as "Replace preventively before hard disk fails".

NEC ESMPRO Agent utilizes S.M.A.R.T. function (Self-Monitoring, Analysis Reporting Technology) of hard disk and confirms error occurrence of hard disk. S.M.A.R.T. function is that each hard disk

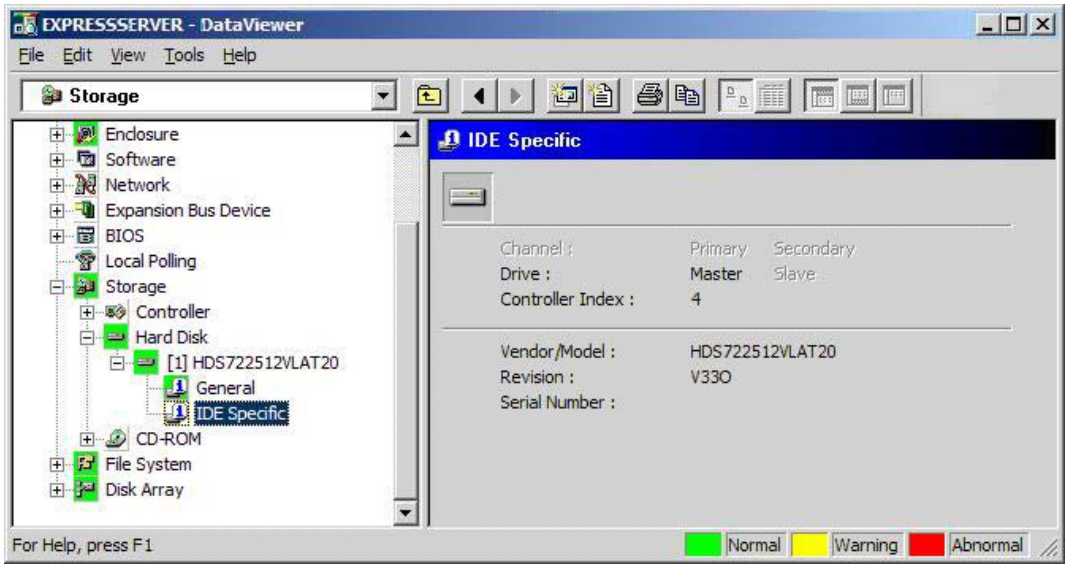
manages data concerning failure internally and in case it determined that failure occurs in the near future and hard disk itself reports alarm. Each hard disk vendor uses threshold suitable to its hard disk for determining preventive maintenance.



[Hard Disk]-[General] view of DataViewer

2. Interface type information (SCSI Information/IDE Information)

This is information displays about all the types of device. Depending of using interface, displaying information is different. You can refer to address, and the information such as vendor, model and others.



[Hard Disk]-[IDE Specific] view of DataViewer

CAUTION

[Storage]-[Controller]-[SCSI Controller]-[Resource] view of Data Viewer is not displayed properly by x64 Edition.
For the information about resource of controller, confirm by system information of relevant server and Device Manager.

3.10-2 Operation of SCSI/IDE device monitoring

Describes about operation procedures such as validation method of failure concerning SCSI/IDE device monitoring and modification method of setting.

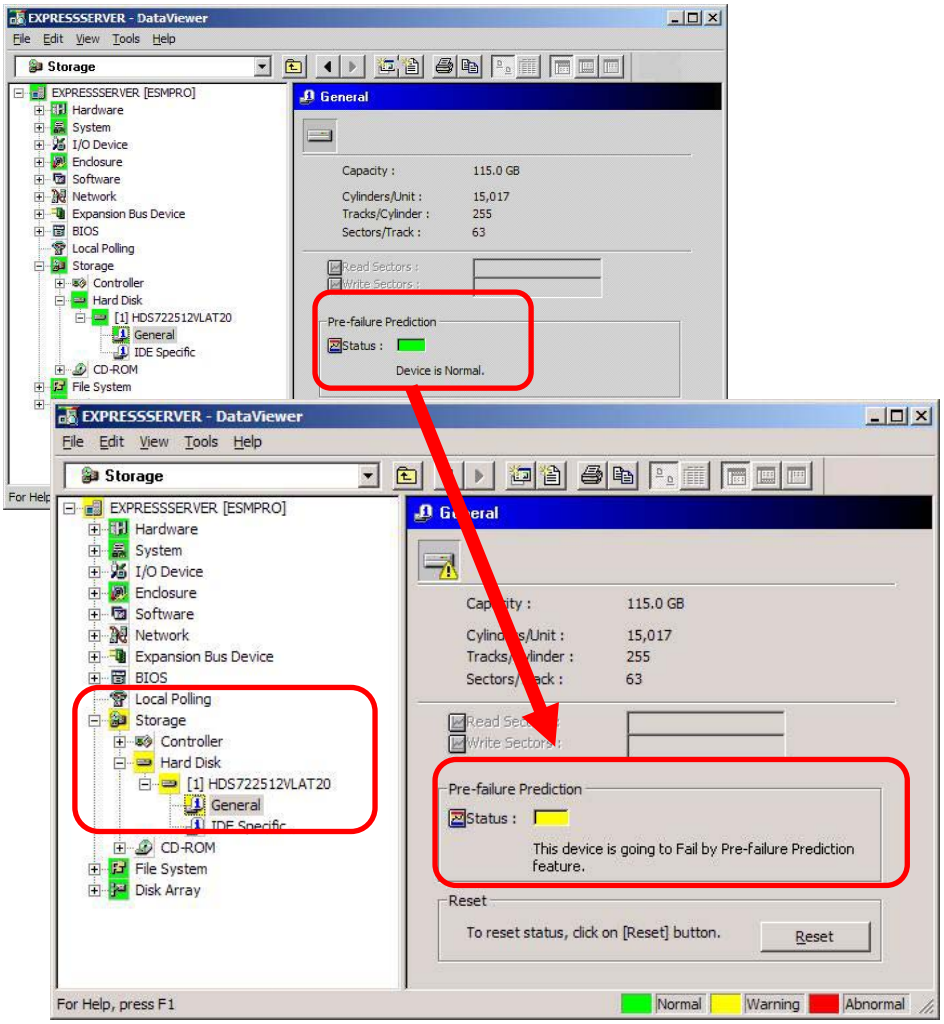
1. Confirmation of alert

In case detects alert of error by diagnosis of hard disk pre-failure prediction function, alert is reported to NEC ESMPRO Manager. Confirm whether alert concerning hard disk is not reported on AlertViewer of Manager.

Alert contents at time of failure of hard disk pre-failure prediction (Example.)

S.M.A.R.T. predicts that your hard disk is going to fail.
Address(Controller-Bus-ID-LUN):1-0-4-1
Hard Disk[2]:NEC HD0001 REV01

You can confirm not only by alert report but also on DataViewer that error was detected by diagnosis of hard disk pre-failure prediction function .In case error was detected, the status color of LED changes to warning (yellow color) on [Hard Disk]-[General] view.



[Hard Disk]-[General] view of DataViewer

The LED of general information of hard disk displays diagnostic outcome of hard disk pre-failure prediction function.

(Normal color) : Normal
(Warning color) : Detects failure by diagnosis of hard disk pre-failure prediction function.

2. Setting of SCSI/IDE device monitoring function

The setting of SCSI/IDE device monitoring function can be changed by DataViewer of NEC ESMPRO Manager or control panel of NEC ESMPRO Agent.

2.1 Change of threshold for hard disk pre-failure prediction

Hard disk pre-failure prediction function is "valid" by default. As this function is mandatory to keep reliability of hard disk, please use as "valid" is.

However, the threshold used by hard disk pre-failure prediction function (S.M.A.R.T. function) is set the value suitable to each hard disk by its vendor. Therefore, you can not change the threshold.

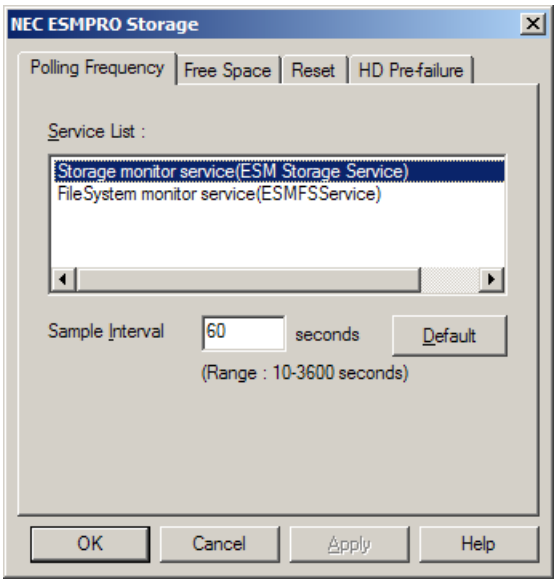
CAUTION

The threshold set by using "Hard disk pre-failure prediction" is set to all hard disks. A different setting cannot be done to an individual hard disk.

2.2 Change of monitoring interval

Monitoring interval of SCSI/IDE device monitoring function can be changed to optional value. You can change monitoring interval by control panel of NEC ESMPRO Agent.

	Default	Setting Coverage
SCSI/IDE Device Monitoring	60 sec.	10~3,600 sec.



[NEC ESMPRO Storage]-[Polling Frequency] tab of Control panel of NEC ESMPRO Agent

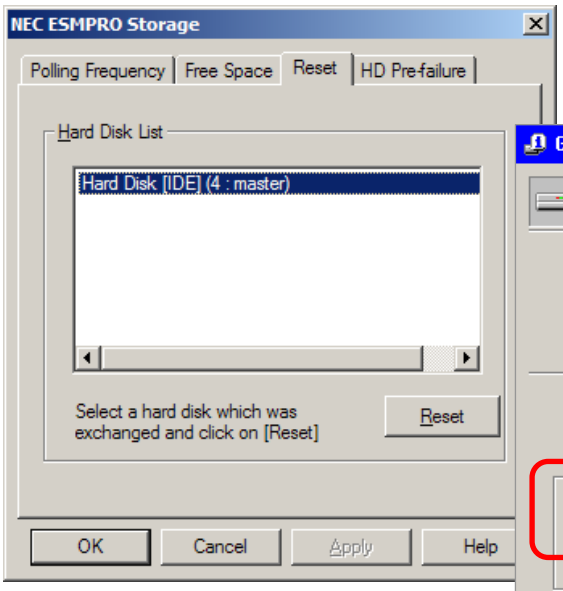
CAUTION

While service stops, it is not displayed on "Service List".

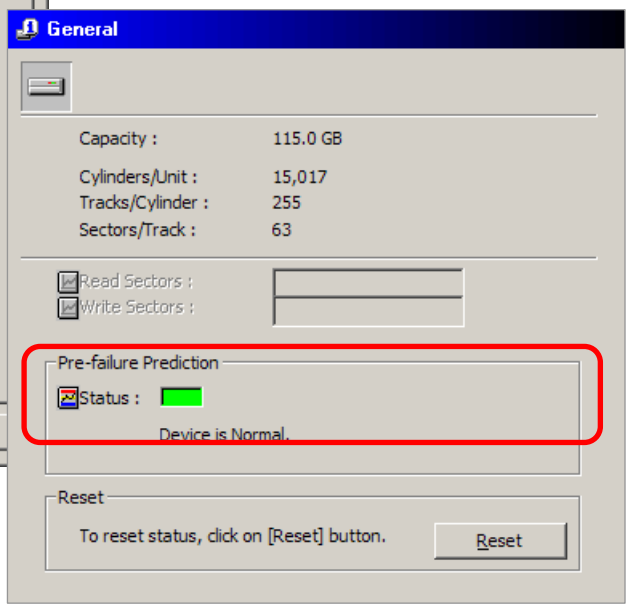
3. Reset of SCSI/IDE Device management information

NEC ESMPRO Agent manages the status of hard disk for preventive maintenance of hard disk. Therefore, when you want to replace hard disk, it is necessary to reset management information of hard disk manually.

The reset of management information can be made by DataViewer of Manager and control panel of NEC ESMPRO Agent.



Control Panel of NEC ESMPRO Agent



[Hard Disk]-[General] of DataViewer

CAUTION

The status color (warning) of "Pre-failure prediction" is maintained until reset manually. Please reset management information after exchanging hard disks.

3.11 Monitoring of Disk Array

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor configuration of disk array and status. However, monitoring function of disk array to be supported is different depending of type of disk array. For details, refer to the table below. The Disk Array Monitoring The function explained in this section is the one valid for the disk array mentioned as "Enable to monitor" in line of "Monitoring of ESMPRO."

Management Utility or type of Disk Array *1	Monitoring of ESMPRO
Universal RAID Utility	Enable to monitor
MegaRAID Storage Manager	Enable to monitor
Web-Based Promise Array Manager Professional	Enable to monitor
Web-Based Promise Array Manager	Enable to monitor
Promise Array Management	Enable to monitor
HostRAID Disk Array controller (Adaptec Storage Manager – browser Edition Adaptec Storage Manager)	Alert reports the event detected by Management Utility to NEC ESMPRO Manager

*1 The RAID controller supported by each management utility must confirm support RAID controller of the table P.126. Confirm model number of Disk Array as well as management utility that the equipment you use supports.

3.11-1 Function of Disk Array monitoring

NEC ESMPRO Manager and NEC ESMPRO Agent can manage configuration information of hard disk (physical device) connecting to Disk Array Controller, Disk Array Controller and constructed RAID (logical device) , and monitor the status of degradation detection of RAID.
In addition, in case Disk Array Controller supports hard disk pre-failure prediction function by S.M.A.R.T. function you can detect of operating life of hard disk.

S.M.A.R.T. function (Self-Monitoring, Analysis, Reporting Technology) is that each hard disk internally manages data about failure and in case it determines that failure occurs in the near future, it itself reports alarm. As pre-failure prediction is determined by the threshold suitable to hard disk by each hard disk vendor, you can determine more accurately.

PLUS 1

About relation between NEC ESMPRO and Disk Array Management Utility
NEC ESMPRO collects the information of disk array from management utility of disk array. Therefore, in terms of monitoring of status, it can manage failure equivalent to management utility. By utilizing NEC ESMPRO, as you can totally manage failure of disk array in units of server, NEC recommend Disk Array Management using NEC ESMPRO of disk array monitoring during operation.
As the above is the structure, in case you monitor disk array by NEC ESMPRO, it is mandatory to install management utility meeting each disk array on system.

3.11-2 Using of Disk Array monitoring

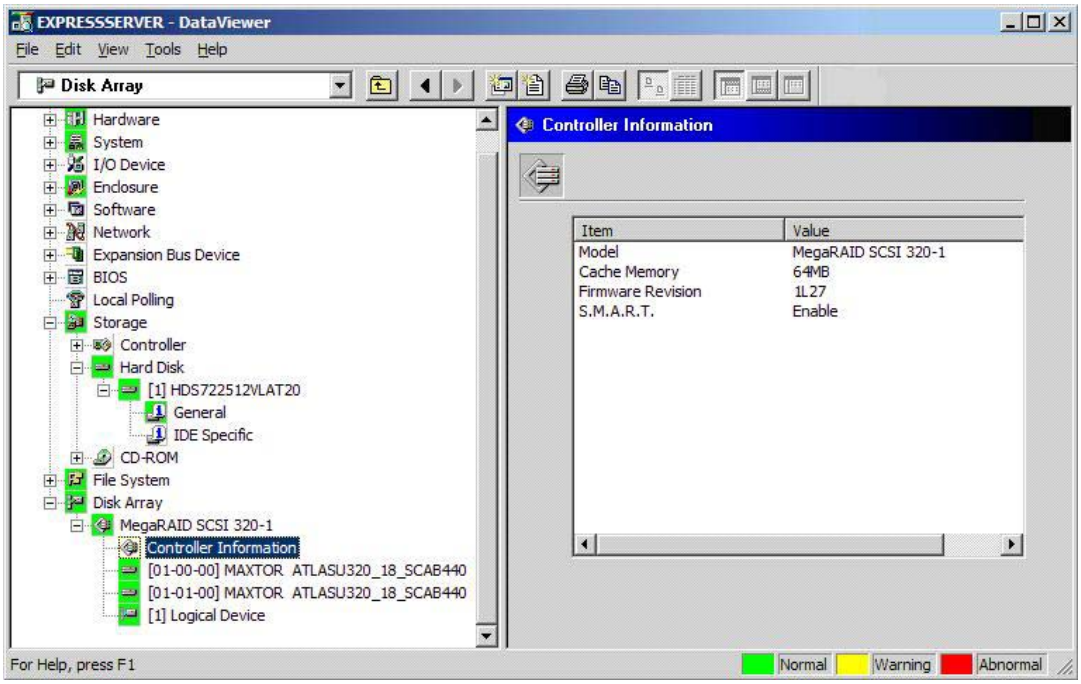
1. Confirmation of configuration of disk array

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor hard disk constructing each disk array and perform preventive maintenance of hard disk and detect its failure at an early stage. You can refer to configuration and information of disk array on DataViewer of Manager.

For management information, there are three information, "Controller Information", "Physical Device Information" and "Logical Device Information".

Controller Information

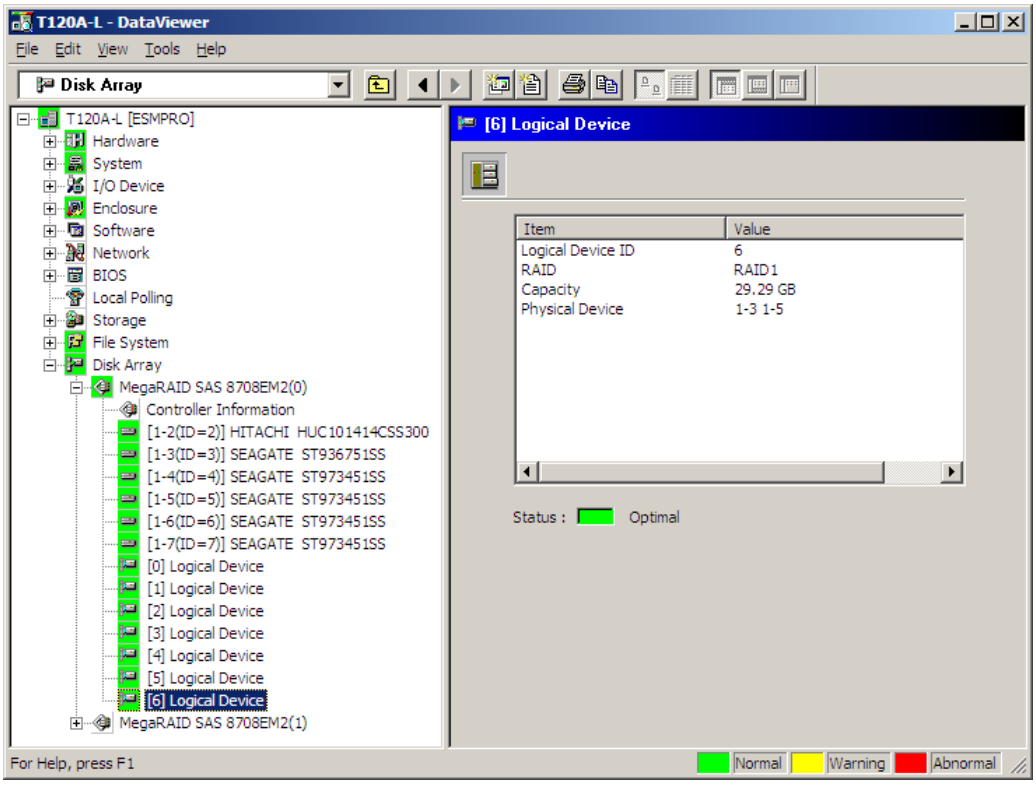
You can refer to various information such as model, driver name and driver version of Disk Array Controller on DataViewer.



[Controller Information] vew of DataViewer

Logical Device Information

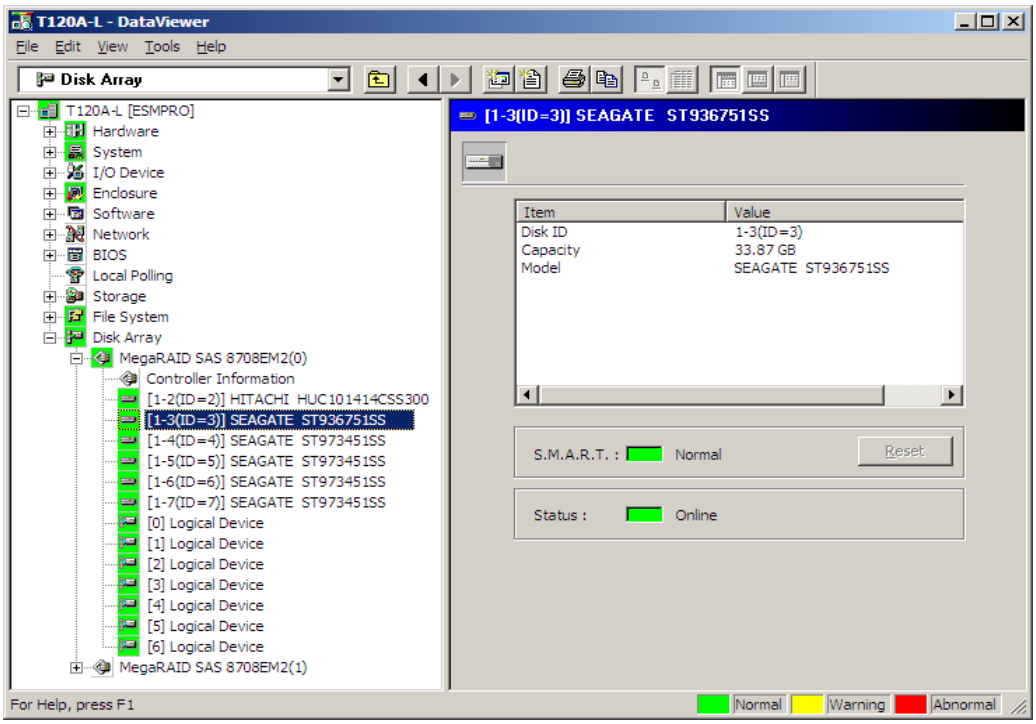
Various information about logical device of disk array can be referred on DataViewer. You can confirm the status of logical device referring to the item of [Status].



[Logical Device Information] view of DataViewer

Physical Device Information

You can refer to the result of determination of preventive maintenance of hard disk configuring Disk Array, configuration information and others on DataViewer. You can refer to the status of physical device referring to the item of [Status].



[Physical Device Information] view of DataViewer

2. Confirmation of hard disk status (status monitoring)

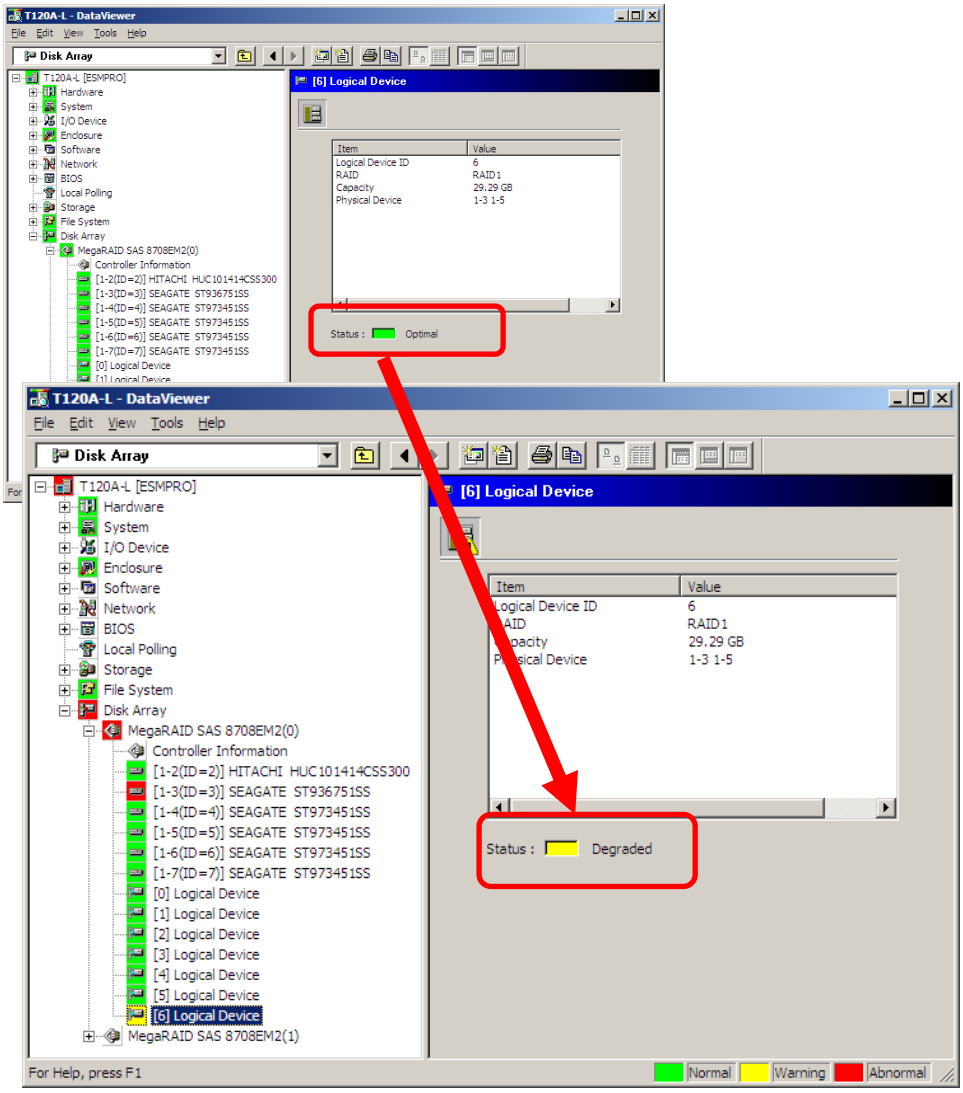
In case failure of hard disk happens, the following alert is reported. Confirm whether alert related to trouble of disk array or hard disk on AlertViewer of Manager is reported or not.
Alert is reported to local device including hard disk where failure occurred and physical device respectively. By referring to alert, you can determine logical device and physical device where failure occured

Alert contents at occurrence of hard disk failure (Example.)

Logical Device changed to Critical(Degraded).
Disk Array : MegaRAID SAS 8708EM2(0)
Logical Device ID : 6

Physical Device changed to Dead(Offline).
Disk Array : MegaRAID SAS 8708EM2(0)
Disk ID : 1-5(ID=5)
Model : SEAGATE ST973451SS

You can confirm hard disk failure of disk array not only on alert report but also on DataViewer.

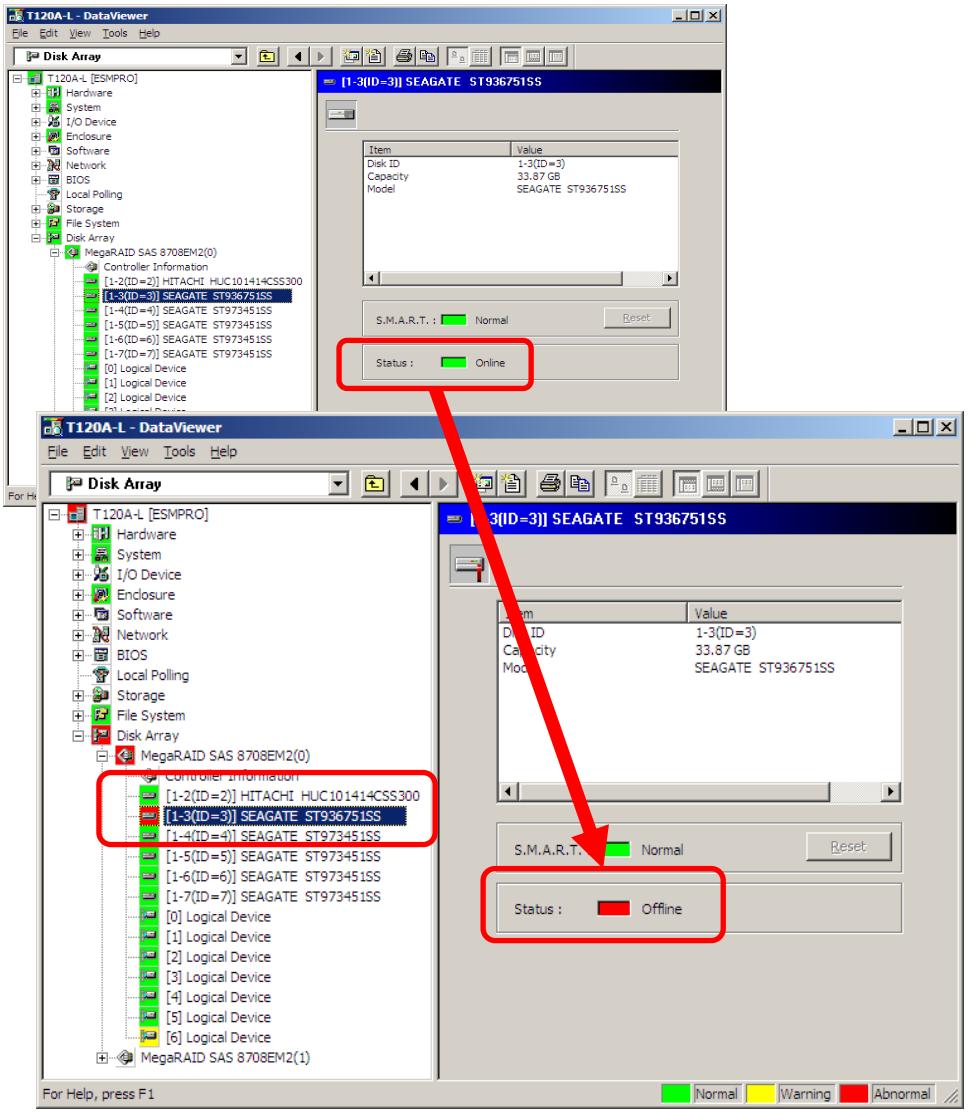


[Logical Device Information] view of DataViewer

The LED of [Status] of logical device displays status of logical device (The [Status] string changes with each vendor of a disk array. For details, see the user's guide for the disk array device.). In case of detection of hard disk failure, the status color of logical device incluing the hard disk changes to abnormal (red color) and warning (yellow color).

(Normal color) : Functional
(Warning color) : Critical
(Abnormal color) : Offline

In addition, the status color of physical device where failure occurred changes to abnormal (red color).



[Physical Device Information] view of DataViewer

LED of [Status] of Physical Device Information displays the status of Physical Device (The [Status] string changes with each vendor of a disk array. For details, see the user's guide for the disk array device.).

(Normal color) : Functional
(Abnormal color) : Offline

Component of RAID System

When the RAID System management utility is "Universal RAID Utility", RAID controller, a Physical Device, and a Logical Device that composes the RAID system are displayed in the DataViewer of NEC ESMPRO Manager by the following format.

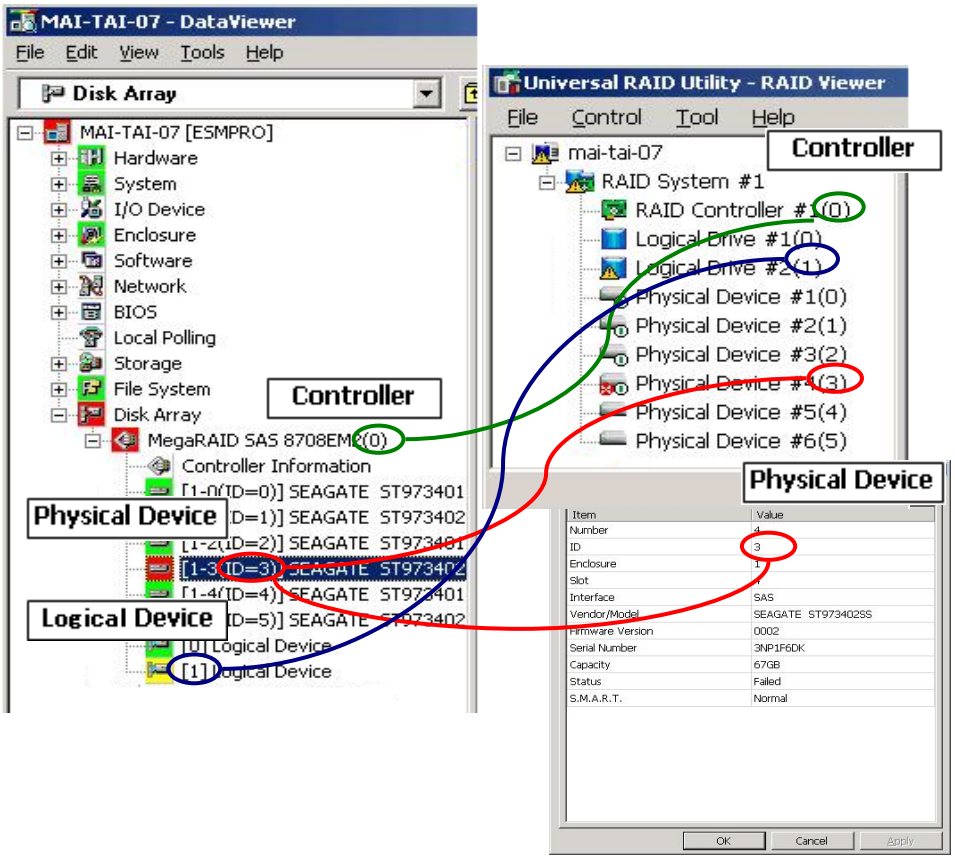
- RAID Controller : Controller name(ID)
- Physical Device : Enclosure number - Slot number(ID)
- Logical Device : (ID)Logical Device

These composition information corresponds with the DataViewer and Universal RAID Utility as follows.

RAID Controller
In the case of the following, it means the same RAID Controller.
- DataViewer : MegaRAID SAS 8708EM2**(0)**
- Universal RAID Utility : RAID Controller #number**(0)**

Physical Device
In the case of the following, it means the same Physical Device.
- DataViewer : 1-3(**ID=3**)
- Universal RAID Utility : Enclosure -> 1, Slot -> 3, **ID -> 3**

Logical Device
In the case of the following, it means the same Logical Device.
- DataViewer : **[1]** Logical Device
- Universal RAID Utility : Logical Device #number**(1)**



CAUTION

Component of RAID System

When the RAID System management utility is "MegaRAID Storage Manager", RAID controller, a Physical Device, and a Logical Device that composes the RAID system are displayed in the DataViewer of NEC ESMPRO Manager by the following format.

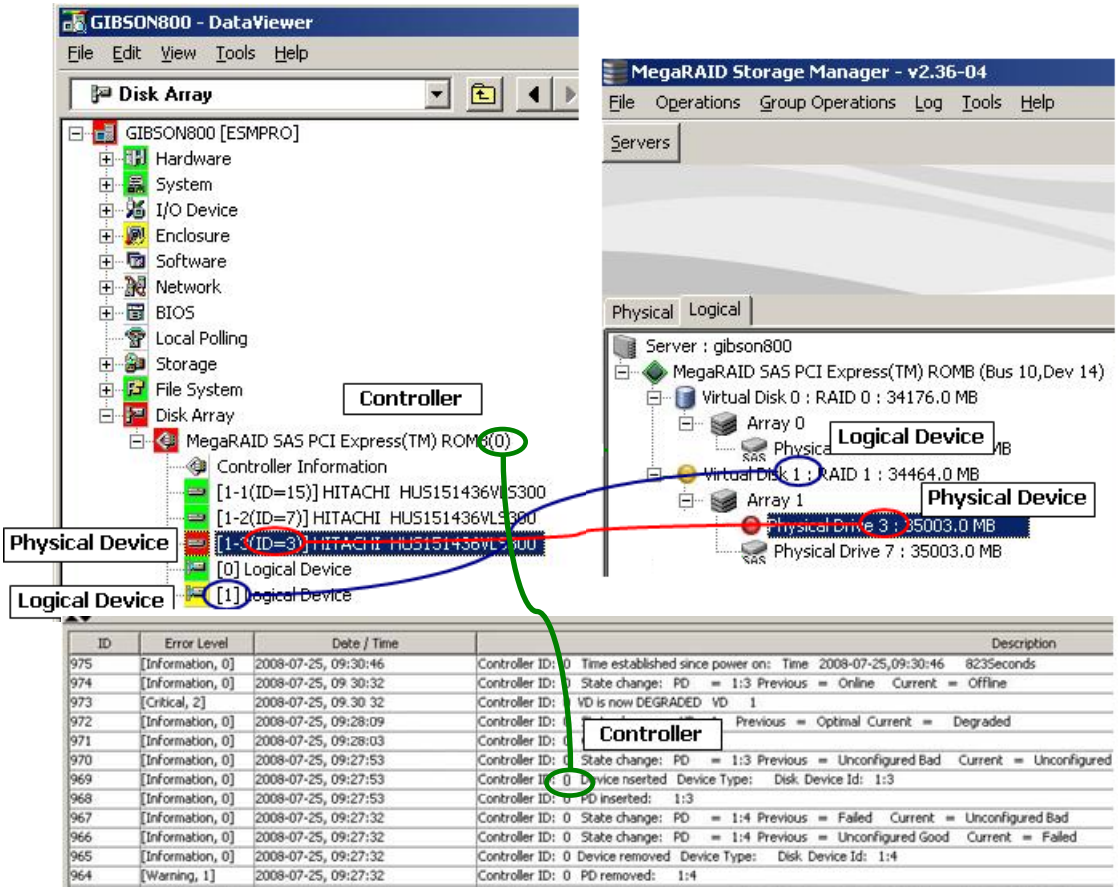
- RAID Controller : Controller name(ID)
- Physical Device : Enclosure number – Slot number(ID)
- Logical Device : (ID)Logical Device

These composition information corresponds with the DataViewer and MegaRAID Storage Manager as follows.

RAID Controller
In the case of the following, it means the same RAID Controller.
- DataViewer : MegaRAID SAS PCI Express(TM) ROMB**(0)**
- MegaRAID Storage Manager : Controller ID : **0**

Physical Device
In the case of the following, it means the same Physical Device.
- DataViewer : 1-3(**ID=3**)
- MegaRAID Storage Manager : Physical Device **3**

Logical Device
In the case of the following, it means the same Logical Device.
- DataViewer : **[1]** Logical Device
- MegaRAID Storage Manager : Virtual Disk **1**



NEC ESMPRO Agent may be disable to monitor the RAID controller when can't get information of the failure hard disk. In this case, NEC ESMPRO ESMDiskArray will recognize that some problem occurred with this hard disk, and will report the below alert to NEC ESMPRO Manager.

Also, the same phenomenon occurs when more then two of hard disk breaks in a logical device, and can't get information of the logical device. In this case, NEC ESMPRO ESMDiskArray will report the below alert too.

If you receive these alert, confirm yes or no of failure of physical device and logical device by disk array management utility, LED and the others.

Alert contents at the time when NEC ESMPRO Agent can't get information of Physical Device and Logical Device. (Example.)

```
Logical Device might change to Critical .
  Disk Array : SuperTrak EX8350
  Logical Device ID : 1
```

```
Physical Device might change to Dead .
  Disk Array :   MegaRAID SAS 8708EM2(0)
  Disk ID : 1-3(ID=3)
  Model : SEAGATE   ST9146803SS
```

CAUTION

Alert during maintaining disk array
When delete some physical device and/or logical device during maintenance of disk array, NEC ESMPRO Agent will recognize that physical device and/or logical device broke, and report the above alert. Ignore the above alert during maintenance of disk array.
If you don't want to see the wrong alert, stop the "ESMDiskArray" Service before maintenance.

CAUTION

Displaying of these physical device and logical device on DataViewer
The DataViewer of NEC ESMPRO Manager will not display such a physical device and logical device. Maintain by the information of alert message.

CAUTION

About the display of the Data Viewer when the Disk Array System is changed
When a Physical Device and a Logical Device are added or are deleted when immediately after the Disk Array System are maintaining it, it takes time of a few minutes until information is reflected in the Disk Array tree of the Data Viewer.

CAUTION

About RAID System including Hot Spare
When the problem happens to Physical Device in the RAID system including the Hot Spare, the DataViewer displays "Ready" as a state of the hard disk.

3. Confirmation of result of hard disk pre-failure prediction

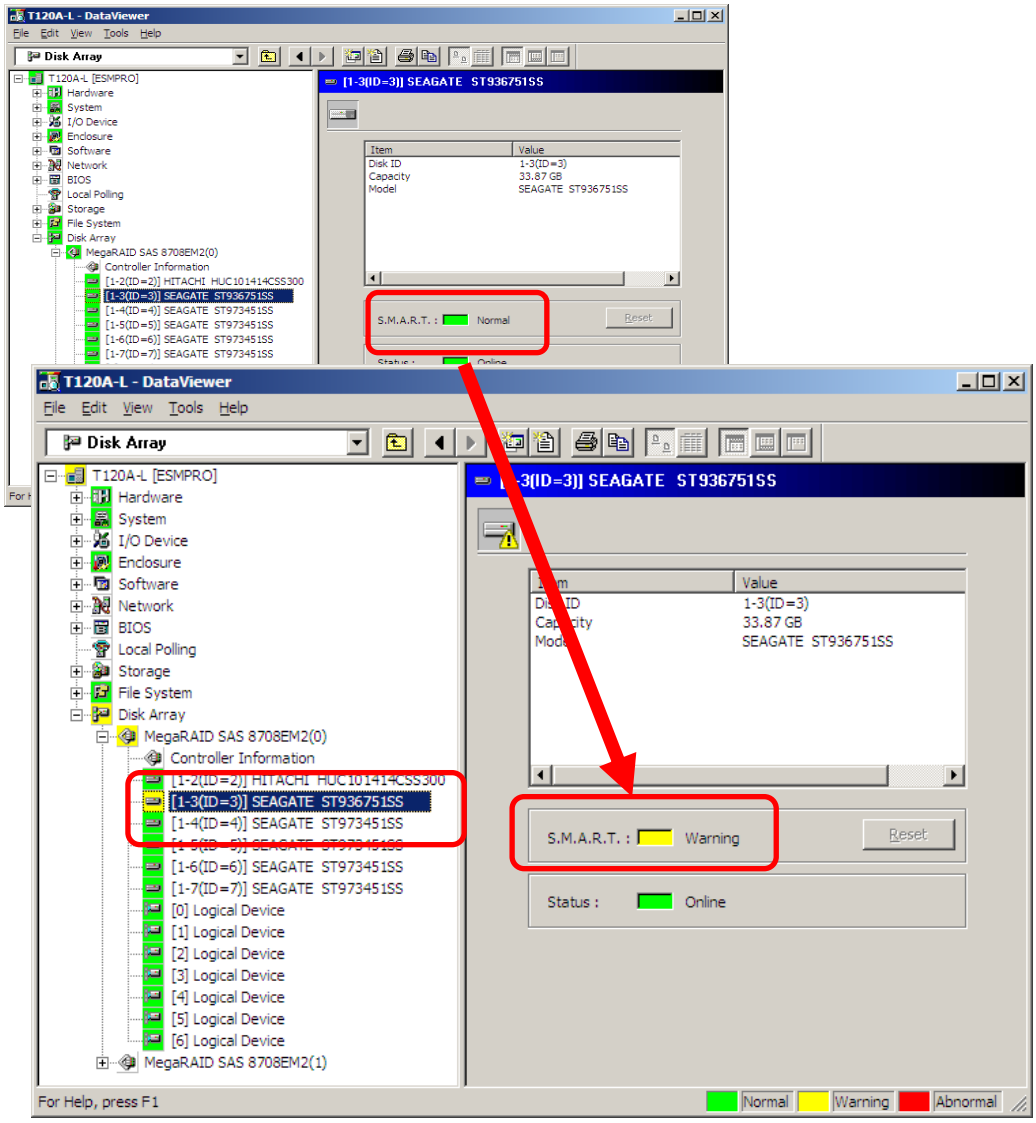
Thanks to hard disk pre-failure prediction function, as you can identify hard disk which has frequent error occurrences before hard disk actually fails, you can take measures such as "Replace preventively before hard disk fails" Disk Array Monitoring Function reports S.M.A.R.T. error Disk Array Controller detected as alert of NEC ESMPRO Agent.

In case it was determined as life by preventive maintenance function for hard disk, the following alert is reported.

Alert contents at the time when hard disk is determined as Life (Example.)

S.M.A.R.T. feature considered the Physical Device to be in Warning state.
Disk Array: FastTrak S150 SX4
Disk ID: CH1-Master
Model: MAXTOR 4K040H2
Reset: Unnecessary

You can confirm that hard disk is determined as life not only by alert report but also on DataViewer.



[Physical Device Information] view of DataViewer

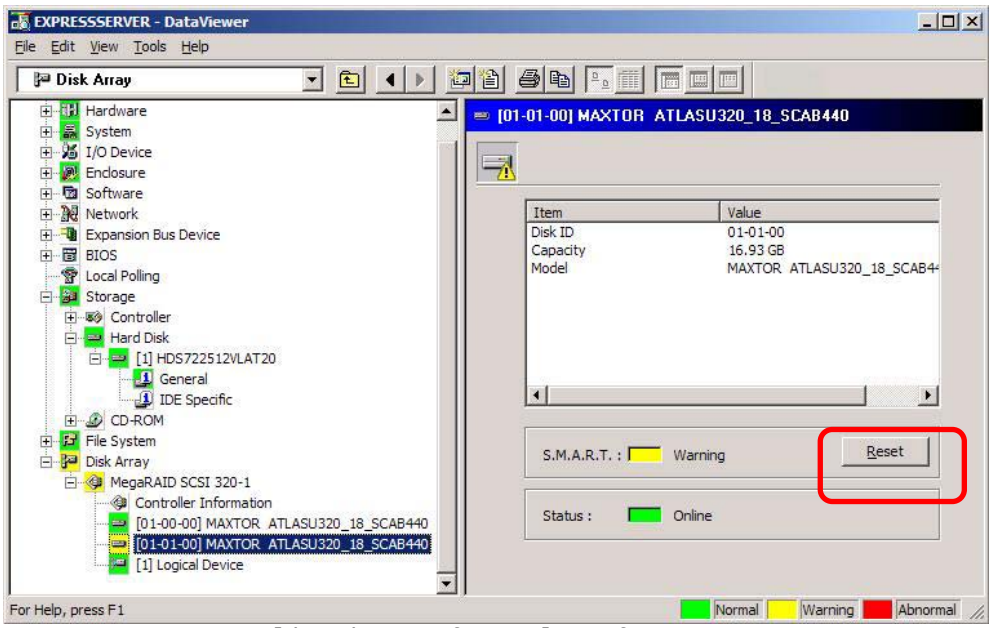
The LED of S.M.A.R.T. error of Physical Device Information displays result of determination of preventive maintenance of physical device.

(Normal color) : Normal
(Warning color) : Detects failure by diagnosis of hard disk pre-failure prediction function.

CAUTION

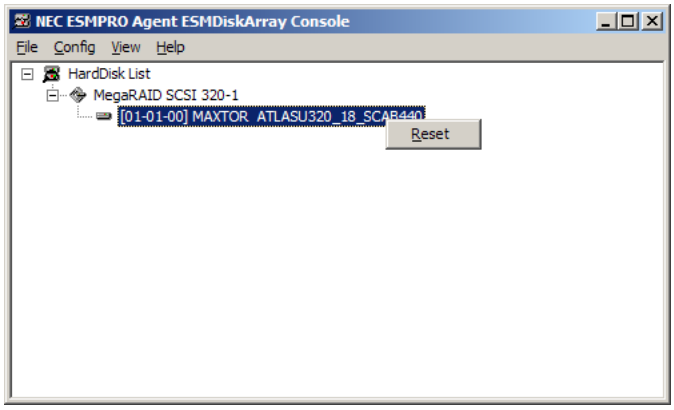
About the restoration of the state of S.M.A.R.T.
The hard disks with S.M.A.R.T. in warning color should be replaced because they have little time left to live.

When you replaced hard disk detected failure by hard disk pre-failure prediction function, there is a possibility that reset may be required. In case reset is necessary, for "Reset" of alert report contents, display as "Necessary" (In case reset is not necessary, display as "Unnecessary")
You can reset in the following two ways:
One is to use Physical Device Information View of DataViewer. Click [Reset] button of right side of [S.M.A.R.T.] after replacing hard disk.



[Physical Device Information] view of DataViewer

The other is to use NEC ESMPRO Agent ESMDiskArray Console. Activate NEC ESMPRO Agent ESMDiskArray Console, select hard disk of Hard Disk List and click "Reset" of context menu.



NEC ESMPRO Agent ESMDiskArray Console

PLUS 1

About Hard Disk List of NEC ESMPRO Agent ESMDiskArray Console
Hard Disk List of NEC ESMPRO Agent ESMDiskArray Console displays physical device only necessary to reset.

4. Setting of disk array monitoring function

The setting of Disk Array Monitoring Function can be made by NEC ESMPRO Agent ESMDiskArray Console of NEC ESMPRO Agent.

4.1 Change of threshold for hard disk pre-failure prediction

You can not change threshold of S.M.A.R.T. function using hard disk pre-failure prediction function. The threshold is set up by each hard disk vendor and shipped and it is not officially announced.

PLUS 1

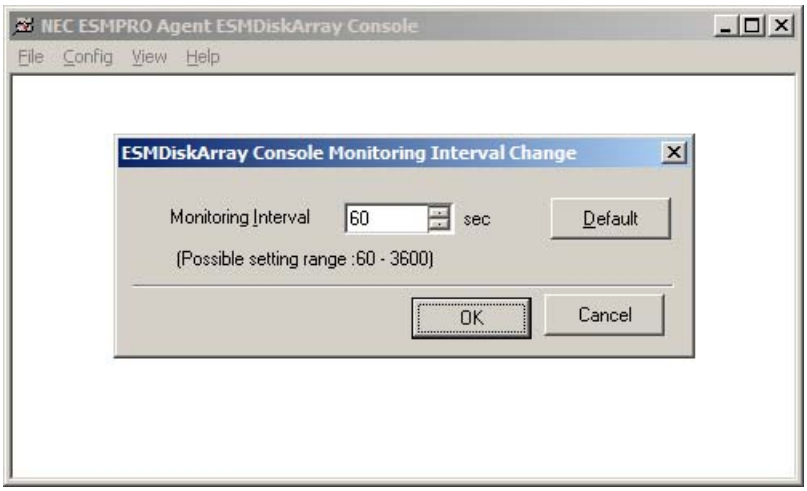
About the default of the threshold judgment method

The threshold of the method of judging S.M.A.R.T. is setting on the hard disk by each vender and is not made public.

4.2 Change of monitoring interval

Monitoring interval of Disk Array monitoring function can be changed to optional value.
However, do not change monitoring interval basically. If you change monitoring interval of Disk Array monitoring function longer, there is a possibility that detection of hard disk failure may delay and data may be lost at worst case.

	Default	Setting Coverage
Disk Array Monitoring	60 sec.	60~3,600 sec.



[ESMDiskArray Console Monitoring Interval Change] dialog

[Support RAID Controller]

DiskArray Management Utility	RAID Controller
Universal RAID Utility	- RAID Controller(128MB, RAID 0/1) [N8103-116A] - RAID Controller(128MB, RAID 0/1/5/6) [N8103-117A] - RAID Controller(256MB, RAID 0/1/5/6) [N8103-118A] - RAID Controller(128MB, RAID 0/1) [N8103-116] - RAID Controller(128MB, RAID 0/1/5/6) [N8103-117] - RAID Controller(256MB, RAID 0/1/5/6) [N8103-118] - RAID Controller [N8103-115] - RAID Controller [N8103-109] - RAID Controller [N8403-026] - LSI Embedded MegaRAID(tm) - Internal RAID Controller (N8103-116 or equivalent) - SAS PCI EXPRESS(TM) ROMB - Disk Array Controller [N8103-90] *
MegaRAID Storage Manager	- Disk Array Controller [N8103-90] * - Disk Array Controller(Internal SAS HDD) [N8103-91] - Disk Array Controller(0ch) [N8103-99] - Disk Array Controller [N8403-019] - LSI Logic Embedded MegaRAID(tm) - LSI Logic MegaRAID(tm) SAS PCI EXPRESS(tm) ROMB
Web-based Promise Array Manager Professional	- Disk Array Controller(SAS) [N8103-105]
Web-based Promise Array Manager	- Disk Array Controller(SATA2) [N8103-103] - Disk Array Controller(SATA2) [N8103-101] - Disk Array Controller(SATA) [N8103-89]
Promise Array Manager	- Disk Array Controller(SATA) [N8103-78]

CAUTION

*** About Disk Array Controller [N8103-90]**

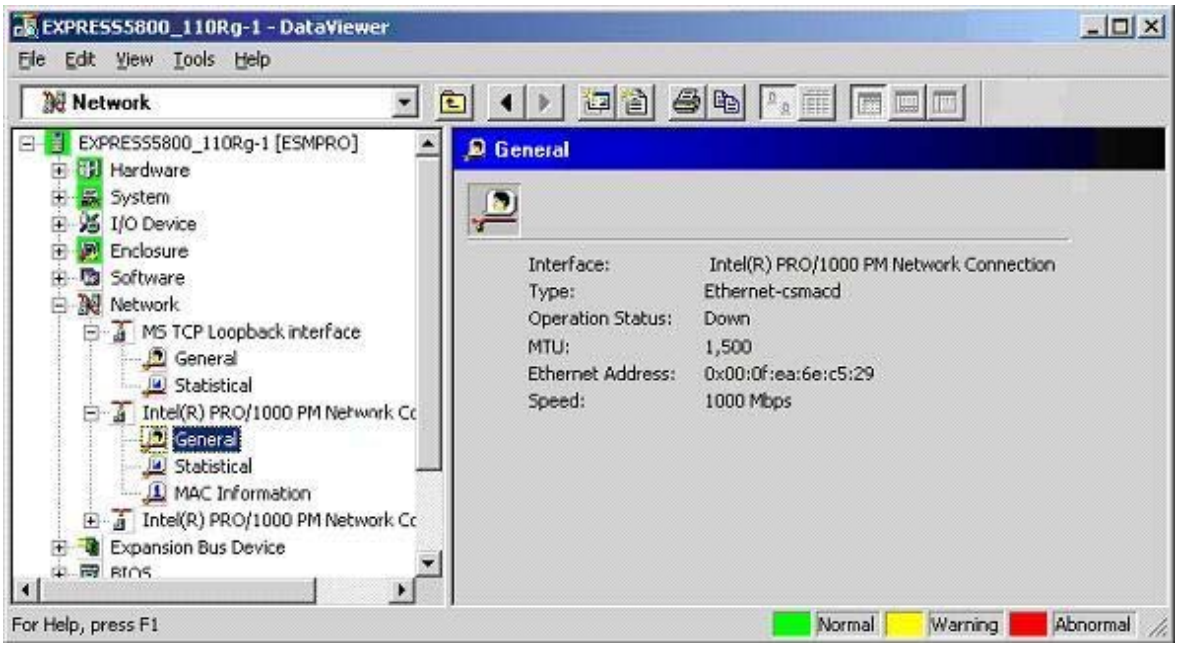
The disk array management utility of Disk Array controller [N8103-90] is different depending on the kind of connected server.

3.12 Monitoring of Network(LAN)

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor sending and receiving packet of server. By monitoring packet, you can detect line failure, high load of line and lack of server resource.

3.12-1 Function of LAN monitoring

In case NEC ESMPRO Agent detected problem concerning LAN, it reports/registers the detected status to Manager and EventLog of system.



[Network]-[General] of DataViewer

3.12-2 Operation of LAN monitoring function

Describes about operation procedures such as validation method of failure concerning LAN Monitoring and modification method of setting.

1. Confirmation of network failure

In case failure concerning LAN occurred, the following alert or Event are reported or registered to Manager or EventLog of system. Confirm whether Event related to LAN is not registered by AlertViewer or EventLog of system

LAN monitoring function registers the following Events to EventLog in case many destruction packets and error packets occur in unit of time (monitoring interval), it determines that failure occurs on network. By referring to the contents of EventLog, you can narrow down the cause.
As the determination of failure about LAN is made at a rate of number of sent and received packet generated during monitoring interval, there is a possibility that Event may be registered by temporary load increment. Even in case Event is registered, there is no problem that it is recovered soon. In case it is not recovered and occurs frequently, confirm network environment (including hardware) and disperse load.

Alert contents at line failure (Example.)

```
A Network Hardware failure may have occurred. Device:\Device\EI90x1   Error No.:1   Alignment Errors = 5
FCS Errors = 0   Carrier Sense Errors = 0
```

In case the percentage of packet of alignment error (packet length is not multiples of 8) among packets received during monitoring interval exceeds the degree of value (threshold:line failure), alert is reported.

```
A Network Hardware failure may have occurred. Device: \Device\EI90x1   Error No.:2   Alignment Errors =
0   FCS Errors = 16   Carrier Sense Errors = 0
```

In case the percentage of packet of FCS error (detect error by checksum) among packets received during monitoring period exceeds the degree of value (threshold:line failure), alert is reported.

```
A Network Hardware failure may have occurred. Device: \Device\EI90x1   Error No.:3   Alignment Errors = 0
FCS Errors = 0   Carrier Sense Errors = 39
```

In case the percentage of packet of carrier sense error (carrier sense can not detect during sending) among packets sending during monitoring interval exceeds the degree of value (threshold:line failure), alert is reported.

```
The Network is under heavy load. Device: \Device\EI90x1   Error No.:1   Total Transmitted Packets = 57
Late Collisions = 9   Single-Collisions = 1   Multiple-Collisions = 6   Delayed Frames = 2    Excess Collisions
= 0   MAC transmitted Errors = 0
```

In case the percentage of packet of sum of packet crash/delay occurred (sum of delay clash, single crash, multiple crash and delay sending) among packet receiving during monitoring exceeds the degree of value (threshold:transmission retry), alert is reported.

```
The Network is under heavy load. Device: \Device\EI90x1   Error No.:2   Total Transmitted Packets = 15
Late Collisions = 0   Single-Collisions = 0   Multiple-Collisions = 0   Delayed Frames = 0    Excess Collisions
= 1   MAC transmitted Errors = 3
```

In case the percentage of sum of abandoned packet (number of excess crash and MAC sending error) among packet received during monitoring due to excess crash and others exceeds the degree of value (threshold:transmission abort), alert is reported.

In addition, in case the following is registered, there is a possibility that the setting of network may be wrong.
Reconfirm manual.

```
SNMP Service does not accept a request
```

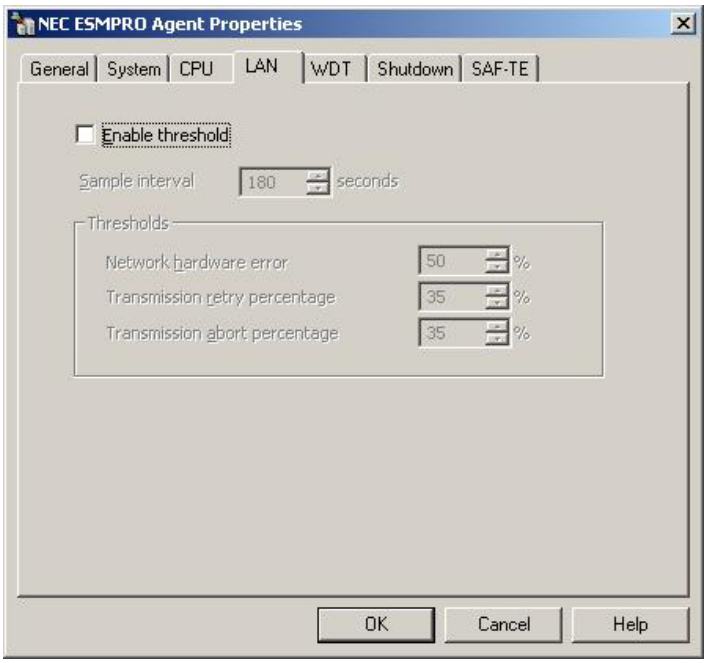
The above is registered in case response is not come from SNMP service at the time of service initialization.
Confirm the setting of SNMP service.

2. Setting of LAN monitoring function

The default of LAN monitoring function is set up as "Not enable to monitor". In case of monitoring LAN, change the setting by control panel of NEC ESMPRO Agent.
For LAN monitoring, basically it is not necessary to change threshold-determining status of network but you can set optional value.

2.1 Change of LAN monitoring threshold

You can change threshold by control panel of NEC ESMPRO Agent.



Control panel of NEC ESMPRO Agent [LAN]

Default of Threshold

Network hardware error:	50% (0~100%) In case alert of "line failure" is frequently reported and you want to ignore it, set the value of [Ratio of line failure] higher.
Transmission retry percentage:	35% (10~50%) For both cases, in case alert of "line high load status" is frequently reported and you want to ignore it, set the value of [Transmission retry percentage] higher.
Transmission abort percentage:	35% (10~50%) For both cases, in case alert of "line high load status" is frequently reported and you want to ignore it, set the value of [Transmission abort percentage] higher.

2.2 Change of monitoring interval of LAN monitoring function

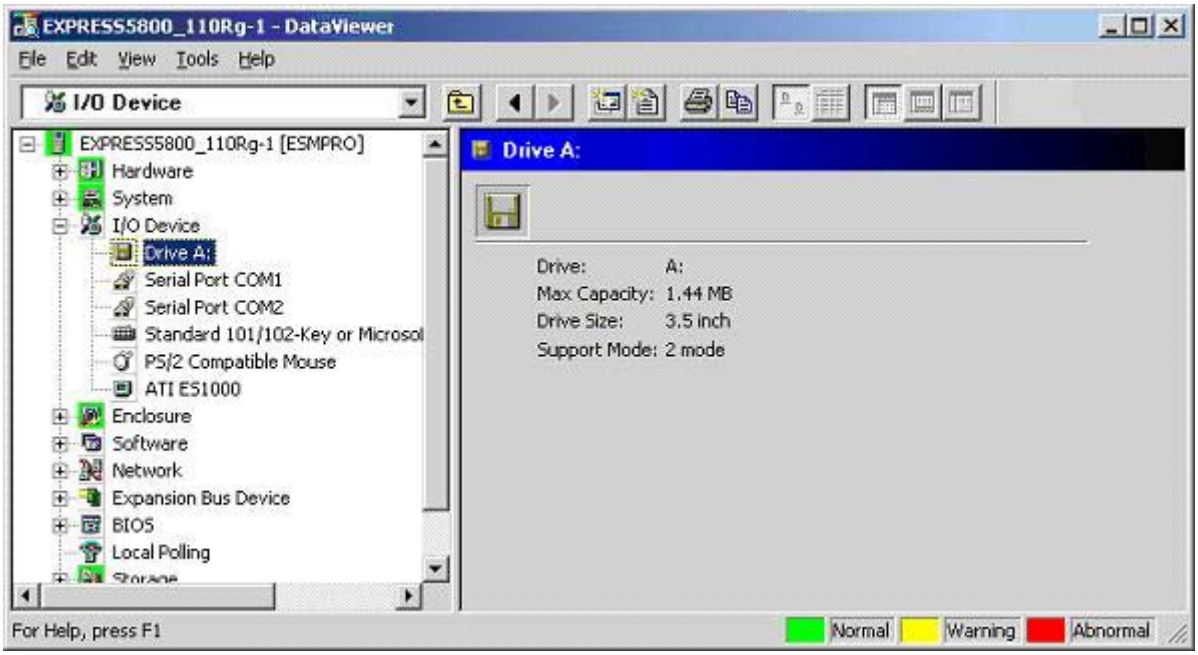
The default of monitoring interval of LAN monitoring is 180 sec.
Monitoring interval of LAN monitoring is at the range of 1~3600 sec. and can change the setting.

3.13 Reference of System Information

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can refer to the information about system environment such as I/O device, software (service, driver, OS), BIOS (system BIOS, video BIOS, SCSI BIOS) and device information (CPU, system board, etc.).

3.13-1 Reference of information of I/O device

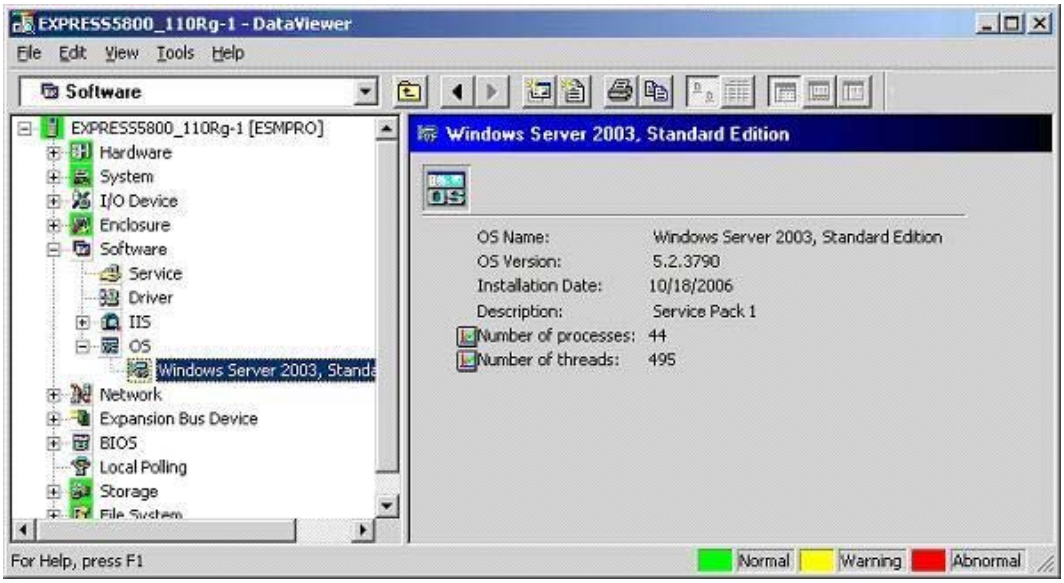
In case you refer to information of I/O device from Manager, select [I/O Device]-"I/O device you refer to" by DataViewer. You can refer to the information of I/O device (floppy disk, drive, serial port, parallel port, keyboard, mouse, video).



[I/O Device]-[Drive A:] of DataViewer

3.13-2 Reference to software information

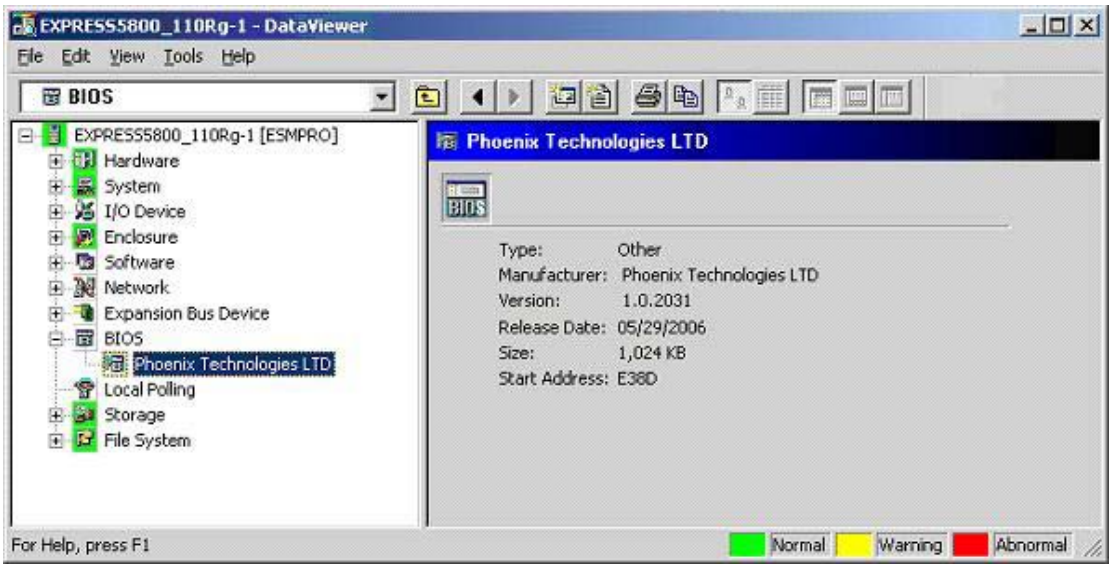
In case you refer to the information of software by Manager, select [Software]-"Software you refer to" by DataViewer. You can refer each information of software.



[Software]-[OS] of DataViewer

3.13-3 Reference to BIOS Information

In case you refer to BIOS information by Manager, select [BIOS]-"BIOS you refer to" by DataViewer. You can refer to each BIOS information.

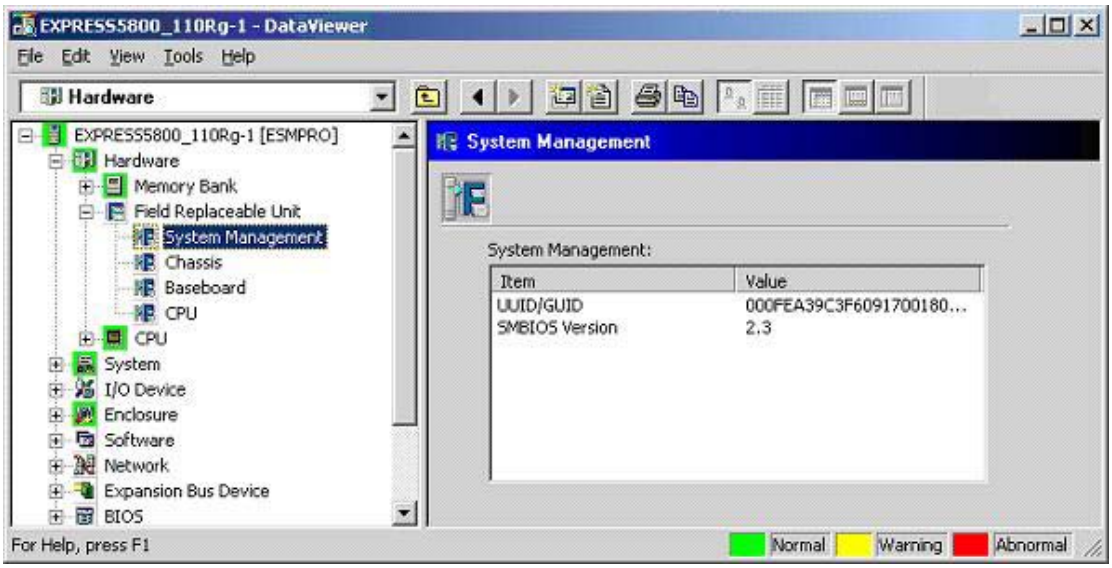


[BIOS] of DataViewer

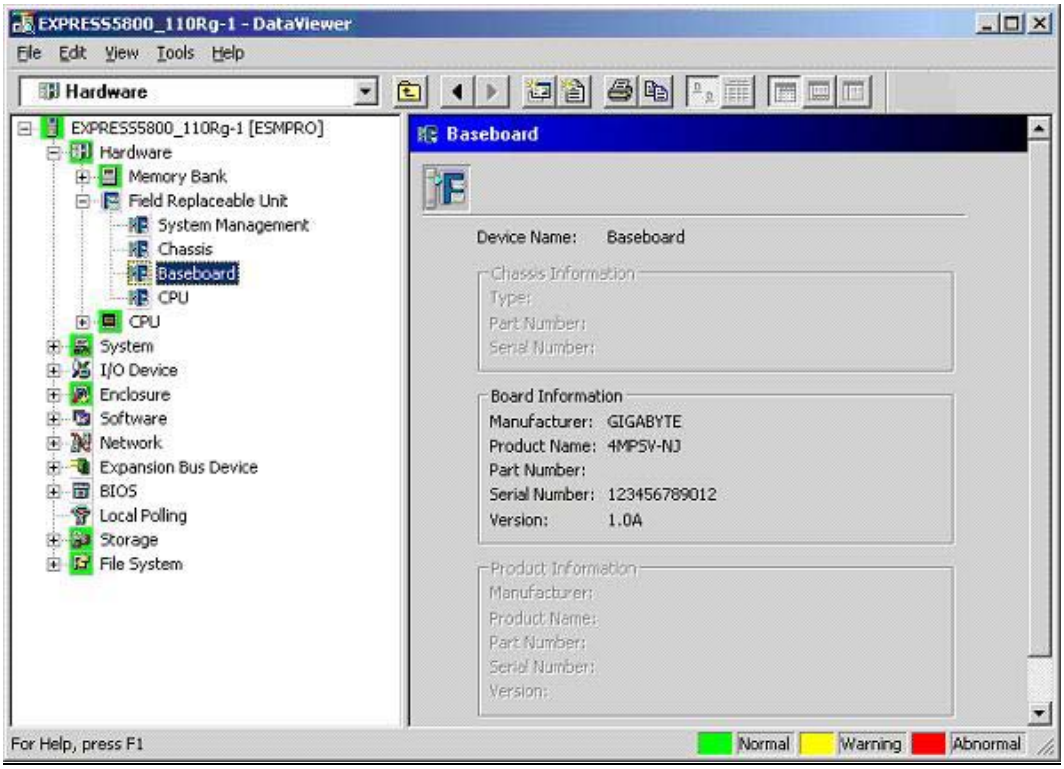
3.13-4 Reference to Equipment Information

In case you refer to equipment information by Manager, select [Hardware]-[Field Replaceable Unit]-"Equipment you refer to" by DataViewer. You can refer to the information of each equipment.

＊ The equipment information you can refer to depends on model.



[Field Replaceable Unit]-[System Management] of DataViewer



[Field Replaceable Unit]-[Baseboard] of DataViewer

3.14 Reference of Error Information detected by HW Level

NEC ESMPRO Agent and NEC ESMPRO Manager provide ESRAS utility by which you can refer to log information of Event/ error detected at HW level and information about sensor of HW system and information of field replaceable unit for maintenance.
By utilizing ESRAS utility, you can detect general HW related malfunction, confirm generation of error (Power Unit failure, etc) at HW level, investigate after failure and perform system diagnosis.

3.14-1. Function of ESRAS utility

ESRAS utility displays log information recorded in special memory(NVRAM) mounted in Express itself or server management board. In addition, the model supporting IPMI (Intelligent Platform Management Interface) which is standard interface of HW information displays log information recorded through IPMI.
ESRAS utility automatically identify the function about HW information supported by relevant server and displays it.
Please note that ESRAS utility can not display the information about server not supporting NVRAM nor IPMI.

1. NVRAM Information

Display of SW(Software) Log
Displays logging information of memory error, critical and system error.

Memory Error	Displays collectable error (1bit error)/uncollectible error (multi bit error) information detected/recorded by memory check in level such as BIOS.
Critical Error	Displays logging information of critical error : temperature malfunction/FAN malfunction and etc.) resulting in system error.
System Error	Displays logging information of system error message of OS (Panic message).

Display of HW (Hardware) Log
Displays failure information occurred in main equipment.
Register information is recorded at occurrence of system error (Panic).

Display of Server Management Board Expansion Log
In equipment mounted server management board, more detailed HW failure information and EventLog can be detected.

Management of NVRAM Logging Information
Performs save (backup)/initialization of logging information recorded in NVRAM of main equipment and server sensing board/server management board.

In order to investigate failure, this save (backup) data is useful.

2. IPMI Information

Display of IPMI Information

Displays System EventLog (SEL), Sensor Device information (SDR), Field Repaceable Unit information (FRU), Management ControllerI Information (version information of IPMI) and system current-carrying accumulated time on local computer as well as network computer.

System EventLog(SEL)	Displays Event/error system and sensor of system Detects. This is log necessary for identification of cause after failure and restoration work.
Sensor Device information(SDR)	Displays information about sensor of hardware system, type of field replaceable unit information (FRU), location of data storage and others. Depending information, you can confirm the sensor –specific information such as threshold.
Field Replaceable Unit Information(FRU)	Displays information of replaceable module or component system maintenance person.
Management Controller Information (version information of IPMI)	Displays version information of IPMI of file backed up the latest information for connected machine to manage.
System Current-carrying Accumulated Time	Displays accumulated time system turns on electricity so far. displays the latest information only.

Backup Function of IPMI information

Backup IPMI information to file.

You can back up from both local computer and network computer

The target of backup is system EventLog (SEL), Sensor Device information (SDR), Field Replaceable Unit information (FRU), management controller information (version information of PMI).

In order to investigate failure, this save (backup) data is useful.

Backup Display Function of IPMI information

Reads backed up IPMI information and displays it.

Displayed information is System EventLog (SEL), Sensor Device information (SDR, Field Replaceable Unit information (FRU) and management controller information (version information of IPMI).

CAUTION

Backup file of IPMI information collected by ESRAS utility is compatible with the following backup file of software and you can refer to them.

・Off-line maintenance utility
・DianaScope
・NEC ESMPRO Manager Ver.5

3.15 Monitoring of Event

NEC ESMPRO Agent monitors and detects various failures (Events) which occur on server and can alert failure contents to NEC ESMPRO Manager.
Though it is set by default to monitor/alert Event resulting in critical failure, you can add/delete MonitoringEvent in accordance with system environment.
You can unify management of MonitoringEvent by tree view of Alert Manager setting tool.

3.15-1 Function of event monitoring

1. Type of event to be monitored

NEC ESMPRO Agent can monitor the following 2 types of Event.

EventLog
Monitors standard EventLog of Windows system.
Always monitors that Event is registered based on source name and EventID of Event. When Event to be monitored is registered to EventLog, the contents are alerted to NEC ESMPRO Manager
Error Event of standard service of Windows and Event NEC ESMPRO product registers are set up by default of MonitoringEvent.
In addition, you can add/delete MonitoringEvent in accordance with system environment.

POINT
You can monitor Event application other than NEC ESMPRO Agent registers.

PLUS 1
You can refer to Event registered in EventLog on EventViewer.
The type of log you can monitor is not only three logs of application log, system log and security but also custom log component and others of Windows are added.

Event of NEC ESMPRO Agent
Event of NEC ESMPRO Agent monitors itself.
For Event of NEC ESMPRO Agent, there are two types of Event. One is Event to alert by status change of server determining threshold and the other is Event to alert by failure of some kind.

PLUS 1
You can only select Alert/Do not Alert for Event of NEC ESMPRO Agent. You can not add nor delete.

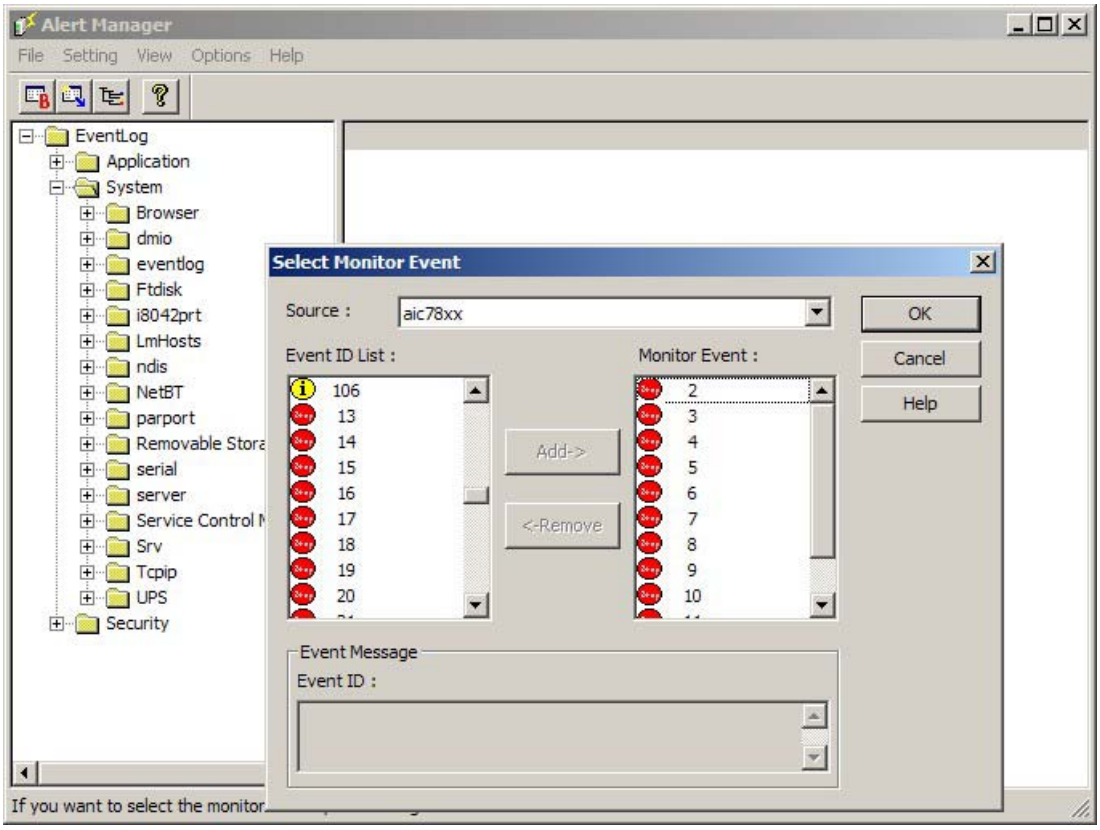
3.15-2 Operation of Event Monitoring

1. Addition/Deletion of MonitoringEvent

By designating MonitoringEvent, you can add and delete MonitoringEvent.

[Procedures]

1. Activate Alert Manager setting tool.
2. Switch tree view(EventLog, Event of NEC ESMPRO Agent) of Event you want to set.
3. Select source name for monitoring on tree view with mouse and click right button of mouse. Select [Select MonitoringEvent] from displayed Pop-up menu.
4. As [Select MonitoringEvent] Dialog Box is displayed, select Event for monitoring.



Alert Manager Select Monitor Event Dialog Box

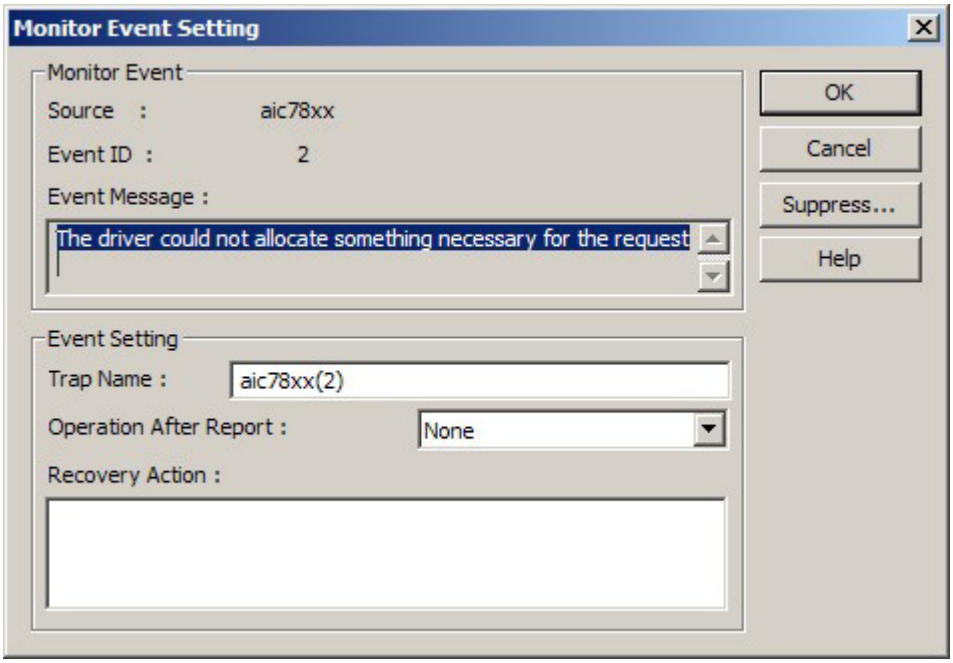
2. Setting of alert contents for MonitoringEvent

By setting MonitoringEvent, you can set alert contents for each Event.

Setting Item has trap name, action after alert and coping process. The information you set here becomes alert contents and AlertViewer displays it [Action after Alert] means the operation after this Event happened and you can select from the following three operations " Shut Down", "Reboot" and "No action".

[Procedures]

1.Activate Alert Manager setting tool.
2.Switch tree view([EventLog] [Event of Agent]) of Event you want to set
3.Select source name for monitoring on tree view with mouse and click right button of mouse. Select [Monitor Event Setting] from displayed Pop-up menu.
4.After [Monitor Event Setting] Dialog Box is displayed, set alert contents.



Monitor Event Setting Dialog Box

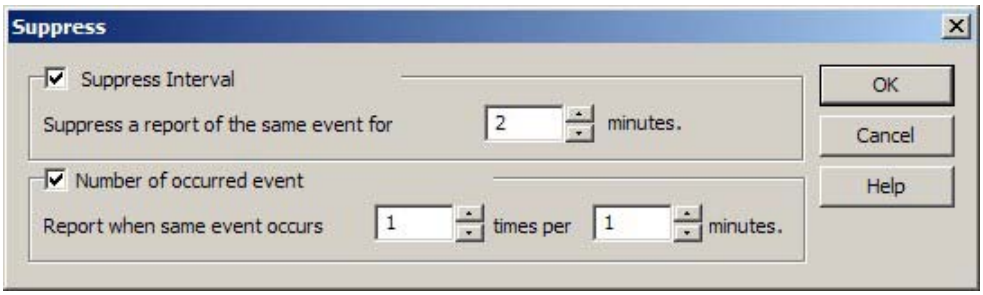
3. Setting of alert suppression of MonitoringEvent

NEC ESMPRO Agent can set alert suppression for each MonitoringEvent.
Suppression of alert has 2 kinds of suppression method of "Suppression by suppress interval" and "Suppression by number of occurred event" By combining these, you can suppress unnecessary duplicate alert, reporting only when same Event was detected.

"Suppression by suppress interval" is that the same Event detected within designated time is not reported. "Suppression by number of occurred event" is that when the same Event of designated number within designated time was detected , alert is reported. You can set combining these 2 methods.

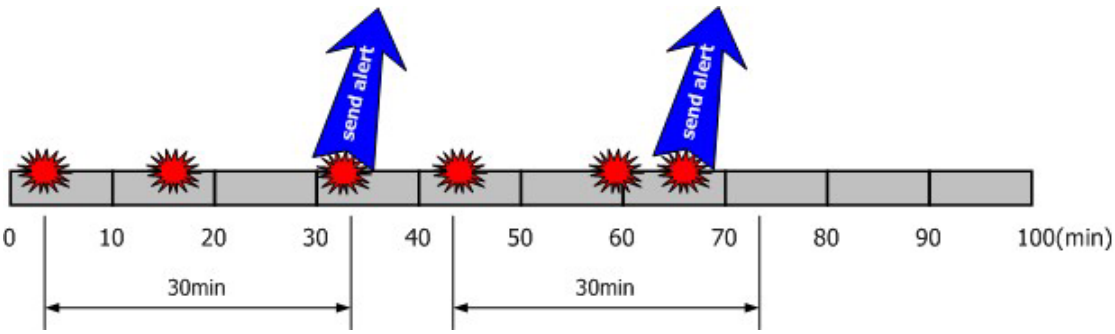
[Procedures]

1.Activate Alert Manager setting tool.
2.Switch tree view ([EventLog], [Agent Event]) of Event you want to set
3.Select source name for monitoring on tree view with mouse and click right button of mouse. Select [Monitor Event Setting] from displayed Pop-up menu.
4.Press [Suppress] button on [Monitor Event Setting] Dialog Box.
5.As [Suppress] Dialog Box is displayed, set suppression



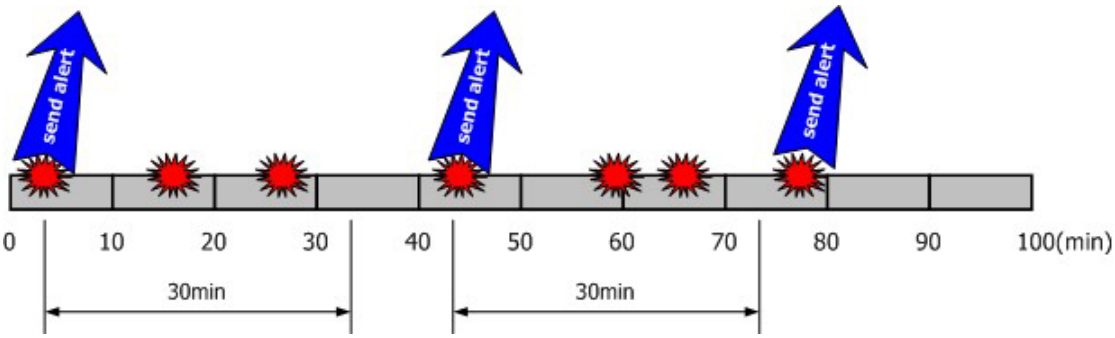
Suppress Dialog Box

[Setting Example.]
Suppresses alert of the same Event in designated time (30 min.).



In suppress interval (30 min.) from alert, alert is not sent even though the same Event is detected. After the suppress interval, alert is sent.

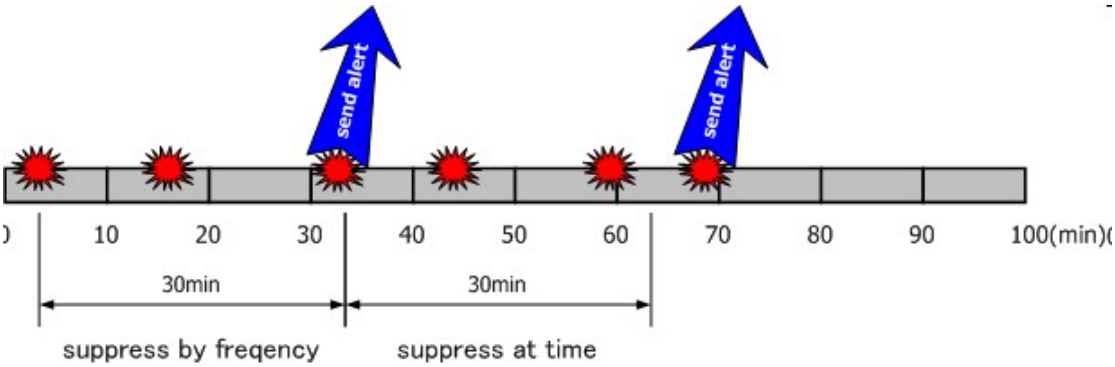
Alert is sent if designated number of occurred event (three times) of the same event is detected in designated time (30 min.).



Alert is sent in case the designated number of occurred event (three times) of the same event is detected in designated time (30 min.).
After that, alert is sent in case the designated number of occurred event of the same event is

detected in the designated time.

If designated number of occurred event (3 times) is detected in designated time (30 min.) is detected, alert is sent and suppresses alert for designated time (30 min.).



If designated number of occurred event (three times) of the same event is detected in designated time (30 min.) is detected, alert is sent.

Alert is not sent even though event is detected in suppress interval (30 min,) from alert. After suppress interval, in case designated number of occurred event is detected in designated time again, alert is sent.

3.16 Monitoring of Stall

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor system stall. By monitoring, you can minimize shutdown time of server and effect to operation by automated and unattended operation in operating system.

3.16-1 Function of stall monitoring

NEC ESMPRO Agent monitors operational condition of OS by regularly updating watchdog timer (timer for software stall monitoring) mounted server.
In case there is no response due to stall of OS and other reasons and timer is not updated, timer times out and reboot the system automatically.

3.16-2 Operation of stall monitoring

Describes about operation procedures such as validation method of failure concerning stall monitoring and modification method of setting.

1. Confirmation of system stall

Monitors system stall by watchdog timer during system operation. In case stall occurred, it detects occurrence of stall after system start-up and send alert to Manager. Confirm whether alert concerning stall is not sent on AlertViewer of Manager.

Alert contents at occurrence of timeout of watchdog timer (Example.)

```
Timeout of watchdog timer..
```

CAUTION

There is a possibility that alert report just after system start-up may fail to send. In case it failed to send, there is a possibility that alert report may delay by retry interval designated by Alert Manager setting tool.

2. Setting of stall monitoring function

Stall monitoring function is set up to monitor when NEC ESMPRO Agent was installed and always monitors during operation.
For normal operation, you do not need to change the setting of stall monitoring function.

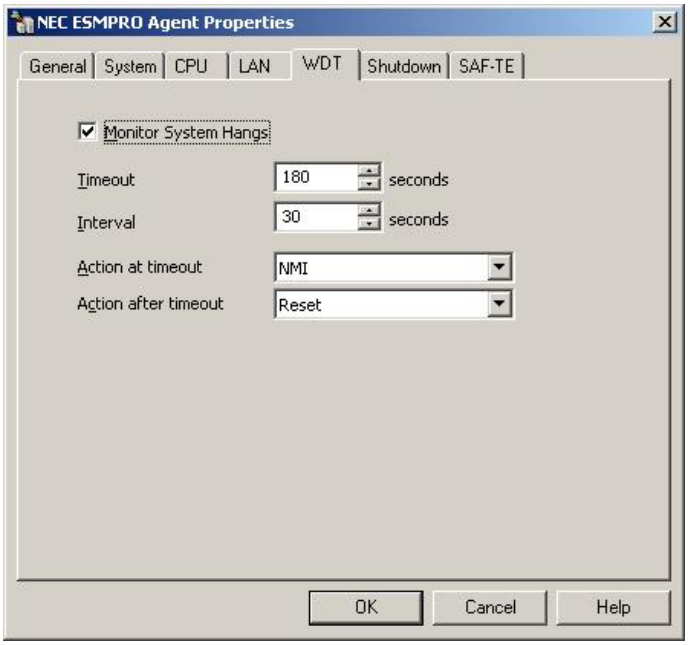
2.1 Change of validation/invalidation of stall monitoring

As for validation/invalidation of Stall Monitoring, you can set up by control panel of NEC ESMPRO Agent.

CAUTION

In case you changed validation/invalidation stall monitoring for IPMI incompatible model, system is required to reboot.

Control panel of NEC ESMPRO Agent



Control panel of NEC ESMPRO Agent [WDT]

2.2 Change of setting of stall monitoring operation

For server supporting IPMI, you can finely set not only the change of Validation/Invalidation but also other changes.
You can set timeout period, update interval, action at timeout and action after timeout control panel of NEC ESMPRO Agent.

Default Threshold

Timeout Period:	90 or 180 (appropriate value is set by model.)
Update Interval:	30
Operation at Timeout:	NMI
Operation after Timeout:	reset

KEYWORD

Timeout Period
Designates the time system judges it stalled in number of seconds.

Update Interval
Designates interval to update timeout period timer in number of seconds.
For instance, in case timeout period is 90 seconds and update interval is 30 seconds, the time judged as stall is from 60 to 90 seconds.

Action at timeout
You select operation at the time of timeout. After operation below, operation after timeout is carried out.

None	:	Nothing happens.
NMI	:	Generates STOP error.

Action after Timeout

How to select restoration after timeout

System	:	In case you set action at the time of timeout as ”NMI”, it conforms to the contents set up for [Restore] of Start-up/ Shut Down] tab of control panel [system] In case of (Windows NT 4.0, ”Restore” of [Start -up/ Shut Down] tab, In case of Windows 2000 ,[Start-up/Restore]) of [Details] tab respectively, if stall occurs, STOP error occurs and resets after collecting memory dump and reboots In case it further timed out on the condition that memory dump can not be collected and it is designated to write debug information by control panel ”system” tab, you collect memory dump and reboot after reset in case “Automatically reboot” is designated. In case action at the time of timeout is "No", it is not restored. It is stall.
Reset	:	In case you set action at the time of timeout as ”NMI” and if stall occurs, STOP error occurs and resets after collecting memory dump and reboots. In case it further timed out on the condition that memory dump can not be collected, activate after reset. In case of setting of ”No”, reset system and try to reboot.
Power Cycle	:	In case action at the time of timeout is set as ”NMI” and if stall occurs, STOP error occurs and resets after collecting memory dump and reboots In case it further timed out on the condition that memory dump can not be collected, reboot after power cycle. In case of setting of ”No”, first power OFF and power ON just after that.
Power Discontinuity	:	In case action at the time of timeout is set as ”NMI” and if stall occurs, STOP error occurs and resets after collecting memory dump and reboots In case it further timed out on the condition that memory dump can not be collected, power is shut down. In case of setting of ”No”, system power is shut down.

3.17 Detection of System Error (Panic)

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can detect occurrence of panic.

3.17-1 Function of system error detection

In case panic occurs in system, NEC ESMPRO Agent automatically detect occurrence of system error at system start-up after panic and sent alert to Manager.

3.17-2 Operation of system error detection

Describes about operation procedures such as validation method of failure concerning detection of system error and modification method of setting.

1. Confirmation of system error failure

NEC ESMPRO Agent detects system error after system start-up. In case it detects system error, it sends alert to Manager. Confirm whether alert about system error is not sent on AlertViewer of Manager

Alert contents at occurrence of system error (Example.)

```
This is the event which occurred between this system start-up
 the last system stop or system shutdown.

System Error Information

Time: : 2002/02/04 19:37:26
Dump Switch : OFF
Message :
*** STOP: 0x69696969
(0x00000000,0x00000000,0x00000000,0x00000000)
```

CAUTION

There is a possibility that alert report just after system start-up may fail to send In case it failed, there is a possibility that alert report may delay by retry interval designated by Alert Manager setting tool.

2. Setting of system error monitoring function

System error Monitoring function always monitors system error. You can not set so as not to monitor system error.

3.18 Monitoring of Shut Down

By utilizing NEC ESMPRO Manager and NEC ESMPRO Agent, you can monitor whether Shut Down procedure was carried out normally.

3.18-1 Function of shut down monitoring

NEC ESMPRO Agent monitors whether shut down procedure is completed normally (monitors from start of Shut Down procedure to power discontinuity).
If shut down procedure is not completed without response in time during executing OS shut down due to stall and other reasons, timer times out and automatically execute the action set beforehand.

3.18-2 Operation of shut down monitoring

Describes Operation Procedures such as validation method about failure concerning shutdown monitoring and modification method of the setting.

1. Confirmation of shut down failure

Monitors stall of shut down by watchdog timer during execution of shut down. In case stall occurred during shut down procedure, it detects occurrence of stall after system start-up and report alert to Manage. Confirm whether alert about stall of shut down is not reported on AlertViewer of Manager.

Alert contents at occurrence of timeout of watchdog timer (Example.)

```
Timeout of fwatchdog timer.
```

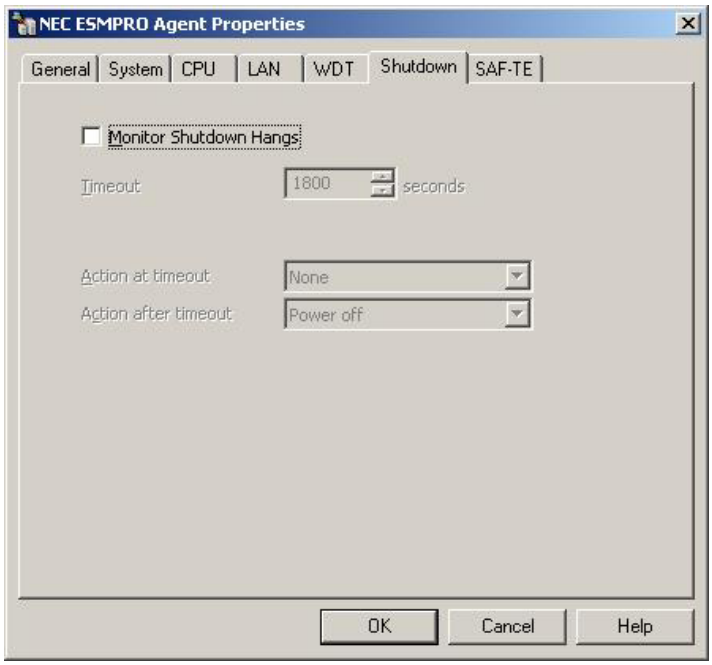
CAUTION

There is a possibility that alert report just after system start-up may fail to send. In case it failed to send, there is a possibility that alert report may delay by retry interval designated by Alert Manager setting tool.

2. Setting of shut down monitoring function

2.1 Change of validation/invalidation of shut down monitoring

The setting of shut down monitoring can be changed by control panel of NEC ESMPRO Agent.



Control Panel of NEC ESMPRO Agent [Shutdown]

2.2 Change of setting for shutdown monitoring action

By setting of control panel of NEC ESMPRO Agent, you can change timeout period, action at timeout and action after timeout. The contents you can change are the same as ones mentioned in"3.16 Monitoring of Stall".

Default of Threshold

Timeout Period:	1800
Action at Timeout :	None
Action after Timeout :	Power discontinuity

CAUTION

For Shut Down Monitoring, all the shutdown process is the target to monitor.
In case there is AP using Shut Down without reboot of OS and power discontinuity, set timeout time longer or monitoring OFF.

3.19 PCI Hot Plug Monitoring

NEC ESMPRO Manager and NEC ESMPRO Agent supports dynamic configuration by PCI hot plug function.

3.19-1 Function of PCI hot plug monitoring

When PCI hot plug generates in the system, NEC ESMPRO Agent automatically detects the generation of PCI hot plug and report it to Manager.

3.19-2 Operation of PCI hot plug monitoring

Describes about validation method of detection of PCI hot plug.

1. Confirmation of generation of PCI hot plug

NEC ESMPRO Agent automatically detects the generation of PCI hot plug and reports it to Manager. You can the contents of alert by AlertViewer of Manager.

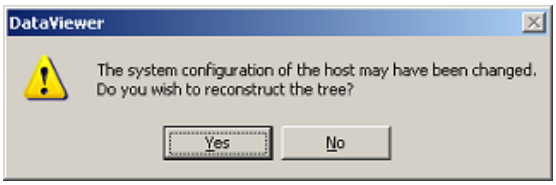
Alert contents at occurrence of generation of PCI hot plug (Example.)

New device has been connected to the slot or the connector device.

Either the slot or connector power has been off, or device has been removed.

3.19-3 Handling at the time of detection of PCI hot plug

In case generation of PCI hot plug is detected, DataViewer of Manager displays the message below and you are asked to reconstruct the tree of DataViewer.



Request for Reconstruction of Tree of DataViewer

When you select [Yes], tree is reconstructed by DataViewer and reconstruction of system by PCI Hot Plug is reflected on DataViewer.

CAUTION

When you select [No], the tree of DataViewer is not reconstructed.
In that case, because reconstruction of system by PCI hot plug is not reflected. there is a possibility that the information of DataViewer is different from the information of the present system.

3.20 Monitoring of Dump Setting

NEC ESMPRO Agent can monitor dump setting of memory dump extracted at the time of failure.
Because the setting of system concerning memory dump is monitored you can avoid the problem that you can not extract memory dump necessary to investigate the failure.

3.20-1 Function of monitoring for dump setting

NEC ESMPRO Agent checks dump setting at the time of start-up and reports alert to Memory in case dump is set not to extract normally.

3.20-2 Operation of monitoring for dump setting

Describes validation method about dump setting monitoring.

1. Confirmation of dump setting

NEC ESMPRO Agent checks the setting about memory dump and reports alert to Manager if the setting is incorrect.

In case of setting not to extract memory dump

The system is not set to extract memory dump(debug information).
It is recommended to setup to extract memory dump(debug information).

In case kernel/complete dump is not set
(Windows 2000 Windows XP Windows 2003)

Memory dump may not be able to extract normally.
The hot plug mclassification of the dump file is not "perfect memory dump" nor "kernel memory dump"
It is recommended to setup to "perfect memory dump" or "kernel memory dump".

In case overwriting is not set

Memory dump may not be able to extract normally.
The dump file is set as "does not overwrite".
It is recommended to change the setup to "overwrite".
Also, a dump file exists. Please move or delete it.

In case value of virtual memory size is less than necessary one

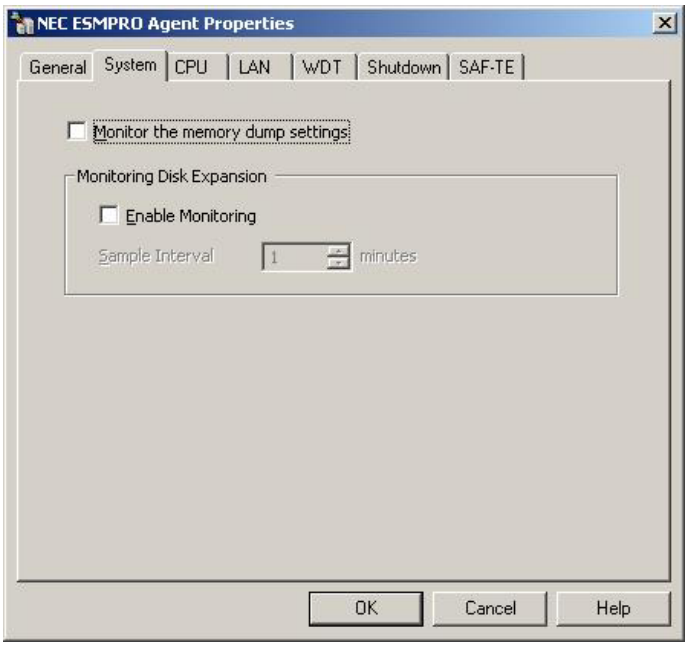
Memory dump may not be able to extract normally.
The initial size of the paging file of the starting drive is set below
the recommendation value,.
It is recommended to set the value of 1.5 times loading memory size or above.

CAUTION

There is a possibility that alert may fail to report just after system start-up In case of failure, alert report may delay by retry interval designated by Alert Manager setting tool.

2. Setting of Dump Setting Monitoring Function

Dump setting monitoring function is set as "Enable Monitoring" by default.
In case you change the setting so as no to monitor, open control panel and untick the checkbox of"Monitor the memory dump settings" of system tab.
In case you monitor, tick the checkbox.



Control Panel of NEC ESMPRO Agent [System]

The change of the setting about memory dump monitoring becomes valid after reboot of system.

3.21 Chassis Identification Function

NEC ESMPRO Agent Ver4.0 and its succeeding versions have Chassis Identification Function by IPMI.
By using Chassis Identification Function, you can identify the chassis which is operating on system using commonly display and keyboard/mouse for rack mounted machine and etc.

3.21-1 Function of chassis identification

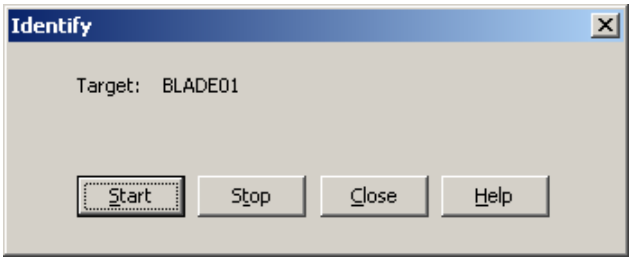
In IPMI compatible model, Chassis Identification Function can be performed from NEC ESMPRO Agent.
By Chassis Identification Function, you can identify operating chassis by chassis identification lamp and etc.

3.21-2 Operation of chassis identification

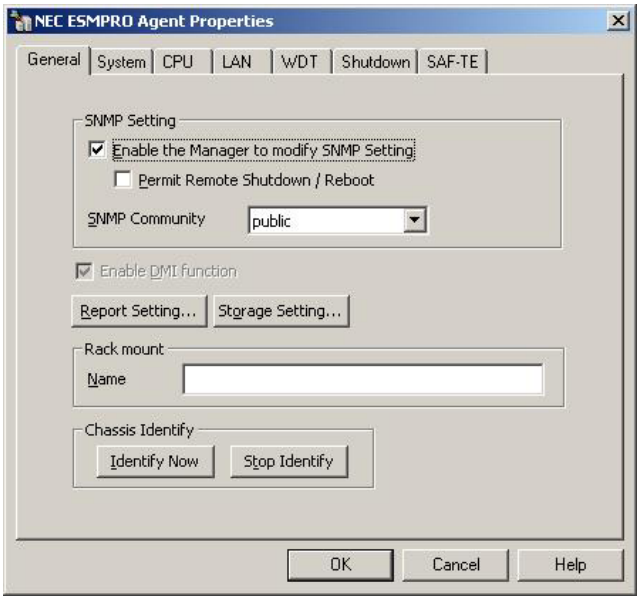
Describes how to use Chassis Identification Function.

1. Execution of chassis identification

Chassis Identification Function can be performed from Operation Window of NEC ESMPRO Manager and control panel of NEC ESMPRO Agent.
In case you identify chassis from Operation Window of Manager, select relevant server of Operation Window and right-click, and select [Identify] of menu.
For start of chassis identification, click "Start" button, for finishing of it, click "Stop"button.
In case you identify chassis from control panel of NEC ESMPRO Agent, open control panel and click "Identify Start"button of general tab.
For finishing it, click "Identify Close" button.



Chassis Identification of Manager



Control Panel of NEC ESMPRO Agent [General]