P3AM-7242-09ENZ0

ETERNUS Nagios® Plugin 1.7

User's Guide

FUJITSU

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Preface

The ETERNUS Nagios® Plugin (referred to as "ETERNUS Nagios Plugin" or "this plugin" in the remainder of this manual) is a plugin that is installed in a Fujitsu server (PRIMEQUEST or PRIMERGY) or non-Fujitsu servers to monitor the ETERNUS AF series All-Flash Arrays or the ETERNUS DX series Hybrid Storage Systems (hereinafter referred to as "ETERNUS AF/DX").
This manual provides an overview and explains how to use this plugin. In addition, refer to the manuals that are related to the ETERNUS AF/DX as necessary.

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About This Manual

Organization

This manual is composed of the following six chapters and an appendix.

- Chapter 1 ETERNUS Nagios Plugin

  This chapter provides an overview of the ETERNUS Nagios Plugin.

- Chapter 2 Installation

  This chapter explains how to install the ETERNUS Nagios Plugin.

- Chapter 3 Uninstallation

  This chapter explains how to uninstall the ETERNUS Nagios Plugin.

- Chapter 4 Display Specifications

  This chapter describes contents that are displayed with the ETERNUS Nagios Plugin.

- Chapter 5 Error Messages

  This chapter describes error messages from the ETERNUS Nagios Plugin.

- Chapter 6 Troubleshooting

  This chapter describes trouble shooting when errors occur in the ETERNUS Nagios Plugin.

"Plugin Help" is provided as an appendix.

Naming Conventions

Abbreviations Used in This Manual

- "ETERNUS AF/DX" refers to the ETERNUS AF series All-Flash Arrays or the ETERNUS DX series Hybrid Storage Systems that are supported by the ETERNUS Nagios Plugin.
  For details on which ETERNUS AF/DX storage systems are supported, refer to "1.3.1 Operating Environment" (page 13).
- "ETERNUS Web GUI" refers to the Web-based GUI management tool that is provided as standard with the ETERNUS AF/DX.
- "ETERNUS CLI" refers to the management tool of the Command Line Interface (CLI) that is provided as standard with the ETERNUS AF/DX.
- The command examples starting with "#" indicate that these commands must be executed by a user with an administrator account.
- The command examples starting with "$" indicate that these commands must be executed by a user account that operates Nagios.
- The screen examples appearing in this manual use Nagios Core screens.
- Trademark symbols such as ™ and ® are omitted in this manual.

Related Manuals

For additional information, refer to the following related manuals:

- ETERNUS Web GUI User's Guide
- ETERNUS CLI User's Guide

ETERNUS Nagios Plugin Updates

The following table shows the modifications for each ETERNUS Nagios Plugin version:

Version	Modifications
1.0.0 (April 2013)	First edition
1.1.0 (February 2014)	• Added support for the ETERNUS DX S3 series • Added the following monitoring functions: - Controller (CM) monitoring function - Host interface (CA) port monitoring function - Number of global hot spare disks monitoring function - Temperature monitoring function • Displayed the number of warnings and errors • Changed the default location to store the trace log files
1.2.0 (February 2015)	• Added support for the ETERNUS DX60 S3 • Added the following monitoring functions: - Power consumption monitoring function - Thin Provisioning Pool monitoring function - REC session monitoring function • Added an inventory data display • Reduced the number of available user accounts
1.3.0 (December 2015)	• Added support for the ETERNUS DX8700 S3/DX8900 S3 • Added the following monitoring function: - Performance monitoring function
1.4.0 (August 2017)	• Added support for SAS host interfaces (12Gbit/s) • Added the following monitoring functions: - System monitoring function - REC path monitoring function
1.5.0 (March 2018)	• Added support for FC host interfaces (32Gbit/s) • Added the following function: - The performance data function of the Nagios option
1.6.0 (December 2019)	• Added support for the ETERNUS AF S3 series and the ETERNUS DX S5 series • Added support for the ETERNUS DX8100 S4/DX8900 S4
1.6.1 (October 2021)	• Added support for Python 3
1.7.0 (May 2024)	• Added support for the ETERNUS DX S6 series

Table of Contents

List of Figures

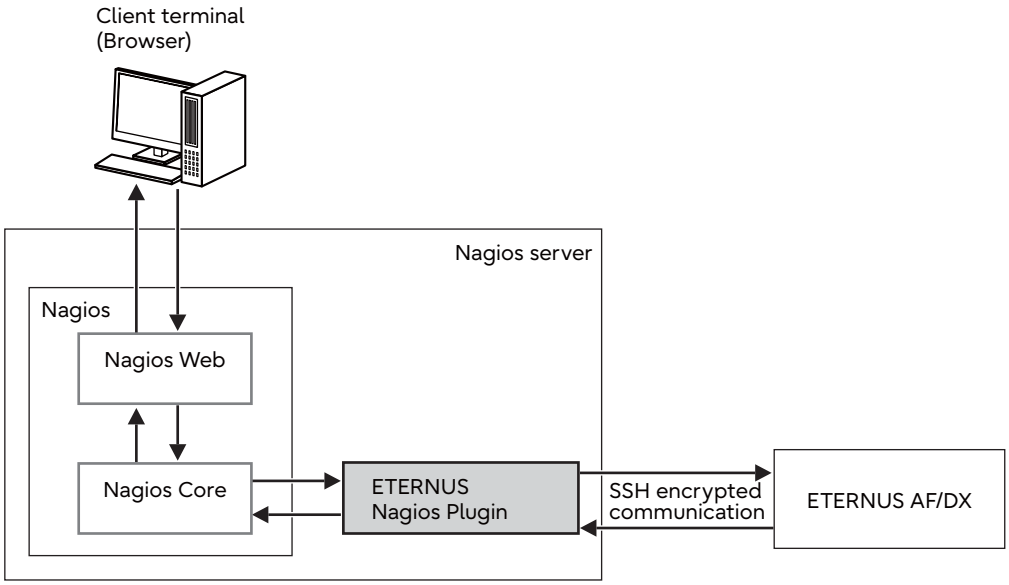
List of Tables

Chapter 1
ETERNUS Nagios Plugin

1.1 Overview

The ETERNUS Nagios Plugin operates with Nagios Core, which is open source application software. This plugin monitors the status of an ETERNUS AF/DX.

Figure 1.1 Overview of the ETERNUS Nagios Plugin



- Nagios server
  The Linux server in which Nagios operates.
- Nagios
  Open source application software that monitors computer systems and networks. Nagios is composed by Nagios Core and Nagios Web.
- Nagios Web
  A component that displays the web screen for Nagios.
- Nagios Core
  A component that provides basic functions for Nagios.
- ETERNUS Nagios Plugin
  The name of this plugin.

1.2 Available Functions

Monitoring functions linked with Nagios Core

The ETERNUS Nagios Plugin provides the following monitoring functions for the ETERNUS AF/DX that are linked with Nagios Core.

Table 1.1 Function of the ETERNUS Nagios Plugin

Function	Description
System monitoring	This function monitors the system status.
Disk drive monitoring	This function monitors the disk drive (*1) status.
RAID group monitoring (*2)	This function monitors the RAID group status.
Volume monitoring	This function monitors the volume status.
Controller Enclosure (CE) monitoring	This function monitors the CE status. In addition, this function displays the model name, the serial number, and the firmware version. **Caution** Note that the battery status cannot be monitored with the controller enclosure (CE) monitoring function.
Drive Enclosure (DE) monitoring	This function monitors the DE status.
Controller (CM) monitoring	This function monitors the CM status.
Host interface (CA) port monitoring	This function monitors the CA port status.
Monitoring of the number of global hot spare disks (*2)	This function monitors the number of global hot spare disks.
Temperature monitoring (*2)	This function monitors the internal temperature (*3) and the ambient temperature for CEs, and the ambient temperature for DEs.
Power consumption monitoring (*2)	This function monitors the power consumption.
Thin Provisioning Pool monitoring (*2)	This function monitors the usage ratio of the Thin Provisioning Pool capacity.
REC path monitoring	This function monitors the REC path status.
REC session monitoring	This function monitors the REC session status.
Performance monitoring (*2)	This function monitors the busy-rate (caused by the CM (*4), the disk drive, and the PFM (*5)) and the I/O response time (of the Host Read and the Host Write).

*1: Includes Solid State Drives (hereinafter referred to as SSD).
*2: The performance data of the Nagios option is also provided.
*3: Not available for the ETERNUS DX S2 series.
*4: Not available for the ETERNUS DX400 S2 series (not displayed properly).
*5: Only available for models in which the PFM is installed.

1.3 Operating Environment

1.3.1 Operating Environment

For information about the ETERNUS AF/DX storage systems and OSs that are supported by the ETERNUS Nagios Plugin, refer to the following URL:

https://www.fujitsu.com/global/support/products/computing/storage/download/nagios-plugin.html

Caution

If the ETERNUS DX8700 S3/DX8900 S3 is monitored using an ETERNUS Nagios Plugin version 1.2.0 or earlier, the ETERNUS DX8700 S3/DX8900 S3 may terminate abnormally.

1.3.2 Required Software Configurations

The following table shows the software configurations that are required to use the ETERNUS Nagios Plugin in a Nagios server.

Table 1.2 Software configurations

Software	Description
Nagios	The ETERNUS Nagios Plugin supports Nagios 3 and Nagios 4, as well as the Nagios Core that is included in Nagios XI. Make sure to use ETERNUS Nagios Plugins that can operate with the currently installed Nagios version.
Httpd	Httpd is a web server. It is recommended to use the Httpd that is provided with the OS.
ETERNUS Nagios Plugin	–
Python	Python is an object-oriented scripting language. The ETERNUS Nagios Plugin operates with version 3.8 or later. It is recommended to use the Python that is provided with the OS.
OpenSSH	OpenSSH is encrypted communication process software. It is recommended to use the OpenSSH that is provided with the OS.

1.4 Required Resources

This section lists the resources that are required in order to use the ETERNUS Nagios Plugin.

1.4.1 Required Disk Space for Installation

Table 1.3 Required disk space for installation

Usage	Required space	Directory
Program storing	1MB	/usr/local/nagios/libexec

1.4.2 Required Disk Space for Operation

Table 1.4 Required disk space for operation

Usage	Required space	Directory
Trace log	60MB (*1)	/tmp

*1: This value is the default setting.

1.4.3 Required Memory Space for Operation

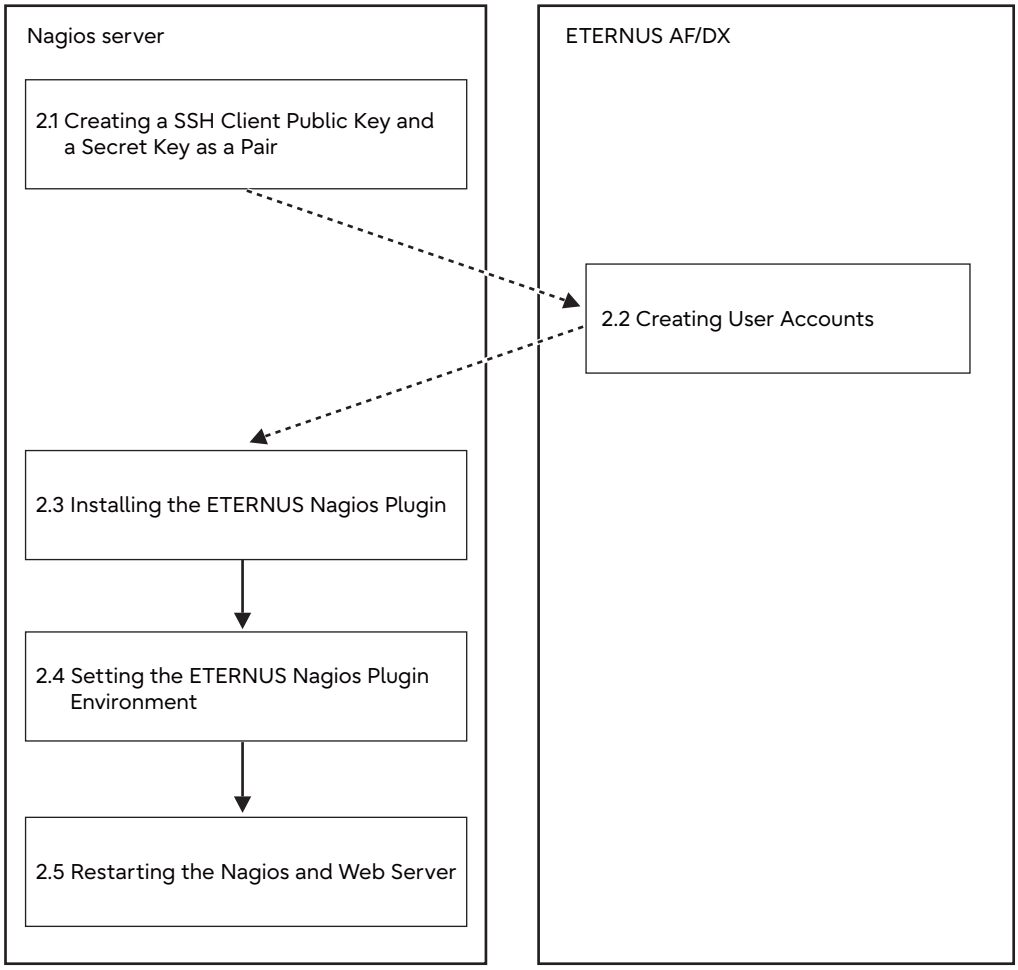
Table 1.5 Required memory space for operation

Usage	Required space	Directory
Program working area	40MB	–

Chapter 2
Installation

This section describes the installation workflow for the ETERNUS Nagios Plugin.

Figure 2.1 Installation workflow



To upgrade the ETERNUS Nagios Plugin, perform the procedure in "2.3 Installing the ETERNUS Nagios Plugin" (page 19).
To modify settings or to add a monitoring target, perform the required procedure in "2.4 Setting the ETERNUS Nagios Plugin Environment" (page 21).
After these settings are complete, perform the procedure in "2.5 Restarting the Nagios and Web Server" (page 31).

2.1 Creating a SSH Client Public Key and a Secret Key as a Pair

Create a SSH client public key and a secret key as a pair in the Nagios server. These keys can be created by using the "ssh-keygen" command of OpenSSH or by another method.
Note that a pair of keys (the SSH client public key and the secret key) must be created and registered in the Nagios server by using the user account that operates Nagios.

An example in which keys are created by using the "ssh-keygen" command is provided below. The public key type is "IETF style RSA for SSH v2".

(1) Create a SSH client public key and a secret key as a pair.

```
$ ssh-keygen -t rsa -N "" -f ~/.ssh/id_rsa
```

(2) Convert the SSH client public key to the IETF (RFC 4716) format.

```
$ ssh-keygen -e -f ~/.ssh/id_rsa.pub > ~/id_rsa.pub.ietf
```

(3) Register "id_rsa.pub.ietf" that is created in (2) as a SSH client public key by using the procedure in "2.2.1 Creating User Accounts" (page 17).

Refer to the manuals that can be viewed at the following URL for details on how to create keys with the "ssh-keygen" command for Open SSH.

https://www.openssh.com/manual.html

The ETERNUS AF/DX supports the public key types that are listed in the table below.

Table 2.1 Public key types

Public key types	Encryption level of public keys
OpenSSH style RSA for SSH v1 (*1)	Up to 4096 bits.
IETF style DSA for SSH v2	
IETF style RSA for SSH v2	

*1: SSH v1 is only supported by the ETERNUS DX S2 series.

To use the SSH v1 type public key, edit the OpenSSH setting file (/etc/ssh/ssh_config) as shown below.

```
Protocol 1
```

or

```
Protocol 1,2
```

2.2 Creating User Accounts

2.2.1 Creating User Accounts

Create the following user accounts for the monitoring target ETERNUS AF/DX. Register the SSH client public key at the same time.

Table 2.2 User account

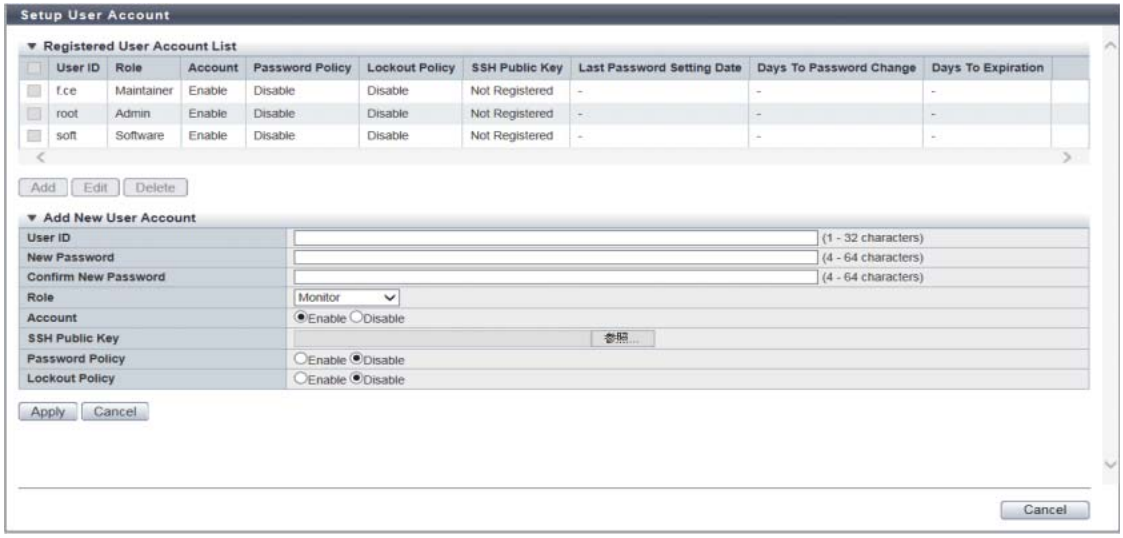
User account	User account name	Role	Registering public key is...	Remarks
User account 1	Any name	Software	Required	This account is specified as the "--user" parameter of the ETERNUS Nagios Plugin.
User account 2 (*1)	Any name	Any role except the Software role Note that this account requires the Status Display policy. The following default roles have the Status Display policy. • Monitor • Admin • StorageAdmin • SecurityAdmin • Maintainer	Required	This account is specified as the "--user2" parameter of the ETERNUS Nagios Plugin.

*1: The ETERNUS AF/DX models and firmware versions that require user account 2 are as follows.

ETERNUS AF/DX	Firmware version
ETERNUS DX100 S3/DX200 S3	Up to and including V10L2x
ETERNUS DX500 S3/DX600 S3	Up to and including V10L2x
ETERNUS DX80 S2/DX90 S2	All versions
ETERNUS DX400 S2 series	All versions
ETERNUS DX8000 S2 series	All versions

To register the user accounts, use ETERNUS Web GUI or ETERNUS CLI. For details on user accounts and how to register them, refer to the ETERNUS AF/DX manuals.
The following screen shot shows the "Setup User Account" screen of ETERNUS Web GUI.

Figure 2.2 "Setup User Account" screen of ETERNUS Web GUI



2.2.2 Verifying Connection with the ETERNUS AF/DX

Confirm that the communication by using the SSH client public key is performed between the Nagios server and the ETERNUS AF/DX.
Make sure to connect to the ETERNUS AF/DX from the Nagios server, and enter "yes" (continue connecting) when the confirmation message is displayed.
Note that this operation must be performed by using the user account that operates Nagios.

Example:
Use the "ssh" command in the terminal device and connect to the ETERNUS AF/DX.

ETERNUS AF/DX information

IP address: 192.168.0.6

User name: nagios-user

```
$ ssh nagios-user@192.168.0.6
The authenticity of host '192.168.0.6(192.168.0.6)' can't be established.
DSA key fingerprint is XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX.
Are you sure you want to continue connecting (yes/no)?  (input yes)
ETERNUS login is required. [2013-03-XX XX:XX:XX]
CLI>
```

Execute the same command again. Confirm that the logging in to the ETERNUS AF/DX is complete without displaying the confirmation message.

```
$ ssh nagios-user@192.168.0.6
ETERNUS login is required. [2013-03-XX XX:XX:XX]
CLI>
```

Confirm that the ETERNUS AF/DX does not request for a password for the user account that is used. If the entering of a password is requested, the SSH client public key and the secret key may have been incorrectly set. Check the SSH client public key and the secret key settings again.

2.3 Installing the ETERNUS Nagios Plugin

Install the ETERNUS Nagios Plugin in the Nagios server.

Procedure

1 Obtain the package

Obtain the ETERNUS Nagios Plugin package and copy the data into the work directory (such as "/tmp") of the Nagios server.

Example:

```
$ cp -p check_fujitsu_eternus_dx-X.X.X.tgz /tmp
```

Caution

Replace the "X.X.X" part with the version number that is actually being used before executing the operation.

2 Extract the package

Use the "tar" command to extract the ETERNUS Nagios Plugin package.

Note that the ETERNUS Nagios Plugin package includes the following directory structure:
./fujitsu/ServerViewSuite/nagios/plugin
Example:

```
$ cd /tmp
$ tar zxvf check_fujitsu_eternus_dx-X.X.X.tgz
```

Caution

Replace the "X.X.X" part with the version number that is actually being used before executing the operation.

The following files are extracted:

- check_fujitsu_eternus_dx.pyc.3.8 (for Python3.8)
- check_fujitsu_eternus_dx.pyc.3.9 (for Python3.9)
- check_fujitsu_eternus_dx.pyc.3.10 (for Python3.10)
- check_fujitsu_eternus_dx.pyc.3.11 (for Python3.11)
- check_fujitsu_eternus_dx.pyc.3.12 (for Python3.12)

3 Allocate the executable file

Allocate the extracted executable file in the predefined directory.
The file that is to be used depends on the Python version.

Executable file: check_fujitsu_eternus_dx.pyc
Allocated directory: ETERNUS Nagios Plugin directory
(Example) /usr/local/nagios/libexec

Example (when using Phython 3.8):

```
$ cp
-p ./fujitsu/ServerViewSuite/nagios/plugin/check_fujitsu_eternus_dx.pyc.3.8
/usr/local/nagios/libexec/check_fujitsu_eternus_dx.pyc
```

4 Set the access authority for the file

Specify a user, a group, and an access authority for the executable format file.
For the user and the group, specify the Nagios user as well as the group to which the user belongs.
For the access authority, specify read-only.

Example (when specifying "nagios" as a user, "nagios" for a group, and "444" (read-only) for an access authority.):

```
$ chown nagios /usr/local/nagios/libexec/check_fujitsu_eternus_dx.pyc
$ chgrp nagios /usr/local/nagios/libexec/check_fujitsu_eternus_dx.pyc
$ chmod 444 /usr/local/nagios/libexec/check_fujitsu_eternus_dx.pyc
```

End of procedure

2.4 Setting the ETERNUS Nagios Plugin Environment

Perform the environment settings for the monitoring target ETERNUS AF/DX.

Caution

Make sure to record the configuration before and after any environment settings are added or changed. In addition, make sure to record what was added. This information is required if the ETERNUS Nagios Plugin needs to be uninstalled.

The following tables shows the files that need to be changed and the setting contents.

- Monitoring definition file

File name	(Any name) In this section, "eternus.cfg" is used as the example setting.
Installation directory	Object definition directory for Nagios Example: /usr/local/nagios/etc/objects
Setting contents	• Target ETERNUS AF/DX information that is to be monitored • Monitoring contents of the ETERNUS AF/DX that is to be monitored • Command information settings

- Nagios definition file

File name	nagios.cfg
Installation directory	Definition directory for Nagios Example: /usr/local/nagios/etc
Setting contents	Monitoring definition file that is used by Nagios Core

2.4.1 Defining the Command Information

Define the command information to execute the ETERNUS Nagios Plugin. Specify the "command_name" and "command_line" for the command information.

Template

The example below shows the template that is used to specify the "command_name" and "command_line" for the command information.

Edit target file: monitoring definition file (eternus.cfg)

When using user account 1 only

```
# ETERNUS definition check_command
define command{
       command_name    check_fujitsu_eternus_dx
       command_line    /usr/bin/python $USER1$/check_fujitsu_eternus_dx.pyc
       --host=$HOSTADDRESS$ --port=$_HOSTPORT$ --user=XXXX --verbose=Z $ARG1$
}
```

When using user accounts 1 and 2

```
# ETERNUS definition check_command
define command{
       command_name    check_fujitsu_eternus_dx
       command_line    /usr/bin/python $USER1$/check_fujitsu_eternus_dx.pyc
      --host=$HOSTADDRESS$ --port=$_HOSTPORT$ --user=XXXX --user2=YYYY --verbose=Z
$ARG1$
}
```

To use this template, replace the "XXXX", "YYYY", and "Z" values with the actual information. Make sure to change the "$_HOSTETERNUS_USER$", "$_HOSTETERNUS_USER2$", and "$_HOSTETERNUS_OPTIONS$" values with the actual information.
Since the Nagios automatically sets "$USER1$" and "$HOSTADDRESS$" in the template, do not change these values. If the default SSH port number "22" is used, the "--port=$_HOSTPORT$" setting can be omitted from the template. If the default SSH port number is not used, define the "_port 922" value for "host" in the monitoring definition file. Since Nagios automatically sets the "--port=$_HOSTPORT$" value in the template, do not change it.
Do not insert a line break in the "command_name" or "command_line" definition.
The template above is described in the top line of the monitoring definition file.

For details on specifying the actual information for each parameter, refer to "Parameters for the command information definition" (page 22).

Whether user account 2 is required depends on the ETERNUS AF/DX model and the firmware version. Refer to "2.2.1 Creating User Accounts" (page 17).

If the "When using user account 1 only" template and the "When using user accounts 1 and 2" template are used at the same time, make sure the setting for "command_name" is not a duplicate.

Parameters for the command information definition

The following parameters need to be specified for the command information definition.

- Host setting

Parameter	Setting contents and special instructions
--host	Specify the host name or the IP address of the ETERNUS AF/DX that is to be monitored with this parameter. In the template, this parameter is indicated by "$HOSTADDRESS$" and Nagios performs the setting automatically.
--port	Specify the SSH port number of the ETERNUS AF/DX that is to be monitored with this parameter. Port number "22" is used if this parameter is omitted or the specified value is not in the range between 0 and 65535. In the template, this parameter is indicated by "$_HOSTPORT$", and Nagios performs the setting automatically depending on the "_port" value of the host in the monitoring definition file.

- User setting

Parameter	Setting contents and special instructions
--user	Specify user account 1. This parameter is indicated by "$_HOSTETERNUS_USER$" in the template.
--user2	Specify user account 2. This parameter is indicated by "$_HOSTETERNUS_USER2$" in the template.

- Display mode setting

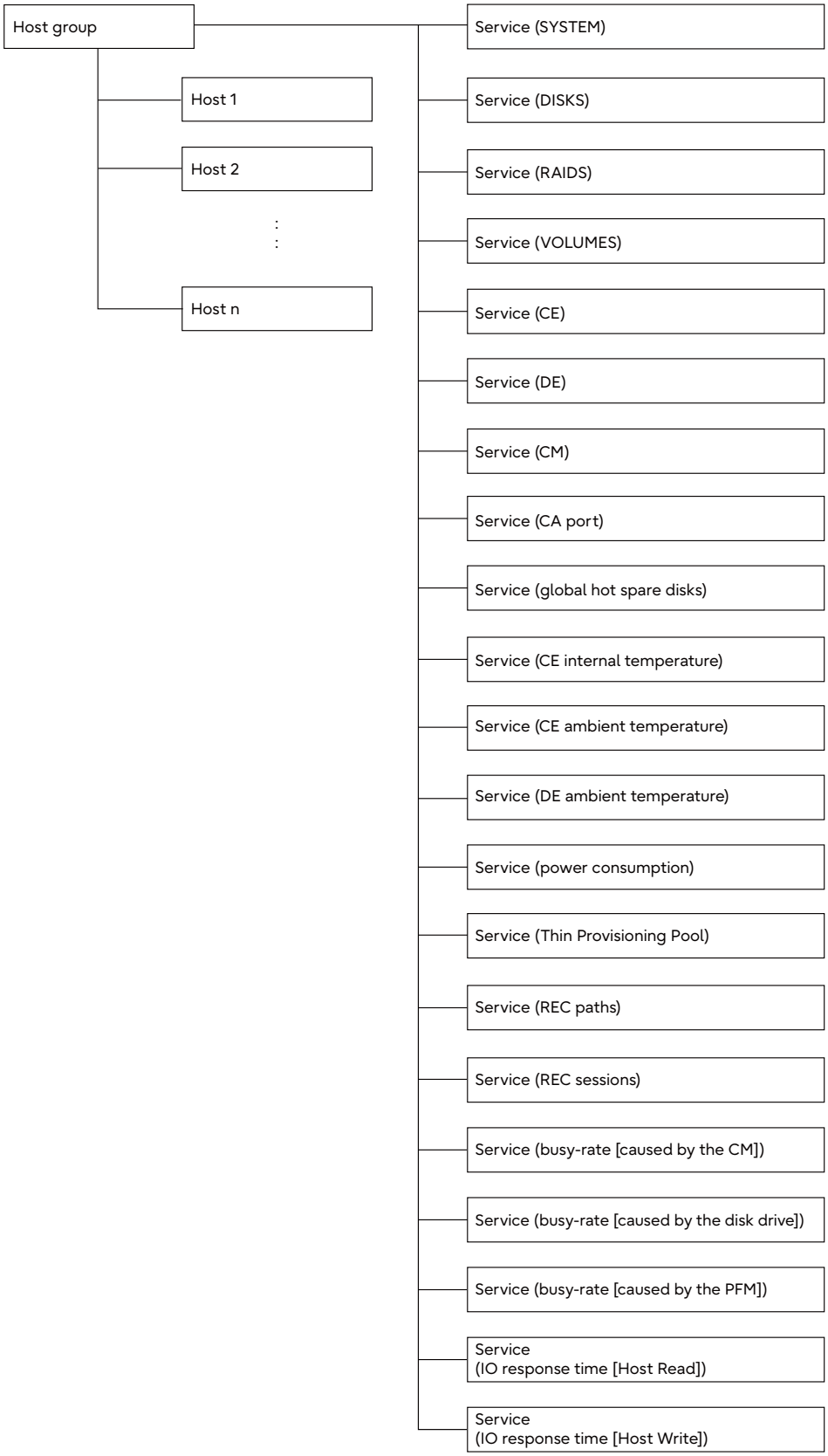
Parameter	Setting contents and special instructions
--verbose	Specify one of the following display modes. This parameter is indicated by "$_HOSTETERNUS_OPTIONS$" in the template. • 1 (general mode) • 2 (detail mode) Refer to "4.1 Nagios Display" (page 35) for details. When this parameter is omitted, "1" is used.

2.4.2 Defining the Monitoring Contents

Specify the ETERNUS AF/DX information and monitoring contents.

- Host group
  To classify ETERNUS AF/DX storage systems, specify the group information. Note that this setting is required even if only a single ETERNUS AF/DX is used.
- Host
  Specify the storage system names for the ETERNUS AF/DX storage systems (or the host names on the operation management LAN) or the IP addresses.
- Service
  Specify the monitoring contents.

Figure 2.3 Definitional structure of the monitoring contents



Template

The following example shows the template that is used for the monitoring contents definition. The setting information is shown below.

Edit target file: monitoring definition file (eternus.cfg)

```
# ETERNUS definition template - This is NOT a real host, just a template!
define host{
        name                    ETERNUS-host
        use                     generic-host
        max_check_attempts      10
        check_command           check-host-alive
        contact_groups          admins
        register                0
}
define service{
        name                    ETERNUS-service
        use                     local-service
        register                0
}
# ETERNUS definitions
define hostgroup{
        hostgroup_name          Fujitsu-ETERNUS
        register                1
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     SYSTEM
        check_command           check_fujitsu_eternus_dx!--chksystem
}

define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     DISKS
        check_command           check_fujitsu_eternus_dx!--chkdisks
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     RAIDS
        check_command           check_fujitsu_eternus_dx!--chkraids
                                        --warning=N1 --critical=M1 --performance=P
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     VOLUMES
        check_command           check_fujitsu_eternus_dx!--chkvolumes
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     CE
        check_command           check_fujitsu_eternus_dx!--chkce
}
```

```
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     DE
        check_command           check_fujitsu_eternus_dx!--chkde
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     CM
        check_command           check_fujitsu_eternus_dx!--chkcm
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     CA-Port
        check_command           check_fujitsu_eternus_dx!--chkcaport
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     SpareDISKS
        check_command           check_fujitsu_eternus_dx!--chksparedisks
                                        --warning=N2 --critical=M2 --performance=P
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     CE-Temp
        check_command           check_fujitsu_eternus_dx!--chkcetemp
                                 --warning=N3 --critical=M3 --performance=P --uom=U
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     CE-IntakeTemp
        check_command           check_fujitsu_eternus_dx!--chkceintaketemp
                                 --warning=N4 --critical=M4 --performance=P --uom=U

}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     DE-IntakeTemp
        check_command           check_fujitsu_eternus_dx!--chkdeintaketemp
                                 --warning=N5 --critical=M5 --performance=P --uom=U
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     Power
        check_command           check_fujitsu_eternus_dx!--chkpower
                                 --warning=N6 --critical=M6 --performance=P --uom=U
}
```

```
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     ThinProPool
        check_command           check_fujitsu_eternus_dx!--chkthinpropools
                                        --warning=N1 --critical=M1 --performance=P
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     REC-Path (Arbitrary identifier)
        check_command           check_fujitsu_eternus_dx!--chkrecpaths
                                                        --remoteboxid=BBBBBBBB1
}
#When monitoring multiple destination storage systems using the REC path monitoring function,
#define the define service for each destination storage system to be monitored.
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     REC-Path (Arbitrary identifier)
        check_command           check_fujitsu_eternus_dx!--chkrecpaths
                                                        --remoteboxid=BBBBBBBB2
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     REC-Session
        check_command           check_fujitsu_eternus_dx!--chkrecsessions
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     CM-BusyRate
        check_command           check_fujitsu_eternus_dx!--chkcmbusyrate
                                        --warning=N7 --critical=M7 --performance=P
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     DISK-BusyRate
        check_command           check_fujitsu_eternus_dx!--chkdiskbusyrate
                                        --warning=N7 --critical=M7 --performance=P
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     PFM-BusyRate
        check_command           check_fujitsu_eternus_dx!--chkpfmbusyrate
                                        --warning=N7 --critical=M7 --performance=P
}
```

```
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     VOL-Read-ResTime
        check_command           check_fujitsu_eternus_dx!--chkvolreadrestime
                                 --warning=N8 --critical=M8 --performance=P --uom=U
}
define service{
        hostgroup_name          Fujitsu-ETERNUS
        use                     ETERNUS-service
        service_description     VOL-Write-ResTime
        check_command           check_fujitsu_eternus_dx!--chkvolwriterestime
                                 --warning=N8 --critical=M8 --performance=P --uom=U
}
```

Note

Do not insert a line break in the "check_command" definition.

Define the following information.

warning
: The warning threshold for displaying the monitoring target component.
In this template, "N1", "N2", "N3", "N4", "N5", "N6", "N7", and "N8" are used.

critical
: The error threshold for displaying the monitoring target component.
In this template, "M1", "M2", "M3", "M4", "M5", "M6", "M7", and "M8" are used.

For example, specify the following parameters:

N1=75, M1=85
: When the usage ratio of the RAID group/Thin Provisioning Pool capacity is 75% or more, "warning" is displayed.
When the usage ratio of the RAID group/Thin Provisioning Pool capacity is 85% or more, "critical" is displayed.

N2=2, M2=0
: When the number of hot spare disks is 2 or less, "warning" is displayed.
When the number of hot spare disks is 0, "critical" is displayed.

N3=70, M3=75
: When the CE internal temperature is 70°C or more, "warning" is displayed.
When the CE internal temperature is 75°C or more, "critical" is displayed.

N4=45, M4=50
: When the CE ambient temperature is 45°C or more, "warning" is displayed.
When the CE ambient temperature is 50°C or more, "critical" is displayed.

N5=53, M5=60
: When the DE ambient temperature is 53°C or more, "warning" is displayed.
When the DE ambient temperature is 60°C or more, "critical" is displayed.

N6=1800, M6=2000
: When the total power consumption is 1800W or more, "warning" is displayed.
When the total power consumption is 2000W or more, "critical" is displayed.

N7=80, M7=90
: When the busy-rate is 80% or more, "warning" is displayed.
When the busy-rate is 90% or more, "critical" is displayed.

N8=500, M8=750
When the response time is 500msec or more, "warning" is displayed.
When the response time is 750msec or more, "critical" is displayed.

performance
Specify one of the following performance modes.
This parameter is indicated by "P" in the template.
- 0 (suppression mode)
- 1 (simple mode)
- 2 (detail mode)

Refer to "4.1 Nagios Display" (page 35) for details.
When this parameter is omitted, "0" is used.

uom
Specify one of the following modes for displaying the unit of measure.
This parameter is indicated by "U" in the template.
- 0 (default mode)
- 1 (full mode)

Refer to "Performance data" (page 39) in "4.2 Output Items" for details.
When this parameter is omitted, "0" is used.

remoteboxid
Specify the Box ID of the destination storage system on the path to be monitored using the REC path monitoring function.
"BBBBBBBB1" and "BBBBBBBB2" are used as example "remoteboxid" values in this template.

(Arbitrary identifier)
Specify an arbitrary identifier for the path to be monitored using the REC path monitoring function.
Specify an arbitrary identifier for "service_description" after "REC-Path" because "define service" for each destination storage system to be monitored must be defined when monitoring multiple destination storage systems using the REC path monitoring function.
(For example, specify a storage system name after ":" as follows.)
service_description REC-Path: ETERNUS#01

Use the template below and define the information for each ETERNUS AF/DX.

Edit target file: monitoring definition file (eternus.cfg)

```
define host{
        use                     ETERNUS-host
        host_name               AAAAAAAA
        address                 XXX.XXX.XXX.XXX
        _port                   NNN
        hostgroups              Fujitsu-ETERNUS
}
```

Define the following information.

host_name
Specify the storage system name (or the host name on the operation management LAN) for the ETERNUS AF/DX storage systems.
"AAAAAAAA" is used as example "host_name" values in this template.

address
Specify the IP address for the ETERNUS AF/DX on the operation management LAN.
"XXX.XXX.XXX.XXX" is used as an example "address" value in this template.

_port
Specify the SSH port number for the ETERNUS AF/DX operation management.
"NNN" is used as an example "_port" value in this template.

For details on specifying the actual information for each parameter in "check_command", refer to "Parameters for the monitoring contents definition" (page 30).
Note that the "service" and "host" settings in the template above define the smallest information for executing the ETERNUS Nagios Plugin. Add the appropriate values according to the required monitoring operations.

Parameters for the monitoring contents definition

The following parameters need to be specified for the monitoring contents definition.

Parameter	Setting contents
--chksystem	Specify this parameter to monitor systems.
--chkdisks	Specify this parameter to monitor disk drives.
--chkraids	Specify this parameter to monitor RAID groups.
--chkvolumes	Specify this parameter to monitor volumes.
--chkce	Specify this parameter to monitor the Controller Enclosure (CE).
--chkde	Specify this parameter to monitor Drive Enclosures (DE).
--chkcm	Specify this parameter to monitor Controllers (CM).
--chkcaport	Specify this parameter to monitor Host Adapter (CA) ports.
--chksparedisks	Specify this parameter to monitor the number of global hot spare disks.
--chkcetemp	Specify this parameter to monitor the internal temperature of the Controller Enclosure (CE).
--chkceintaketemp or --chkceambienttemp	Specify this parameter to monitor the ambient temperature of Controller Enclosure (CE).
--chkdeintaketemp or --chkdeambienttemp --chkdeintaketemp10 or --chkdeambienttemp10	Specify this parameter to monitor the ambient temperature of Drive Enclosures (DE). "--chkdeintaketemp10" is used to monitor the following ETERNUS AF/DX storage systems. • ETERNUS DX80 S2/DX90 S2 • ETERNUS DX400 S2 series • ETERNUS DX8000 S2 series
--chkpower	Specify this parameter to monitor the total power consumption.
--chkthinpropools	Specify this parameter to monitor the usage ratio of the Thin Provisioning Pool capacity.
--chkrecpaths	Specify this parameter to monitor REC paths.
--chkrecsessions	Specify this parameter to monitor REC sessions.
--chkcmbusyrate	Specify this parameter to monitor the busy-rate that is caused by the CM.
--chkdiskbusyrate	Specify this parameter to monitor the busy-rate that is caused by the disk drive.
--chkpfmbusyrate	Specify this parameter to monitor the busy-rate that is caused by the PFM.
--chkvolreadrestime	Specify this parameter to monitor the IO response time (Host Read).
--chkvolwriterestime	Specify this parameter to monitor the IO response time (Host Write).

2.4.3 Editing a Nagios Definition File

Edit the Nagios definition file and specify the monitoring definition by using the ETERNUS Nagios Plugin in Nagios.

Template

The figure below shows the template that is used for the Nagios definition file.

Edit target file: Nagios definition file (nagios.cfg)

```
# Definitions for monitoring a Fujitsu ETERNUS Storage
cfg_file=/usr/local/nagios/etc/objects/XXXXXXXX
```

Make sure to change "XXXXXXXX" with the monitoring definition file name (example: eternus.cfg) that was created in "2.4.1 Defining the Command Information" (page 21) or "2.4.2 Defining the Monitoring Contents" (page 23).

Add the template above in the "OBJECT CONFIGRATION FILE (S)" section of the Nagios definition file.

2.4.4 Confirming Settings

Execute the following command to confirm the setting contents.

```
$ /usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg
```

Caution

If an error exists or items are duplicated in the edited setting files, check the displayed error contents and modify the parameters accordingly.

2.5 Restarting the Nagios and Web Server

Execute the following command to restart the Nagios and Web server.

```
# service httpd stop
# service nagios restart
# service httpd start
```

2.6 Setting a Trace Log

The ETERNUS Nagios Plugin creates a trace log to output the information during operation of the program.
Some customization of the trace log such as the storage location can be performed by using the setting file.
If no setting files are created, the default settings are used.

- Setting file

File name	check_fujitsu_eternus_dx.cfg
Installation directory	Nagios Plugin directory Example: /usr/local/nagios/libexec

- Setting contents of the setting file

Section	Setting items	Setting contents (allowed input)	Default value
tracefile	path	Specify the absolute path in which the trace log is stored.	/tmp/check_fujitsu_eternus_dx.log
	level	Specify the information level that is output in the trace log. Note that smaller values output more details. 50 (CRITICAL) 40 (ERROR) 30 (WARNING) 20 (INFO) 10 (DEBUG) 0 (NOTSET)	20 (INFO)
	format	Specify the information that is output in the trace log. Multiple parameters can be specified by separating them with a comma. %(asctime)s: File creation date (date) %(created)f: File creation date (floating-point number) %(filename)s: File name %(funcName)s: Function name (Python 2.5 or later) %(levelname)s: Message logging level %(levelno)s: Numeric logging level %(lineno)d: Source line number %(module)s: File name (without an extension) %(msecs)d: Milliseconds for the file creation date %(message)s: Message %(name)s: Logger name %(pathname)s: Complete path of the file %(process)d: Process ID %(relativeCreated)d: Relative milliseconds %(thread)d: Thread ID %(threadName)s: Thread name	%(asctime)s, %(levelname)s, %(process)d, %(thread)d, %(module)s, %(lineno)d, %(message)s
	maxbytes	Specify the byte count that is output in the trace log file (up to 10MB).	10240000 (bytes)

Section	Setting items	Setting contents (allowed input)	Default value
tracefile	backupcount	Specify the number of file generations that is to be created with numeric characters. 0: No generation files are created. 1 – 10: The specified number of generation files is created.	5: Five generation files are created.
	maxwaitseconds	Specify the maximum number of seconds to wait for the exclusive control of the trace logs.	30

- Setting example of the setting file

```
[tracefile]
path=/var/tmp/nagios/check_fujitsu_eternus_dx.log
level=10
format=%(asctime)s,%(process)d,%(levelname)s,%(module)s,%(lineno)d,%(message)s
maxbytes=1048576
backupcount=10
maxwaitseconds=60
```

The first line of the example above cannot be omitted. This line specifies the section.
Specify setting items described from the second line onward as required.
The specified parameters are automatically enabled after the parameters are saved in the setting files. No extra operations such as rebooting are required.

Chapter 3
Uninstallation

This chapter describes how to uninstall the ETERNUS Nagios Plugin.

The procedure to uninstall the ETERNUS Nagios Plugin is described below.

Procedure

1 Restore the default settings

Restore any settings that were changed or added as described in "Chapter 2 Installation" (page 15) to their default values (the settings before installation of the ETERNUS Nagios Plugin).

2 Confirm the settings

Execute the Nagios command to confirm the setting contents as shown below.

```
$ /usr/local/nagios/bin/nagios -v /usr/local/nagios/etc/nagios.cfg
```

3 Restart the Nagios and Web server

Execute the following command to restart the Nagios and Web server.

```
# service httpd stop
# service nagios restart
# service httpd start
```

End of procedure

Caution

- If an error exists or items are duplicated in the edited setting files, check the displayed error contents and modify the parameters accordingly.
- Delete any executable files that were allocated while performing the procedure in "2.3 Installing the ETERNUS Nagios Plugin" (page 19) and trace the logs that are displayed in "2.6 Setting a Trace Log" (page 32) if required.

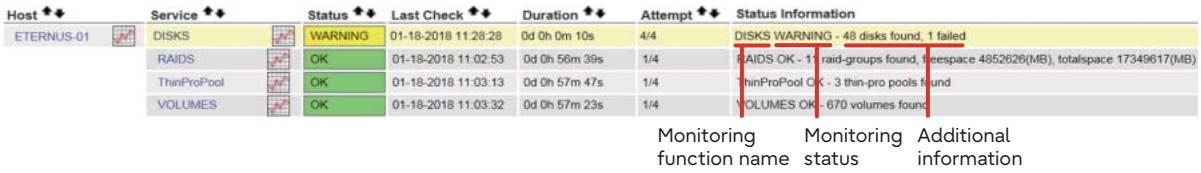
Chapter 4
Display Specifications

This chapter describes display contents in the Nagios screen by the ETERNUS Nagios Plugin.

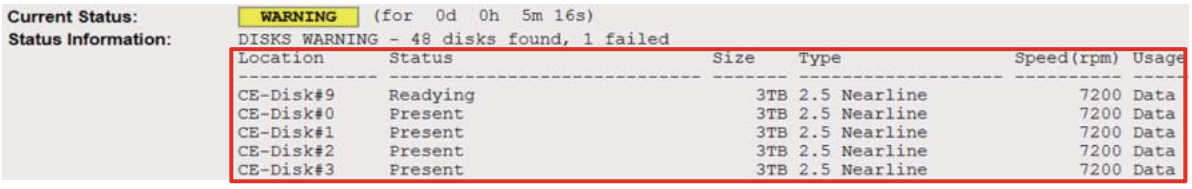
4.1 Nagios Display

The following figure shows the monitoring result of the ETERNUS AF/DX in the Nagios screen.

An overview of the status is displayed in the "Status Information" field in the service list.
The monitoring function name, the monitoring status, and additional information are displayed.

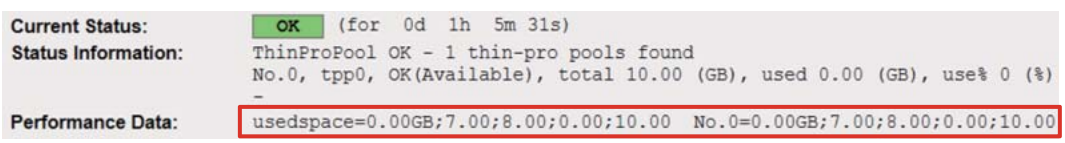


When the monitoring status is not "OK", clicking the monitoring contents in the "Service" field in the service list displays the following detailed information.



- When the display mode is "1 (general mode)"
  A summary of the monitoring information and monitoring contents with an error is displayed.
- When the display mode is "2 (detail mode)"
  A summary of the monitoring information and all of the monitoring contents is displayed.

Clicking the monitoring contents in the "Service" column in the service list displays the following performance data.



Caution

The maximum output length for the monitoring result in the "Status Information" field is 8KB. Note that some monitoring results are not displayed. Whether or not the results are displayed depends on the defined monitoring contents.

4.2 Output Items

This section describes the monitoring function name, the monitoring status, the additional information, and the performance data that are output from the ETERNUS Nagios Plugin.

- Monitoring function name
  How the monitoring function names for the ETERNUS AF/DX are displayed is shown in the following table.

Monitoring function name	Display contents
System monitoring	SYSTEM
Disk drive monitoring	DISKS
RAID group monitoring	RAIDS
Volume monitoring	VOLUMES
Controller Enclosure (CE) monitoring	CE
Drive Enclosure (DE) monitoring	DE
Controller (CM) monitoring	CM
Host interface (CA) port monitoring	CA-Port
Monitoring of the number of global hot spare disks	SpareDISKS
Temperature monitoring (internal temperature of the CE)	CE-Temp
Temperature monitoring (ambient temperature of the CE)	CE-IntakeTemp/CE-AmbientTemp
Temperature monitoring (ambient temperature of DEs)	DE-IntakeTemp/DE-AmbientTemp
Power consumption monitoring	Power
Thin Provisioning Pool monitoring	ThinProPool
REC path monitoring	REC-Path
REC session monitoring	REC-Session
Busy-rate (caused by the CM)	CM-BusyRate
Busy-rate (caused by the disk drive)	DISK-BusyRate
Busy-rate (caused by the PFM)	PFM-BusyRate
IO response time (Host Read)	VOL-Read-ResTime
IO response time (Host Write)	VOL-Write-ResTime

- Monitoring status
  The following four monitoring statuses of the ETERNUS AF/DX are displayed.

Monitoring status	Display contents	Status and meanings
Normal	OK	The monitoring target component is in normal status.
Warning (*1)	WARNING	The monitoring target component is in warning status. Check the Status Information field for details.
Error	CRITICAL	The monitoring target component is in error status. Check the Status Information field for details.
Unknown	UNKNOWN	The monitoring target information cannot be obtained. Check the ETERNUS AF/DX.

*1: A monitored item with "Maintenance in Progress" in ETERNUS Web GUI is displayed as "WARNING" in the ETERNUS Nagios Plugin.

- Additional information
  The additional information for the ETERNUS AF/DX monitoring component is displayed.

Monitoring function name	Additional information	
System monitoring	(Normal)	None
	(Warning/ Error)	None
Disk drive monitoring	(Normal)	"*n* disks found"
	(Warning/ Error)	"*n* disks found, *m* failed"
	n: Number of disk drives *m*: Number of disk drives in which a warning or an error is detected	
RAID group monitoring	(Normal)	"*n* raid-groups found, freespace *p* (MB), totalspace *q* (MB)"
	(Warning/ Error)	"*n* raid-groups found, *m* failed, freespace *p* (MB), totalspace *q* (MB)"
	n: Number of RAID groups *m*: Number of RAID groups in which a warning or an error is detected *p*: Total unused space for all the RAID groups *q*: Total space for all the RAID groups	
Volume monitoring	(Normal)	"*n* volumes found"
	(Warning/ Error)	"*n* volumes found, *m* failed"
	n: Number of volumes *m*: Number of volumes in which a warning or an error is detected	
Controller Enclosure (CE) monitoring	(Normal)	Depending on the model of ETERNUS AF/ DX, the information is displayed with one of the following formats. "Model:*xxx*, Serial Number:*yyy*, Firmware Version:*zzz*" "*n* CEs found, Model:*xxx*, Serial Number:*yyy*, Firmware Version:*zzz*"
	(Warning/ Error)	Depending on the model of ETERNUS AF/ DX, the information is displayed with one of the following formats. "Model:*xxx*, Serial Number:*yyy*, Firmware Version:*zzz*" "*n* CEs found, *m* failed, Model:*xxx*, Serial Number:*yyy*, Firmware Version:*zzz*"
	n: Number of CEs *m*: Number of CEs in which a warning or an error is detected *xxx*: Model name *yyy*: Serial number *zzz*: Firmware version	

Monitoring function name	Additional information	
Drive Enclosure (DE) monitoring	(Normal)	"*n* DEs found"
	(Warning/ Error)	"*n* DEs found, *m* failed"
	n: Number of DEs *m*: Number of DEs in which a warning or an error is detected	
Controller (CM) monitoring	(Normal)	"*n* CMs found"
	(Warning/ Error)	"*n* CMs found, *m* failed"
	n: Number of CMs *m*: Number of CMs in which a warning or an error is detected	
Host interface (CA) port monitoring	(Normal)	"*n* ca-ports found"
	(Warning/ Error)	"*n* ca-ports found, *m* failed"
	n: Number of CA ports *m*: Number of CA ports in which a warning or an error is detected	
Monitoring of the number of global hot spare disks	(Normal/ Warning/ Error)	"*n* spare-disks found, *m* unused"
	n: Number of global hot spare disks *m*: Number of unused global hot spare disks	
Temperature monitoring	(Normal/ Warning/ Error)	"*n* (C)"
	n: Celsius thermometer	
Power consumption monitoring	(Normal/ Warning/ Error)	"*n* (Watt)"
	n: Power consumption	
Thin Provisioning Pool monitoring	(Normal)	"*n* thin-pro pools found"
	(Warning/ Error)	"*n* thin-pro pools found, *m* failed "
	n: Number of Thin Provisioning Pools *m*: Number of Thin Provisioning Pools in which a warning or an error is detected	
REC path monitoring	(Normal)	"*n* rec-paths found"
	(Warning/ Error)	"*n* rec-paths found, *m* failed"
	n: Number of REC paths *m*: Number of REC paths in which a warning or an error is detected	

Monitoring function name	Additional information	
REC session monitoring	(Normal)	"*n* rec-sessions found"
	(Warning/ Error)	"*n* rec-sessions found, *m* failed"
	n: Number of REC sessions *m*: Number of REC sessions in which a warning or an error is detected	
Busy-rate monitoring	(Normal/ Warning/ Error)	"*n* (%)"
	n: Highest value for busy-rate	
IO response time monitoring	(Normal/ Warning/ Error)	"*n* (msec)"
	n: Highest value for IO response time	

- Performance data
  The performance data for components of the ETERNUS AF/DX is displayed.

Function Name	Mode	Description/Format
RAID group	Simple mode	The total capacity of the RAID groups in an ETERNUS AF/DX is displayed. usedspace=*xxxx*MB;*wwww*,*cccc*;0;*yyyy* *xxxx*: Total used capacity of all RAID groups *wwww*: Specified warning threshold (The result of "Total capacity of all RAID groups" multiplied by the warning threshold in MB. If omitted, the threshold value is not applied.) *cccc*: Specified critical threshold (The result of "Total capacity of all RAID groups" multiplied by the critical threshold in MB. If omitted, the threshold value is not applied.) *yyyy*: Total capacity of all RAID groups
	Detail mode	In addition to the simple mode information, the capacity of each RAID group in an ETERNUS AF/DX is displayed. No.*n*=*xxxx*MB;*wwww*,*cccc*;0;*yyyy* *n*: RAID group number *xxxx*: Used capacity of a RAID group *wwww*: Specified warning threshold (The result of "Capacity of a RAID group" multiplied by the warning threshold in MB. If omitted, the threshold value is not applied.) *cccc*: Specified critical threshold (The result of "Capacity of a RAID group" multiplied by the critical threshold in MB. If omitted, the threshold value is not applied.) *yyyy*: Capacity of a RAID group

Function Name	Mode	Description/Format
Number of global hot spare disks	Simple mode	The number of unused global hot spare disks in an ETERNUS AF/DX is displayed. SpareDISKS=*nn*;*ww*:;*cc*:;0;*yy* *nn*: Number of unused global hot spare disks *ww*: Specified warning threshold *cc*: Specified critical threshold *yy*: Total number of global hot spare disks
	Detail mode	None If "2" (detail mode) is specified for the "--performance" parameter, the same information as the simple mode is displayed.
Temperature	Simple mode	The internal and ambient temperatures of CEs and the ambient temperature of DEs in an ETERNUS AF/DX are checked and the results (highest sensor temperatures) are displayed. (*1) CE-Temp(C)=*xx*;*ww*;*cc* CE-AmbientTemp(C)=*xx*;*ww*;*cc* DE-AmbientTemp(C)=*xx*;*ww*;*cc* *xx*: Highest sensor temperature *ww*: Specified warning threshold *cc*: Specified critical threshold
	Detail mode	In addition to the simple mode information, the internal and ambient temperatures of CEs and the ambient temperature of DEs in an ETERNUS AF/DX are displayed for each sensor. (*1) Depending on the model of ETERNUS AF/DX, the information is displayed with one of the following formats. CE-Temp*M*(C)=*xx*;*ww*;*cc* CE-AmbientTemp*M*(C)=*xx*;*ww*;*cc* DE#*NN*-AmbientTemp*M*(C)=*xx*;*ww*;*cc* CE#*N*-Temp*M*(C)=*xx*;*ww*;*cc* CE#*N*-AmbientTemp*M*(C)=*xx*;*ww*;*cc* DE#*NN*-AmbientTemp*M*(C)=*xx*;*ww*;*cc* *N*: CE/DE number *M*: Sensor number *xx*: Sensor temperature *ww*: Specified warning threshold *cc*: Specified critical threshold

Function Name	Mode	Description/Format
Power consumption	Simple mode	The power consumption of an ETERNUS AF/DX is displayed. (*1) Power(Watt)=*xxx*;*www*;*ccc* *xxx*: Power consumption *www*: Specified warning threshold *ccc*: Specified critical threshold
	Detail mode	None If "2" (detail mode) is specified for the "--performance" parameter, the same information as the simple mode is displayed.
Thin Provisioning Pool	Simple mode	The total capacity of Thin Provisioning Pools in an ETERNUS AF/DX is displayed. usedspace=*xx.xx*GB;*ww.ww*;*cc.cc*;0.00;*yy.yy* *xx.xx*: Total used capacity of all Thin Provisioning Pools *ww.ww*: Specified warning threshold (The result of "Total capacity of all Thin Provisioning Pools" multiplied by the warning threshold in GB. If omitted, the threshold value is not applied.) *cc.cc*: Specified critical threshold (The result of "Total capacity of all Thin Provisioning Pools" multiplied by the critical threshold in GB. If omitted, the threshold value is not applied.) *yy.yy*: Total capacity of all Thin Provisioning Pools
	Detail mode	In addition to the simple mode information, the capacity of each Thin Provisioning Pool in an ETERNUS AF/DX is displayed. No.*n*=*xx.xx*GB;*ww.ww*;*cc.cc*;0.00;*yy.yy* *n*: Thin Provisioning Pool number *xx.xx*: Used capacity of a Thin Provisioning Pool *ww.ww*: Specified warning threshold (The result of "Capacity of a Thin Provisioning Pool" multiplied by the warning threshold in GB. If omitted, the threshold value for the Thin Provisioning Pool is used.) *cc.cc*: Specified critical threshold (The result of "Capacity of a Thin Provisioning Pool" multiplied by the critical threshold in GB. If omitted, the threshold value for the Thin Provisioning Pool is used.) *yy.yy*: Capacity of a Thin Provisioning Pool

Function Name	Mode	Description/Format
Busy-rate	Simple mode	The busy-rate of each factor in an ETERNUS AF/DX is checked and the results (highest busy-rates) are displayed. CM-BusyRate=*xx*%;ww;*cc* DISK-BusyRate=*xx*%;*ww*;*cc* PFM-BusyRate=*xx*%;*ww*;*cc* *xx*: Highest busy-rate (CM, Disk, PFM) *ww*: Specified warning threshold *cc*: Specified critical threshold
	Detail mode	In addition to the simple mode information, the busy-rate of each factor resource in an ETERNUS AF/DX is displayed. Depending on the model of ETERNUS AF/DX, the information is displayed with one of the following formats. CM#*M*=*xx*%;*ww*;*cc* DE#*NN*-Disk#*M*=*xx*%;*ww*;*cc* (or CE-Disk#*M*=*xx*%;*ww*;*cc*) CM#*M*-PFM#*P*=*xx*%;*ww*;*cc* (or PFM#*P*=*xx*%;*ww*;*cc*) CE#*N*-CM#*M*=*xx*%;*ww*;*cc* DE#*NN*-Disk#*M*=*xx*%;*ww*;*cc* (or CE#*N*-Disk#*M*=xx%;*ww*;*cc*) CE#*N*-CM#*M*-PFM#*P*=*xx*%;*ww*;*cc* (or CE#*N*-PFM#*P*=*xx*%;*ww*;*cc*) *N*: CE/DE number *M*: CM/Disk number *P*: PFM number *xx*: Busy-rate (CM, Disk, PFM) *ww*: Specified warning threshold *cc*: Specified critical threshold

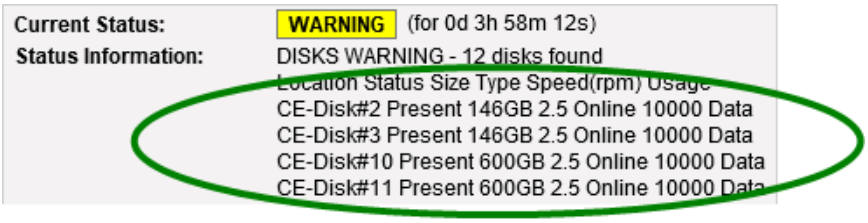
Function Name	Mode	Description/Format
I/O response time	Simple mode	The response time of each volume in an ETERNUS AF/DX is checked and the results (longest response time) are displayed. VOL-Read-ResTime=*XXX*ms;*www*;*ccc* VOL-Write-ResTime=*XXX*ms;*www*;*ccc* *XXX*: Longest volume response time *www*: Specified warning threshold *ccc*: Specified critical threshold
	Detail mode	In addition to the simple mode information, the response time of each volume in an ETERNUS AF/DX is displayed. (*1) No.*n*[ResTime]=*XXX*ms;*www*;*ccc* No.*n*[IOPS]=*XXX* No.*n*[Throughput(MB/s)]=*XXX* *n*: Volume number *XXX*: Volume response time, IOPS or throughput *www*: Specified warning threshold *ccc*: Specified critical threshold

*1: If "1" (full mode) is specified for the "--uom" parameter, the unit of measure is added to "value", not to "label".
Example:

```
label=value[UOM]; ...
```

4.3 Customizing the Browser Display

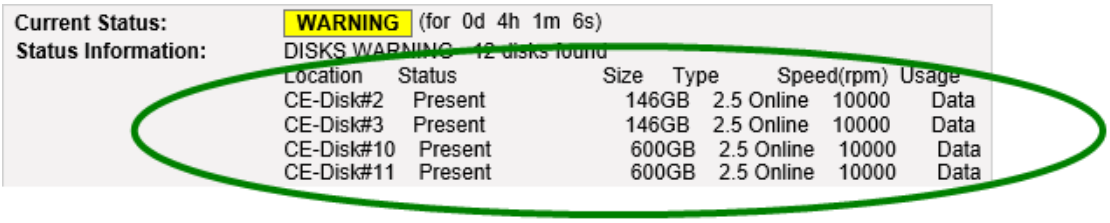
In the browser display contents, consecutive spaces can be displayed as one character by using the style sheet.
The ETERNUS Nagios Plugin controls the display width between items by using consecutive spaces. However, note that the monitoring status may be displayed with only one space between each value as shown below.



To avoid the situation described above and keep the output result readable, performing the following procedure is recommended in an ETERNUS Nagios Plugin environment.

- Edit the style sheet for Nagios Web (details are described below).
- Use Internet Explorer 9 or later. Disable the compatibility view.

After performing the above settings, the display result can be improved, as shown below.



The following table shows how the style sheet for Nagios Web will be changed.

Changing target file	/usr/local/nagios/share/stylesheets/extinfo.css
Changing target item	.dataVal { font-size: 9pt; white-space: pre; }
Changing target contents	Add "white-space: pre;"

Availability of this setting can be confirmed with the following browsers.

Browser	Microsoft Internet Explorer 9, 10, 11
	Mozilla Firefox 18, 19, 20, 25, 33

Chapter 5
Error Messages

All error messages that ETERNUS Nagios Plugin outputs are displayed on the Nagios screen.

If an error message appears, refer to the troubleshooting methods in this chapter and solve the problem.

ID: 201

- Output

```
error : 201 : Parameter is not specified.
```

- Meaning
  No available parameters are specified.
- Action
  Check the parameters of the ETERNUS Nagios Plugin in the following target file.
  Specify the appropriate parameters, and then try again.
- Target file
  Monitoring definition file

ID: 202

- Output

```
error : 202 : Host or IP is not specified.
```

- Meaning
  A storage system name (or host name on the operation management LAN) or an IP address for the ETERNUS AF/DX that is to be monitored has not been specified.
- Action
  Check the storage system name setting (or host name setting on the operation management LAN) or the IP address setting of the ETERNUS AF/DX that is to be monitored in the following target file.
  Specify the correct name or IP address, and then try again.
- Target file
  Monitoring definition file

ID: 203

- Output

```
error : 203 : User or User2 is not specified.
```

- Meaning
  No user account for the ETERNUS AF/DX that is to be monitored is specified for "user" or "user2".

- Action
  Check the user account setting for the ETERNUS AF/DX that is to be monitored for "user" or "user2" in the following target file.
  Specify the appropriate "user" or "user2" values, and then try again.

- Target file
  Monitoring definition file

ID: 204

- Output

```
error : 204 : The item to be checked is not specified.
```

- Meaning
  No monitoring target item is specified in the parameter.

- Action
  Check the monitoring target setting in the following target file.
  Specify the appropriate monitoring target item, and then try again.

- Target file
  Monitoring definition file

ID: 205

- Output

```
error : 205 : The specified item to be checked is a duplicate.
```

- Meaning
  Multiple monitoring target items are specified in the parameter.

- Action
  Check the monitoring target setting in the following target file.
  Specify the appropriate monitoring target item, and then try again.

- Target file
  Monitoring definition file

ID: 206

- Output

```
error  : 206 : The threshold value is unavailable or not specified.
```

- Meaning
  The threshold of the parameter is invalid or the parameter is not specified.
- Action
  Check the parameter threshold settings for the ETERNUS Nagios Plugin in the following target file.
  Specify a valid threshold value, and then try again.
- Target file
  Monitoring definition file

ID: 207

- Output

```
error : 207 : The parameter value is unavailable or not specified.
```

- Meaning
  The parameter is invalid or is not specified.
- Action
  Check the parameter settings for the ETERNUS Nagios Plugin in the following target file.
  Specify a valid parameter, and then try again.
- Target file
  Monitoring definition file

ID: 210

- Output

```
error : 210 : Failed to execute command. [(command line)]
```

- Meaning
  Shell startup failed in the Nagios server.
- Action
  Check the shell environment of the user account in which the Nagios was performed.
  Solve the problem, and then try again.

ID: 290

- Output

```
error : 290 : Internal error occurred. [(detailed information)]
```

- Meaning
  An unexpected error occurred.

- Action
  Refer to the following procedure and perform maintenance. Solve the problem, and then try again.
  Whether the following phenomenon occurs depends on the displayed "detailed information".

  - [ssh return code = 126] or [ssh return code = 127]
    SSH cannot be used in the Nagios server.
    Some problems may occur in the SSH environment. Check the SSH environment again.

  - [ssh return code = 215]
    The ETERNUS CLI command cannot be performed in the ETERNUS AF/DX.
    Check the ETERNUS AF/DX.

  - [ssh return code = 255]
    Some problems may occur in the network connection environment between the Nagios server and the ETERNUS AF/DX.
    Check the port status, the network connection environment, and the SSH public key settings.

  - [cli return code = None]
    The Nagios server and the ETERNUS AF/DX are not connected correctly.

    1 Check whether the user account role of the ETERNUS AF/DX is correct.

    2 Check whether the number of ETERNUS CLI session connections to the ETERNUS AF/DX does not reached the maximum value.

    3 Check whether the specified monitoring target item is supported by the ETERNUS AF/DX.

  - [cli return code = 2] and a four-digit hexadecimal number is output in the second line
    The four-digit hexadecimal number is part of a message number that is output by ETERNUS CLI.
    Check for the error messages in the ETERNUS CLI manual and remove the cause of the error.

Chapter 6
Troubleshooting

This chapter explains points to note when using the ETERNUS Nagios Plugin.

6.1 Required Information for Inquiries

Before contacting your maintenance engineer when trouble occurs, prepare the following information.

Required Nagios server information

- Model
- OS
  - Distribution
  - Version
  - Applied update version
- The following information of the ETERNUS Nagios Plugin
  - Product version
  - Displayed message
  - /tmp/check_fujitsu_eternus_dx.log file
  - /tmp/check_fujitsu_eternus_dx.log.1 file
  - /tmp/check_fujitsu_eternus_dx.log.2 file
  - /tmp/check_fujitsu_eternus_dx.log.3 file
  - /tmp/check_fujitsu_eternus_dx.log.4 file
  - /tmp/check_fujitsu_eternus_dx.log.5 file

Required ETERNUS AF/DX information

- Model
- Firmware version

6.2 Troubleshooting for Monitoring Large-Scale ETERNUS AF/DX Storage Systems

6.2.1 Timeout

When monitoring of large-scale ETERNUS AF/DX storage systems (ETERNUS AF/DX storage systems with 500 or more volumes) is performed, timeouts may occur frequently. If a timeout occurs, "CRITICAL" is displayed in the "Status Information" field and "(Service Check Timed Out)" is displayed in the "Status Information" field of the service list.

If timeouts frequently occur, change the "service_check_timeout" value (seconds) that is specified in the Nagios definition file (refer to "2.4 Setting the ETERNUS Nagios Plugin Environment" (page 21)).

Example) Changing the service timeout value to 120 (seconds)

(1) Edit the Nagios definition file.

```
service_check_timeout=120
```

(2) Restart Nagios.

```
# service nagios restart
```

Appendix A
Plugin Help

The Help contents for the ETERNUS Nagios Plugin are shown below.

```
NAME
    check_fujitsu_eternus_dx.py
    check_fujitsu_eternus_dx.pyc
                            - Nagios-Check-Plugin for Fujitsu ETERNUS DX series

SYNOPSIS
    check_fujitsu_eternus_dx.py      { -H|--host=<hostname or IP>
    { [--port=<SSH port>] }
    { --user=<username> [--user2=<username>] }
    { [--chkdisks] | [--chkraids] | [--chkvolumes] | [--chkce] | [--chkde] |
      [--chksystem] | [--chkcm] | [--chkcaport] | [--chksparedisks] |
      [--chkcetemp] | [--chkceintaketemp] | [--chkceambienttemp] |
      [--chkdeintaketemp] | [--chkdeambienttemp] | [--chkdeintaketemp10] |
      [--chkdeambienttemp10] | [--chkpower] | [--chkthinpropools] |
      [--chkrecsessions] | [--chkcmbusyrate] | [--chkdiskbusyrate] |
      [--chkpfmbusyrate] | [--chkvolreadrestime] | [--chkvolwriterestime] |
       { [--chkrecpaths --remoteboxid=<Remote Box ID>] } }
    [-w|--warning=<warning threshold>] [-c|--critical=<critical threshold>]
    [-v|--verbose=<verbose mode level>] [--performance=<performance mode>]
    [--uom=<UOM mode>] } |
    [-h|--help] | [-V|--version]

    Checks a Fujitsu ETERNUS DX using ETERNUS CLI.

OPTIONS
    -H|--host=<name-or-IP>
        Host address as DNS name or IP address of the server

    --port=<SSH port>
        Host SSH port. If not set, the default port 22 will be used.

    --user=<username>
        ETERNUS authentication user. This user must have the software-role
        in a SSH connection environment.

    --user2=<username>
        ETERNUS authentication user. This user must have a non-software role
        that can view the component status in a SSH connection environment.
        This option is required for the following ETERNUS DX/AF:
          ETERNUS DX S3 series and ETERNUS DX200F with firmware version V10L30 or earlier
          ETERNUS DX S2 series

    --chkdisks
        Check all of the hard disk drives in the ETERNUS Disk storage system.

    --chkraids
        Check the RAID groups in the ETERNUS Disk storage system.
```

```
--chkvolumes
     Check the volumes in the ETERNUS Disk storage system.

--chkce
     Check the controller enclosure (CE) in the ETERNUS Disk storage system.

 --chkde
     Check the drive enclosures (DE) in the ETERNUS Disk storage system.

 --chksystem
     Check the ETERNUS Disk storage system.

 --chkcm
     Check the controller modules (CM) in the ETERNUS Disk storage system.

 --chkcaport
     Check the channel adapter (CA) ports in the ETERNUS Disk storage system.

 --chksparedisks
     Check the global hot spare disks in the ETERNUS Disk storage system.

 --chkcetemp
     Check the CE internal temperature (only for the ETERNUS DX S3 or later series).

 --chkceintaketemp or --chkceambienttemp
     Check the CE ambient temperature.

 --chkdeintaketemp or --chkdeambienttemp
     Check the DE ambient temperature (only for the ETERNUS DX S3 or later series).

 --chkdeintaketemp10 or --chkdeambienttemp10
     Check the DE ambient temperature (only for the ETERNUS DX S2 series).

 --chkpower
     Check the total power in the ETERNUS Disk storage system.

 --chkthinpropools
     Check the thin provisioning pools in the ETERNUS Disk storage system.

 --chkrecsessions
     Check the remote copy sessions in the ETERNUS Disk storage system.

 --chkcmbusyrate
     Check the CM busy-rate in the ETERNUS Disk storage system.

 --chkdiskbusyrate
     Check the Disk busy-rate in the ETERNUS Disk storage system.

 --chkpfmbusyrate
     Check the PFM busy-rate in the ETERNUS Disk storage system.

 --chkvolreadrestime
     Check the Volume Read-ResponseTime in the ETERNUS Disk storage system.

 --chkvolwriterestime
     Check the Volume Write-ResponseTime in the ETERNUS Disk storage system.
```

```
--chkrecpaths
    Check the remote copy paths in the ETERNUS Disk storage system.

--remoteboxid=<Remote Box ID>
    This option sets the Box ID of the remote storage system.
    This option is specified together with the "--chkrecpaths" option.

-w|--warning=<warning threshold>
    This option sets the warning threshold.
    <warning threshold> must be a simple integer 0..100..1000000.

-c|--critical=<critical threshold>
    This option sets the critical threshold.
    <critical threshold> must be a simple integer 0..100..1000000.

-v|--verbose=<verbose mode level>
    Enable verbose mode (levels: 1,2).
    verbose level 1 : Only displays a list of the components in which
                      errors occur.

    verbose level 2 : Always displays a list of all the components.
    Note that the verbose mode is disabled when the following parameters
    are specified;
    '--chkce'
    '--chkde'
    '--chkpower'

--performance=<performance mode>
  This option can be specified if the functions support performance.
      Mode 0: Suppression mode. Performance data is not included.
      Mode 1: Simple mode. Only the main performance data is included.
      Mode 2: Detail mode. All performance data is included.
  The following functions support performance:
      '--chkraids'
      '--chkthinpropools'
      '--chksparedisks'
      '--chkcetemp'
      '--chkceintaketemp'
      '--chkceambienttemp'
      '--chkdeintaketemp'
      '--chkdeambienttemp'
      '--chkdeintaketemp10'
      '--chkdeambienttemp10'
      '--chkpower'
      '--chkcmbusyrate'
      '--chkdiskbusyrate'
      '--chkpfmbusyrate'
      '--chkvolreadrestime'
      '--chkvolwriterestime'
--uom=<UOM mode>
  This option can be specified if the functions support performance.
      Mode 0: Default mode.
      Mode 1: Full mode.

-V|--version
    Print version information.

-h|--help
    Print help text.
```

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User's Guide

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