

# DELL

## PERC5 Storage Management in Novell® NetWare® 6.5

Support Pack 6 and Support Pack 7

## Global Solutions Engineering

By Faisal Ahmed, Mike Novak, Naveen Harsani,  
Ankit Goel, and Cindy Lee Stap

Dell | Custom Solutions Engineering  
[support.dell.com](http://support.dell.com)



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## EXECUTIVE SUMMARY

This white paper explains how to use the LSI™ MegaCli tool as a storage subsystem monitoring utility attached to PERC5i and PERC5e controllers on Dell™ PowerEdge™ 1950, 2900, and 2950 systems running Novell® NetWare® 6.5, SP6 or SP7.

## INTRODUCTION

Active server monitoring is a necessity for the network administrator since many network outages can be traced back to events such as disk subsystem failure. Monitoring of the Dell PERC5 and attached storage can be performed by several methods including SNMP, SMTP, and prepackaged utilities such as the Dell OpenManage™ Storage Services (OMSS), Dell Remote Access Controller (DRAC) and so on. Since support options for NetWare OS are limited at this time, this document is designed to show how the **MegaCli** utility can be leveraged to provide an acceptable level of monitoring in a NetWare 6.5 environment.

This document focuses on the NetWare command-line utility, **MegaCli.NLM**, developed by LSI™ (PERC5 manufacturer), and how it can be used to monitor physical and logical disk health from within a NetWare 6.5 environment. **MegaCli.NLM** can be called from either a **Perl Script**, running in the system background or from a **NetWare NCF** file or console terminal window. The Perl Script must be initialized in the system via an NCF file placed within the **AUTOEXEC.NCF** so that it runs with any restart of the server.

## What Is MegaCli?

The **MegaCli** Command Tool (CT) is a command-line interface application that is used to configure, maintain, or monitor storage configurations created with Embedded MegaRAID Software. **MegaCli** is not a replacement for NetWare disk/volume management utilities; rather it is a pre-NetWare configuration tool used to create/modify drives and volumes below the NetWare system level, and a NetWare utility like Remote Manager is still needed to create system-level volume additions.

You can use this command tool to perform the following tasks:

- Configure logical drives and create configurations on the adapter
- Display the configuration on the adapter
- Display and change logical drives properties on the adapter
- Display and change physical drives properties on the adapter
- Display and change adapter properties
- Load a configuration to the adapter from a file
- Save an adapter configuration to a file
- Start or stop rebuild, consistency check, and initialization
- Suspend and display an ongoing background initialization
- Display relevant user messages on the console or write them to the log file
- Work in silent mode, if selected (no messages are displayed on the console)
- Display adapter inventory data in a single command
- Customize output strings

- Exit with predefined success or failure exit codes
- Set some predefined environment variables, like the number of adapters and/or logical drives after the execution of CT
- Display help on how to use the command line options of CT



Adobe Acrobat 7.0  
Document

To view a list of available **MegaCli** command line options, see Chapter 3 of the preceding PDF document, or download it from the LSI website at:

[http://www.lsi.com/files/docs/techdocs/storage\\_stand\\_prod/sas/mr\\_sas\\_ug.pdf](http://www.lsi.com/files/docs/techdocs/storage_stand_prod/sas/mr_sas_ug.pdf)

Possible storage monitoring options:

- Available drives
- Drives online
- Drive degradation via error reports
- Drive dies
- Volume integrity
- Volume rebuilding

### **NetWare Installation of the MegaCli and the Mega\_SAS Drivers**

NOTE: If you have already installed NetWare 6.5, skip steps 1 through 3.

1. Install NetWare Open Enterprise Server Version 6.5 SP6 or SP7 with default options.
2. During Installation of operating system, ensure that the server has a valid IP address and valid subnet mask.
3. The installation will take the default drivers for PERC 5/i or PERC 5/E. These drivers need can be updated to the latest driver and firmware package in order to function properly.

([http://support.dell.com/support/downloads/driverslist.aspx?os=WNET&osl=EN&catid=46&impid=-1&servicetag=&SystemID=PWE\\_2950&hidos=WNET&hidlang=en](http://support.dell.com/support/downloads/driverslist.aspx?os=WNET&osl=EN&catid=46&impid=-1&servicetag=&SystemID=PWE_2950&hidos=WNET&hidlang=en))<sup>ii</sup>

<b>Dell Firmware Information</b>	<b>Your system must be updated to these versions</b>
Dell 9G system BIOS Version	1.3.7
Product:	LSI PERC 5 i/e
Package:	1.03.10-0216
FW Version:	5.1.1-0040
Bios Version	MT28
CtrlR Version	1.04-017A
Boot Block Version	R.2.3.12

The associated NetWare 6.5 driver and LSI tool files are:

<b>Driver File</b>	<b>Version</b>	<b>Date</b>
MEGA_SAS.HAM	1.06.05	8/23/2007
MEGA_SAS.DDI	N/A	8/23/2007
<b>LSI Tool</b>		
MegaCli.NLM	1.13.00	8/24/2007

Files are currently available for download from Novell at:

<http://www.novell.com/> and <http://www.lsi.com/>

To update the drivers, first visit the folder `C:\NWSERVER\DRIVERS` and rename or copy the original **MEGA\_SAS.HAM** and **MEGA\_SAS.DDI** files to a local temporary directory for backup purposes. Then copy the updated driver files, (**MEGA\_SAS.HAM** and **MEGA\_SAS.DDI**), to the `C:\NWSERVER\DRIVERS` directory. You will be prompted to overwrite the existing files – proceed with the copy operation.

Next, copy the **MegaCli.NLM** file into the `NetWare - sys:\system` folder, as this will be used as a tool to extract alert log information through the script. You will need to reboot the system in order to load the latest drivers, (**MEGA\_SAS.HAM** and **MEGA\_SAS.DDI**), automatically. Remember to place any additionally created NCF files here, as well, for ease of use and consistency.

## The Perl Script Method

A Perl Script, included later in this document, can be used for monitoring drive activity via SMTP alerts, and this script can be modified by a system administrator, which can provide automatic performance data gathering via a set of command-line options. This command line generates system-level information, which is gathered to a log file that can be monitored for related data. Once in place, this script is activated from within the Novell **AUTOEXEC.NCF** file, which is used to set startup parameters for the system and is run on any subsequent reboot of the server.

The objective of the script is to generate e-mail alerts to the administrator of any failures in the storage component. There are three files associated with this script:

- **Generate\_log.ncf** : The NetWare NCF file used to call the Perl script as a background process.
- **Generate\_log.pl**: This is the main Perl script that retrieves the logs from the controller, and processes them, and then sends an e-mail alert to the administrator.
- **OldSeq.txt**: This file is the lock file that keeps track of the last sequence number read from the log file to record the last read pointer on the event log output file.



generate\_log.ncf   oldseq.txt   generate\_log.pl

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To run a script, **generate\_log.pl** and **oldseq.txt** files to the **NetWare sys:\perl\scripts** directory, and copy the **generate\_log.ncf** file to NetWare **sys:\system** directory. Again, in order to run this script automatically every time the server starts, perform the following steps:

1. Modify the **AUTOEXEC.NCF** file to contain the **generate\_log.NCF** file at the end of the script. Anytime the server reboots, the **generate\_log.ncf** file gets automatically executed during boot-up so the script is loaded to the system.

2. You can also execute generate\_log.NCF from the console terminal in the current logged-on session for a quick overview of the current system state.

The setup requires an SMTP mail server account, network connectivity and TCP/IP connectivity to the mail server for the purpose of sending e-mail alerts. Modify these values in the script file in case you want to give any other e-mail address for sender and receiver.

A copy of the Perl script is presented here for your convenience. Parts of the script, (contents shown below), need customer specific modifications, including SMTP server address, and administration e-mail account designation, which the customer must modify in order for the script to function in a given environment. The script areas that require customer modification are highlighted in **RED**. You will need to modify the original Perl script included with this documentation before using it so that it functions properly.

### <Contents of generate\_log.pl>

```
*****
WARRANTY DISCLAIMER
*****
:: * THE SAMPLE SCRIPT IS BEING PROVIDED TO YOU "AS IS". DELL DISCLAIMS ANY
:: * AND ALL WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, WITH RESPECT TO THE
:: * SAMPLE SCRIPT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
:: * MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND ANY WARRANTY
:: * OF NON-INFRINGEMENT. YOU WILL USE THE SAMPLE SCRIPT AT YOUR OWN RISK.
:: * DELL SHALL NOT BE LIABLE TO YOU FOR ANY DIRECT OR INDIRECT DAMAGES
:: * INCURRED IN USING THE SAMPLE SCRIPT. IN NO EVENT SHALL DELL OR ITS
:: * SUPPLIERS BE RESPONSIBLE FOR ANY DIRECT OR INDIRECT DAMAGES WHATSOEVER
:: * (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, LOSS OF USE,
:: * LOSS OF DATA, BUSINESS INTERRUPTION, OR OTHER PECUNIARY LOSS, NOR FOR
:: * PUNITIVE, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES OF ANY KIND,
:: * UNDER ANY PART OF THIS AGREEMENT, EVEN IF ADVISED OR AWARE OF THE
:: * POSSIBILITY OF SUCH DAMAGES).
*****
#SMTP is a Library Function

use Net::SMTP;

#Defines a counter
$counter = 0;

#Defines a variable
$var1 = "\n";

#Using infinite Loop
```

```

while(1)
{
    # Generate Log using MegaCli command line tool
    system("MegaCli -AdpEventLog -GetEvents -f sys:\\perl\\scripts\\fetchlog.txt -
aall");

    #sleep(50);

    #For loop starts here

    # Opens the log for READ ONLY ACCESS
    open(FETCHLOG, "fetchlog.txt");

    # Reads the Recent most requence
    open(OLDSEQ, "oldseq.txt");
    $old_seq = <OLDSEQ>;
    close(OLDSEQ);

    #Converts the hex code to decimal value
    $oldseq_hex = substr($old_seq, 10, 8);
    $oldseq_dec = hex($oldseq_hex);

    #sleep(50);
    #Reads the logfile line by line

    while($readline = <FETCHLOG>)
    {
        $var1 = substr($readline, 0, 7);

        #IF Condition BEGINS NOW and Finds out the correct line starting
with a string seqNum

        if($var1 eq "seqNum:")
        {
            #Converts hex code to decimal value
            $readline_hex = substr($readline, 10, 8);
            $readline_dec = hex($readline_hex);

```

```

        if($readline_dec > $oldseq_dec)
        {

#Updates the recent most sequence
open(OLDSEQ, ">oldseq.txt");
    print OLDSEQ "$readline\n";
    close(OLDSEQ);

    #sleep(10);

# YOU ARE NOW GOING TO CONNECT TO SMTP MAIL SERVER TO SEND THE MAIL

my $smtp = Net::SMTP->new('1.1.1.1');
    $smtp->mail('netware-monitor@customer.com');
    $smtp->to('novell@customer.com');
    $smtp->data();
    $smtp->datasend("To: novell@customer.com\n");
    $smtp->datasend("From: netware-monitor\@customer.com\n");
    $smtp->datasend("Subject: ADP0 Storage Event log from netware-
monitor\n");

    $smtp->datasend("Reply-To: netware-monitor\@customer.com\n");
    $smtp->datasend("\n");
    $smtp->datasend("Please find the event log");

for($count = 0; $count < 10; $count++)
    {

        $smtp->datasend("$readline\n");
        $readline = <FETCHLOG>;
    }

# DISCONNECTS FROM SMTP CONNECTION
    $smtp->dataend();
    $smtp->quit;
    #sleep(10);
}

#IF Condition CLOSES DOWN

```

```

    }

    #SHORT WHILE LOOP ENDS NOW
    }
    #Closes the event log file
    close(FETCHLOG);

    # WAITS FOR 100 SECONDS
    sleep(100);

#For LOOP ENDS HERE
}*

```

For long term data gathering and historical data collection, the generated log file should be archived periodically to a separate data collection area and modified to reflect archival date or some other consistent method.

### **The NetWare NCF Method**

The NCF method is useful for a quick view, or as a historical collection method from within the NetWare Console screen and generated log file, of the current health of the monitored RAID drive devices. The convenience of the NCF file is that it can be called from the console by an administrator at any time, and the current state of the system components can be viewed immediately in the Console Log screen. It can also be used to consistently generate a timed information collection on the system. This procedure is recommended and is configured via the Scheduled Tasks function, located in the NetWare Remote Manager. This logged data can be parsed for pertinent information, and then used to create historical data pertaining to disk subsystem health.

Error counts on the drives should be used as a way of monitoring the drive health on the controller. As error counts increase, the likelihood of failure will also increase. The resulting data can be used to determine a set of potential drive failures, or a volume degradation, which will require system maintenance.

Depending on the collected data format in the script-generated log file, an SQL data query may be used to pull pertinent information from the log file. This is possible using either the Perl Script or NetWare NCF file method. Otherwise, a visual inspection and logged information, input into a spreadsheet or database, can be used.

## MegaCli Command-Line Tool-Generated Information Options

```
MegaCli -AdpEventLog -GetEvents -fsys:\perl\scripts\fetchlog.txt  
-aall
```

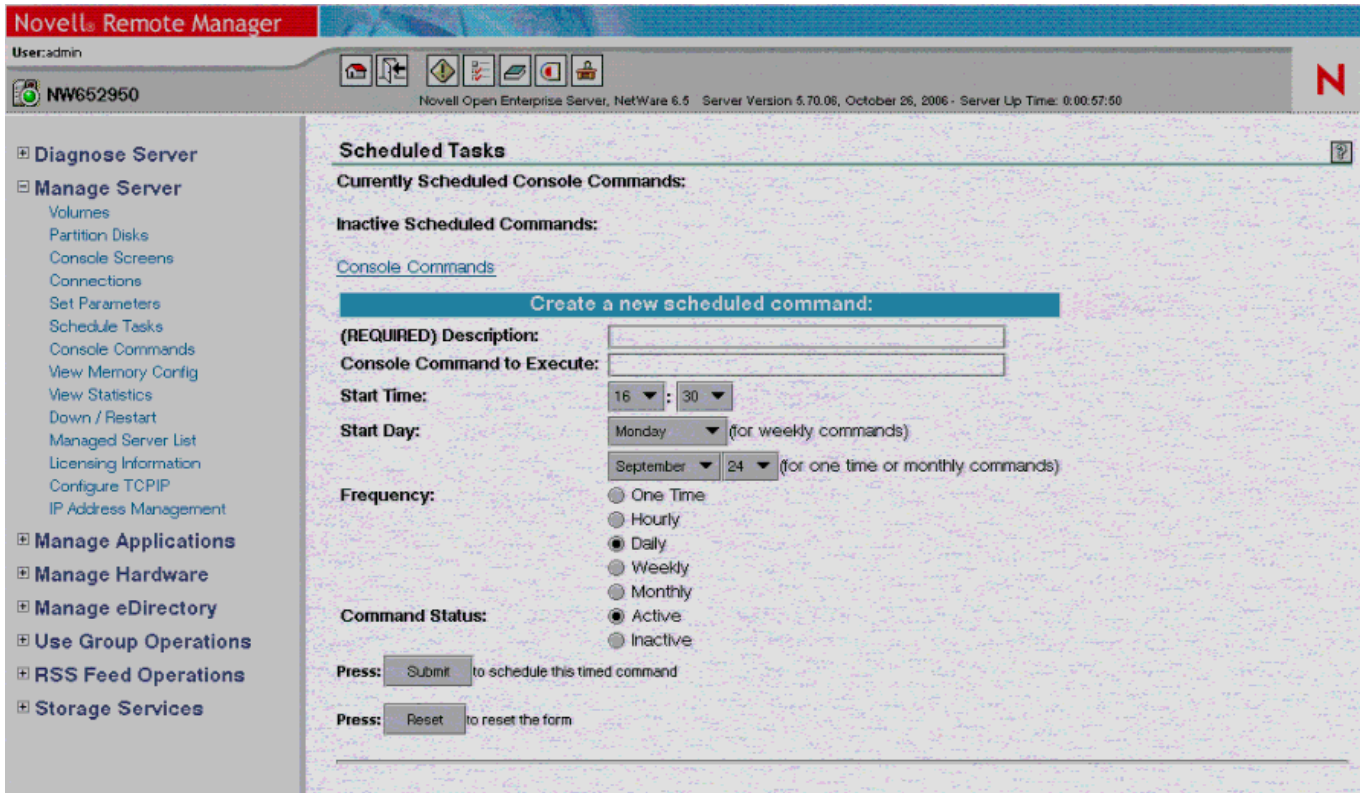
Logs all event information to the **fetchlog.txt** file.

```
MegaCli -LdPdInfo -aN|-a0,1,2|-aALL
```

Collects drive information including any drive errors due to degradation, or other factors.

After you begin collecting the monitoring data associated with the MegaCli commands, you will need a network available storage location off the monitored server in order to archive historical data for analysis at a later date. It is suggested that you set these command-line scripts in a Scheduled Task NCF routine to copy the data in multiple locations, both on and off the monitored server, as this will allow for greater retention and accessibility should there ever be a catastrophic issue on the monitored server.

By using Scheduled Tasks, you can increase the consistency of collected data by running the commands to collect the pertinent data continuously on an Hourly, Daily, Weekly, or Monthly basis, depending on your monitoring needs. (See the following screenshot.)  
When the desired monitoring command is placed into an NCF file and launched as a Scheduled Task, the system will continue to run the task until the task is halted from within the Scheduled Tasks section of NetWare Remote Manager.



Novell Remote Manager – Scheduled Tasks configuration page allowing for hourly, daily, weekly, or monthly frequency.

Remember, the MegaCli tool is a local-use-only tool and cannot be used to remotely monitor other NetWare servers in your datacenter. By using the preceding outlined automation, the MegaCli tool can be used for Perc5 storage device monitoring.

<sup>i</sup> [http://www.lsi.com/storage\\_home/index.html](http://www.lsi.com/storage_home/index.html)

<sup>ii</sup> [http://support.dell.com/support/downloads/driverslist.aspx?os=WNET&osl=EN&catid=46&impid=-1&servicetag=&SystemID=PWE\\_2950&hidos=WNET&hidlang=en](http://support.dell.com/support/downloads/driverslist.aspx?os=WNET&osl=EN&catid=46&impid=-1&servicetag=&SystemID=PWE_2950&hidos=WNET&hidlang=en)

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