



Storage. Networking. Accelerated.™

LSI® Nytro Predictor™ Software Tool

User Guide

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Revision History

Version and Date	Description of Changes
Version 1.3, December 2012	<ul style="list-style-type: none">■ Updated the OS support matrix in Section 1.1, Supported Operating Systems.■ Updated the JRE support matrix in Section 1.3, Software Requirements.■ Updated the directory structure in Section 4.1, Windows Application Directory Structure and Section 5.1, Linux Application Directory Structure.■ Updated the JRE-related information in Appendix A.2: Nytro Predictor Feature.■ Modified Figure 6 and Figure 7.

NOTE

This revision history lists only the changes that are made to the current version of the document. For a complete list of all the previous revisions of this document since its original publication, see [Appendix C: Revision History](#).

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Corporate Headquarters
Milpitas, CA
800-372-2447

Email
globalsupport@lsi.com

Website
www.lsi.com

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Chapter 1: Nytro Predictor Software Tool Overview

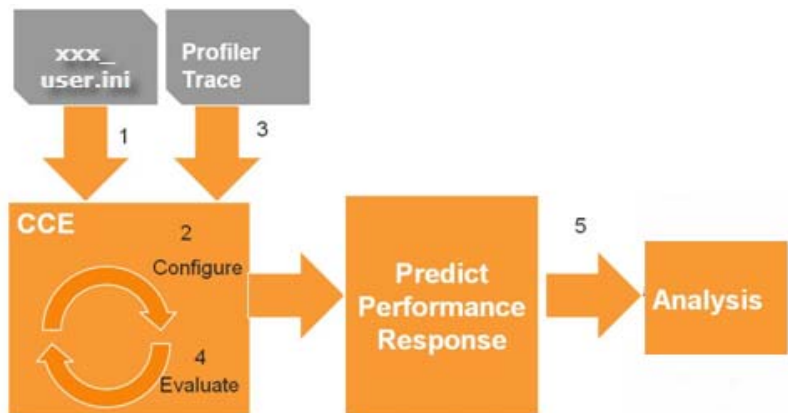
The LSI® Nytro Predictor™ software tool determines whether the LSI Nytro™ XD Application Acceleration Storage Solution and LSI Nytro™ MegaRAID® Application Acceleration Card for DAS caching solutions can accelerate your applications. The caching technology depends on the applications creating *hot data* of the storage activity. *Hot data* occur when data is being accessed frequently. By retaining a copy of this data on Flash, you can write or retrieve this data much faster than the HDD-based storage.

To confirm the presence of *hot data*, traces of storage activity are recorded on your production servers. These trace files are then analyzed using the Nytro Predictor software tool. Using the trace data, the tool estimates the performance improvement that might be possible using the Nytro XD or Nytro MegaRAID acceleration solutions with a similar workload.

The Nytro Profiler CLI executable creates trace files using the proven industry performance software, the `xperf` tool on Microsoft® Windows® and `blktrace` tool on Linux®. This software has minimal performance impact on your production servers, and samples might be taken for several hours (see [Chapter 2, Best Practices](#)). No customer data is ever recorded, only the frequency and locations of the application storage accesses are captured. These trace files might become quite large. The Nytro Predictor software tool is Java-based, and it analyzes the traces on a non-production server to make sure that there is no additional load on the production servers.

The *LSI® Nytro Predictor™ Software Tool Online Help* provides steps to use the Nytro Predictor software tool to analyze the collected I/O traces in the graphical user interface (GUI). The Nytro Predictor software tool runs as a standalone tool inside the host system.

Figure 1 Nytro Predictor Software Tool Flowchart



NOTE Do not modify the `xxx_user.ini` file.

Legend:

1. `xxx` in `xxx_user.ini` can either be the NytroXD or NytroMR ini file.

1.1 Supported Operating Systems

The Nytro Predictor software tool supports the following operating systems (OSs) on 32-bit and 64-bit architectures.

- Red Hat® Enterprise Linux (RHEL)
 - RHEL 5.3 to 5.7 and RHEL 6.0 to 6.3

- SuSE® Linux Enterprise Server (SLES)
 - SLES GA (32-bit/64-bit)
- Microsoft® Windows®
 - On 32-bit/64-bit machines
 - Windows 7-SP1
 - Windows Vista-SP2
 - Windows Server 2008 SP2/Windows Server 2008 R2 SP1
 - On 64-bit machines
 - Windows Server 2012
- Oracle® Enterprise Linux (OEL)
 - OEL 5.6/OEL 6
- CentOS 5.7 to 6.3
- Ubuntu
 - Ubuntu 10.04/ 11.1/12.04

1.2 Hardware Requirements

The Nytro Predictor software tool runs without any additional hardware.

1.3 Software Requirements

- The Nytro Predictor software tool runs with Java Runtime Environment (JRE) 64-bit version 1.6 or later.
- The Nytro Profiler feature requires the following performance software to capture the storage access traces on the production servers.
 - On Linux OS
 - blktrace version 1.0.0 or 2.0.0
 - blkparse version 1.0.1
 - You can download the supported RPM from here:
<http://rpmfind.net/linux/rpm2html/search.php?query=blktrace>
 - On Microsoft Windows OS
 - Microsoft Windows Xperf Performance Analyzer Version 4.8.7701
 - To install the `Xperf` utility, you must have Microsoft Windows Performance Toolkit (MSWPT). The Microsoft Windows SDK contains the performance kit (for 32-bit and 64-bit architectures). You can download the supported SDK (ISO Image) from here:
<http://msdn.microsoft.com/en-us/windowsserver/bb980924.aspx>

NOTE Do not use the Nytro Profiler tool on PowerShell.

1.4 Application Directory Structure

The Nytro Predictor software tool package contents are extracted under a directory named `<package name>`. For example, if the Nytro Predictor `zip` folder contents are downloaded and extracted into the `<base dir>` directory, and if the package name is `Nytro Predictor`, you can find the contents of the `zip` folder in the `/home/<base dir>/<NytroPredictor>` directory.

- For Windows application directory structure, see [Section 4.1, Windows Application Directory Structure](#).
- For Linux application directory structure, see [Section 5.1, Linux Application Directory Structure](#).

1.5 Nytro Predictor Software Tool Packages

The Nytro Predictor is composed of Nytro Profiler, a CLI-based application and Nytro Predictor, a GUI-based application.

1.5.1 Installation Steps

1.5.1.1 Nytro Profiler

To install the Nytro Profiler, extract the `NytroProfiler.zip` package on the target machine (for example, on the production server). The target machine is the machine whose workload must be analyzed.

NOTE You must have `administrator` or `root` user privileges to use the Nytro Profiler.

1.5.1.2 Nytro Predictor

Extract the `NytroPredictor.zip` package on your machine.

NOTE The Nytro Predictor tool requires the traces collected by the Nytro Profiler for further analysis.

Chapter 2: Best Practices

This chapter lists out the best practices for the optimal use of the Nytro Predictor software tool.

- Long duration trace collection could consume more disk space; therefore avoid using your `root filesystem`.

NOTE

You might have to run the Nytro Profiler for a reasonable period of time based on your workload to get a better analysis report, for at least 15 to 30 minutes.

- Run the Nytro Profiler in the production machine to capture the I/O traces in a non-intrusive manner, and then run the Nytro Predictor GUI on a remote machine for analysis.
- Because the Nytro Profiler generates new trace files, create an empty folder, and run the Nytro Profiler from there to make sure that the files are not scattered across different locations.
- Because of the inherent `blktrace` tool issues, do not run two instances of the Nytro Profiler tool to capture the traces on the same device.
- On the Linux machine, you must run the Nytro Profiler on a session that does not time out.
- If the Nytro Profiler is running on a heavily loaded target machine, use the CPU command line option to reduce the CPU usage of the Nytro Profiler application. See [Chapter 4, Running the Nytro Profiler On Windows](#).
- Copy the I/O trace files onto disks that are not being used by the Nytro Profiler.
- Do not copy the I/O trace files onto the operating system disks.
- Keep track of the disk usage consumed by the trace file during trace capture.

Chapter 3: Getting Started with the Nytro Predictor Software Tool

This chapter provides the Nytro Predictor software tool usage guidelines. For the Nytro Predictor software tool to run, the traces must already be collected using the Nytro Profiler.

3.1 Nytro Predictor Software Tool Functionality

The Nytro Predictor software tool contains two parts: the Nytro Profiler and the Nytro Predictor. The Nytro Predictor software tool uses the I/O traces already collected by the Nytro Profiler.

3.1.1 Nytro Profiler Feature

The Nytro Profiler is a CLI-based tool that collects the I/O traces and generates a trace file.

- The Nytro Profiler collects the statistics and I/O traces of the interested Hard Disk Drive (HDD) volumes.
- The Nytro Profiler converts the collected I/O traces into a format required by the Nytro Predictor functionality.

NOTE The generated trace file size could vary; therefore install and run the Nytro Profiler on the storage disk that has sufficient space.

3.1.2 Nytro Predictor Feature

The Nytro Predictor software tool uses the I/O traces collected by the Nytro Profiler. Using the GUI interface, the Nytro Predictor software tool analyzes the collected I/O trace workload, and provides predicted, expected, and estimated improvement to the workload.

NOTE The analyzed file size could vary; therefore facilitate more disk space in the storage disk.

The analyzer, through the GUI lets you perform these operations:

- Analyze the collected I/O traces.
- View a graphical representation of progressive cache build-up.
- Determine the read/write mix of the workload.
- Predict hot data size.
- Save the report of the trace analysis in a zip file for further potential review by LSI technical support.
- View the charts showing different I/O characteristics.

3.2 Nytro Predictor Software Tool Usage

3.2.1 Using the Nytro Profiler Feature

You can use the Nytro Profiler feature on the Windows platform and Linux platform. You can run the Nytro Profiler in either the Manual mode or the Automatic mode.

- Manual mode
 1. Collect the I/O traces of interested HDDs using either `blktrace` or `Xperf` tool on a Linux machine or Windows machine, respectively.

2. Run the Nytro Profiler with the trace file collected from the previous step as input.

The Nytro Profiler generates a file with `.qt` extension, which is used by the Nytro Predictor tool for further analysis.

NOTE Step 1 and Step 2 are independent. That is, you can perform Step 1 on the target machine (see [Section 1.5.1.1, Nytro Profiler](#), for information about target machine) and Step 2 on any machine.

- Automatic mode

Run the Nytro Profiler on the interested HDDs. The tool seamlessly collects the I/O traces and also generates the `.qt` file for further analysis by the Nytro Predictor tool.

NOTE The examples provided in this chapter are for 64-bit machines. Use `./NytroProfiler_32` on Linux or `NytroProfiler.exe` on Windows for 32-bit machines.

NOTE By default, the `qpcp.log` file is created when you run the Nytro Profiler.

For information about using the Nytro Profiler on Windows, see [Section 4, Running the Nytro Profiler On Windows](#).

For information about using the Nytro Profiler on Linux, see [Section 5, Running the Nytro Profiler On Linux](#).

3.2.2 Using the Nytro Predictor Feature

You can use the Nytro Predictor feature on the Windows platform and Linux platform using the GUI interface. Use the I/O traces collected using the Nytro Profiler, and analyze the workload response and generate the reports from the results obtained.

3.2.3 Workload Information

The Nytro Predictor shows the following information:

- Improved average application performance (in percentage).
- Percentage of cache hits or cache misses, invalidates, and so on.
- Percentage of read/write accesses and cache use (dirty pages versus clean pages).
- Number of writes into Flash.

3.3 Advanced Settings


- Right-click the graph to view the following options:
 - Properties...
 - Copy
 - Save as...
 - Print
 - Zoom In
 - Both Axis
 - Domain Axis
 - Range Axis
 - Zoom Out

- Both Axis
- Domain Axis
- Range Axis
- Auto Range
 - Both Axis
 - Domain Axis
 - Range Axis
- You can also access the **Analyzer**, **Presenter**, and **Charts** features using the respective tabs.

3.3.1 GUI Background Theme

The Nytro Predictor software tool GUI provides two background color themes: LSI and aqua blue theme.

To change the background theme of the GUI, perform these steps:

1. Click the  (Settings) icon.
2. Select the required theme from the drop-down list.
3. Click **Apply**.
4. Restart the application to view the GUI in the new theme.

3.3.2 Custom Cache Size Settings

To customize the cache size to your required settings, perform these steps:

1. Click the **Settings** button.
2. Select the **Configuration** tab.
3. Type the required cache size in the **Custom Cache Size (GB)** text box and press **Apply**.

NOTE Set these configurations before starting the analysis process of any trace file.


3.3.3 Setting the Windows Screen Resolution

For better display of your GUI, perform these steps:

1. On Windows: Set the appearance of your Windows display to 1400 × 900 pixels.
2. On Linux: Set the appearance of your Linux display to 1024 × 768 pixels.

3.3.4 GUI Help Option

The Nytro Predictor GUI online help system provides detailed help topics to use the Nytro Predictor software tool features.

To view the help topics, Click the  (Help) icon.

3.3.5 Save Option

Click the **Save** icon to save the report of the analyzed trace file in a zip format for further support from LSI. This report contains only the workload characteristics and not the actual workload data.

Chapter 4: Running the Nytro Profiler On Windows

This chapter provides the instructions to collect the I/O traces by using the Nytro Profiler on the Windows machine.

4.1 Windows Application Directory Structure

```
|--NytroPredictor_Windows.zip
    |--Predictor
        |--GuiDataFiles
        |--predictor.dat
        |--Readme.txt
        |--ReleaseNotes.txt
        |--Runme.bat
    |--Profiler
        |--NytroProfiler_32.exe
        |--NytroProfiler_64.exe
        |--profiler.dat
        |--Readme.txt
        |--ReleaseNotes.txt
    |--UserGuide.pdf
|--SampleTraces.zip
    |--.qt files
```

4.2 Running the Nytro Profiler

NOTE You must have Administrator privileges to run the Nytro Profiler tool.

You can run the Nytro Profiler commands on the Microsoft Windows platform either in the Manual mode or in the Automatic mode.

Usage

```
NytroProfiler_<64> -D <dev list> -CFG <san/das> -SZ <dev size list>
[-S <start time>] [-W <run time>] [-T Linux -P </proc/partitions path> | -T Windows]
[-I <raw trace file>] -O <O/P filename> [-cpu <0-10>]
```

NOTE The Nytro Profiler options are not case sensitive; do not use white space for filenames or paths.

Legend

To view the help topics, type `NytroProfiler_64.exe -h` at the command prompt.

- -D: <VD path separated by '>'.>
- -SZ: <VD size in GB separated by '>'; round off the VD size into nearest integer.
- -P: </proc/partitions file for traces collected on Linux>; for Linux only: copy /proc/partitions file or path into /proc partitions.
- -T: <traces were taken upon <Windows, Linux>>.

- -I: <input trace file>.
- -O: <output file name>.
- -W: <run time in seconds>.
- -S: <start time in minutes>.
- -CFG: <configuration <san/das>>.
- -cpu: <0 to 10> at the end of the command to reduce the CPU usage (the higher the number, the lower the CPU usage).

4.2.1 Running the Nytro Profiler in the Automatic Mode

- To profile the I/Os traces on the disk, for example, Disk0, type this command at the command prompt:

```
NytroProfiler_<64> -D disk0 -CFG san -SZ 200:400 -O trace_out
```

The Nytro Profiler runs until you press Ctrl+C on the keyboard. A `trace_out.qt` output file is generated.
- To profile I/Os on a disk, for example, Disk0, for a specified run time, type this command at the command prompt:

```
NytroProfiler_<64> -D disk0 -CFG san -SZ 200:400 -W 10 -O trace_out
```

A `trace_out.qt` output file is generated after the Nytro Profiler runs for 10 seconds.
- To set a start time for the trace collection on a disk, for example, Disk0, type this command at the command prompt:

```
NytroProfiler_<64> -D disk0 -CFG das -SZ 200:400 -S 20 -O trace_out
```

Run the preceding command to start profiling after 20 minutes. To stop profiling, press Ctrl+C on the keyboard. A `trace_out.qt` file is generated.
- To use both the -S and -W options together, type this command at the command prompt:

```
NytroProfiler_<64> -D disk0 -CFG das -SZ 200:400 -S 20 -W 10 -O trace_out
```

To set the profiling to start after 20 minutes, run the preceding command with the -S 20 option and to set the Nytro Profiler to last only for 10 seconds, include the -W 10 option. A `trace_out.qt` output file is generated.
- To profile I/Os on multiple disks simultaneously (for example, Disk0, Disk1, and Disk5):

```
NytroProfiler_64.exe -D Disk0:Disk1:Disk5 -CFG das -SZ 200:400:500  
-O trace_out
```

The Nytro Profiler runs until you press Ctrl+C on the keyboard. A `trace_out.qt` output file is generated.

NOTE Do not use *space* between multiple disks for -d option.

NOTE The .qt extension is added to the output file specified, for example, the -o *trace* file generates a *trace.qt* file.

4.2.2 Running the Nytro Profiler and Converter in the Manual Mode

Usage

```
NytroProfiler_<64> -D /dev/sda -CFG das -SZ 500 -T Linux -P /proc/partitions  
-I blk_trace.txt -O trace_results
```

Or

```
NytroProfiler_<64> -D disk0 -CFG san -SZ 500 -T Windows -I xperf_trace.txt  
-O trace_results
```

Type the following commands at the command prompt to manually run the Xperf utility:

- To start tracing: `xperf -on disk_io -f qpc_result.etl`

- To stop tracing: `xperf -stop`
- To generate the Xperf trace file: `xperf -i qpc_result.etl -a diskio -detail > xperf_trace`

To manually run the Nytro Profiler under various scenarios, type this command at the command prompt:

- If you want to profile the I/Os onto a disk (for example, Disk0) on a Windows machine:
 - Run Xperf on the machine as described in the preceding bulleted list.
 - Run `NytroProfiler_64.exe -d disk0 -CFG das -SZ 200 -t Windows -i xperf_trace.txt -o trace_out`The Nytro Profiler generates a `trace.qt` file for a previously collected `xperf_trace` file on any windows machine.

NOTE Both steps can be run on the same machine or on a different Windows machine. Make sure that the trace file collected using Step 1 is fed as input to Step 2.

- If you want to collect traces on a Linux machine by using the `blktrace` tool, and then run the Nytro Profiler on a Windows machine:
 - Run the `blktrace/blkparse` tool.
(see [Section 5.2.2, Running the Nytro Profiler and the Converter in the Manual Mode](#)).
 - Run `NytroProfiler_64.exe -D /dev/sdb -CFG das -SZ 200 -T linux -P dev_info -I trace -O trace_out`.
 - Copy the `/proc/partitions (dev_info)` onto machine A (Linux) to machine B (Windows).
 - Copy the trace file from machine A (Linux) to machine B (Windows).
 - Run the Nytro Profiler on machine B (Windows) to generate the final `*.qt` file.

NOTE Step 1 runs on a Linux machine and Step 2 runs on a Windows machine. You must provide the `blktrace` file generated from Step 1 as input to Step 2. You must also provide a partitions file information in Step 2
(see [Section 5.2.2, Running the Nytro Profiler and the Converter in the Manual Mode](#)).

Chapter 5: Running the Nytro Profiler On Linux

This chapter provides the instructions to collect the I/O traces by using the Nytro Profiler on a Linux machine.

5.1 Linux Application Directory Structure

```
--NytroPredictor_Linux.zip
|--Profiler
|   |--NytroProfiler_32
|   |--NytroProfiler_64
|   |--profiler.dat
|   |--Readme.txt
|   |--ReleaseNotes.txt
|--Predictor
|   |--GuiDataFiles
|   |--predictor.dat
|   |--Readme.txt
|   |--ReleaseNotes.txt
|   |--Runme.sh
|--UserGuide.pdf
--SampleTraces.zip
--.qt files
```

5.2 Running the Nytro Profiler

NOTE The Nytro Profiler or the blktrace tool can be run only on raw devices.
The MD/DM devices are not supported.

NOTE You must have root privileges to run the Nytro Profiler tool.

You can run the Nytro Profiler commands on the Linux platform either in the Manual mode or in the Automatic mode.

Usage

```
NytroProfiler_<32|64> -D <dev list> -CFG <san/das> -SZ <dev size list> [-S <start time>] [-W <run time>] [-T Linux -P </proc/partitions path> | -T Windows] [-I <raw trace file>] -O <O/P filename> [-cpu <0-10>]
```

Legend

To view the help topics, type `./NytroProfiler_64 -h` at the command prompt.

- -D: <VD path separated by ':'>.
- -SZ: <VD size in GB separated by ':'>; round off the VD size into nearest integer.
- -P: </proc/partitions file for traces collected on Linux>; for Linux only: copy /proc/partitions file or path into /proc partitions.
- -T: <trace was collected by using Windows, Linux machine>.
- -I: <input trace file>.

- -O: <output file name>.
- -W: <run time in seconds>.
- -S: <start time in minutes>.
- -CFG: <configuration <san/das>>.
- -cpu: <0 to 10> at the end of the command to reduce the CPU usage (the higher the number, the lower the CPU usage).

NOTE By default, the `qpcp.log` file is created when you run the Nytro Profiler.

5.2.1 Running the Nytro Profiler in the Automatic Mode

- To profile I/Os on the device (for example, `/dev/sdb:/dev/sdga`), type this command at the command prompt:

```
./NytroProfiler_64 -D /dev/sdb:/dev/sdga -CFG das -SZ 200:400 -O trace_out
```

The Nytro Profiler runs until you press Ctrl+C on the keyboard. A `trace.qt` output file is generated.
- To profile I/Os on a device (for example, `/dev/sdb:/dev/sdga`) for a specified run time, type this command at the command prompt:

```
./NytroProfiler_64 -D /dev/sdb:/dev/sdga -CFG das -SZ 200:400 -W 10 -O trace
```

The `trace.qt` file is generated after the Nytro Profiler runs for 10 seconds.
- To set a start time for the trace collection on a device (for example, `/dev/sdb:/dev/sdga`), type this command at the command prompt:

```
./NytroProfiler_64 -D /dev/sdb:/dev/sdga -CFG das -SZ 200:400 -S 20 -O trace
```

Run the preceding command to start profiling after 20 minutes, and to stop, press Ctrl+C on the keyboard. A `trace.qt` file is generated.
- To use both the `-S` and `-W` options together, type this command at the command prompt:

```
./NytroProfiler_64 -D /dev/sdb:/dev/sdga -CFG das -SZ 200:400 -S 20 -W 10 -O trace
```

To set the profiling to start after 20 minutes, run the preceding command with the `-S 20` option and to set the Nytro Profiler to last only for 10 seconds, include the `-W 10` option. A `trace.qt` output file is generated.
- To profile I/Os on multiple devices simultaneously (for example, `/dev/sda, /dev/sdb, and /dev/sdga`):

```
./NytroProfiler_64 -D /dev/sda:/dev/sdb:/dev/sdga -CFG das -SZ 200:400:500 -O trace
```

The Nytro Profiler runs until you press Ctrl+C on the keyboard. A `trace.qt` output file is generated.

NOTE Do not use *space* as the separator between disks names.

NOTE A file with the `.qt` extension is added to the output file specified, for example, the `-o trace` generates a `trace.qt` file.

5.2.2 Running the Nytro Profiler and the Converter in the Manual Mode

Usage

```
./NytroProfiler_64 -D /dev/sdb -CFG das -SZ 500 -T Linux -P /proc/partitions  
-I blk_trace.txt -O trace_results
```

Or

```
./NytroProfiler_64 -D disk5 -CFG das -SZ 500 -T Windows -I xperf_trace.txt -O trace_results
```

- If you want to collect the I/O traces on `/dev/sdb` and `/dev/sdga` of capacity 200 GB and 400 GB respectively, perform these steps:
 1. Run `mount debugfs debugfs /sys/kernel/debug`.
 2. Run `blktrace -d /dev/sdb /dev/sdga`.
To stop the `blktrace` tool, press `Ctrl+C` on your keyboard.
 3. Run `blkparse -t sdb sdga> blk_trace.txt`.
This step generates several temporary files and a trace file, `blk_trace.txt` (you can have any file name or path). Delete the `blktrace` temporary files.

If the proposed devices for I/O analysis are `/dev/sda`:

- Collect the traces using the `blktrace` and `blkparse` tools.

NOTE The `blktrace` tool generates several temporary files in the folder from where it is run. These files are inputs to the `blkparse` command. You must run the `blkparse` tool from the same folder.

CAUTION `blkparse` is CPU-intensive:

- Use the `nice` command to control the trace collecting priority.
- After running the `blktrace` tool on the target/production machine, you can also copy the generated `blktrace` files onto another machine to run the `blkparse` tool.

- The generated output file is `trace_out.qt` (`-o` option).

To manually run the Nytro Profiler in various scenarios:

- If you want to run the Nytro Profiler on the same Linux machine, where the `blktrace` tool runs, or on another Linux machine, perform these steps:
 1. Run the `blktrace/blkparse` tool on the Linux machine.
 2. Run `./NytroProfiler_64 -d /dev/sdb:/dev/sdga -CFG das -SZ 200:400 -t Linux -p partitions.txt -i blk_trace.txt -o trace_out`.

The Nytro Profiler generates the `.qt` file for a previously collected `blktrace` and `blkparse` trace file. In this example, `blk_trace.txt` is the trace file, `partitions.txt` is either the path to `/proc/partitions` or a copy `/proc/partitions` on the machine where the `blktrace` tool was run.

If Step 1 and Step 2 run on the different Linux machine, make sure that the trace file collected through Step 1 is fed as input into Step 2. `/proc/partitions` is also an input into the Nytro Profiler. Additionally, to generate the `dev_info` file, run the `cat /proc/partitions > dev_info` command on the machine where Step 1 was run. Copy the `dev_info` file onto the machine where Step 2 runs, to generate the `*.qt` file.

- If you want to generate a `.qt` file for a trace file obtained on a Windows machine for a disk (for example, Disk5):
 1. Run `Xperf` (see [Section 4.2.2, Running the Nytro Profiler and Converter in the Manual Mode](#)).
 2. Run `./NytroProfiler_64 -d Disk5 -CFG das -SZ 200 -t Windows -i xperf_trace -o trace_out`.
`xperf_trace` is the input trace file, and the Nytro Profiler generates the `trace_out.qt` file.

NOTE Step 1 runs on a Windows machine and Step 2 runs on a Linux machine. You must provide the `Xperf` file from Step 1 as input to Step 2.

Chapter 6: Using the Nytro Predictor Software Tool

This chapter helps you run the GUI-based executable to use the Nytro Predictor software tool.

6.1 Running the Nytro Predictor Software Tool

This section helps you run the GUI-based executable to use the Nytro Predictor software tool.

To start using the Nytro Predictor software tool, perform these steps:

1. Extract the contents of the `NytroPredictor.zip` package.
2. Store the generated I/O trace file (for example, `trace.qt`) into any folder on your local machine.
3. To run the Nytro Predictor GUI, run the appropriate executable file.

NOTE Run the `Runme.bat` file on Microsoft Windows or the `Runme.sh` file on Linux.

NOTE The `qpca.log` file and `run.log` file are created by default when you run the GUI.

The LSI Nytro Predictor disclaimer page appears as shown in the following figure.

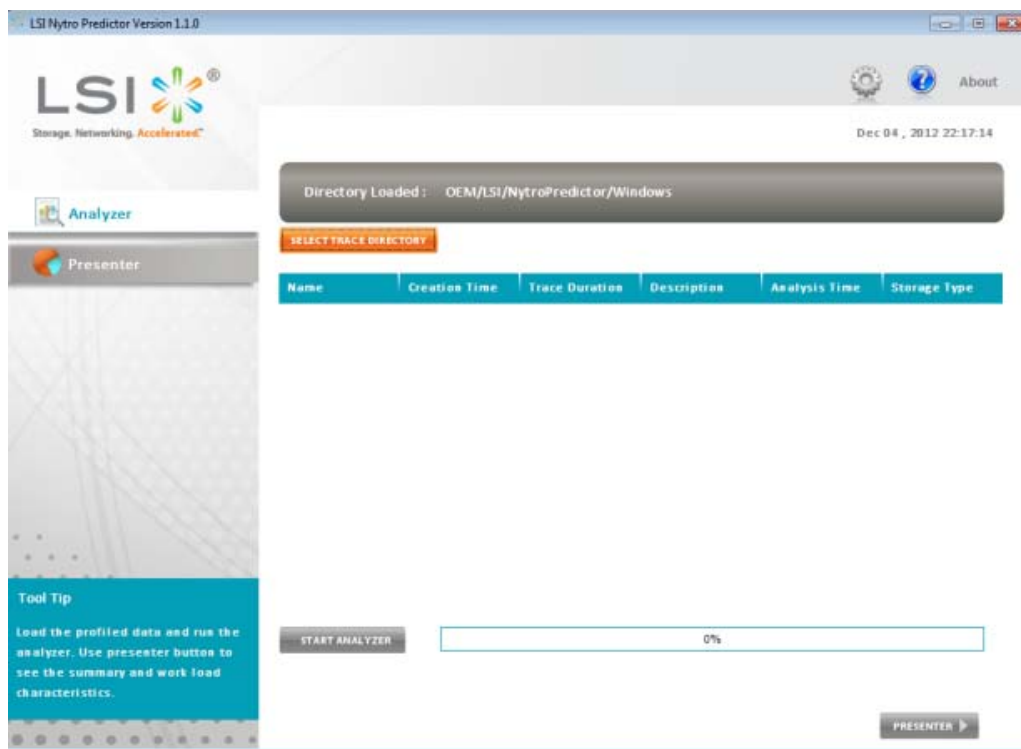
Figure 2 LSI Disclaimer



1. Click **Accept**, to accept the LSI terms and conditions to go to the Nytro Predictor tool window.

By default, the **Analyzer** dialog appears.

Figure 3 Predictor Main Window



2. Click **Select Trace Directory**, and browse for the folder that contains the .qt files.
3. Select the trace file, for example, trace.qt. You can identify the trace file by its .qt file extension.
4. Click **Start Analyzer**.

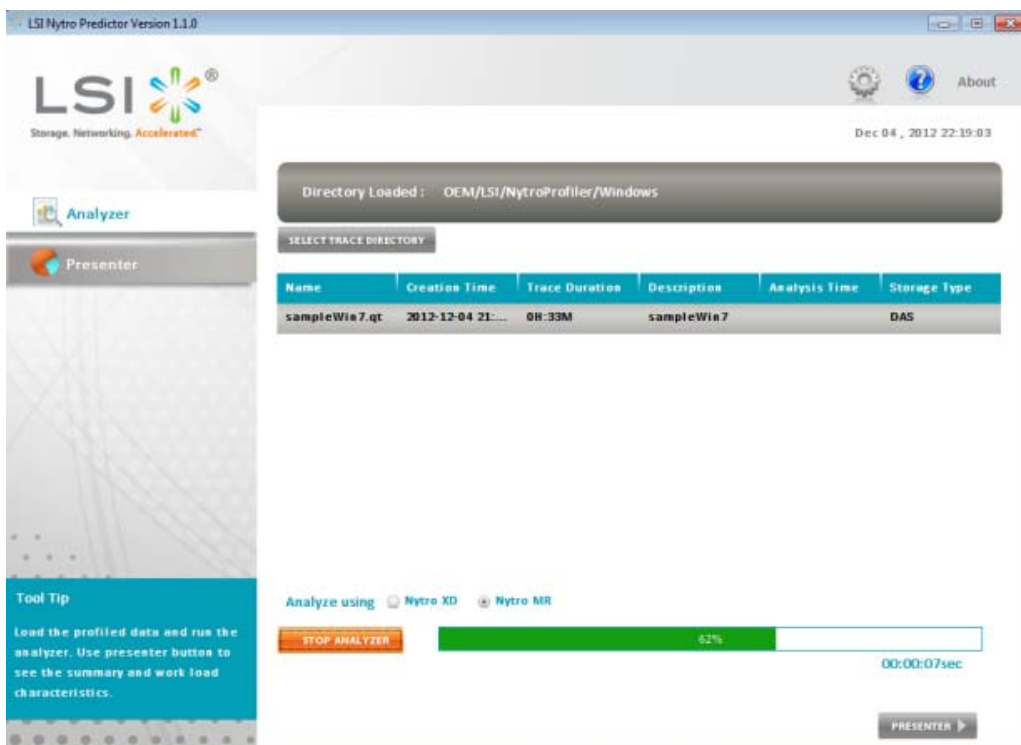
The **Analysis Time** field corresponding to a trace file contains the time when the file was last analyzed. A blank **Analysis Time** field conveys that the analysis was never done.

If the storage type is DAS, two radio buttons/options appear on the **Trace Analysis** dialog as shown in [Figure 4](#). Based on your selection, you can view the benefits offered by Nytro MegaRAID or Nytro XD for your workload.

If you select a trace file with SAN storage type, you can view the benefits offered by Nytro XD for your workload.

If you select a trace file with DAS storage type as shown in the following figure, you can view the benefits offered by Nytro XD or Nytro MegaRAID for your workload.

Figure 4 Trace Analysis – DAS Storage



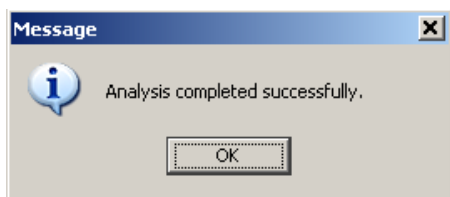
The progress bar on the preceding figures shows the progress of the analysis.

- To analyze another trace file, select the required trace file, click **Start Analyzer**.

NOTE If you rerun the analyzer on a previously analyzed I/O trace, the previously generated report is overwritten.

After the successful analysis, the following message appears.

Figure 5 Message



6.2 Viewing the Final Output Using the GUI

After the analysis is complete, the **Presenter** button is enabled.

Select any of the analyzed trace file, and click **Presenter**, to view the graphical representation of the analyzed workload.

Analysis 1

Upon successful completion of the I/O trace analysis, Nytro Predictor shows the statistics providing enhanced understanding of the application I/O workload, and charts substantiating the predicted application performance acceleration.

■ Workload Characteristics

Workload is characterized by read and write mix or percentage, and by the frequently accessed *hot data* size of the application.

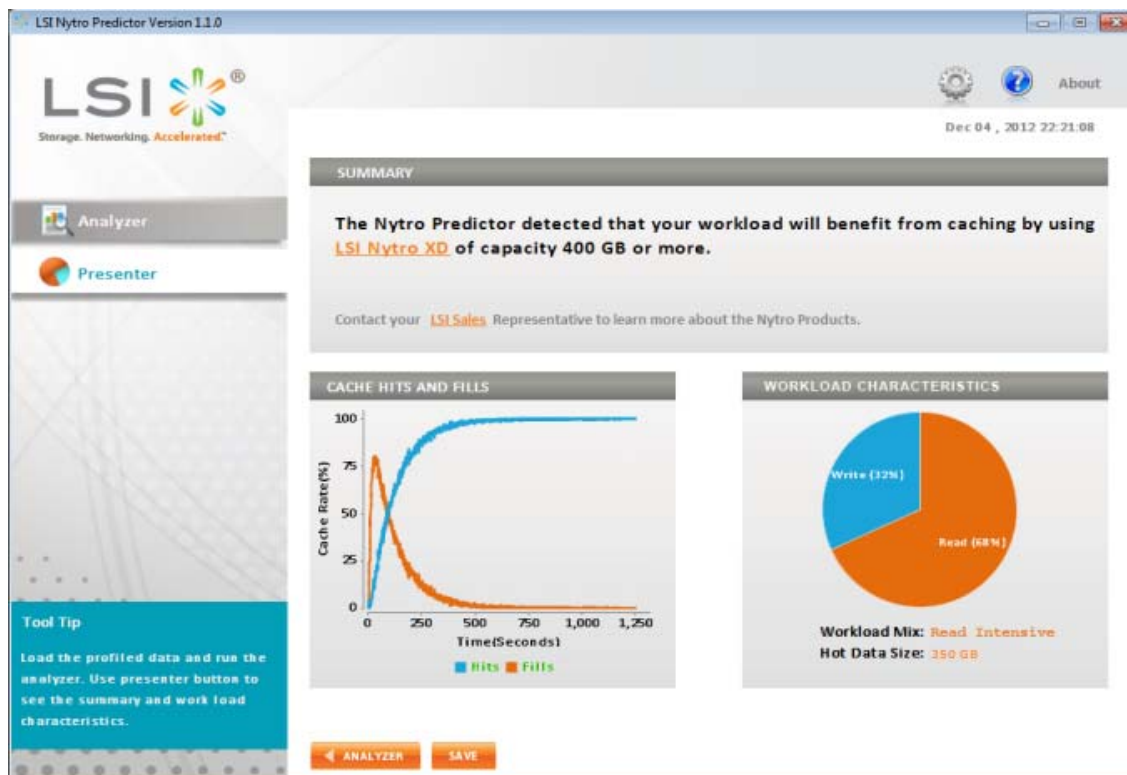
The *hot data* size provides accurate insight into the size of the application's most frequently accessed data. This size is determined by the total amount of cache fills required to move the most frequently accessed application data to Nytro accelerated storage providing the highest level of cache hits and the highest potential for application performance acceleration.

■ Cache Hits and Fills

The cache hits and fills provides the Nytro Predictor analysis statistics supporting the predicted application performance acceleration improvement. The subsequent sections provide a more detailed description of this chart.

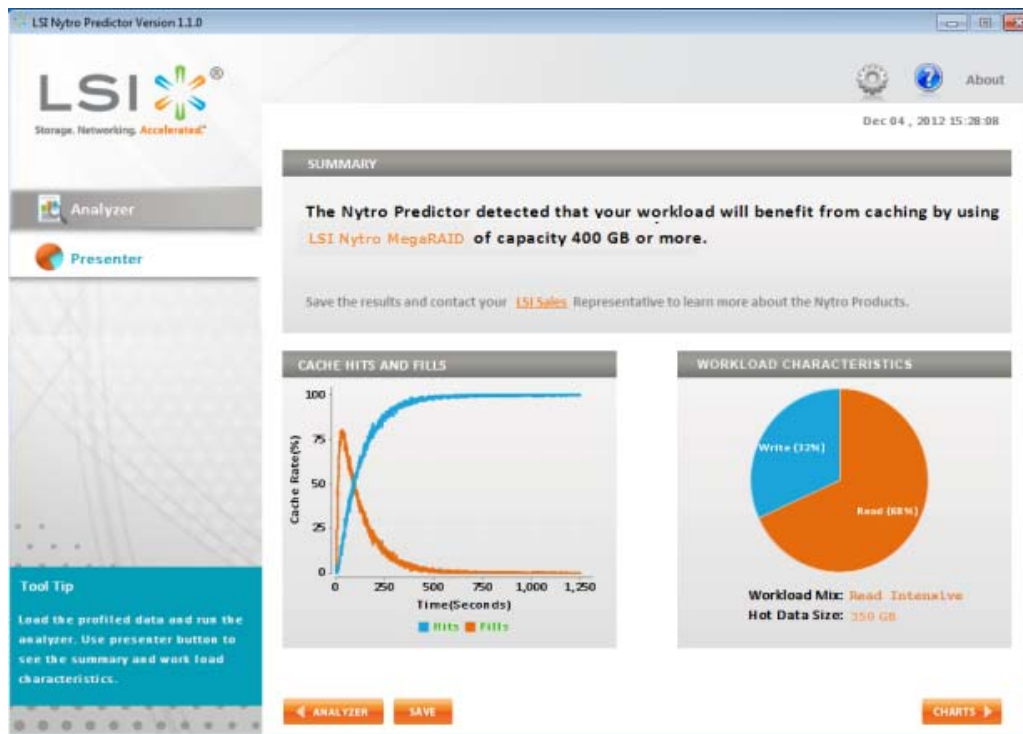
If the storage type is SAN, the following figure appears showing the benefits of using Nytro XD.

Figure 6 Trace Analysis – Benefit from Nytro XD



If the storage type is DAS, the following figure appears showing benefits of using Nytro MegaRAID and Nytro XD.

Figure 7 Trace Analysis – Benefit from Nytro MegaRAID



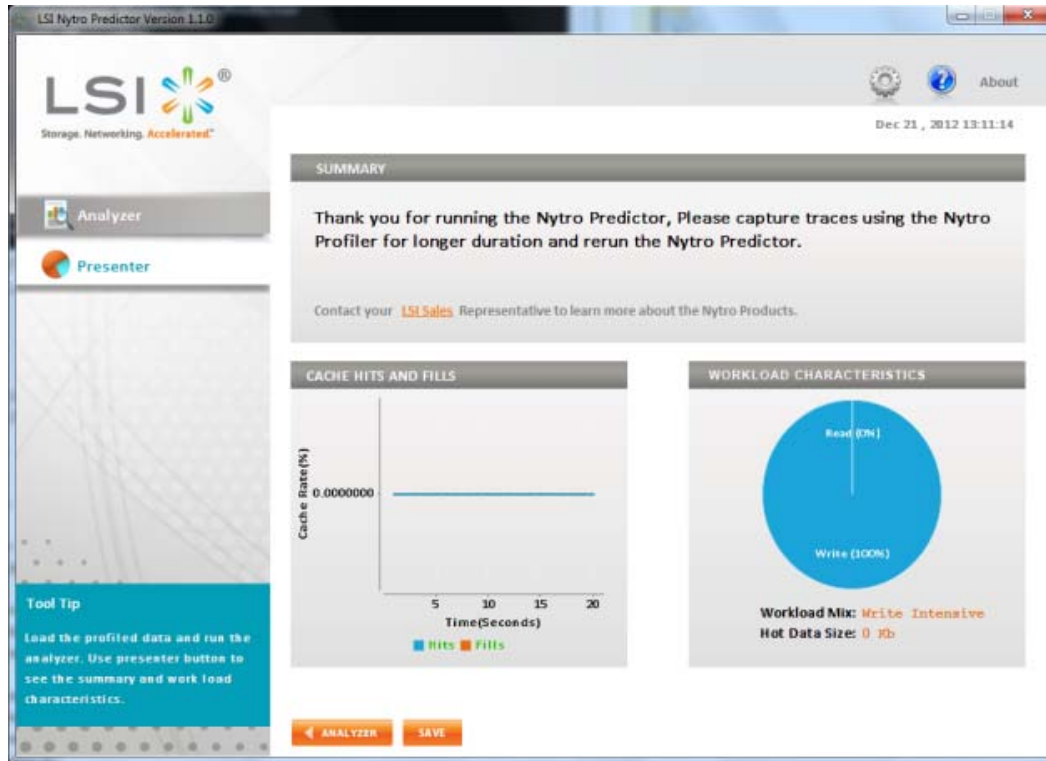
NOTE

The preceding figure reflects the Nytro MegaRAID in the Write Back (WB) write policy with virtual disks in the Write Through (WT) write policy.

Analysis 2

The following dialog appears indicating that the workload might not benefit from the Nytro Predictor software tool. You might have to collect I/O traces for a longer duration, and then run the Nytro Predictor software tool again.

Figure 8 Presenter Status



Appendix A: Troubleshooting

This appendix lists the known issues and provides workaround solutions.

A.1 Nytro Profiler Feature

- Possible causes if the Nytro Profiler exits with the following error message:
 - Check if I/O is occurring on the device.
This error indicates that in the Automatic mode, the `blktrace` or `Xperf` tool generated an empty trace, which could be because of the following reasons:
 - The device passed is invalid.
 - No I/Os on the device.
 - Inherent `blktrace` or `Xperf` tool issues.
 - No write permissions on the folder from where the Nytro Profiler is started.
 - Unsupported or empty trace file.
This error indicates that the `blktrace`, `blkparse`, or `Xperf` tool version present on the machine might not be supported.
 - The trace collection might be in process.
This error indicates that another Nytro Profiler instance is already collecting the I/O traces on the same device.
 - A previous run of the Nytro Profiler instance on this device was shut down abruptly.

Restart the machine to be able to run the Nytro Profiler on the same device again.

A.2 Nytro Predictor Feature

- If the Nytro Predictor GUI fails to start with the `DLL missing` error message, check if the 64-bit `DLL` or `.so` file is in the same folder.
On Linux, run `export LD_LIBRARY_PATH=.` from the location where the `.so` file is stored.
- If the Nytro Predictor GUI does not display any `.qt` file even after you select the directory containing the `.qt` files, the files might be corrupt or there could be a mismatch between the Nytro Profiler and the trace file versions.
- If the Nytro Predictor GUI fails to start, try these work around solutions:
 - Use JRE version 1.6.0_30 or later.
 - You must have a Java Runtime Environment (JRE) installed. See the documentation accompanying your JRE or JDK to find out into which location the JRE or JDK is installed. Make sure that the `PATH` and `JAVA_HOME` variables are correctly set.

A.3 Software Installation

A.3.1 Installing Xperf

Visit the <http://msdn.microsoft.com/en-us/library/windows/desktop/ff190927%28v=vs.85%29.aspx> link for the installation procedures.

Download ISO (32-bit/64-bit configuration) from the following link:
<http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=8442>.

A.3.2 Installing the Blktrace Tool

Usually, you can select the `blktrace` tool during the Linux installation. For any reason, if you cannot select it during installation, download it from this location <http://rpmfind.net/linux/rpm2html/search.php?query=blktrace> (`blktrace-0.99.3` and later) after downloading, run `rpm -ivh <blktrace package>`.

Appendix B: Error Messages

The Nytro Predictor GUI provides these error messages:

- The device list is invalid.
- Memory is insufficient in the storage disk.
- The trace file provided is invalid.
- The `proc` directory provided is invalid.
- The Nytro Predictor tool does not support this OS.
- The trace file is empty.
- The `proc` directory is empty.
- An internal error has occurred.
- A file error has occurred.
- The trace header is corrupted.
- This file is a bad trace file.
- Check I/O on the devices.
- Check for root directory permission.
- A version mismatch has occurred.
- The trace collection might be in process.
- No disk space is available.
- Provide a trace name.

Appendix C: Revision History

The following table lists the revision history of this document.

Table 1 Revision History

Version and Date	Description of Changes
Version 1.2, December 2012	<ul style="list-style-type: none"> Deleted Windows Server 2012 OS support. Modified the existing note in Section 4.2, Running the Nytro Profiler. Modified the <code>blktrace</code> command in Section 5.2.2, Running the Nytro Profiler and the Converter in the Manual Mode. Modified Figure 7.
Version 1.1, December 2012	<ul style="list-style-type: none"> Added references for Nytro MegaRAID. Modified the <code>user.ini</code> block in Figure 1. Updated the Section 1.1, Supported Operating Systems with new OS support matrix. Added notes to Section 1.3, Software Requirements. Added a note to first bullet in the Section 2, Best Practices. Replaced the existing help options in the Legend section. Restructured the Windows and Linux commands sections and modified the Nytro Profiler commands in Chapter 4, Running the Nytro Profiler On Windows and Chapter 5, Running the Nytro Profiler On Linux. Replaced the existing figures with Figure 3 and Figure 4.
Version 1.0, October 2012	<p>Modified these sections:</p> <ul style="list-style-type: none"> Chapter 1: Nytro Predictor Software Tool Overview. Section 1.4, Application Directory Structure. Section 4.2.2, Running the Nytro Profiler and Converter in the Manual Mode. Section 5.2.2, Running the Nytro Profiler and the Converter in the Manual Mode. Chapter 2: Best Practices. Appendix A: Troubleshooting. Appendix B: Error Messages. <p>Released the document to LSI web site.</p>
Version 0.2, May 2012	Initial release of the advance document.

Glossary

Special Characters

C

CLI Command Line Interface

D

DAS Direct Attached Storage

G

GUI Graphical User Interface

H

HDD Hard Disk Drive

J

JRE Java Runtime Environment

JVM Java Virtual Machine

L

LVM Logical Block Address

M

MSWPT Microsoft Windows Performance Toolkit

O

OS Operating System

R

RHEL Red Hat Enterprise Linux

S

SDK Software Development Kit

SLES SuSE Linux Enterprise Server

T

TBD To be determined

V

VD Virtual Disk



Storage. Networking. Accelerated.™