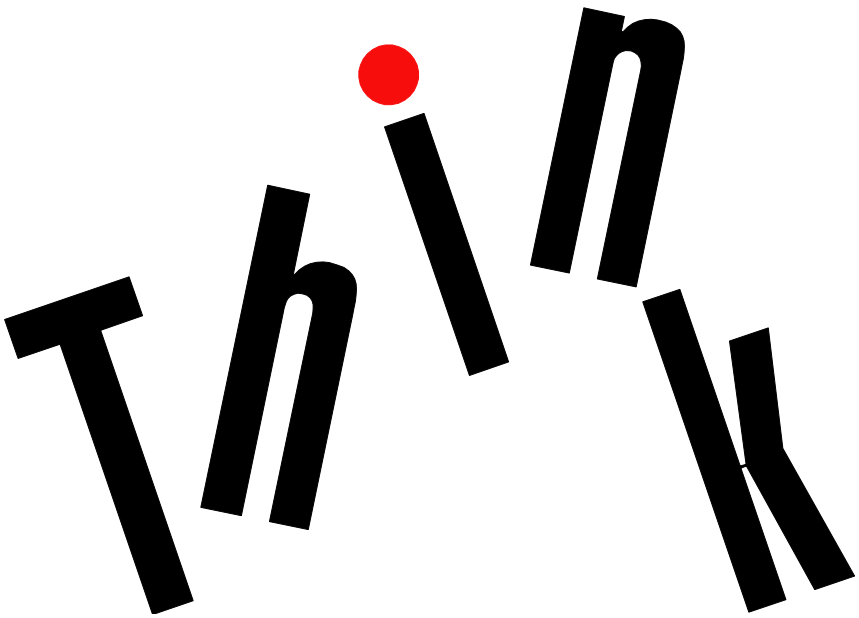
Lenovo

ThinkServer®

Lenovo ThinkServer Diagnostics Embedded Edition User Guide



Notes:

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information about the products and services currently available in your area.

LENOVO PROVIDES THIS PUBLICATION “AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

UNDER NO CIRCUMSTANCES IS LENOVO, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING EVEN IF INFORMED OF THEIR POSSIBILITY: 1) THIRD PARTY CLAIMS AGAINST YOU FOR DAMAGES; 2) LOSS OF, OR DAMAGE TO, YOUR DATA INCLUDING THE USB KEY THAT TO BE FORMATED; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, BUSINESS REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk.

Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Lenovo, the Lenovo logo, ThinkServer, and the ThinkServer logo are trademarks of Lenovo in the United States, other countries, or both.

Microsoft, Windows, and Windows server are trademarks of the Microsoft group of companies.

Linux is a registered trademark of Linus Torvalds.

Other company, product, or service names may be trademarks or service marks of others.

Content

About this document **3**

1 Introduction **1**

1.1 LTDE overview 1

1.2 Related documentation 1

2 Launching LTDE **2**

3 Main functions **4**

3.1 Viewing system information 4

3.2 Collecting system-related information 5

3.3 Running the health check 7

3.4 Running the CPU test 10

3.5 Running the memory test 13

3.6 Running the HDD test 15

3.7 Running all tests 17

3.8 Changing the FRU information 20

3.9 Performing network settings 21

3.10 Setting a log storage path 22

4 Updating LTDE **26**

4.1 Updating LTDE by TDM 26

4.2 Updating LTDE on the TSM Web UI 30

4.3 Updating LTDE by OSPUT 33

4.3.1 Updating LTDE by OSPUT (Windows) 33

4.3.2 Updating LTDE by OSPUT (Linux) 36

4.4 Updating LTDE on the TSM command-line interface 37

About this document

This document provides information about how to use the embedded edition of the Lenovo® ThinkServer® Diagnostics program (hereinafter referred to as LTDE). LTDE can assist you or Lenovo service technicians to diagnose system problems.

1 Introduction

1.1 LTDE overview

LTDE is a diagnostic tool that runs before your server enters an operating system. LTDE enables you to run diagnostics tests on the server and collect service data including system information and logs.

LTDE resides in the following Lenovo ThinkServer systems:

- ThinkServer RD350
- ThinkServer RD450
- ThinkServer RD550
- ThinkServer RD650
- ThinkServer TD350

To obtain the latest information about LTDE, go to:
http://support.lenovo.com/us/en/downloads/ds102932

1.2 Related documentation

The Lenovo Limited Warranty (LLW) contains warranty terms that apply to the product you purchased from Lenovo. You can read the LLW on the documentation DVD that comes with your server or get a printable version of the latest LLW in more than 30 languages at http://www.lenovo.com/warranty/llw_02. If you cannot obtain the LLW through the documentation DVD or Lenovo Web site, contact your local Lenovo office or reseller to obtain a printed version of the LLW for free.

For warranty service, refer to the worldwide Lenovo Support telephone list. Telephone numbers are subject to change without notice. The most up-to-date telephone list for Lenovo Support is always available on the Web site at http://www.lenovo.com/support/phone. If the telephone number for your country or region is not listed, contact your Lenovo reseller or Lenovo marketing representative.

Lenovo maintains pages on the World Wide Web where you can get the latest technical information and download documentation or device drivers and updates. To access the Lenovo Support Web site, go to:
http://www.lenovo.com/support

2 Launching LTDE

You can launch LTDE through one of the following methods:

- Turn on the server. Press F2 as soon as you see the ThinkServer logo screen.

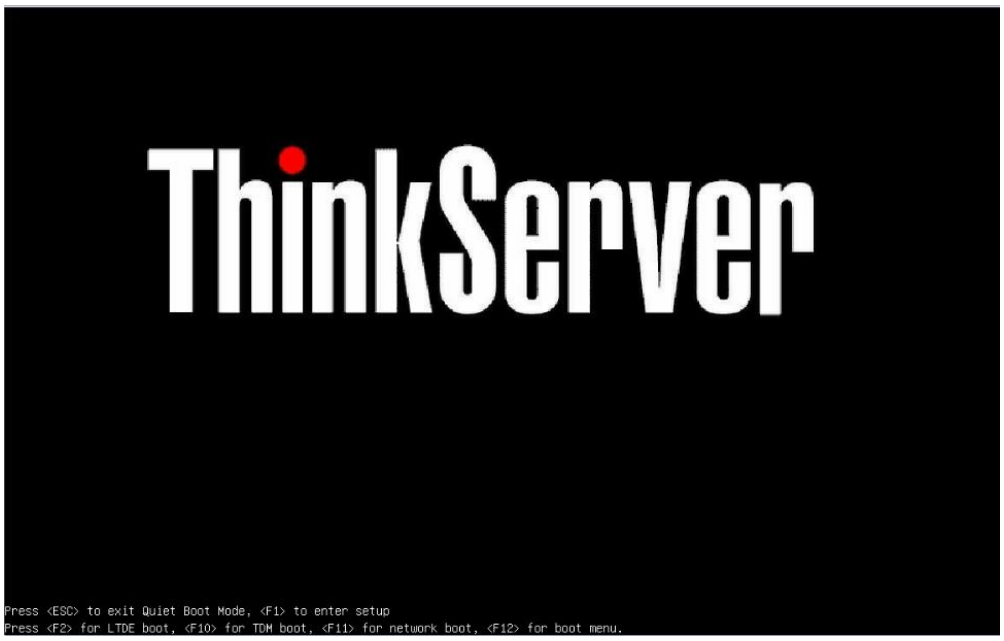


Figure 2-1 ThinkServer logo screen

- Turn on the server. Press F1 as soon as you see the ThinkServer logo screen. On the Basic Input Output System (BIOS) setup menu, select **Boot Manager -> Launch Diagnostics**.

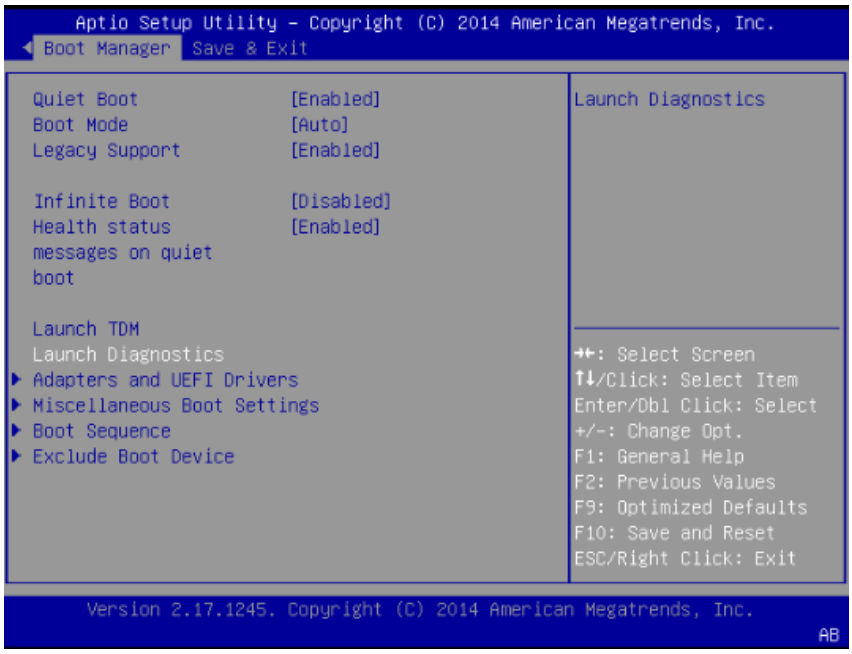


Figure 2-2 BIOS setup menu

3 Main functions

This chapter describes the main functions of LTDE.

3.1 Viewing system information

The System Info function enables you to view the following system information:

- System overview
- Central processing unit (CPU) information
- Dual in-line memory module (DIMM) information
- General information about the peripheral component interconnect (PCI) card adapters
- Detailed information about the PCI card adapters
- Hard disk drive (HDD) information
- Power supply unit (PSU) information

Click the **System Info** tab and view the displayed system information by using the scroll bar on the right pane.

Note: Service engineers can click **Modify FRU** on the System Info interface to change Field Replaceable Unit (FRU) information after system board replacement. For detailed information, refer to chapter 3.8 Changing the FRU information.

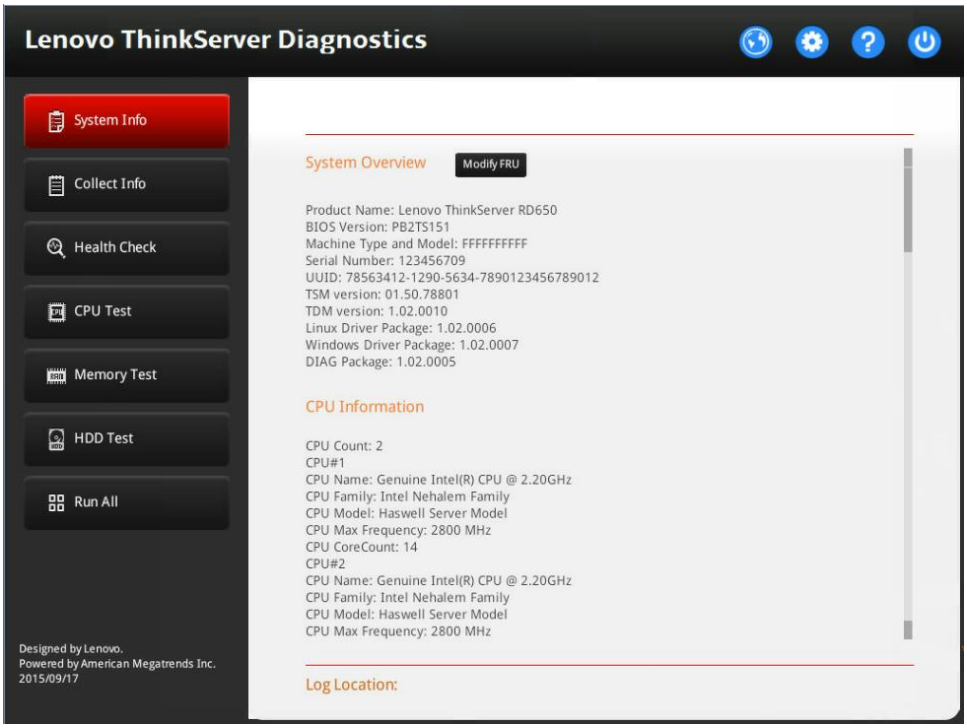


Figure 3-1 System Info interface

3.2 Collecting system-related information

The Collect Info function enables you to collect the following system-related information:

- System configuration
- PCI device and PCI-Express card information
- Logs related to Redundant Array of Independent Disks (RAID)
- Intelligent Platform Management Interface (IPMI) event logs
- Operating system logs (if selected)

To collect system-related information, do the following:

1. Click the **Collect Info** tab, and click **Run** on the right pane.

   If you select **Option: When selected, collects below user OS info if applicable**, the following files are collected, depending on the operating system:

   - For the Microsoft® Windows® operating system: system event log files and files in the Minidump folder
   - For the Linux® operating system: startup configuration file

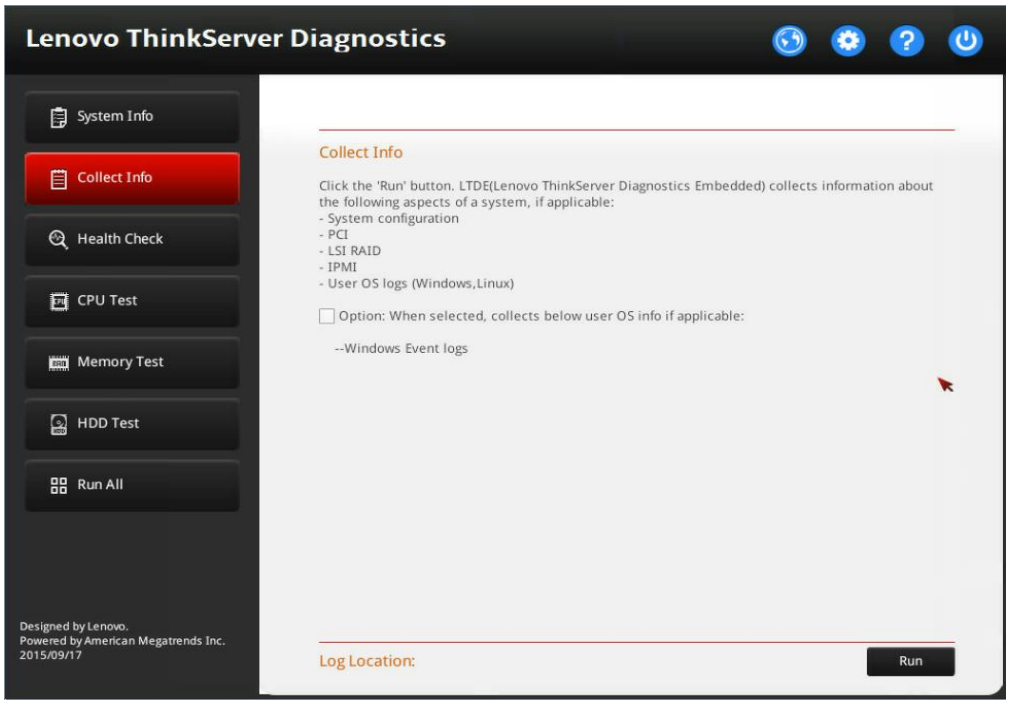


Figure 3-2 Collect Info interface

The log collection process takes several minutes, depending on the system configuration. A progress bar is displayed to indicate the log collection progress.

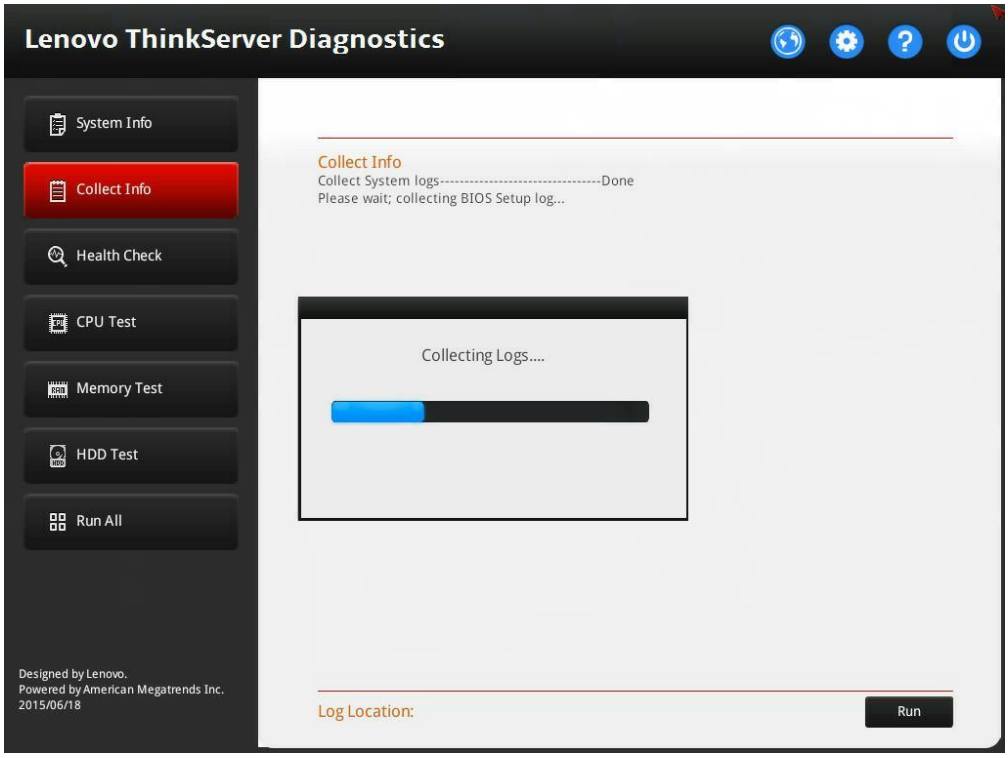


Figure 3-3 Progress bar (log collecting)

Note: The mouse pointer does not work until the log collection process is completed.

When a log collection item is completed, a completion result “Done” is displayed on the interface.

2. After the whole log collection process is completed, click **Save** to save the collected logs.

   The logs are saved in a system_info.txt file in the log storage path.

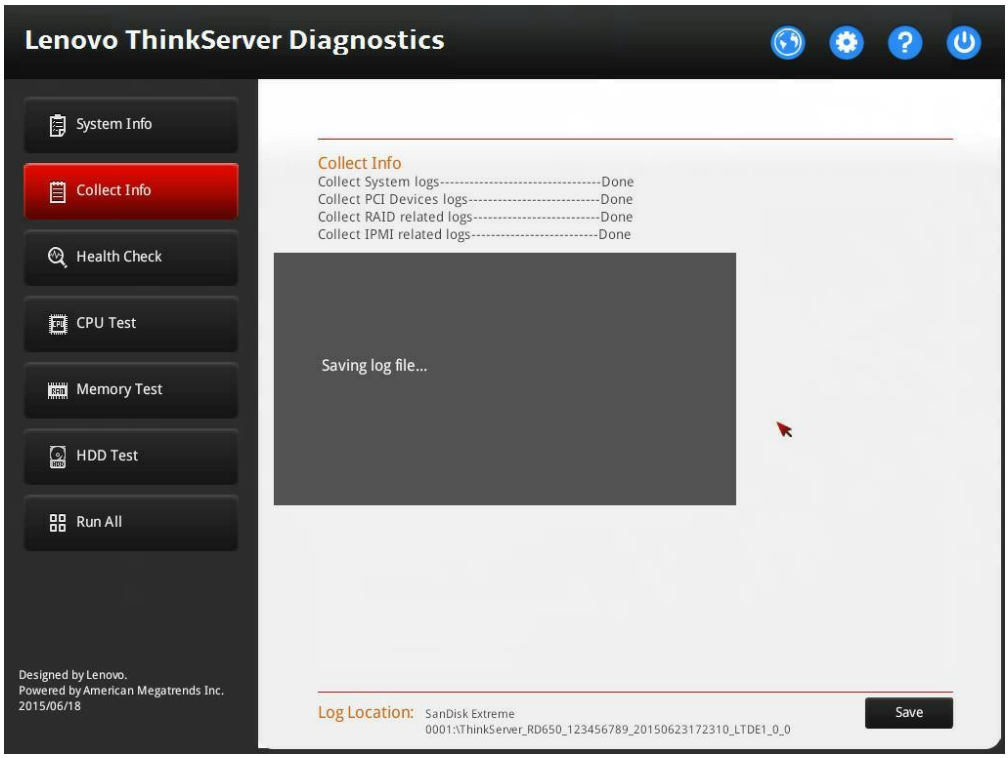


Figure 3-4 Log saving window

3.3 Running the health check

The Health Check function enables you to do the following:

- RAID and HDD status check

  This item collects LSI RAID event records and HDD Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T.) check result. If a critical, fatal, or warning event is detected, a notice is displayed in the check result.

- ThinkServer System Manager (TSM) self-test

  This item checks the working status of TSM. If the status is abnormal, a notice is displayed to provide detailed information.

- Light emitting diode (LED) status check

  This item checks the status of the system ID LED, the TSM heartbeat LED, the system health LED, PSU fault LEDs, and system fan fault LEDs.

  - If the system ID LED is on, you can quickly locate the server.
  - If the TSM heartbeat LED is blinking, TSM works properly.
  - If the system health LED is on, the server does not work properly.
  - If a PSU fault LED is on, the model and registers of the faulty PSU are checked to identify the fault.
  - If a system fan fault LED is on, the speed and status of the faulty fan are checked.

- Sensor status check

This item checks the status of TSM sensors. The check result includes sensor number, sensor name, sensor status, and sensor reading information (only for threshold sensors). If the status of the sensor is abnormal, a notice is displayed to provide detailed information.

- Collection of five latest System Event Log (SEL) records

  A maximum of five latest SEL records are displayed in the check result. You can view all SEL logs in the log storage path after saving the health check logs.

To run the health check, do the following:

1. Click the **Health Check** tab, and click **Run** on the right pane.

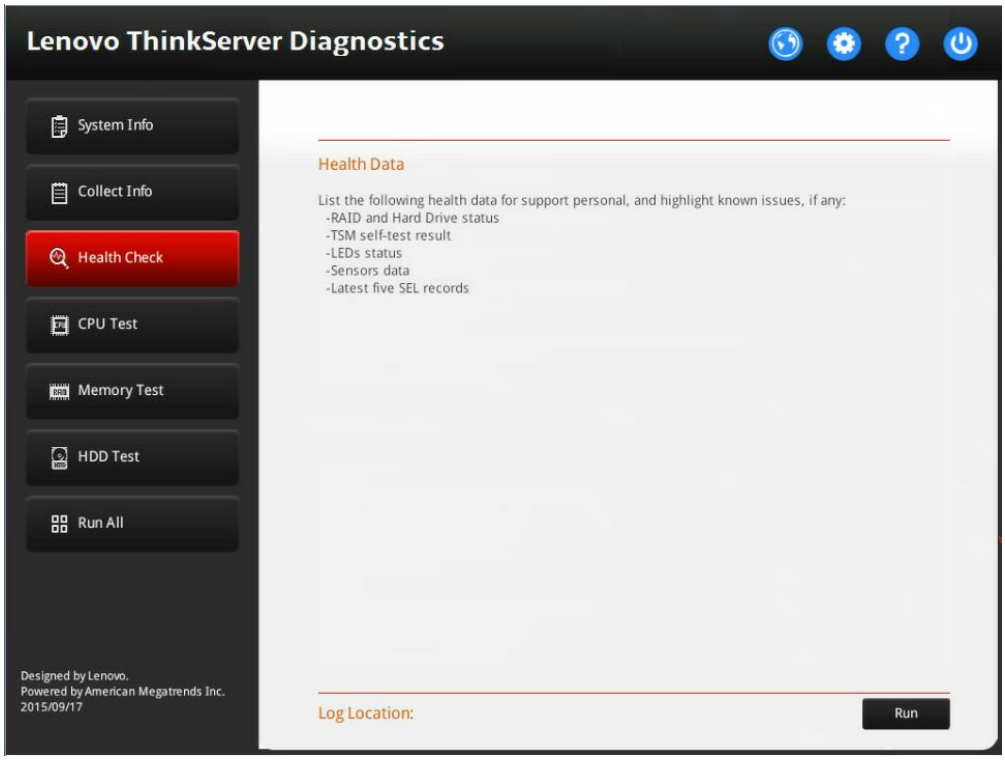


Figure 3-5 Health Check interface

The health check process takes several minutes, depending on the system configuration.

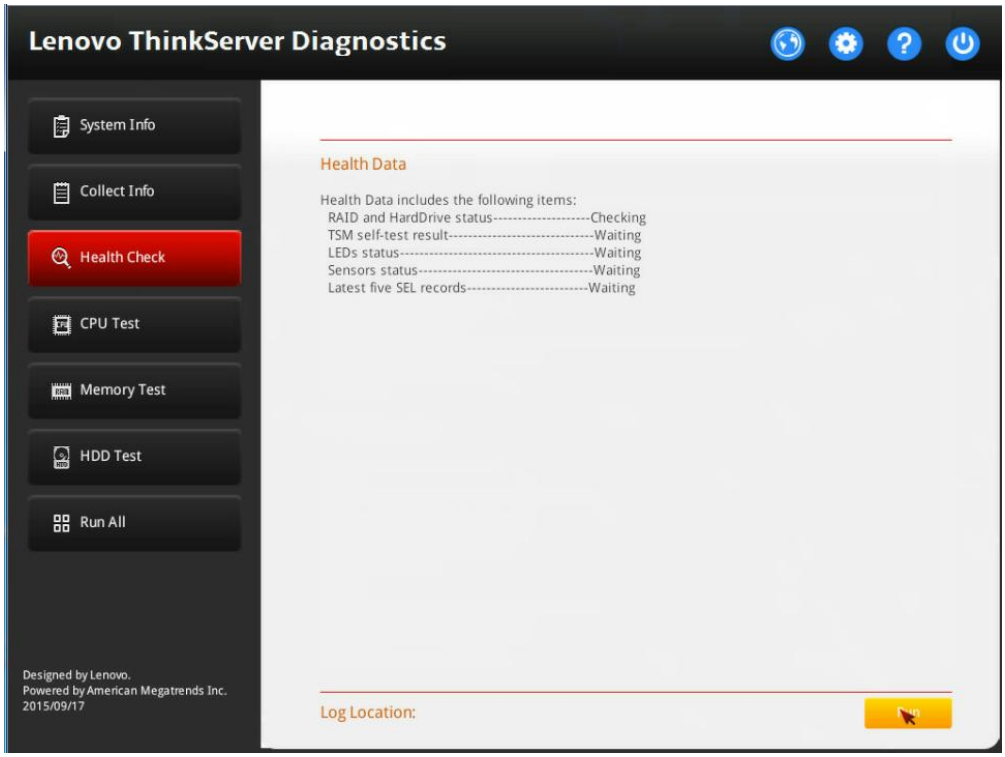


Figure 3-6 Heath Check interface (check running)

Note: The mouse pointer does not work until the health check process is completed.

When a test item is completed, a completion result “Done” is displayed on the interface.

If a problem is detected during the test, a notice is displayed in the test results.

2. After the health check process is completed, click **View Log** to view LSI-related information or click **Save** to save the logs.

   The logs are saved in a health_check.txt file in the log storage path.

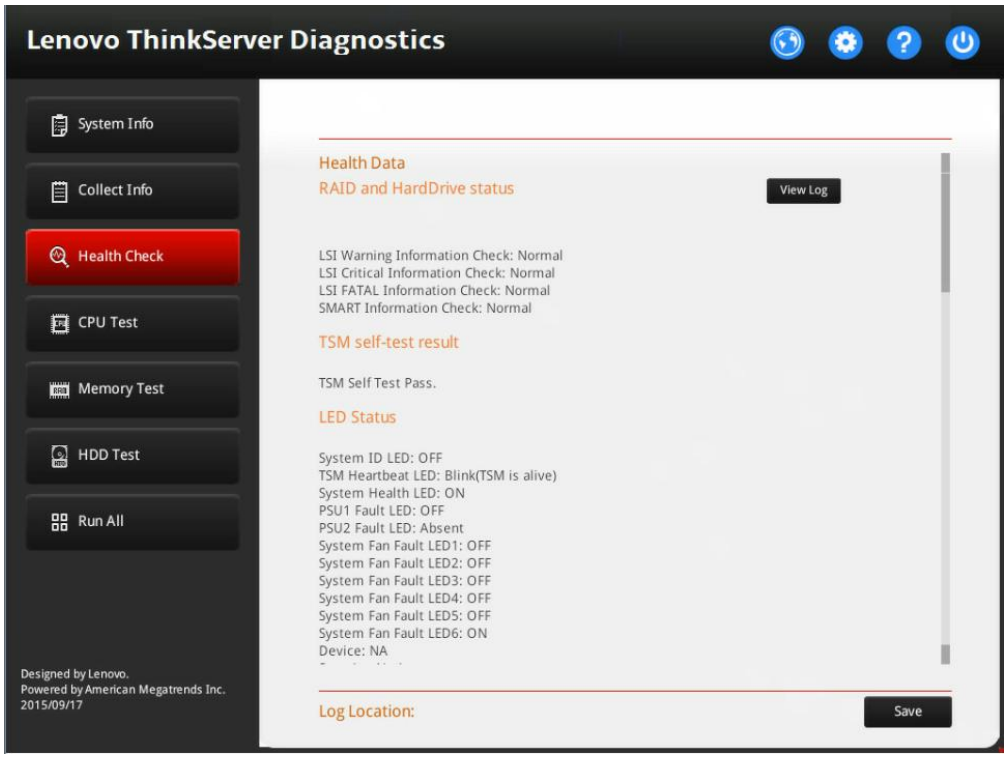


Figure 3-7 Health Check interface (check completed)

3.4 Running the CPU test

The CPU Test function enables you to perform the following operations:

- Getting the number of CPU cores
- Getting the CPU cache size
- Frequency test
- Floating point test
- Multimedia extensions (MMX) test
- Temperature test
- Machine check (MC) status register check

Note: In the CPU test, every core of the tested CPU is checked.

To run the CPU test, do the following:

1. Click the **CPU Test** tab, and click **Run** on the right pane.

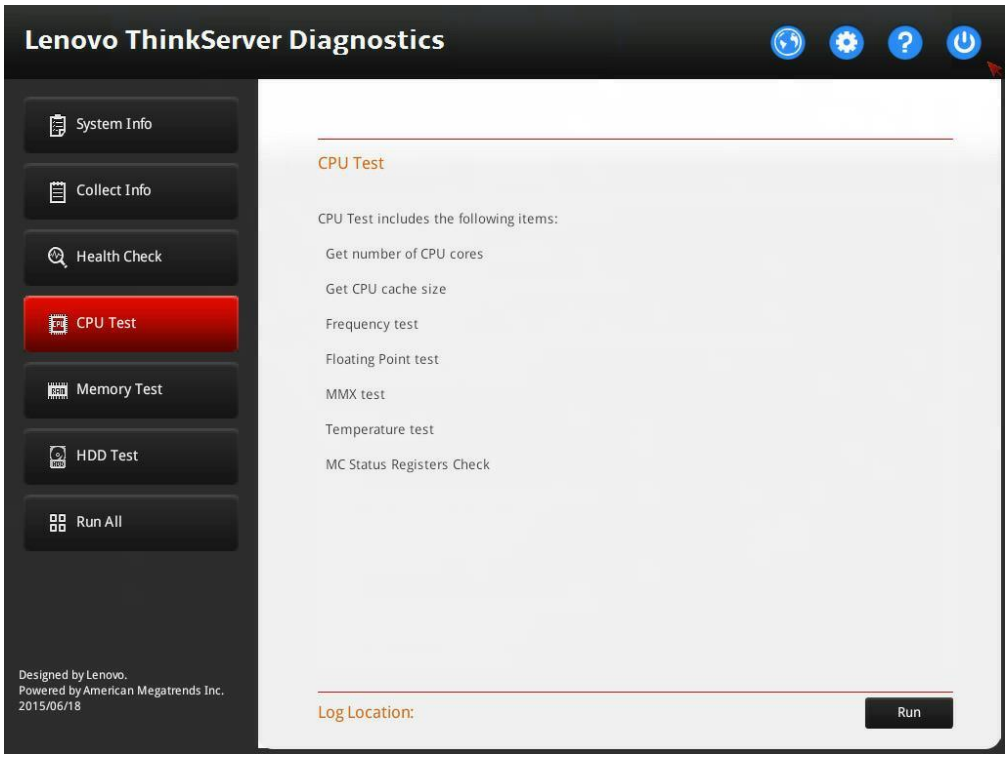


Figure 3-8 CPU Test interface

A progress bar is displayed to indicate the test progress.

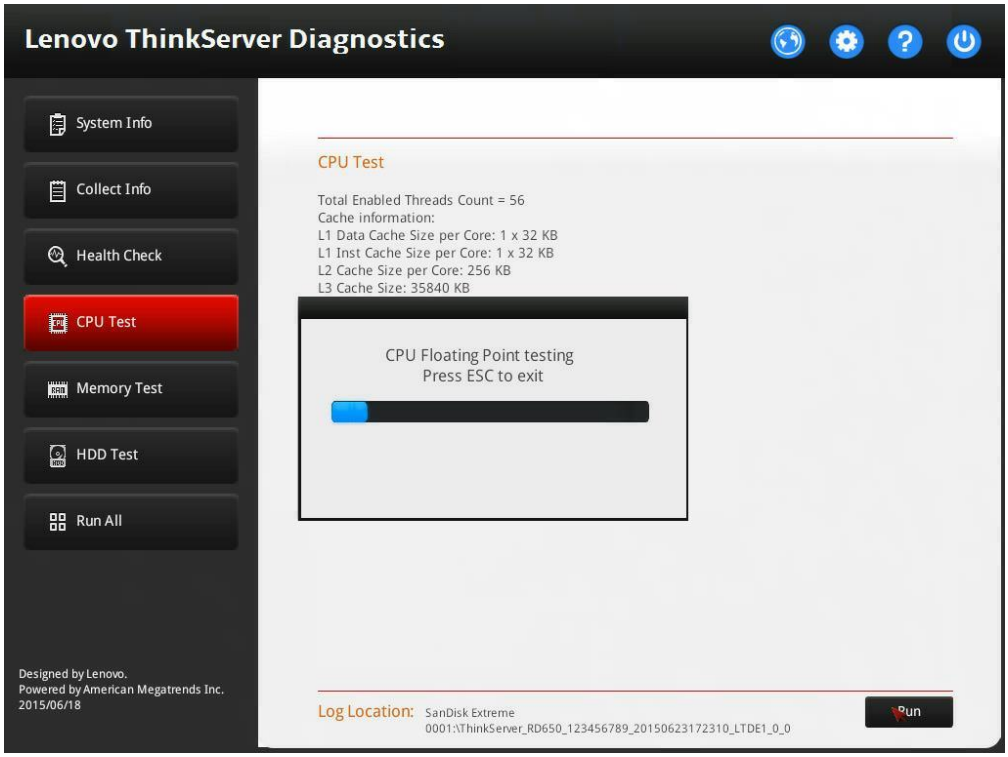


Figure 3-9 Progress bar (CPU test running)

Notes:

- The mouse pointer does not work until the test process is completed.
- You can press Esc to quit the test.

2. After the test process is completed, click **Save** to save the logs.

   The logs are stored in a test_cpu.txt file in the log storage path.

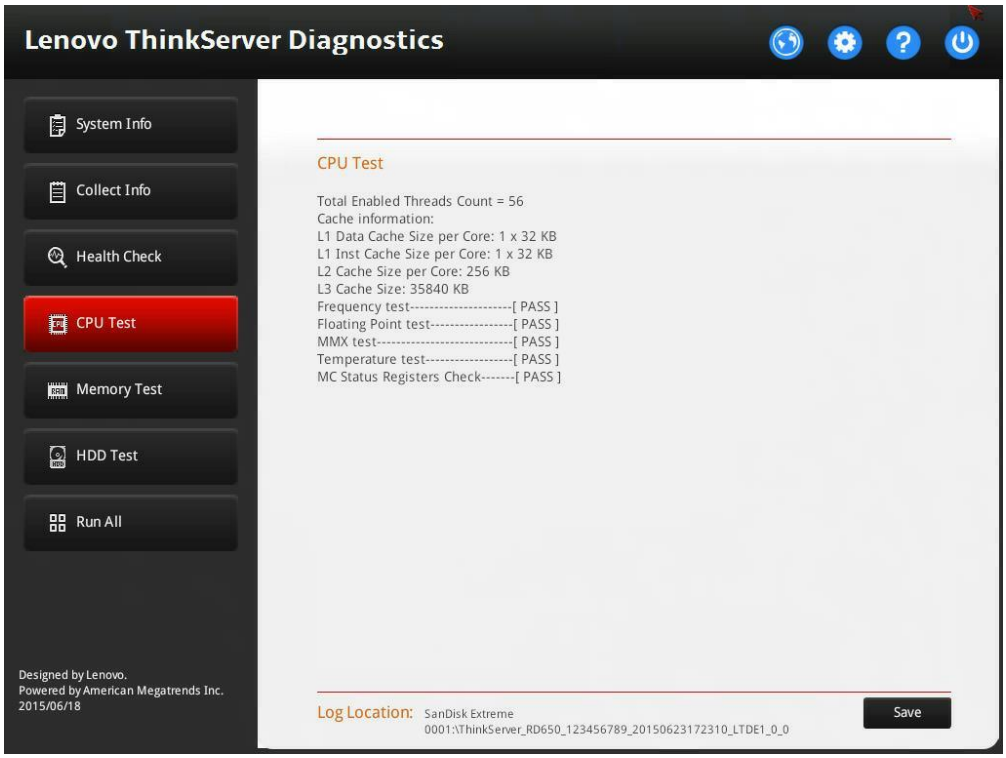


Figure 3-10 CPU Test interface (test completed)

3.5 Running the memory test

The Memory Test function enables you to test the system memory.

To run the memory test, do the following:

1. Click the **Memory Test** tab, and configure the test mode and test items according to your needs. Then, click **Run**.

In the **Memory Test Patterns** section, **WriteRead Test** is selected by default.

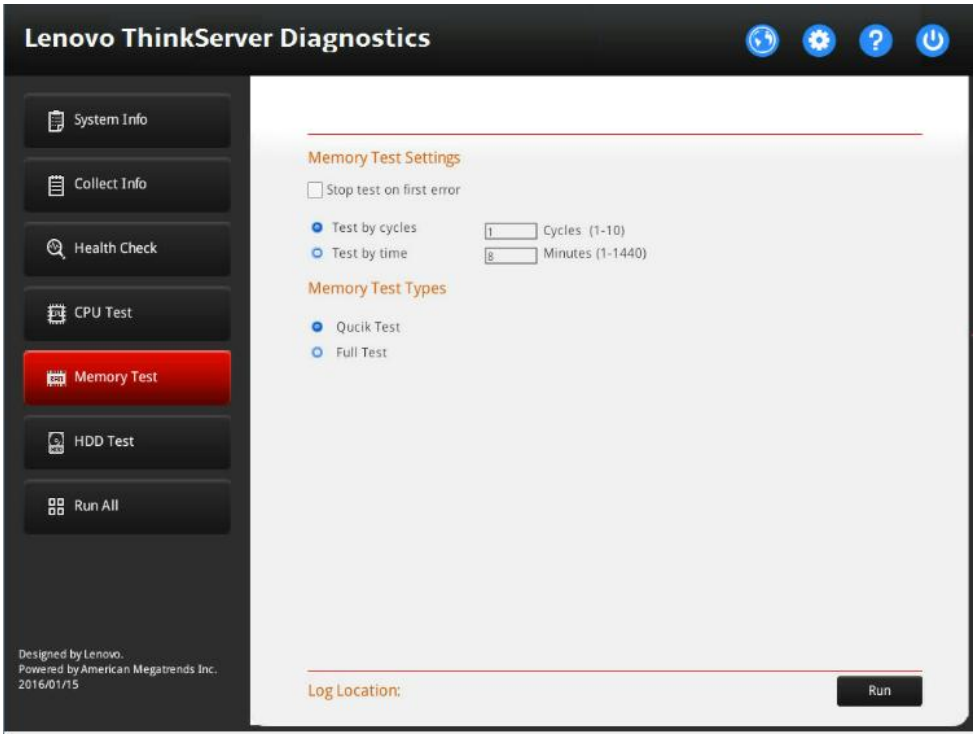


Figure 3-11 Memory Test interface

During the memory test, the status of each selected test item is displayed on the interface.

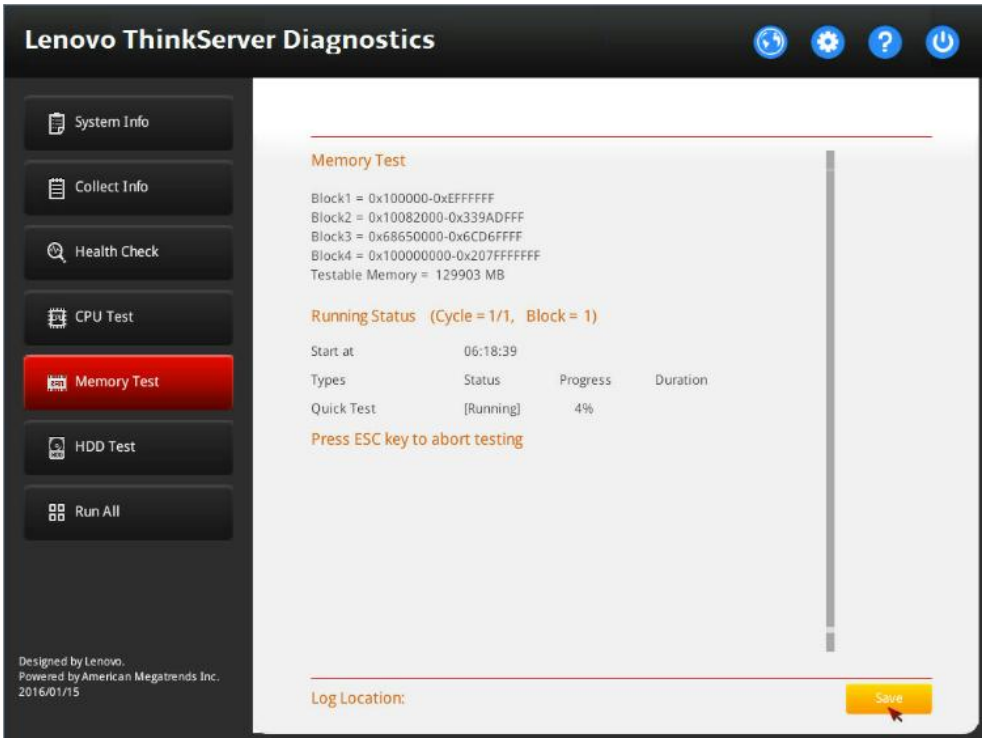


Figure 3-12 Memory Test interface (test running)

Notes:

- The mouse pointer does not work until the test process is completed.
- You can press Esc to quit the test.

2. After the test process is completed, click **Save** to save the logs.

   The logs are saved in a test_mem.txt file in the log storage path and include more details than the test results displayed on the interface.

3.6 Running the HDD test

The HDD Test function enables you to check the HDD status.

To run the HDD test, do the following:

1. Click the **HDD Test** tab, select the HDDs and test items, and then click **Run**.

   By default, all HDDs displayed on the interface and **Short Self Test** are selected.

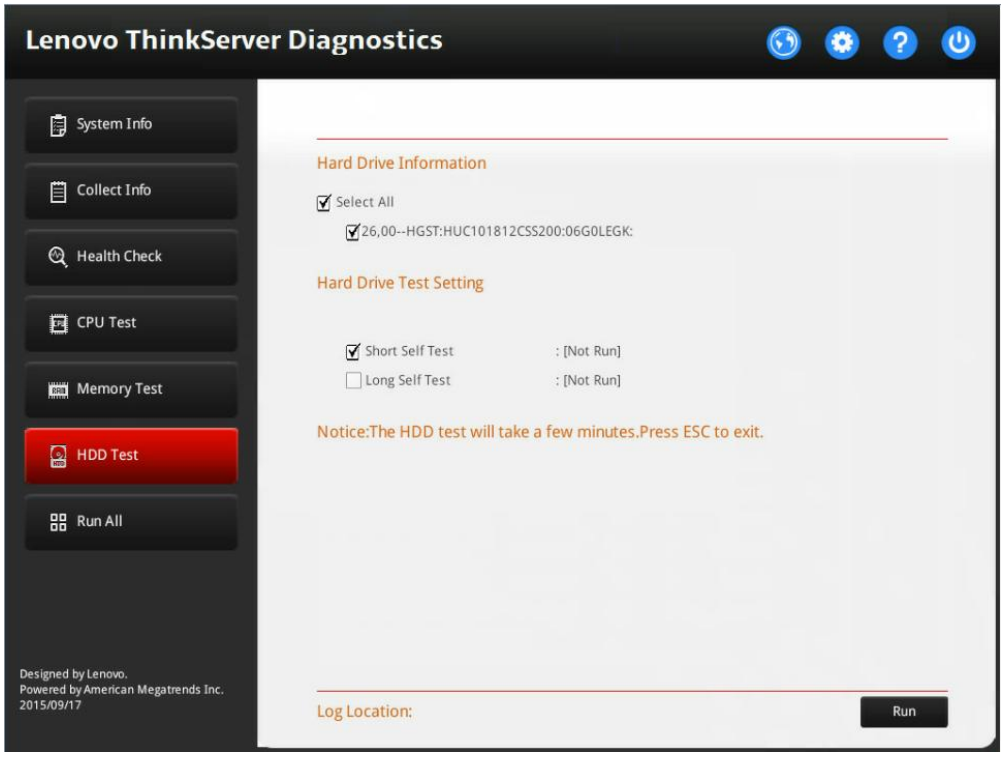


Figure 3-13 HDD Test interface

A progress bar is displayed to indicate the test progress.

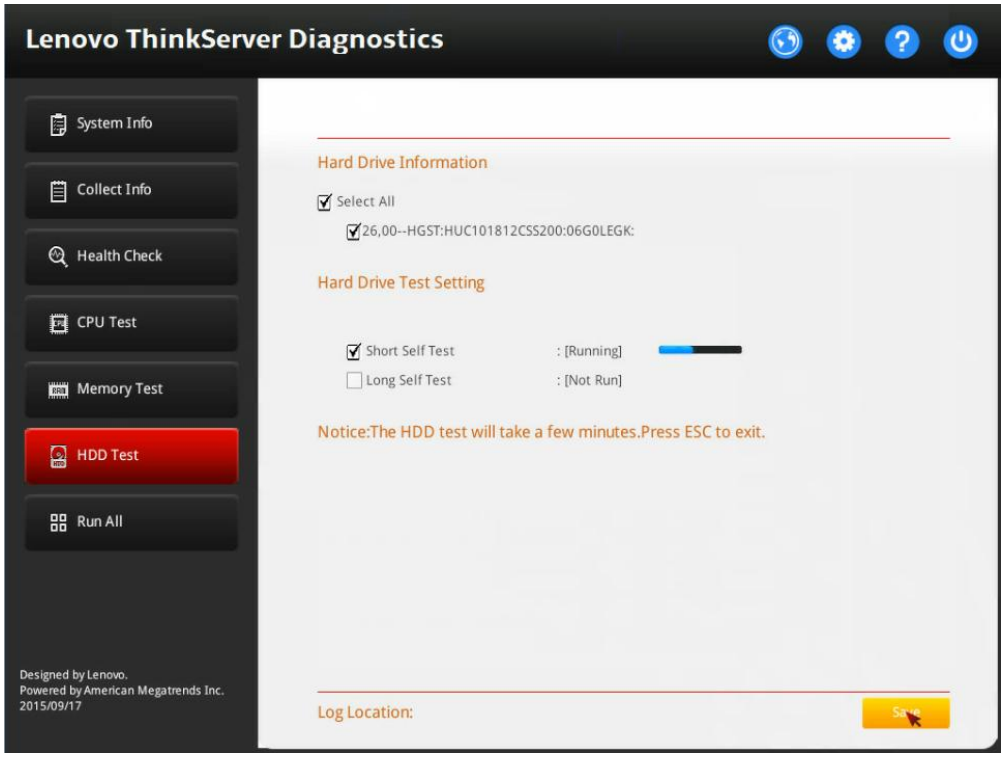


Figure 3-14 HDD Test interface (test running)

Notes:

- The mouse pointer does not work until the test process is completed.
- You can press Esc to quit the test.

2. After the test process is completed, click **Save** to save logs.

   The logs are stored in a test_hdd.txt file in the log storage path.

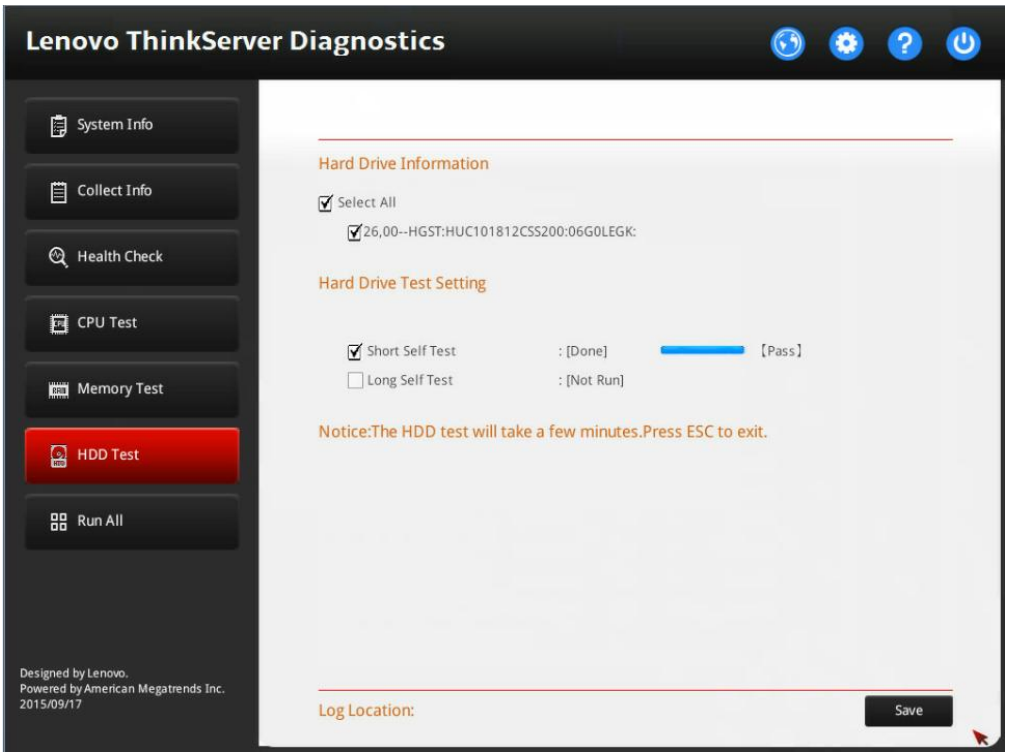


Figure 3-15 HDD Test interface (test completed)

Note：HDD Test only supports system with LSI raid card configuration. Not Support onboard raid and non-raid configuration.

3.7 Running all tests

The Run All function enables you to run one or all of the following test items:

- Collect Info
- Health Check
- CPU Test
- Memory Test
- HDD Test

To collect system-related information and run all tests at one time, do the following:

1. Click the **Run All** tab, select the test items according to your needs, and then click **Run** to run all the selected items.

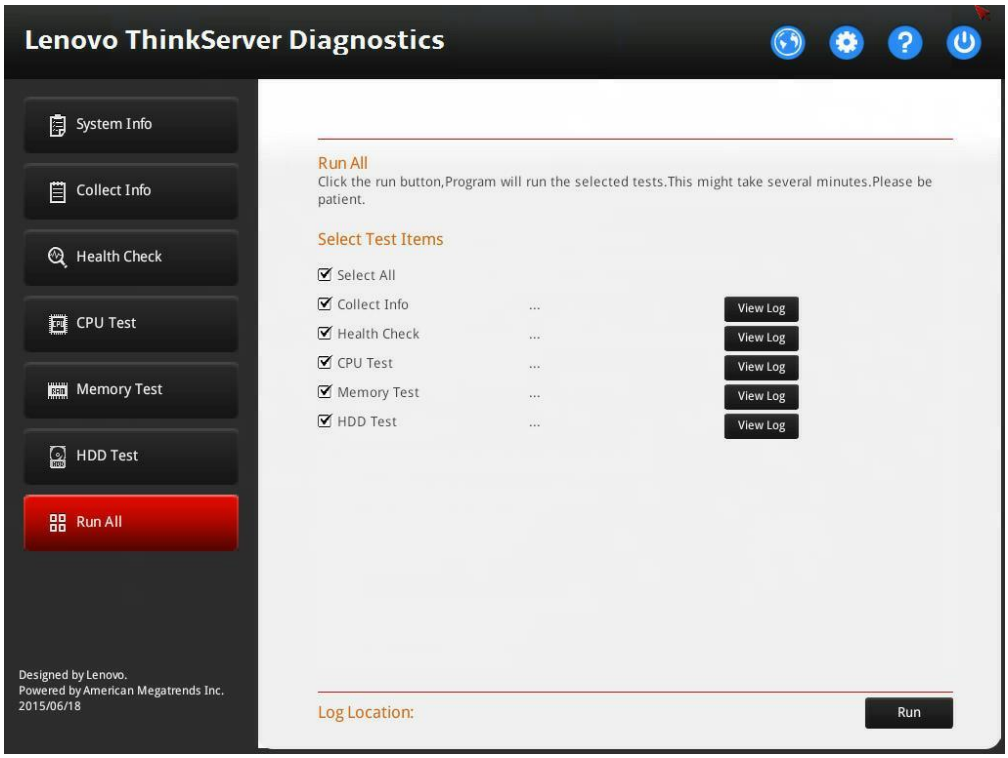


Figure 3-16 Run All interface

2. After all the selected test items are completed, click **View Log** to view the test logs or click **Save** to save the logs.

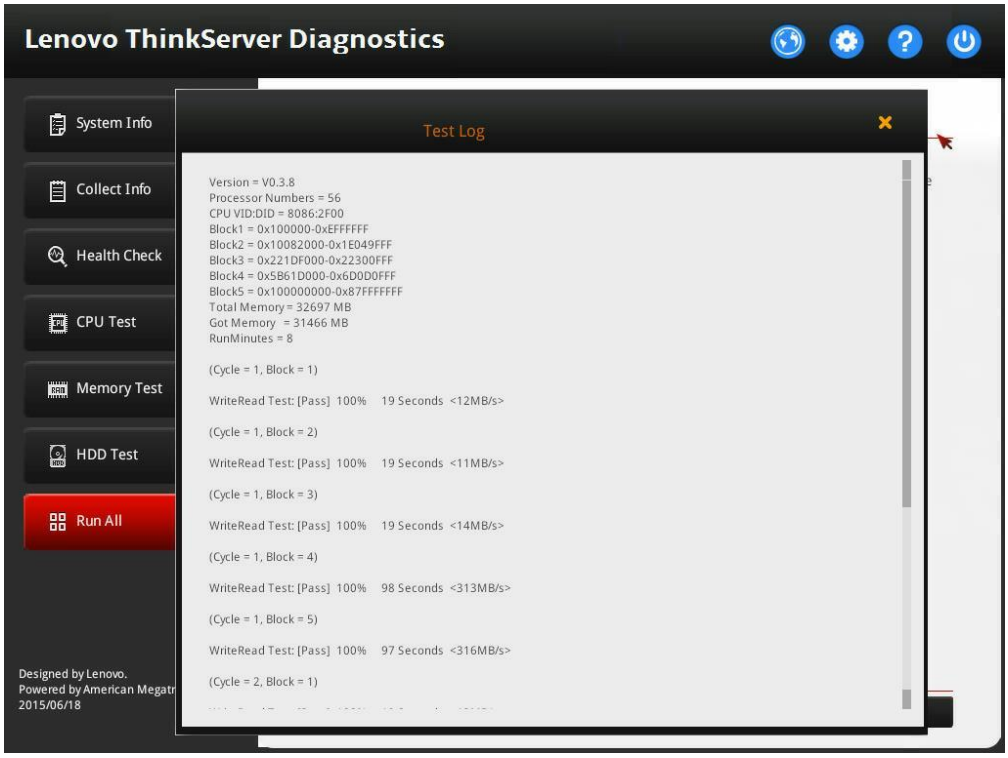


Figure 3-17 Log viewing window

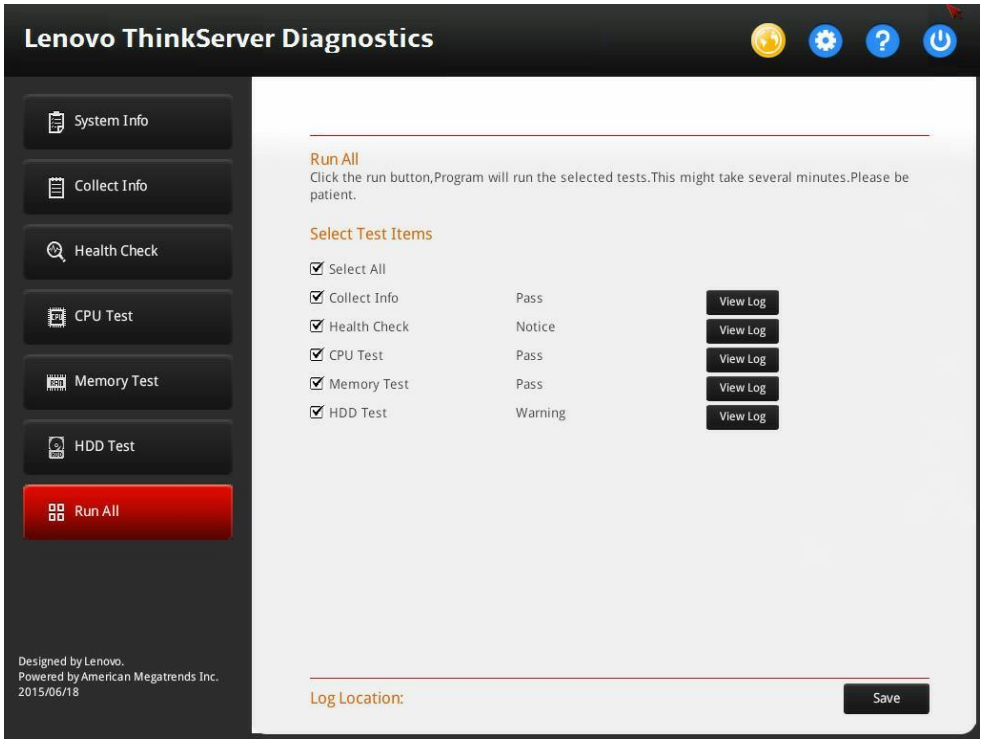


Figure 3-18 Run All interface (test completed)

3.8 Changing the FRU information

The FRU information change function enables you to update the following FRU information for a system board in the server:

- Product manufacturer
- Product name
- Product serial number
- Product asset tag
- Universally Unique Identifier (UUID)

Attention: Only Lenovo service technicians can change the FRU information. Incorrect FRU information change might affect the product warranty.

To change FRU information, do the following:

1. Click the **System Info** tab, and click **Modify FRU** on the right pane.

Figure 3-19 System Info interface

2. In the displayed Modify FRU window, change the values of **Product Mfg**, **Product Name**, **Product Serial**, **Product Version** and **Product Asset Tag**. Click **Auto** to generate a new UUID value. Then, click **Update** to validate the changes.

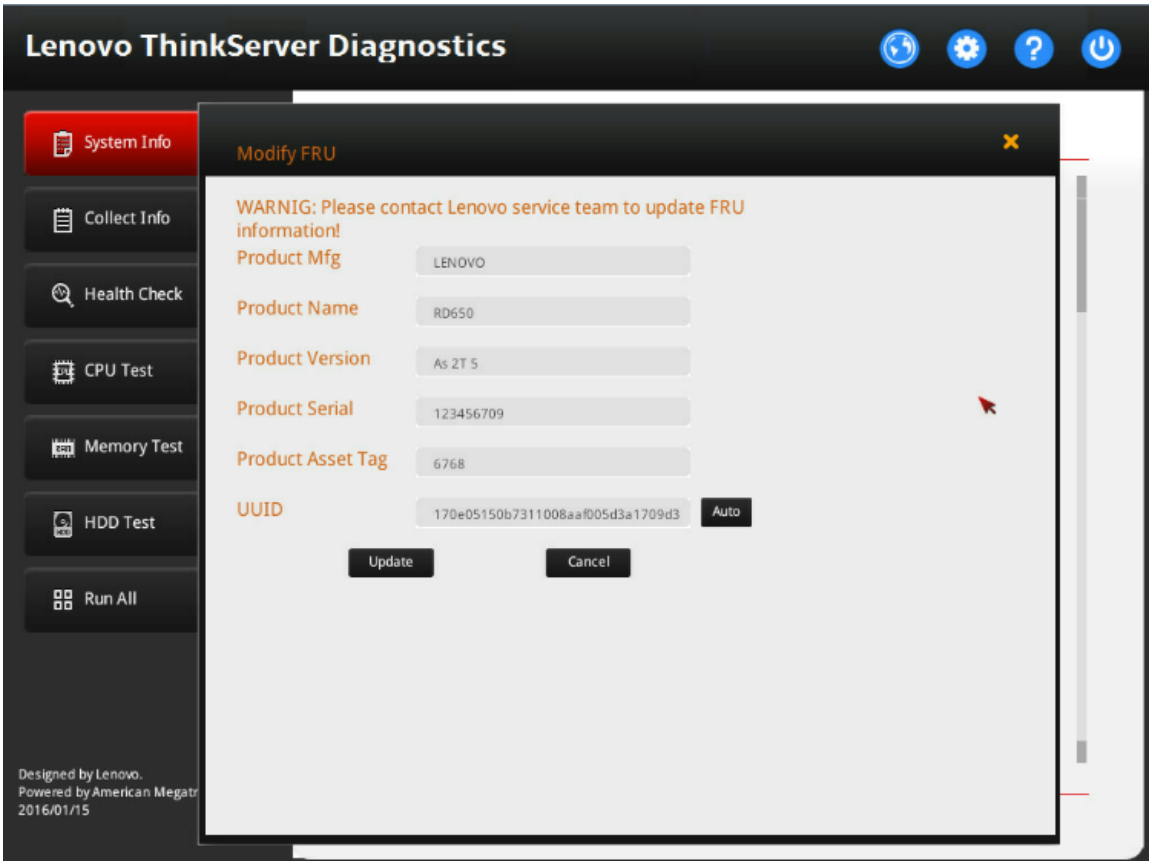


Figure 3-20 Modify FRU window

3.9 Performing network settings

The network setting function enables you to set a Windows share folder to save logs in a network.

To perform network settings, do the following:

1. Click the network settings icon on the upper-right corner of the LTDE main interface.

2. In the displayed Network Settings window, set the IP addresses for storing logs on a network location.

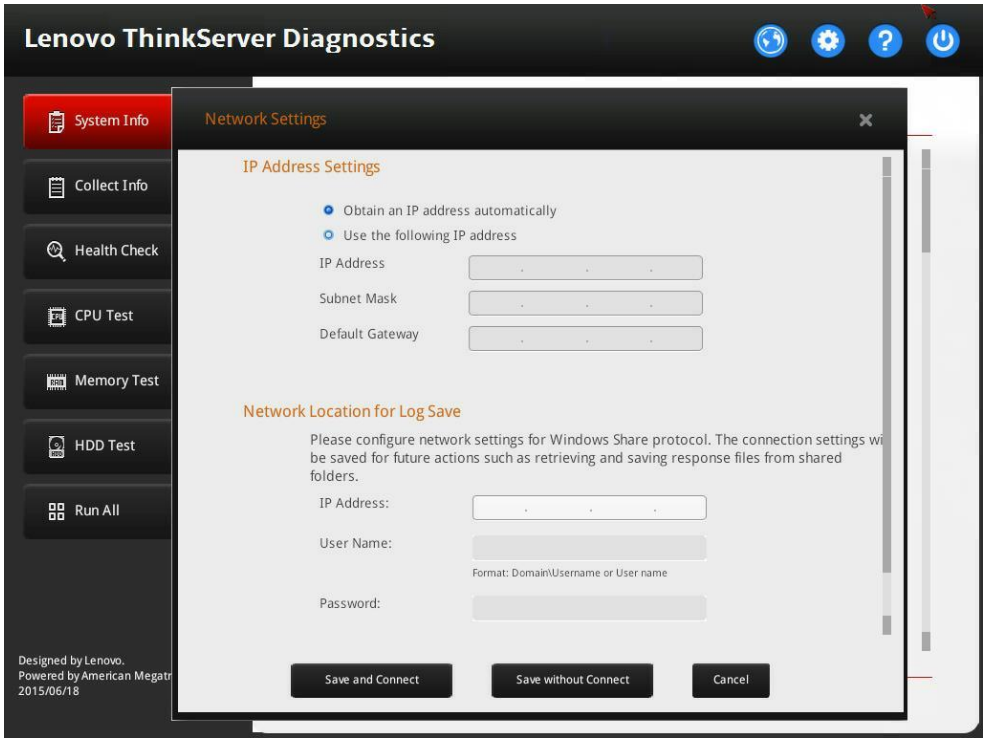


Figure 3-21 Network Settings window

3. Click **Save and Connect**.

3.10 Setting a log storage path

If it is the first time you click **Save** on the LTDE main interface, you will be prompted to set the log storage path. After the setting, all saved logs are stored in this path.

To set the log storage path, do the following:

1. After collecting system-related information or running any check, click **Save** on the LTDE main interface.

2. In the displayed Save to window, select a log storage path, such as a Windows Share folder set in the Network Settings window or a Universal Serial Bus (USB) key attached to the server. Then, click **OK**.

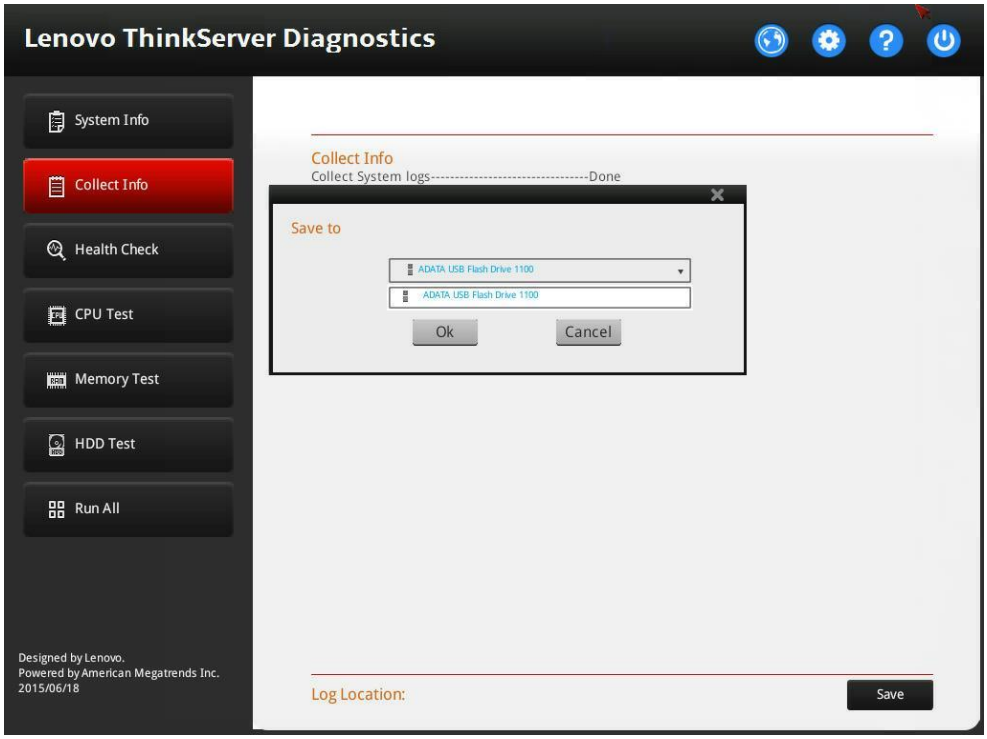


Figure 3-22 Save to window

A folder named in the format of ThinkServer_*product name_serial number_timestamp_LTDE version number* (such as ThinkServer_RD650_123456789_20150623172310_LTDE1_0_0) is created in the path and stores all saved logs. Both the selected path and the created folder name are displayed in the **Log Location** section at the bottom of the main interface.

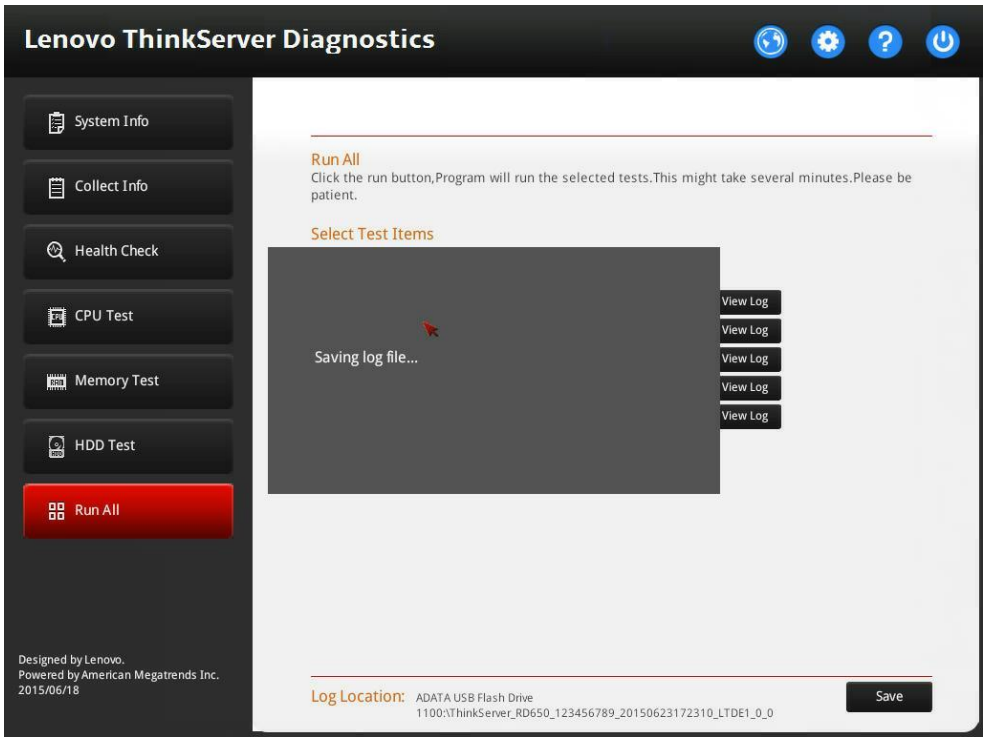


Figure 3-23 Log saving window

The log files stored in the folder include:

- application.evtx: Windows application event file (a duplicate of application.evtx in \windows\system32\winevt\logs in the Windows file system)
- security.evtx: Windows security event file (a duplicate of security.evtx in \windows\system32\winevt\ogs in the Windows file system)
- system.evtx: Windows system event file (a duplicate of system.evtx in \windows\system32\winevt\logs in the Windows file system)
- Bios_settings.txt: BIOS setting information
- drivers.txt: unified extensible firmware interface (UEFI) environment driver information
- health_check.txt: health check log
- TSM_Info.txt: TSM-related information, including TSM version, PSU status, FRU information, BMC-related information, and TSM device status
- map.txt: UEFI storage mapping information
- pci.txt: PCI device information
- pci-i.txt: PCI-Express card information
- seldump.txt: IPMI SEL
- smbiosview.txt: UEFI system management (SMBIOS) log
- storcli_c0show.txt: RAID 0 controller overview
- storcli_ctrlcount.txt: RAID controller quantity

- storcli_events.txt: RAID event log
- storcli_fwtermlogs.txt: RAID firmware log
- storcli_showall.txt: detailed RAID information
- storcli_smartlog.txt: RAID S.M.A.R.T. check log
- system_info.txt: system-related information
- test_cpu.txt: CPU test log
- test_mem.txt: memory test log
- test_hdd.txt: HDD test log
- grub.conf: Linux startup configuration file (a duplicate of grub.conf in \efi\redhat in the Windows file system)
- *XX*.evtx: system even logs
- *XX*.dmp: Minidump files in the Minidump folder of the Windows operating system

4 Updating LTDE

To update LTDE, use one of the following tools:

- ThinkServer Deployment Manager (TDM): recommended
- TSM Web user interface (UI)
- Operating System-based Platform Update Tool (OSPUT)
- TSM command-line interface

4.1 Updating LTDE by TDM

Prerequisites: The LTDE bundle file with the .bdl extension (such as LTDE_v1.*x*.*x*.bdl) is copied to a USB key, and the USB key is attached to the server.

To update LTDE by TDM, do the following:

1. Turn on the server.
2. Press F10 to start TDM as soon as you see the ThinkServer logo screen.

Figure 4-1 ThinkServer logo screen

3. From the TDM main interface, click the **Platform Update** tab. Select **Application** on the right pane and then click **Next**.

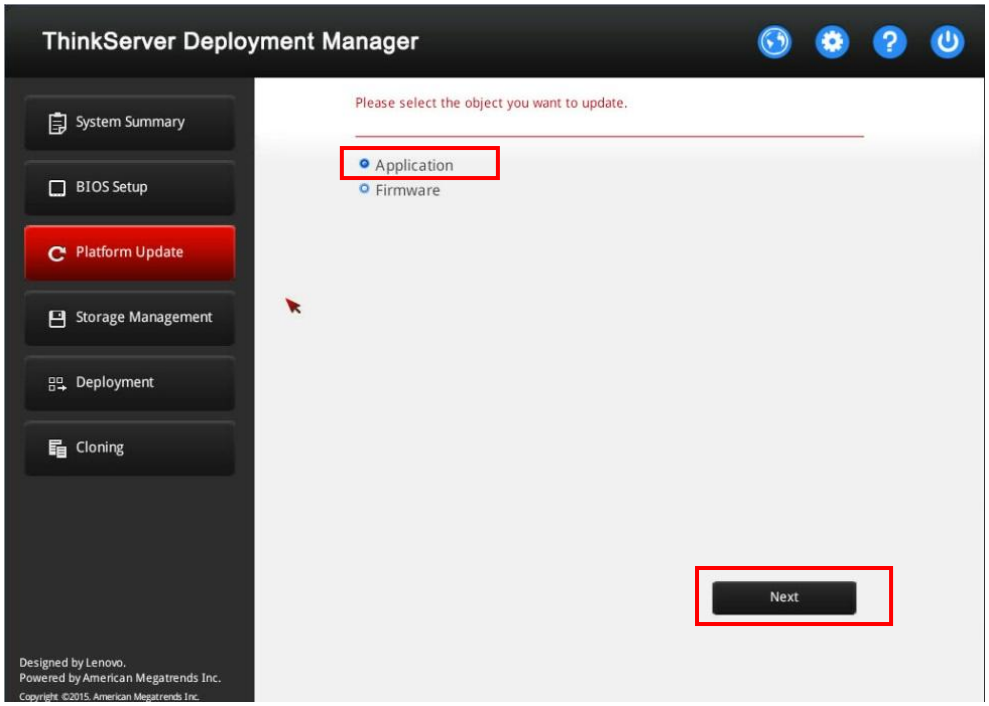


Figure 4-2 Platform Update interface

4. Click the **Browse** button for **Diagnostic Tool**.

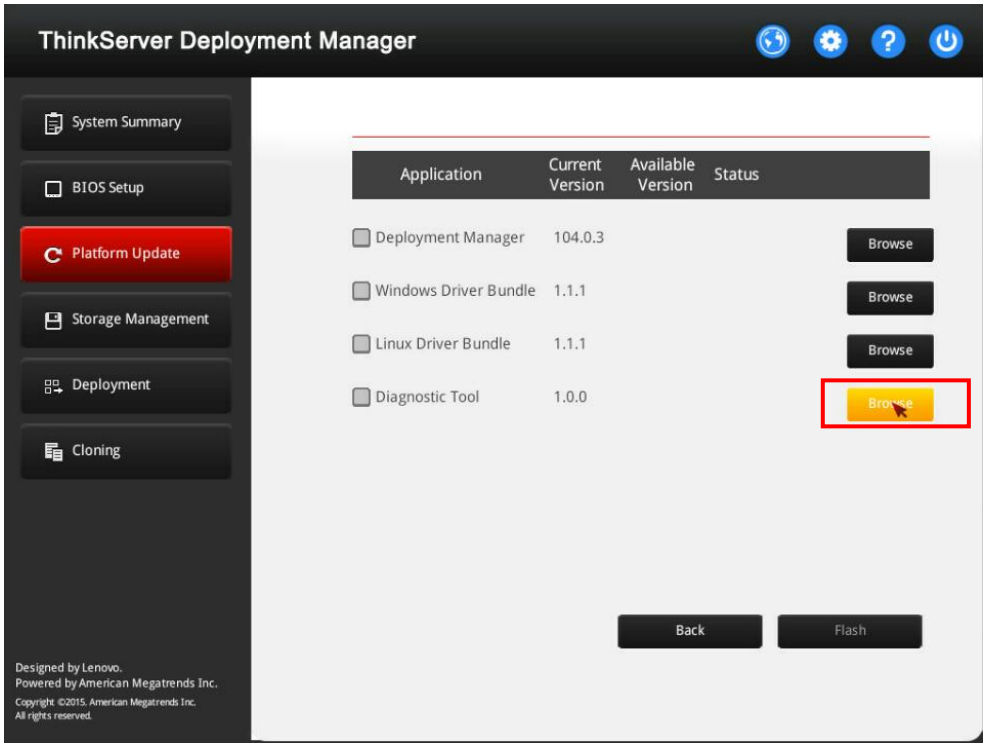


Figure 4-3 Platform Update interface (Application)

5. In the displayed Select File window, select the required LTDE bundle file in the USB key and click **OK**.

Note: TDM also supports LTDE version rollback (for example, rollback from version 1.0.1 to version 1.0.0).

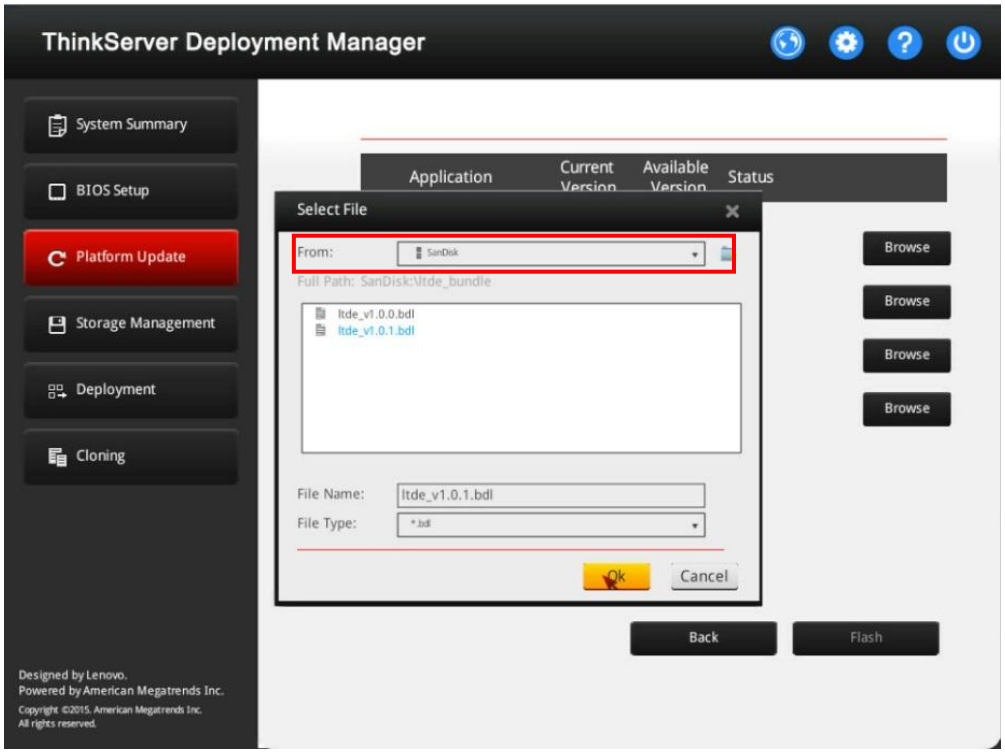


Figure 4-4 Select File window

6. Click **Flash** to start the LTDE update process.

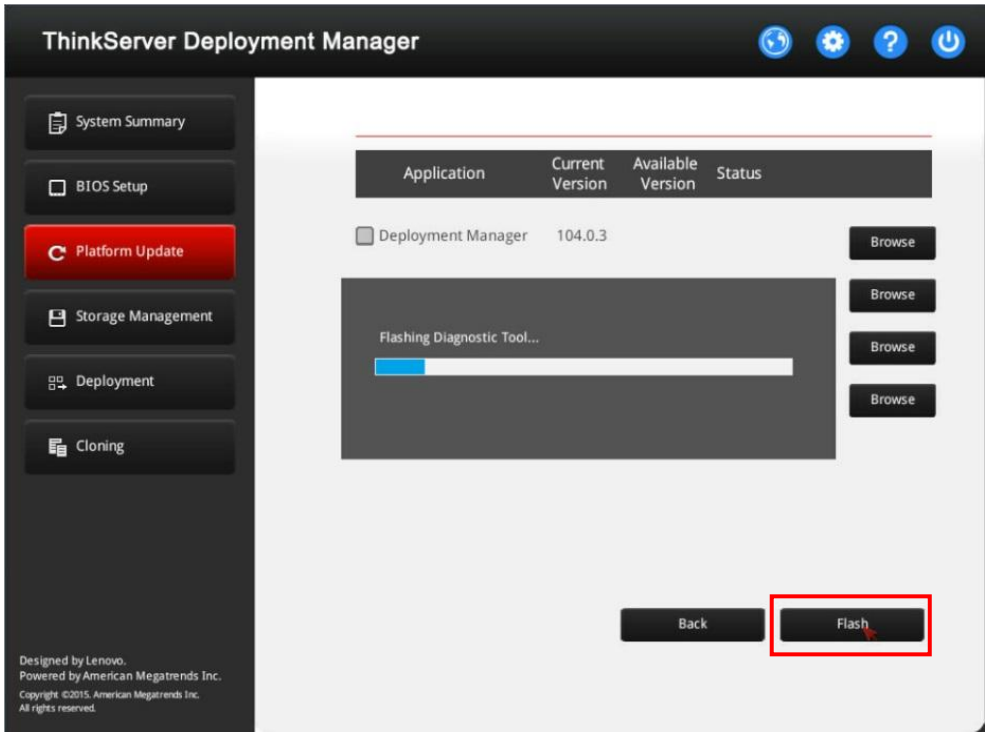


Figure 4-5 Progress bar (LTDE flashing)

When "In Progress" is shown in the **Status** column, LTDE is being updated.

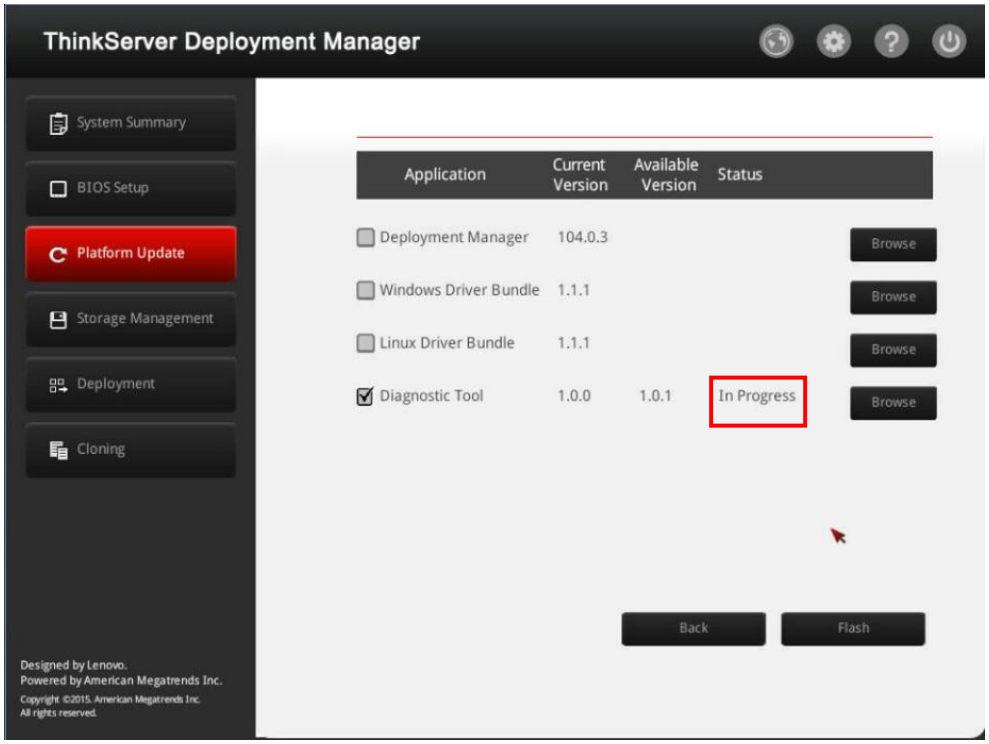


Figure 4-6 Platform Update interface (LTDE updating)

When “Success” is shown in the **Status** column, LTDE is updated successfully.

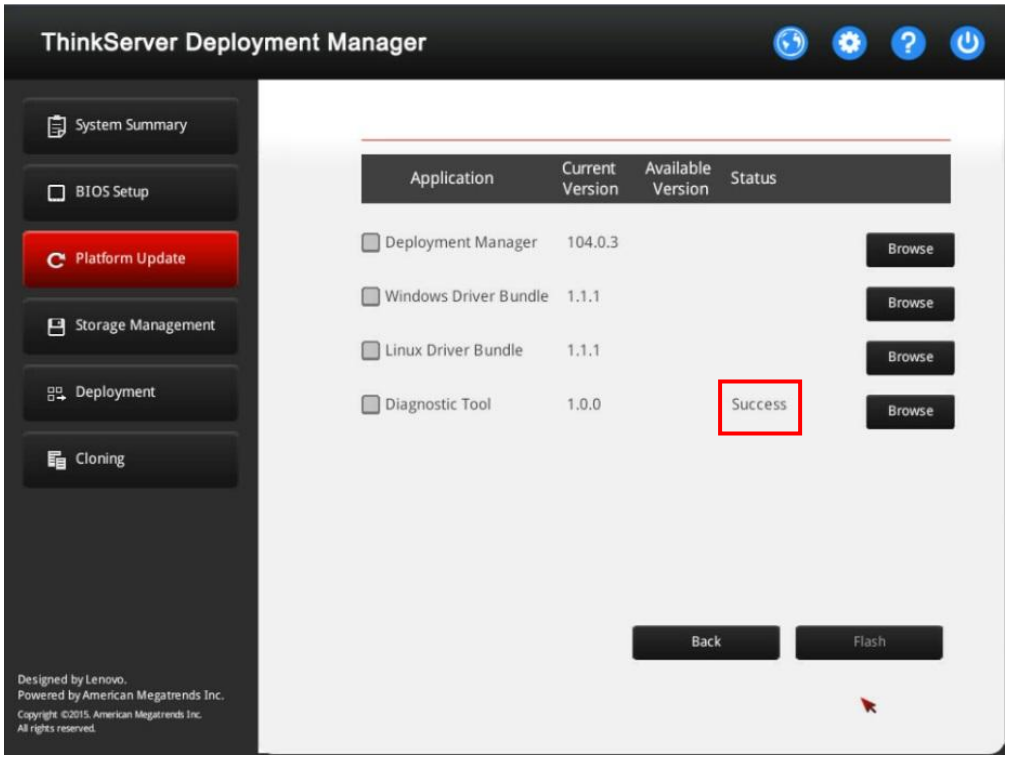


Figure 4-7 Platform Update interface (LTDE update completed)

7. Restart the server by doing one of following:

   - Click on the upper-right corner and select **Reboot**.
   - Press Ctrl+Alt+Delete.
   - Press and hold the power button on the front panel of the server till the server is turned off. Then, press the power button again to restart the server.

4.2 Updating LTDE on the TSM Web UI

Prerequisites: The LTDE bundle file with the .bdl extension (such as LTDE_v1.*x*.*x*.bdl) is copied to a local computer.

To update LTDE on the TSM Web UI, do the following:

1. On the local computer, open a Web browser, and then input the TSM IP address of the server to go to the TSM login page. Input the user name and password to sign in.

Note: The default user name and password are **lenovo** and **len0vO**.

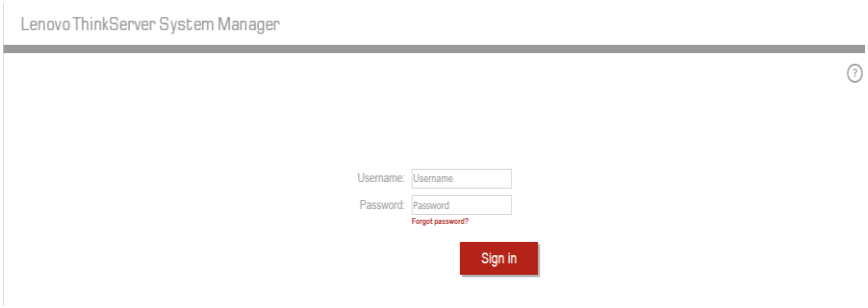


Figure 4-8 TSM login page

2. After you have logged in, switch to the second page.

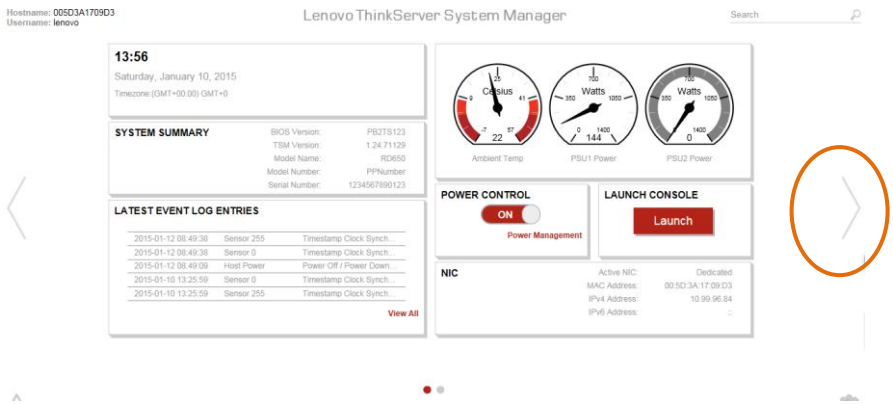


Figure 4-9 TSM Web UI main interface

3. Double-click the **Firmware Update** icon .

Figure 4-10 Firmware Update icon

4. In the displayed Firmware Update Mode Select window, click **Upload a firmware bundle**.

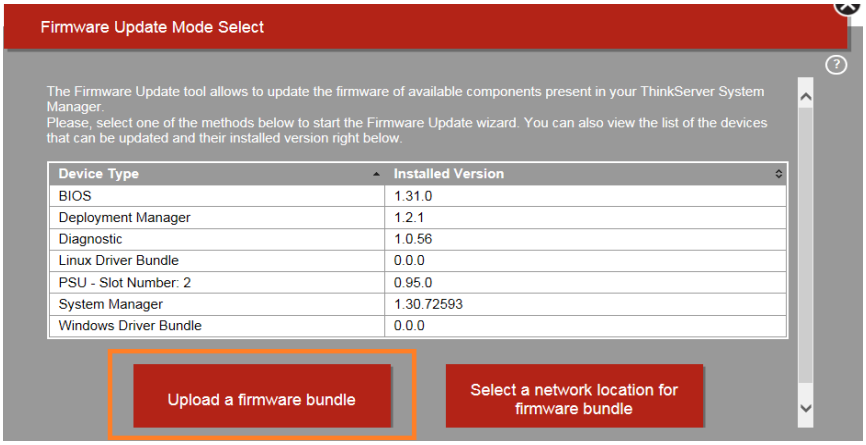


Figure 4-11 Firmware Update Mode Select window

5. In the displayed Firmware Update window, click **Browse** to select the required LTDE bundle file and then click **Upload**.

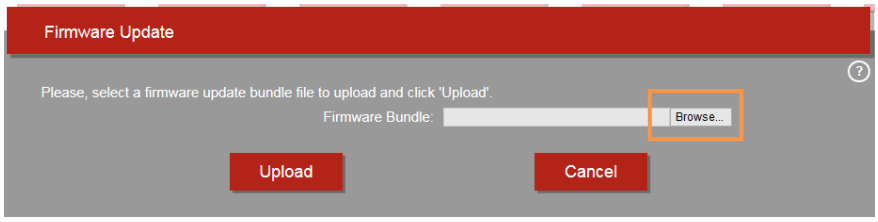


Figure 4-12 Firmware Update window

6. In the displayed Available Updates window, select **Diagnostic** and then click **Apply** to start the LTDE update process.

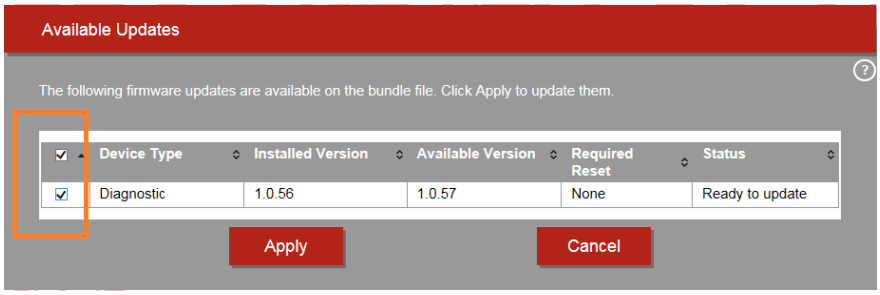


Figure 4-13 Available Updates window

In the displayed Update Progress window, “Pending” and then “In progress” are displayed in the **Status** column, indicating the status of the LTDE update process.

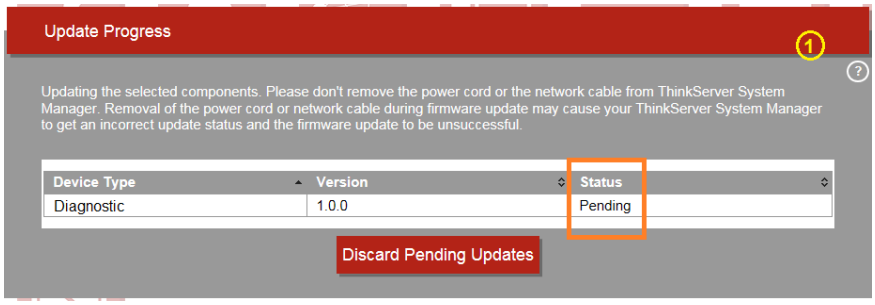


Figure 4-14 Update Progress window (pending)

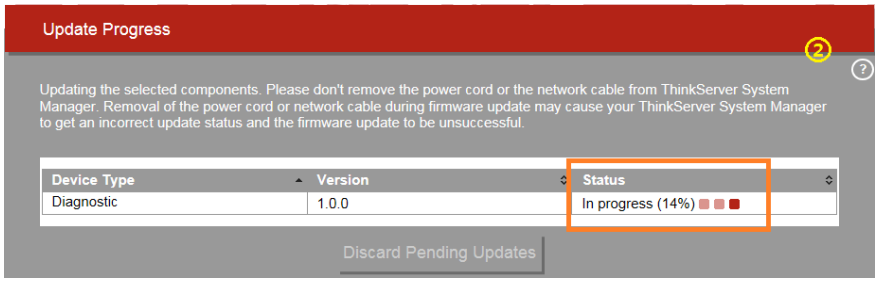


Figure 4-15 Update Progress window (in progress)

When the Success window is displayed, LTDE is updated successfully.

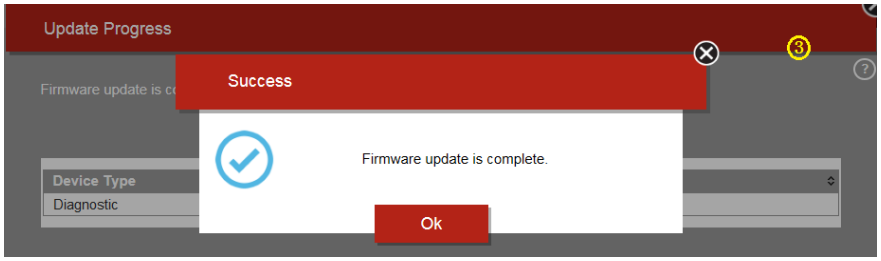


Figure 4-16 Success window (LTDE update completed)

7. Click **OK** and then restart the server.

4.3 Updating LTDE by OSPUT

Prerequisites: OSPUT is installed in the server. The LTDE bundle file with the .bdl extension (such as LTDE_v1.*x*.*x*.bdl) is copied to a USB key, and the USB key is attached to the server.

To download OSPUT and its user guide, go to:
http://support.lenovo.com/us/en/downloads/ds101716

4.3.1 Updating LTDE by OSPUT (Windows)

To update LTDE by OSPUT on the Windows operating system (for example, Windows Server® 2012), do the following:

1. Turn on the server.

2. Double-click the **OSPUT Command Line** icon to open OSPUT.

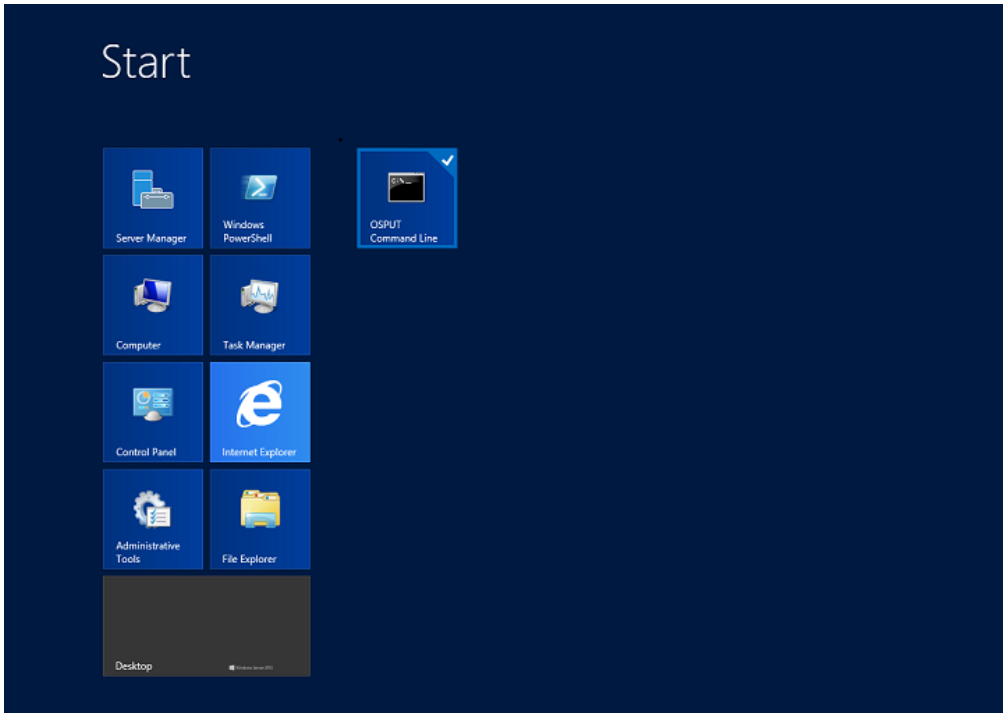


Figure 4-17 OSPUT Command Line icon

3. Copy the required LTDE bundle file in the USB key and paste it into C:\Program Files\Lenovo\OSPUT.

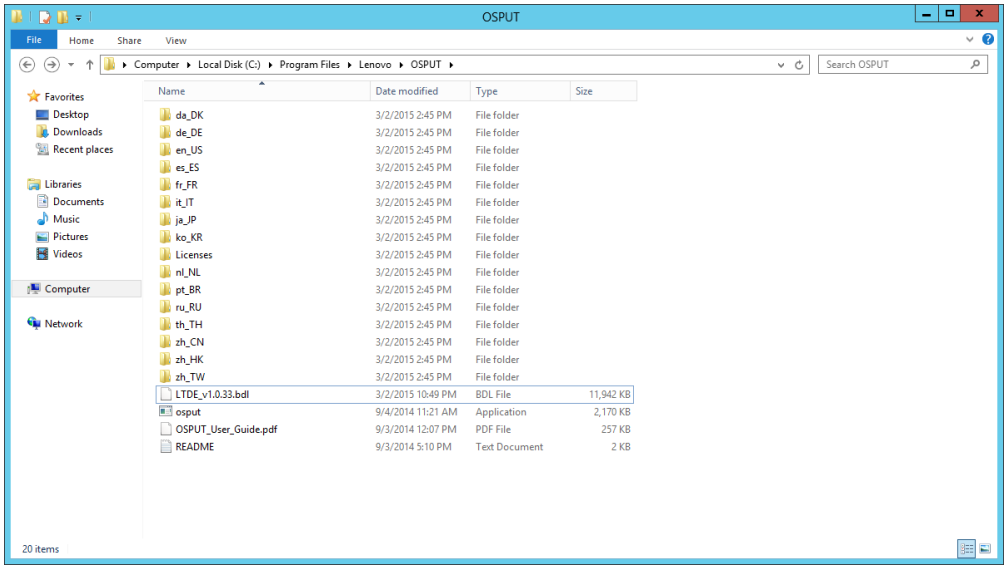


Figure 4-18 OSPUT folder

4. On the OSPUT command-line user interface, run the following command to upload the LTDE bundle file to OSPUT:

```
OSPUT -c update -f LTDE_v1.x.x.bdl - -noRebootAfterUpdate
- -force
```

Note: If you have input– `–noRebootAfterUpdate` in the command line, the server will not restart automatically after LTDE is updated successfully.

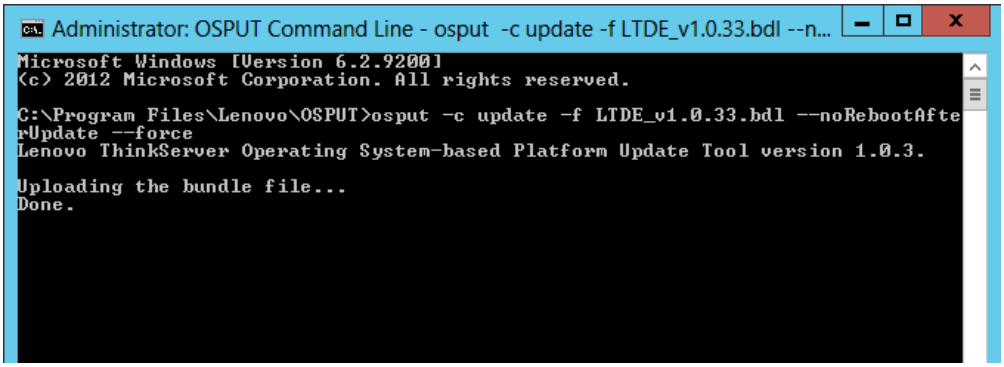


Figure 4-19 OSPUT command-line user interface (LTDE bundle file uploading)

When `Done` is displayed under `Uploading the bundle file...`, the LTDE bundle file is uploaded successfully. Then, the LTDE update process starts automatically.

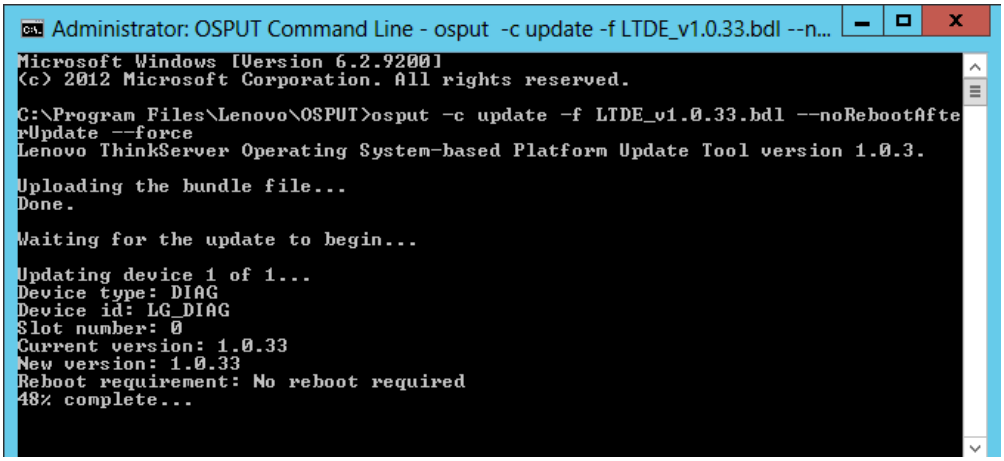


Figure 4-20 OSPUT command-line user interface (LTDE updating)

When `Device update complete` is displayed, LTDE is updated successfully.

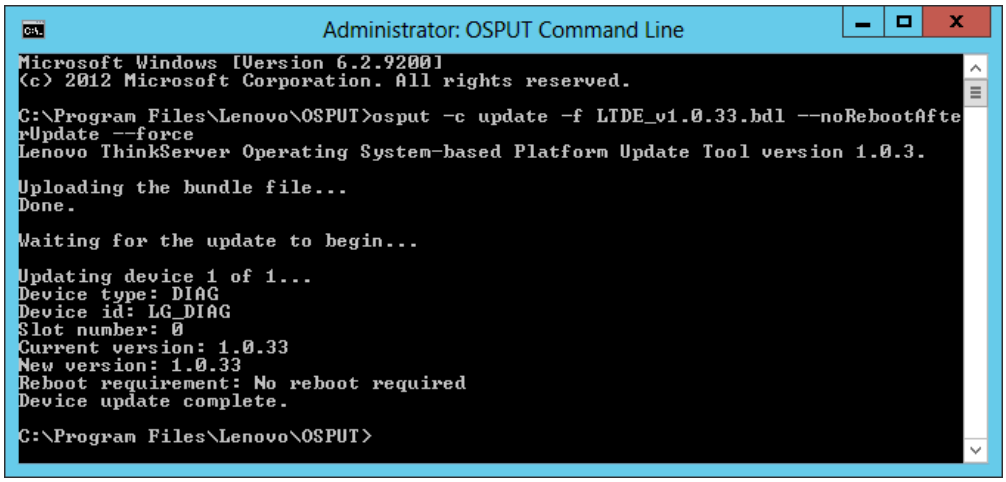


Figure 4-21 OSPUT command-line user interface (LTDE update completed)

5. Restart the server.

4.3.2 Updating LTDE by OSPUT (Linux)

To update LTDE by OSPUT on the Linux operating system (for example, Red Hat® Enterprise Linux 6.5), do the following:

1. Turn on the server.
2. Copy the required LTDE bundle file in the USB key and paste it into /opt/Lenovo/OSPUT.

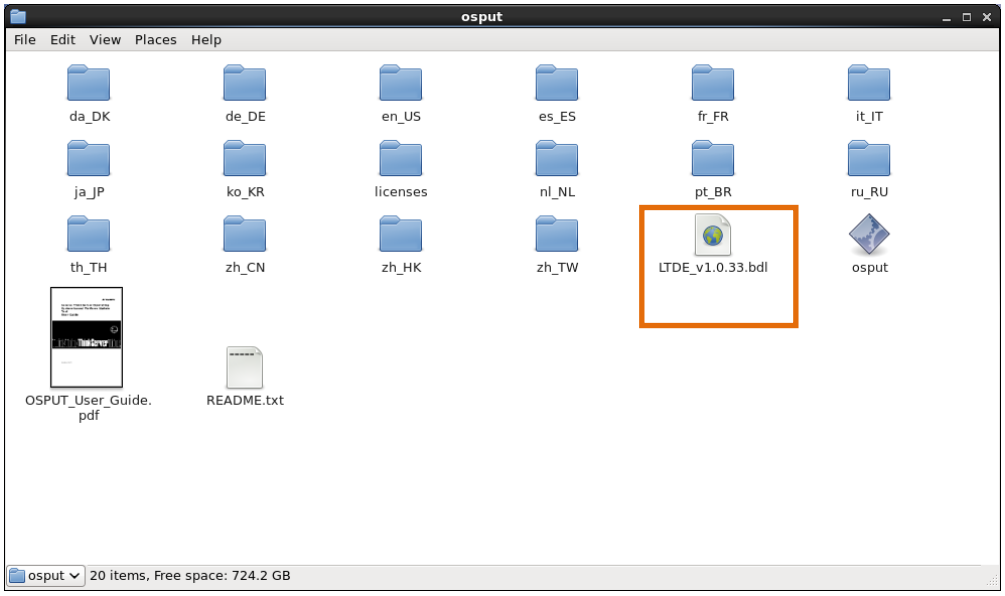


Figure 4-22 OSPUT folder

3. Open the Linux client and go to /opt/Lenovo/OSPUT, enter the following command to upload the LTDE bundle file to OSPUT:
   `./OSPUT -c update -f LTDE_v1.x.x.bdl - -noRebootAfterUpdate - -force`

   Note: If you have input`- -noRebootAfterUpdate` in the command line, the server will not restart automatically after LTDE is updated successfully.

   When `Done` is displayed under `Uploading the bundle file...`, the LTDE bundle file is uploaded successfully. Then, the LTDE update process starts automatically.

   When `Device update complete` is displayed, LTDE is updated successfully.

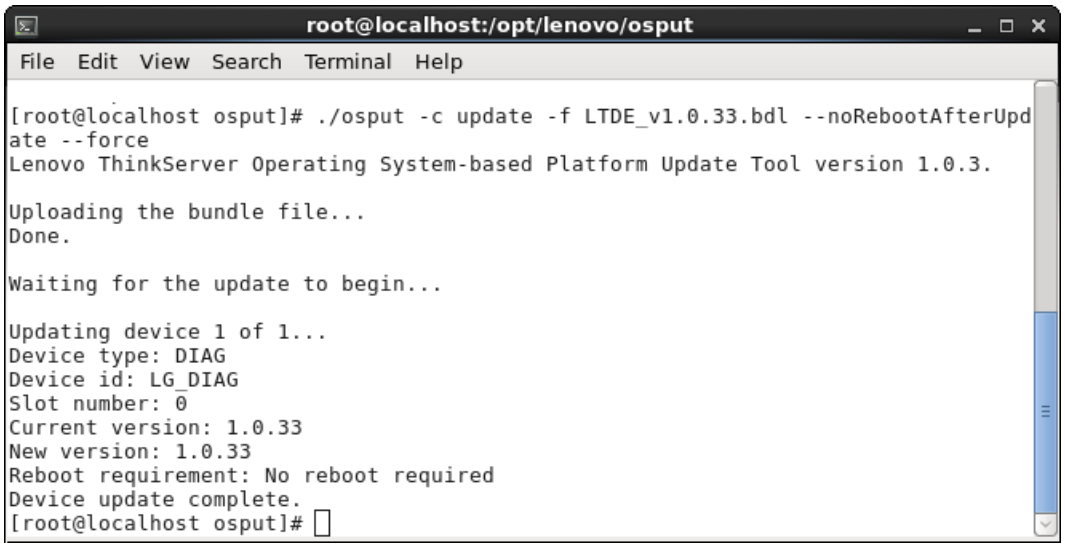


Figure 4-23 OSPUT command-line user interface (LTDE update completed)

4. Restart the server.

4.4 Updating LTDE on the TSM command-line interface

Prerequisites: The TSM command-line interface launcher is installed on a local computer. The LTDE bundle file with the .bdl extension (such as LTDE_v1.*x*.*x*.bdl) is copied to C drive.

To download the TSM command-line interface launcher and its user guide, go to: http://support.lenovo.com/us/en/downloads/ds101157

To update LTDE on the TSM command-line interface, do the following:

1. On the local computer, double-click

to open the TSM command-line interface.

   The TSM command-line interface is displayed.

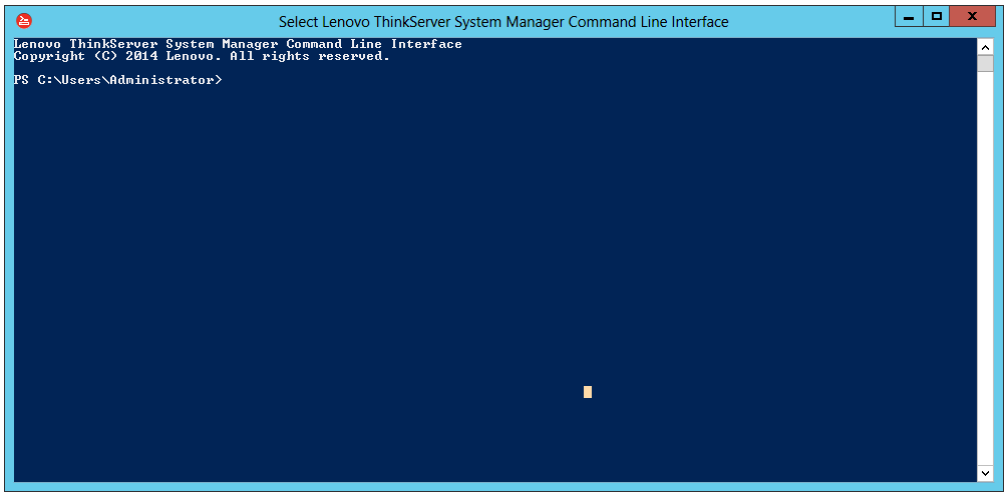


Figure 4-24 TSM command-line interface

2. Run the following command to create a credential:
   `$cred=Invoke-TSMCLI -CommandName create-credential -CommandArgs @{username="lenovo"; password = "len0vO"}`

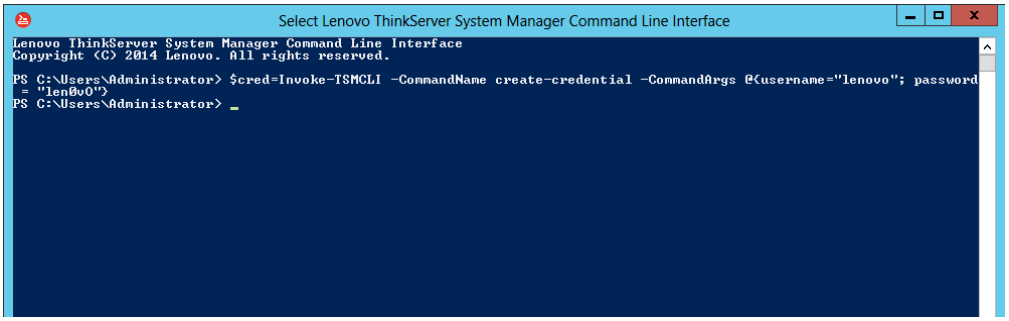


Figure 4-25 TSM command-line interface (credential creating)

Note: When a new command-line text `PS C:\Users\Administrator>` is displayed on the interface, the previous command is run successfully. Then, you can run the next command.

3. Run the following command to enter the firmware update mode:
   `Invoke-TSMCLI -CommandName enter-fwupdatemode -ComputerName 10.99.96.70 -Port 80 -Authentication basic -Credential $cred`

Note: In the command line, `-ComputerName 10.99.96.70` is an example of the TSM IP address of the server.

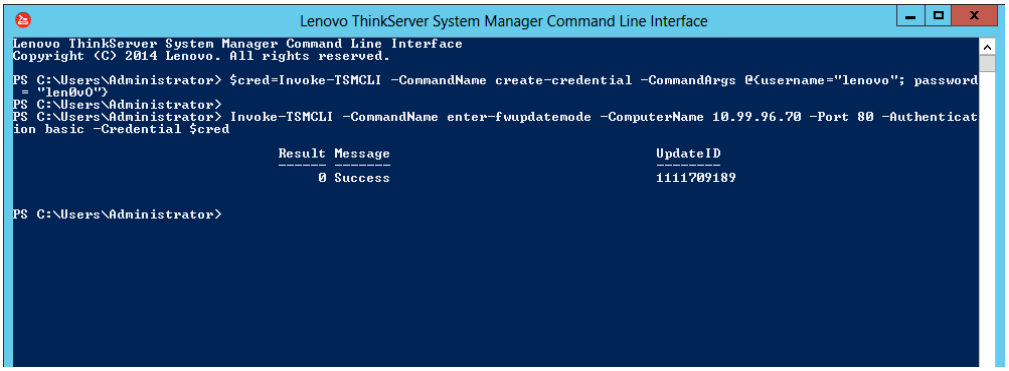


Figure 4-26 TSM command-line interface (firmware update mode)

4. Run the following commands in sequence to check the current LTDE version:

- `$a=Invoke-TSMCLI -CommandName get-fwversions -ComputerName 10.99.96.70 -Port 80 -Authentication basic -Credential $cred`
- `$a.FWImages`

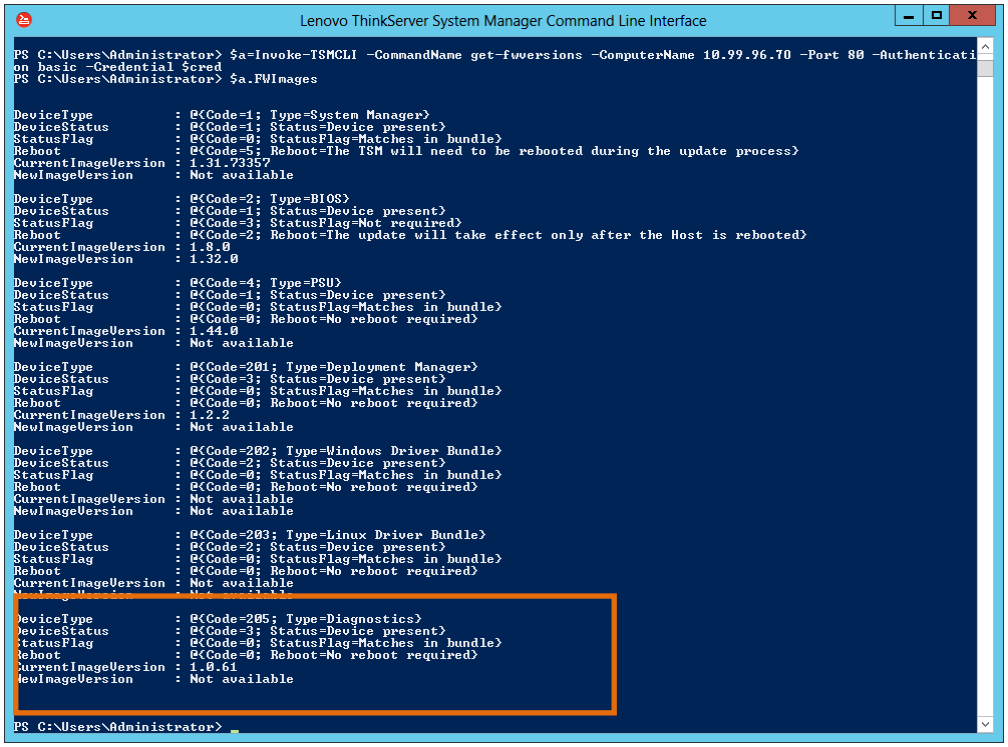


Figure 4-27 TSM command-line interface (current LTDE version)

In the command output, the value of `CurrentImageVersion` is the current LTDE version.

5. Confirm that the current LTDE version is earlier than the version of the required LTDE bundle file.

6. Run the following command to upload the LTDE bundle file:
```
Invoke-TSMCLI -CommandName upload-fwimage -ComputerName 10.99.96.70
-Port 80 -Authentication basic -Credential $cred -CommandArgs
@{updateId="1111709189"; fwFile="C:\LTDE_v1.0.61.bdl"}
```

Note: In the command line, `1111709189` is the value of `UpdateID` in the command output in step 3.

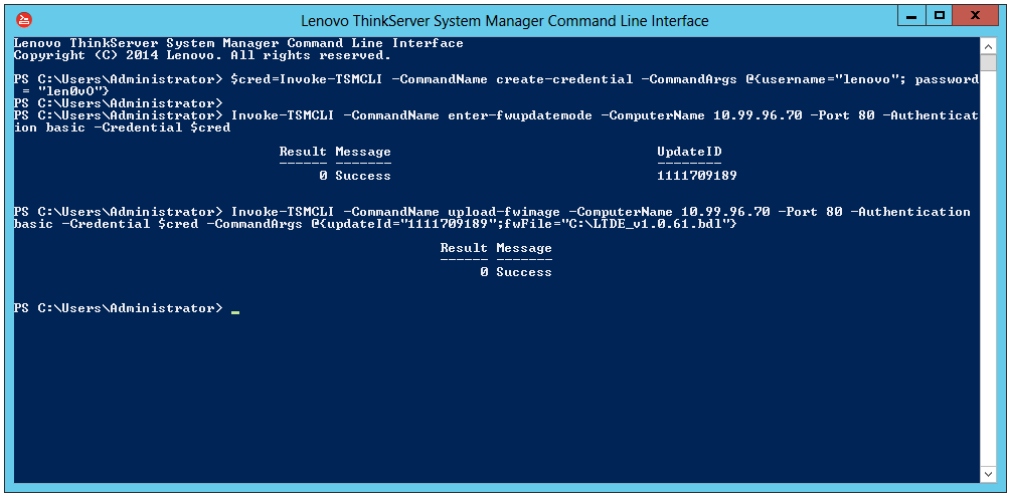


Figure 4-28 TSM command-line interface (LTDE bundle file uploading)

7. Run the following command to start the LTDE update process:
`Invoke-TSMCLI -CommandName start-fwupdate -ComputerName 10.99.96.70 -Port 80 -Authentication basic -Credential $cred -CommandArgs @{updateId="912590849"; rebootAfterUpdate="auto"}`

Note: You can set the value of `rebootAfterUpdate` as required:

- `auto`: After LTDE is updated successfully, the server restarts automatically.
- `manual`: After LTDE is updated successfully, the server needs to be restarted manually.

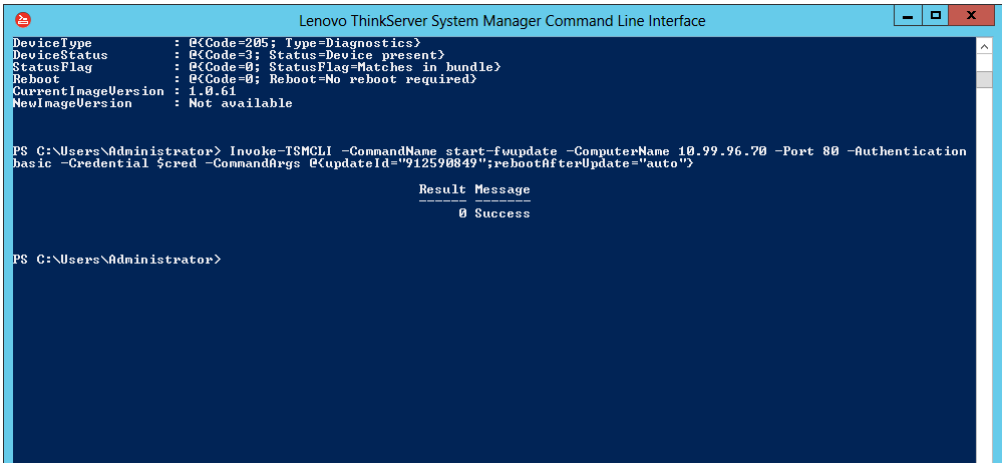


Figure 4-29 TSM command-line interface (LTDE updating)

Note: Only when the LTDE update process is in pending status, can you run the following command to terminate the LTDE update process:

```
Invoke-TSMCLI -CommandName stop-pendingupdates -ComputerName
10.99.96.70 -Port 80 -Authentication basic -Credential $cred -
CommandArgs @{updateId="1111709189"; force="1"}
```

After LTDE is updated successfully, the server restarts automatically to validate the update. However, if you have set `rebootAfterUpdate` to `manual`, the server will not restart automatically. Do the following to manually restart the server:

1. Run the following command to exit the firmware update mode:
   ```
   Invoke-TSMCLI -CommandName exit-fwupdatemode -ComputerName
   10.99.96.70 -Port 80 -Authentication basic -Credential $cred
   @{updateId="1111709189"}
   ```
2. Restart the server.