Intel® System Event Log Viewer Utility

User Guide

Reference for using the Intel® System Event Log Viewer Utility (SEL Viewer).

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July 2016	1.00	First version
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August 2017	1.02	Removed utility version Added new supported platform
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1 Introduction

The Intel® System Event Log Viewer (SEL Viewer) can be used to display, clear, or save the SEL logon on a server.

The SEL Viewer utility provides the ability to view system event records stored on the server management storage device of a server. The Baseboard Management Controller (BMC) records the details about the system events in a log in flash memory. Each SEL entry is a single system event.

- Displays the SEL records in either a text or a hexadecimal format.
- Allows saving SEL entries to a file.
- Allows loading SEL entries from a server and displays their properties.

The SEL Viewer utility is only supported on the following Intel® Server products:

- Intel® Server Board based on Intel® Xeon® Scalable Processor Family
- Intel® Server Board based on Intel® Xeon® 2nd Scalable Processor Family
- Intel® Server Board based on Intel® Xeon® Platinum 9200 Processor Family

For the latest information on a server, refer to http://support.intel.com/support/motherboards/server/.

1.1 Operating System Supported

This version of the SEL Viewer utility runs on the following operating systems (OS).

Table 1. Operating systems supported

Platforms	Operating Systems/Preboot Environment Supported
• Intel® Server Board based on Intel® Xeon® Scalable Processor Family • Intel® Server Board based on 2nd Generation Intel® Xeon® Scalable Processor family • Intel® Server Board based on Intel® Xeon® Platinum 9200 Processor Family	• • UEFI Shell • WinPE* 4.0 (x64) • Windows* Server 2019 • Windows* Server 2016 • Windows* Server 2012 R2 • Windows* 10 • RHEL* 6.8 (x64) • RHEL* 7.3 • RHEL* 7.5 • RHEL* 7.6 • SLES* 11.4 (x64) • SLES* 12.2 • SLES* 15 • CentOS* 7.3 (x64) • Debian* 8.10

Note: The SEL Viewer Utility version may be different across different platforms. Download the supported SEL Viewer Utility version and build for a specific platform from Intel's support website. Refer to release notes for known issues.

1.2 Target Audience

This User Guide is intended for Original Equipment Manufacturers and those who are responsible for configuring the system BIOS and Management Firmware settings on a Intel Server system.

1.3 Support Information

For more information, visit Intel's support site at http://support.intel.com/support/.

For an updated support contact list, see http://www.intel.com/support/9089.htm/.

2. Using the Intel® System Event Log Viewer Utility

2.1 Installing the SEL Viewer

SEL Viewer requires Windows* administrative or Linux* root permissions.

To install the SEL Viewer Utility in EFI, do the following:

1. Copy all the files in the SEL Viewer release directory for EFI to a USB flash drive, or create an EFI-bootable CD.
2. Insert the removable media into the server.
3. Boot the server and press the **<F2>** key when prompted to enter BIOS setup.
4. Go to the **Boot Manager** menu and select the option to boot to EFI shell.
   At the EFI shell prompt, type `fsn:` where n is the file system number corresponding to the device that contains the SEL Viewer utility files.

To install the SEL Viewer Utility in Windows* with the standalone installation, do the following:

Prerequisites: Java* Runtime Environment (JRE*) must be installed.

1. Install JRE X64 version for supporting WinPE (x64) OS. Installation of JRE in a USB pen drive should be performed on the same version of the OS.
   Example: for the JRE x64 version use Windows 64-bit OS.
2. In Windows/Windows PE set the JRE path using `PATH=%PATH%;<>:\bin` (where <> is the USB directory shown on the command prompt such as `D:` or `E:` or the path where java is installed (for example, `c:\Program Files\Java`).
3. While installing JRE on USB pen drive to support Windows PE OS, change the installation directory USB pen drive (for example, `g:\`).
4. Copy all files and subdirectories from the utility released location into a folder on the hard drive (for example, `c:\Selview`).
5. Open a command prompt and change to that directory:
6. For 32-bit Windows, go to folder `c:\Selview\Windows\x86\imbdriver`.
7. For 64-bit Windows/Windows PE*, go to folder `c:\Selview\Windows\x64\imbdriver`.
8. Execute `install.cmd` as administrator.
9. This installation script installs the IPMI driver from Intel. If the IPMI driver from Microsoft* is present, the IPMI driver from Intel is not be installed on the system.
10. To run the SEL Viewer Utility, open a command prompt, and change directory to the folder where the `selview.exe` file resides (for example, `cd c:\Selview\windows\x64`).

The SEL Viewer Utility can now be run.

To install the SEL Viewer Utility in Linux*, perform the following steps.

Prerequisites

1. Java* Runtime Environment (JRE*) must be installed.
2. XServer must be running for the SEL Viewer GUI to work.
3. In Red Hat* OSes:
   - If the utility fails with the error message:
     "Error while loading shared libraries: libncurses.so.5: cannot open shared object file: No such file or directory"
     then install libstdc++-xxx.rpm and ncurses-xxx.rpm from the OS CD itself using the following commands:
     ```
     #rpm -ivh libstdc++-xxx.rpm
     #rpm -ivh ncurses-xxx.rpm
     ```
     Example:
     ```
     rpm -ivh media\Packages\libstdc++-xxx.rpm
     ```
   - If the utility fails with error message:
     "Error: /lib/ld-linux.so.2: Bad ELF interpreter: No such file or directory".
     It indicates the development and optional packages are not installed. Install the necessary packages accordingly.
4. On Red Hat Enterprise Linux, CentOS, UEFI aware Linux* or other Linux*:
   There might be a driver confliction between internal driver and kernel. Start up OpenIPMI driver and make sure the `/dev/ipmi0` device exists.
   For example, use the below command to start up OpenIPMI driver on Red Hat Enterprise Linux.

   ```
   #modprobe ipmi_devintf
   ```

   a. Regular Installation:
      i. Boot into Linux and unzip the SELViewer utility ZIP file into a folder on the hard drive.
      ii. Copy all files and subdirectories from the utility released location into a folder on the hard drive (for example, `/home/Selview/Linux`).
      iii. Open a command prompt and change to the correct directory (for example, `cd /home/Selview/Linux_x64`).
      iv. Unzip `selview.zip` to get the executable.
      Use "`chmod 755`" to change executable and script.
      Type: "`./selview`" to run the SEL Viewer utility.

   b. RPM Installation:
      i. Boot into Linux and unzip the SEL Viewer utility ZIP file into a folder on the hard drive.
      ii. Copy rpm from Linux/RPM folder to a local folder.
      iii. If there is another version already has been installed previously, uninstall the older version before installing the new version.
      iv. Install the SEL Viewer utility by using `rpm -ivh selviewer-xxx.rpm`. This installs the utility in `/usr/bin/selview/` folder.
      v. In Red Hat/SUSE after installing the rpm, close the terminal from which rpm was installed and then execute the utility from a new terminal (for example, `# selview`).
      vi. Type `selview` to run the SEL Viewer utility.

2.2 Launching the SEL Viewer

To launch the SEL Viewer, do the following:

1. Boot to the target OS.
2. From the directory containing the SEL Viewer files, launch the SEL Viewer from the EFI shell using the following syntax:

```
selview [/clear | {/save [filename] [/hex]} | /h | /?]
```

Note: A hyphen (–) may be substituted for the forward slash (/).

Examples:

```
selview
```

(This launches the graphical version of the SEL viewer.)

```
selview /clear
selview /save MyFileName /hex
selview /h
```

2.3 Viewing SEL Records in Interpreted Text Format

1. Launch the SEL Viewer.
2. All the SEL entries are displayed in the SEL Viewer. The text view is shown in Figure 1.

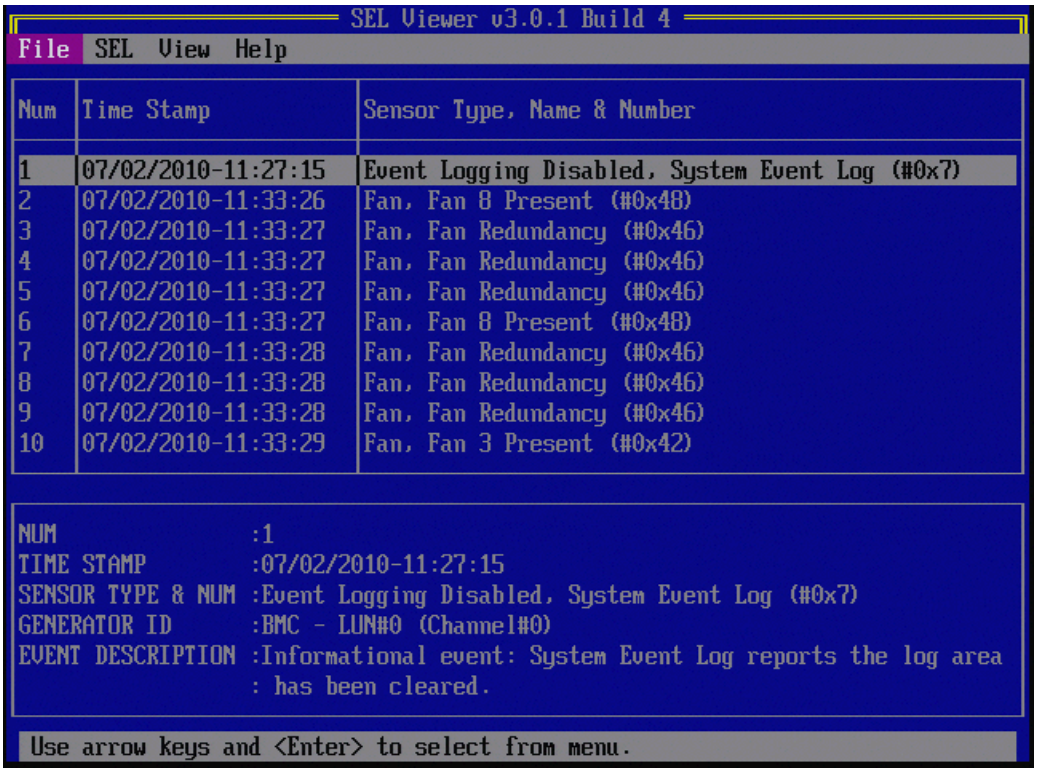

Figure 1: SEL Viewer text view

The EFI-based SEL Viewer main window is based on a multi-column display pane as shown in Figure 1. All the SEL records are displayed and a pull-down menu used for selecting the main functions available in the utility.

See Figure 2 for the SEL Viewer main utility window (Windows and Linux OSes). The default format in which information is displayed in interactive mode is the interpreted text format.

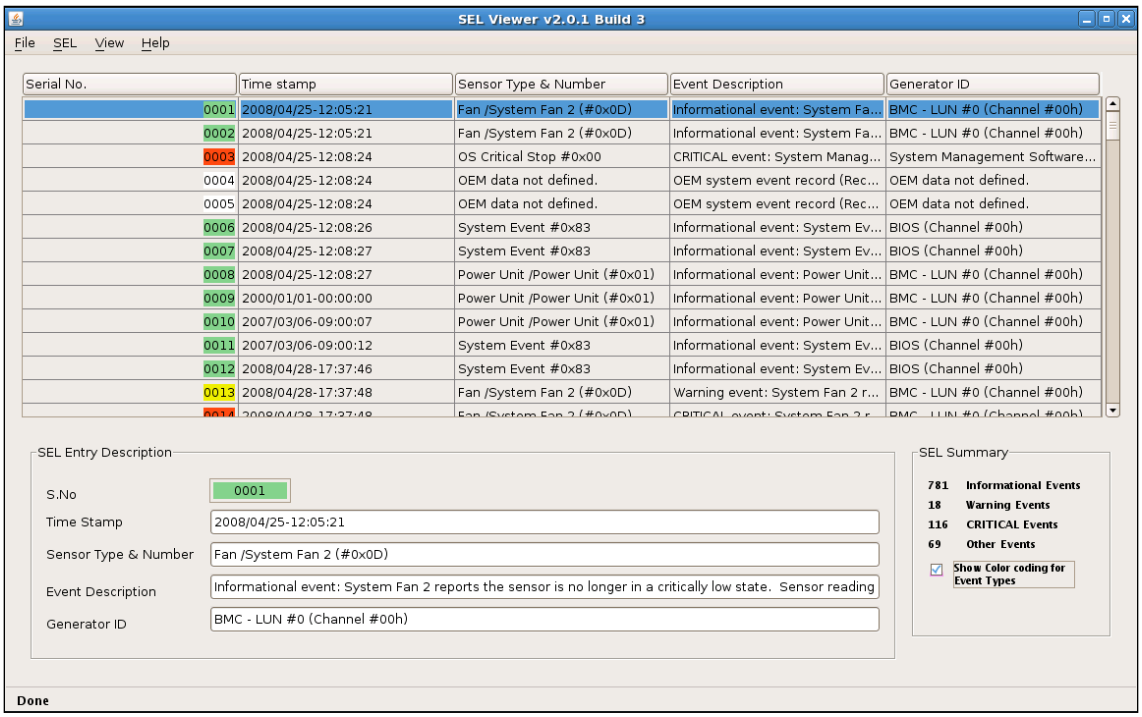

Figure 2: SEL Viewer main window (Windows* and Linux* operating systems)

The following interpreted data is displayed in several columns in Figure 2:

- **Serial No.**: Serial number of the system events are displayed starting with 1, and increasing by one for each event.
- **Time Stamp**
- **Sensor Type and Number**
- **Event Description** (Based on the IPMI Specification, BIOS EPS)
- **Generator ID**

The bottom information pane shows the details on the highlighted SEL entry. Use the arrow keys to move up and down, or the **<Tab>** key to highlight a menu. In Linux, the bottom information pane contains a statistics panel which holds a statistical table of events based on their Event Type (Critical, Warning, Informational, or Others).

For information on using the menu items, see section 2.5.

2.4 Viewing SEL Records in Hex Format

Highlight the **View** tab to choose how the SEL entries are displayed (raw hexadecimal format or plain text). Select the raw-hexadecimal format to view the SEL records in HEX format.

Figure 3 shows an example of the SEL log in hex format.

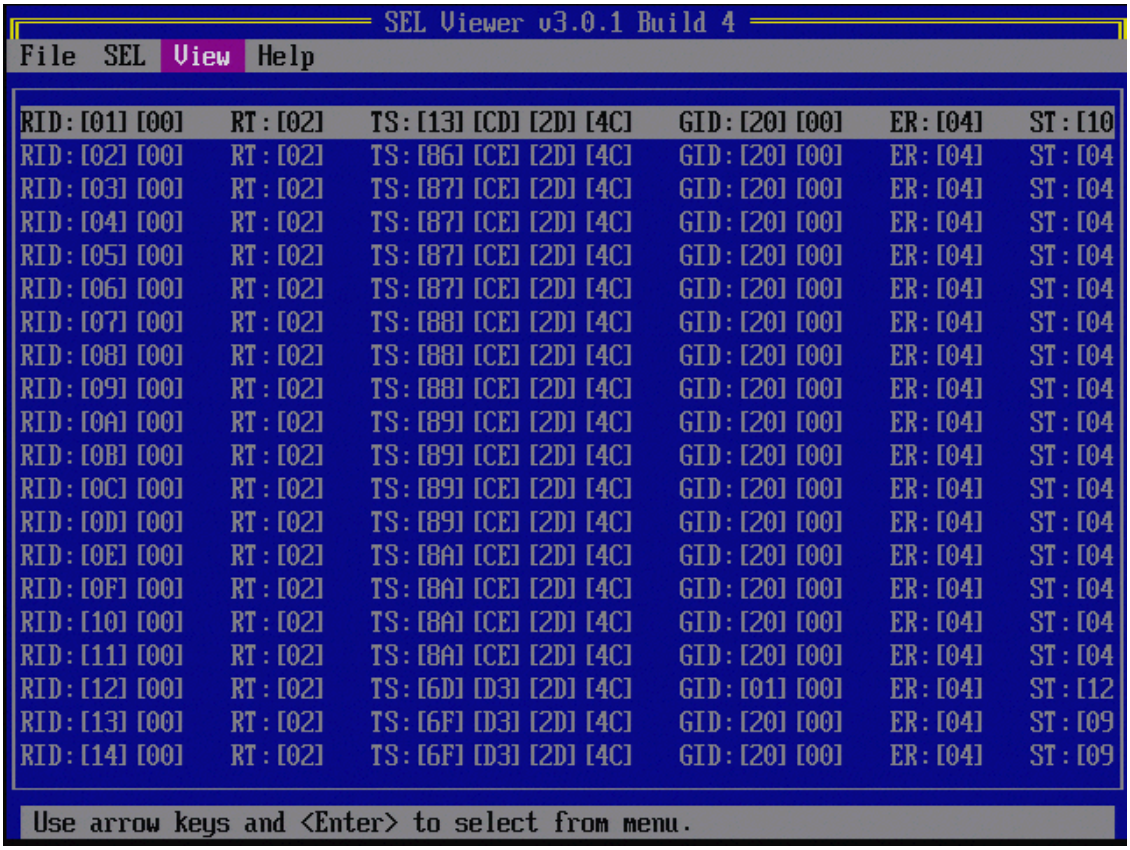

Figure 3: SEL log in hex format (EFI)

Figure 4 shows SEL records in Hex format (Windows and Linux OSes).

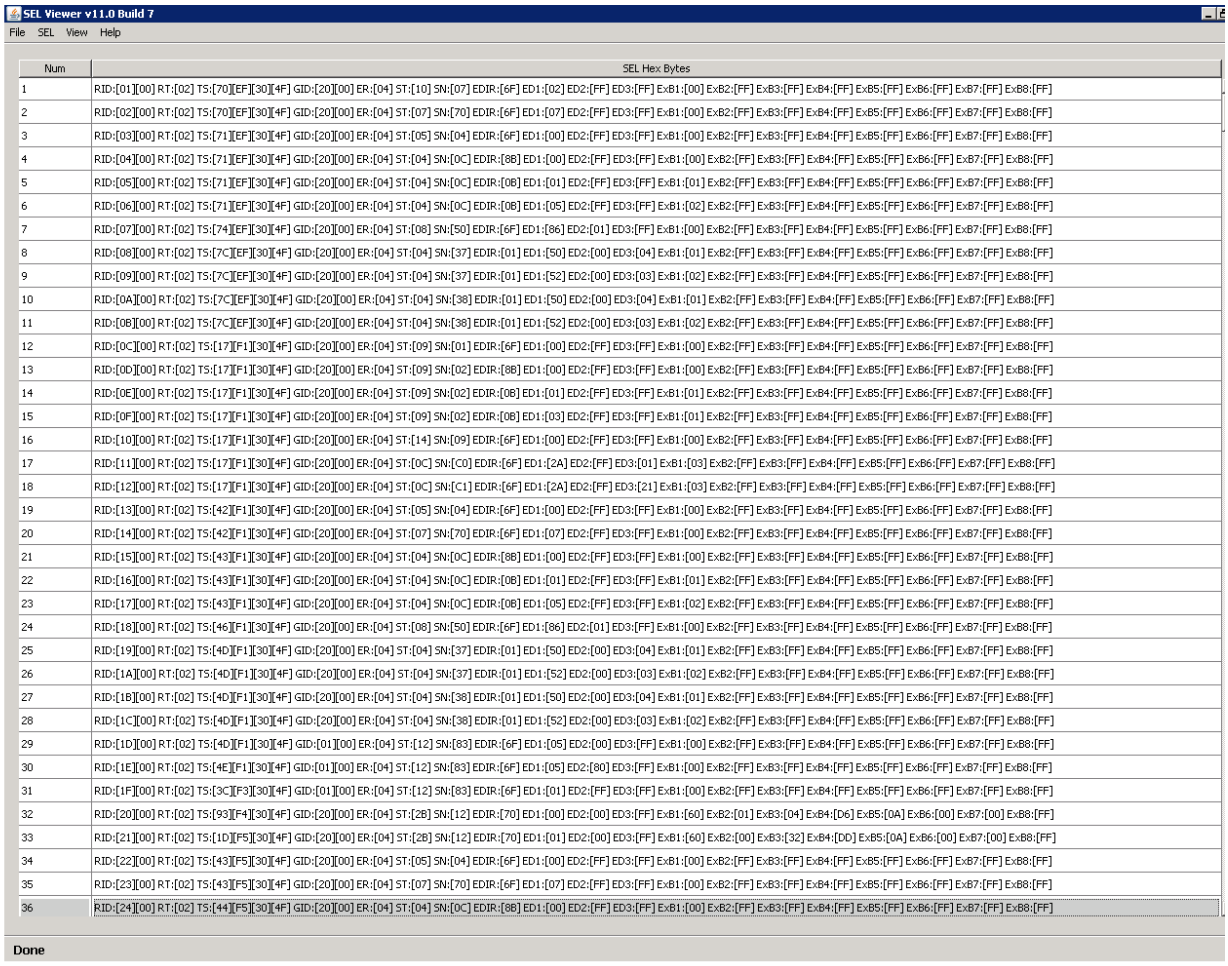

Figure 4: SEL records in hex format (Linux*)

The abbreviations used in the raw hex display are as shown in Table 1Table 2.

Table 2. Acronyms used in the raw hex display

Acronym	Description
RID	Record ID
RT	Record Type
TS	Time Stamp
GID	Generator ID
ER	Event Message Format Revision
ST	Sensor Type
SN	Sensor Number
EDIR	Event Dir and Event Type
ED1, ED2, ED3	Event Data
MID	Manufacturer ID
OEM	OEM Defined
ExB1...ExB8	Extended Byte1...Extended Byte8 **Note:** Supported only on: Intel® Server Board based on Intel® Xeon® processor E5-1600/2600/4600 v2 product family Intel Server Board based on Intel Xeon processor E5-2400 v2 product family Intel Server Board based on Intel Xeon processor E3-1200 v3/v4 product family

2.5 Viewing the SEL Viewer Information Window

This option allows a user to view/hide the SEL Information window. When the utility is run, by default, the SEL Info window is visible and the sub-menu is shown as **Hide SEL Info Window**.

If **Hide SEL Info Window** is selected, the SEL Info window is removed from the display area and the sub-menu text changes to **View SEL Info Window**. Add the SEL Info window again using this sub-menu.

Hide SEL Info Window / View SEL Info Window option is currently disabled in Hex view of EFI-based SEL Viewer utility. The SEL Info window automatically goes off when changing from text view to hex view. In case of Linux, this option is available under the **SEL Menu**.

2.6 Navigating the SEL Viewer Window

To navigate the SEL Viewer window from the pull-down menu, use the arrow keys to move around the various menu items and the **<Enter>** key to select a particular menu item.

A brief help message about the option selected from the menu is displayed in the tip-view window, which is displayed at the bottom of the main window for EFI-based SEL Viewer Utility. This feature is not supported by the Windows PE-based SEL Viewer Utility.

- For the Windows PE-based SEL Viewer Utility
  - Use the **<Alt>** key to select the menu and use arrow keys to move around various menu items
  - Use the **<Enter>** key to select a particular menu item.
  - A menu item is also accessed by clicking the menu item.
  - In the display pane, use **<Home>** key selects the first record and **<End>** key selects the last record.

  Table 3 list the shortcut keys in the SEL Viewer.

Table 3. Shortcut keys for Windows PE*-based SEL Viewer utility

Utility Version	Shortcut Keys	Descriptions
Windows PE*	<Alt>+<F>	Open File menu.
	<Alt>+<S>	Open SEL menu.
	<Alt>+<V>	Open View menu.

- For the EFI-based SEL Viewer Utility:
  - Use **<Tab>** key to move between the display pane, information window at the bottom and pull-down menu.
  - The display pane supports arrow keys, **<PgDn>**, **<PgUp>**, **<Home>**, and **<End>** keys to move across the display pane.
  - Use **<Home>** key selects the beginning of the selected SEL entry in the display pane, and **<End>** key selects the end of the selected SEL entry in the display pane.
  - Use **<F5>** key to move forward between columns and **<F6>** to move backwards.
  - Use left arrow key to scroll to the left and right arrow key to scroll to right in display pane.

  When the utility is first invoked, it loads the SEL records from non-volatile storage on the server. Figure 5 shows the status of the SEL Viewer loading SEL records from the server.

Figure 5: Status box

- For Window/Linux-based SEL Viewer Utility
  - Serial Numbers can be color coded based on the severity of a SEL Event.
  - A small panel is provided on the bottom right corner which has a statistical view of the SEL Records. It contains the count of the SEL events segregated based on the severity type (i.e. Informational, Warning, Critical, or Others).
  - In Linux, the status message is displayed on the status bar of the Utility main window.

2.7 Saving the SEL Viewer records to a File

At this point the user may want to save the SEL records to a file for analysis, record keeping, or documentation of a system issue. There are two ways to save the SEL to a file (the Windows PE version is shown in this example). To save the SEL, use the following command line syntax:

- In interpreted text format:

  ```
  selview /save MyFileName
  ```

- In hex format:

  ```
  selview /save MyFileName /hex
  ```

- Use the **File | Save** menu option from the graphical SEL viewer window to save the SEL data to a file with a `.sel` file name extension, either in interpreted text format or in raw hex format, depending on the mode in which records are currently displayed.

2.8 Viewing the SEL Viewer from a File

To view the SEL records previously saved to a file, use the **File | Open** menu option from the graphical SEL viewer window.

To return to viewing the SEL records from non-volatile memory, use the **SEL | Reload** menu option.

2.9 Checking the SEL Viewer Properties

To check the SEL properties (number of entries, add/erase time, space available, and so on) in the SEL Properties dialog, use the **SEL | Properties** menu option from the SEL Properties Dialog as shown in Figure 6.

Figure 6: SEL properties dialog

Notes:

- The SEL viewer displays the Free Space Remaining in bytes.
- In Linux, the SEL Properties dialog does not display Last Add Time and Last Erase Time.

2.10 Clearing the SEL Viewer Utility

The SEL Viewer has a limited capacity. Refer to the Specifications in the Intel® Server Board product guide for the maximum number of records for server. After the SEL is full, subsequent system events are not be recorded and the SEL Viewer needs to be manually cleared. There are two ways to clear the SEL Viewer (the Windows PE version is shown in this example):

- Use the command line syntax: `selview /clear`
- Use the **SEL | Clear** menu option from the graphical SEL viewer window.

2.11 Sorting the SEL Viewer Utility Entries in the User Interface

Use the **SEL | Sort by** option in the SEL Viewer main window to sort the SEL entries by different fields.

This option, when selected, displays a list of fields by which the entries can be sorted. Sort the records by Num, Time Stamp, Sensor Type and Number, Event Description, or Generator ID upon choosing the appropriate field.

This option is not available if the SEL entries are displayed in hexadecimal mode.

For the Windows/Linux based SEL Viewer utility, sorting can also be performed by clicking on the appropriate Column heading using a mouse (in case of text mode display).

2.12 Go to Option (Windows*/Linux*-Feature Only)

Use the **SEL | Go To** option in the SEL Viewer main window to select a particular SEL entry given its Serial Number. Enter the Serial Number of the SEL Entry in the textbox provided in the Go To dialog and the SEL Table on the Utility main window scrolls and that particular entry is highlighted. **Go To** can be accessed by the shortcut **<CTRL>+<G>**. This feature is currently supported only on Windows and Linux.

2.13 Getting Additional Help

For help on the command line syntax or any of the graphical menu items that are not described in this User Guide, use the online help. There are two ways to get help:

- Use the command line syntax: `selview /help`
- Use the **Help** menu option from the graphical SEL Viewer window.

2.14 Uninstalling the SEL Viewer Utility

To uninstall the SEL Viewer Utility in EFI, do the following:

1. Go to the directory in the command line prompt, where all the utility files are copied from the utility released location.
2. Run `cd ..` on a command line prompt. This goes to one directory level below.
3. Remove all the directories including subdirectories in the current directory. This leads to the uninstallation of the utility files.

To uninstall the SEL Viewer Utility in Windows, do the following:

The utility files should be manually removed, if they were installed stand alone.

1. Go to the directory in the command line prompt, where all the utility files are copied from the utility released location.
2. Run `cd ..` on a command line prompt. This goes to one directory level below.
3. Remove all the directories including subdirectories in the current directory. This uninstalls the SEL Viewer utility files.

To uninstall the SEL Viewer Utility in Linux, do the following:

1. Go to the directory in the command line prompt, where all the utility files are copied from the utility released location.
2. Run `cd ..` on a command line prompt. This goes to one directory level below
3. Remove all the directories including subdirectories in the current directory. This uninstalls the SEL Viewer utility files.

Appendix A. Appendix Exit Error Codes

The command line version of the Intel® System Event Log Viewer Utility (SEL Viewer) may be used in a script to automate the tasks of saving the SEL, clearing the SEL, or searching the SEL.

The exit codes listed in Table 4 may be useful in the error handling section of the script.

Table 4. Exit error codes

Integer Value	Interpretation
0	Successful termination
1	Unable to clear SEL
2	SEL log is empty
3	Unable to read SEL entries
4	Unable to create SEL file
5	Invalid invocation
6	IPMI Driver initialization failed
7	Unable to initialize SEL Viewer
8	Unknown error

Appendix B. Glossary

Term	Definition
BIOS	Basic Input/Output System
BMC	Baseboard management controller
EPS	External Product Specification
IPMI	Intelligent Platform Management Interface
JRE	Java* Runtime Environment
LAN	Local area network
RAM	Random Access Memory
SEL	System event log