



Data Recovery of SSDs

Detecting File System Corruption

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VMware

What defines Corruption

- Simply put, corruption is the failure of reading or writing of digital data
- Common failures
 - System crashes
 - Power loss / Kernel panic / BSOD
 - Hardware
 - Media / Controller / mechanical
 - Software
 - Firmware / File systems

Linux/UNIX

- Kernel Messages (Syslog)
- FSCK
- Boot errors

```
*** An error occurred during the file system check.  
*** Dropping you to a shell; the system will reboot  
*** when you leave the shell.  
Give root password for maintenance  
(or type Control-D to continue):  
(Repair filesystem) 1 # _
```

Windows

- Event Viewer
- CHKDSK
- BSOD

```
D:\>chkdsk
The type of the file system is NTFS.

WARNING! F parameter not specified.
Running CHKDSK in read-only mode.

CHKDSK is verifying files (stage 1 of 3)...
File verification completed.
CHKDSK is verifying indexes (stage 2 of 3)...
Index verification completed.
CHKDSK is verifying security descriptors (stage 3 of 3)..
Security descriptor verification completed.

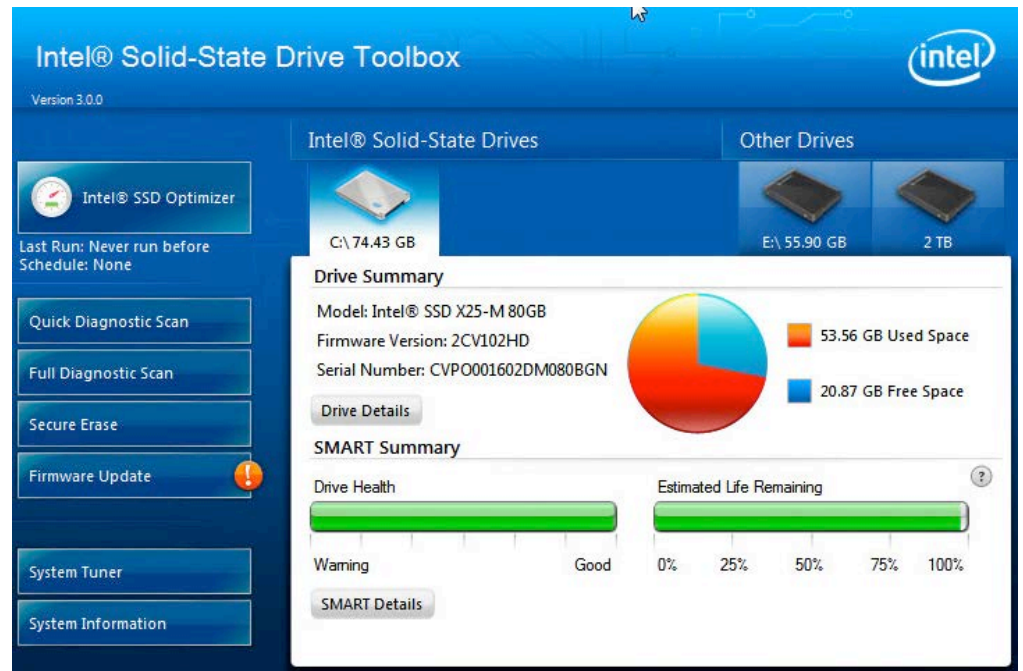
64115383 KB total disk space.
13268648 KB in 28188 files.
 19396 KB in 3320 indexes.
   0 KB in bad sectors.
 112399 KB in use by the system.
 65536 KB occupied by the log file.
50714940 KB available on disk.
```

VMware ESX

- VC alerts regarding metadata corruption
- Log files (vmkernel)
 - Volume XXXXX may be damaged on disk. Corrupt lock detected at offset 0
 - Resource cluster metadata corruption detected
Volume

What should I to do?

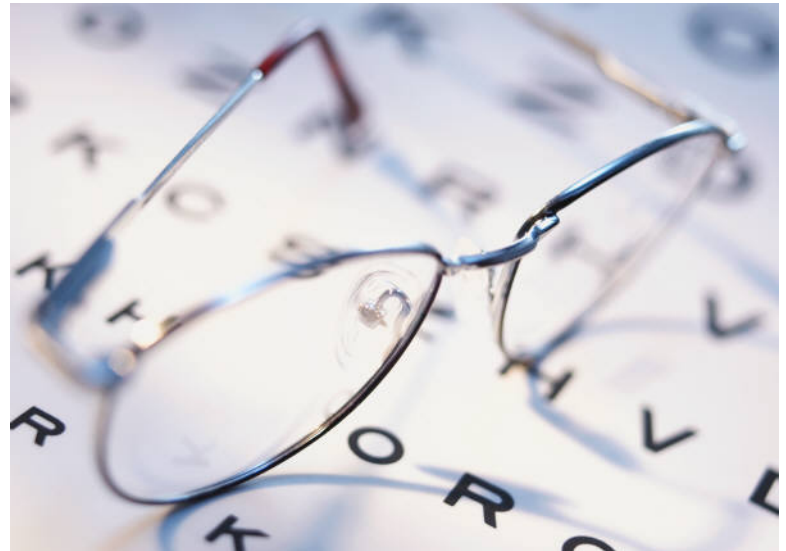
- Stop making changes
 - Shutdown services
 - Disable shares
- Built in system tools
 - CHKDSK
 - FSCK
- 3rd Party tools



The screenshot shows the Intel Solid-State Drive Toolbox interface. The main window is titled "Intel® Solid-State Drive Toolbox" with the Intel logo in the top right corner. Below the title bar, it says "Version 3.0.0". The interface is divided into two main sections: "Intel® Solid-State Drives" and "Other Drives". Under "Intel® Solid-State Drives", there is a drive icon for "C:\ 74.43 GB". Under "Other Drives", there are icons for "E:\ 55.90 GB" and "2 TB". The "C:\ 74.43 GB" drive is selected, and its details are shown in a large panel. This panel includes a "Drive Summary" section with a pie chart showing "53.56 GB Used Space" (orange) and "20.87 GB Free Space" (blue). Below this is a "SMART Summary" section with two progress bars: "Drive Health" (showing "Warning" to "Good") and "Estimated Life Remaining" (showing 0% to 100%). The "Drive Health" bar is currently in the "Warning" range. The "Estimated Life Remaining" bar is at 100%. On the left side of the interface, there is a vertical menu with several buttons: "Intel® SSD Optimizer" (with a sub-menu showing "Last Run: Never run before" and "Schedule: None"), "Quick Diagnostic Scan", "Full Diagnostic Scan", "Secure Erase", "Firmware Update" (with a warning icon), "System Tuner", and "System Information".

Do you have backups

- Eventually everyone will deal with data corruption or disk failure
- Having backups can greatly effect the outcome of data corruption
- Backups can be easy
- Test restores
- No backups = huge cost



- Corruption is the failure of reading or writing due to system crashes, hardware or software failures
- Stop making changes; use FSCK and CHKDSK in read only modes
- Backups do you have them?