

Monitor And Protect Your Data

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PATACS / OPCUG Joint Meeting

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Epsilonlogix

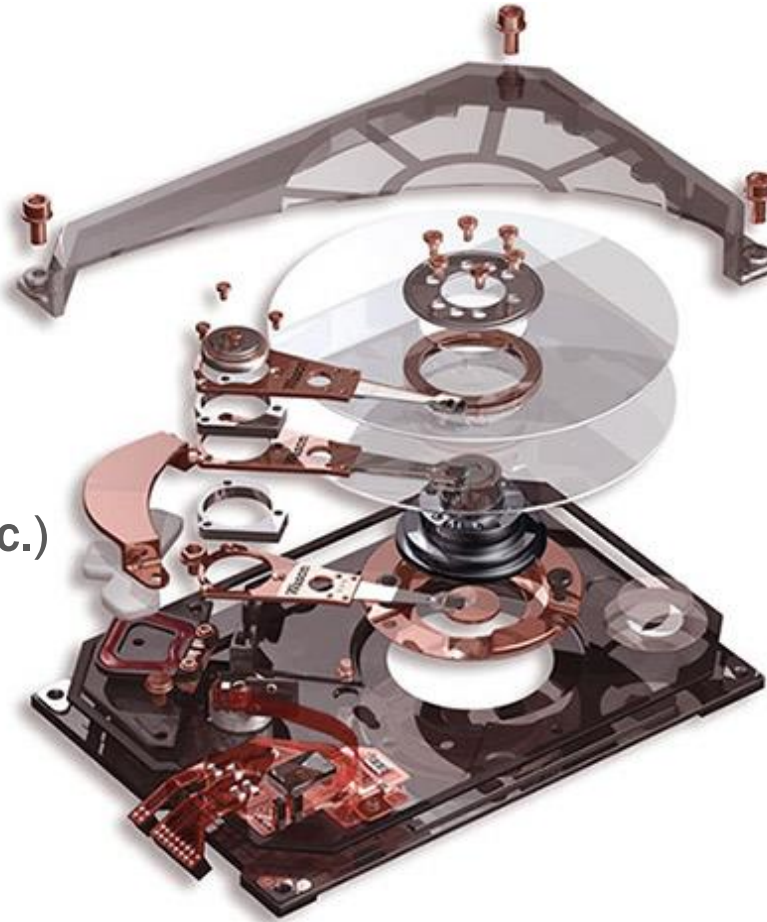
Modern Storage Devices Are Very Reliable...

- ...but they do fail
- How many of you have experienced a failure?
- Do you know when your next failure will occur?
- **Would you like to?**



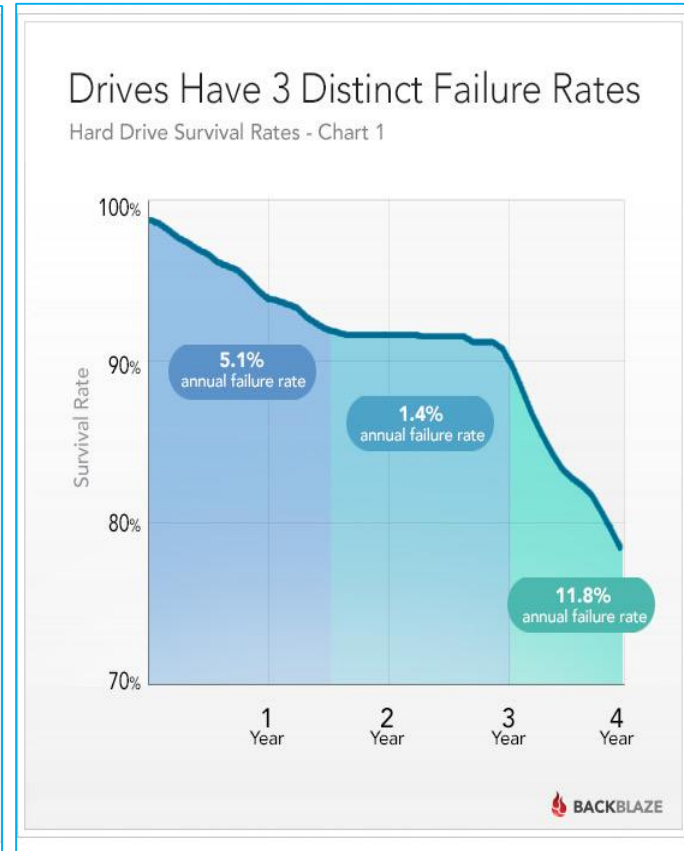
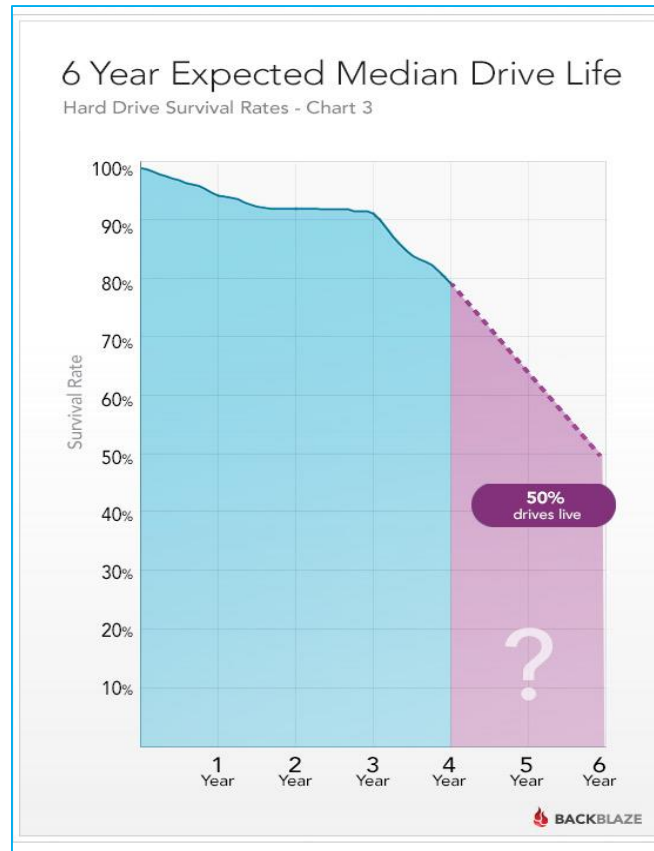
What Devices Are We Talking About?

- Spinning Hard Drive
 - Internal
 - External
- Solid State Drive (SSHD)
- USB Memory Stick
- Memory Card (SD, microSD, etc.)
- Anything with **firmware**



Tried And True: Spinning Drive

- 5.1% AFR at 18 months
- 11.8% AFR at 3 years
- It gets worse after that
- Tip: More expensive Enterprise drives failed slightly more than consumer drives
- Source: Backblaze
 - How Long Do Disk Drives Last?
 - 60,000 spinning drives today
 - Detailed statistics since 2011



<https://www.backblaze.com/blog/how-long-do-disk-drives-last/>

The New Standard: Solid State

- Definitely better performance
- Vendors claim return rates that are half (or less) of spinning drives
 - Tip: Their lips are moving
- When they fail, they fail quickly and hard
 - Tip: Check the warranty period
- Do you know what **Write-cycle Exhaustion** is?
 - **All SSD devices will eventually fail, based on the number of write cycles (15-20 years)**
- Source: Tom's Hardware
 - Is Your SSD More Reliable Than A Hard Drive?

With these [SSD] failures however, the drives were not recoverable at all. They generally disappeared completely, no longer being readable. Spinners die much more gracefully with an easier disk recovery...

<http://www.tomshardware.com/reviews/ssd-reliability-failure-rate,2923-2.html>

A Window Into Your Device: **S.M.A.R.T.**

- **S**elf-**M**onitoring, **A**nalysis and **R**eporting **T**echnology
- General ability of devices to monitor and report on metrics which determine the health of the device
- SMART code is stored in the **firmware** of the device, and runs whenever the device has power

Quick history of SMART:

- **Predictive Failure Analysis**
 - IBM, 1992
- **IntelliSafe**
 - Group lead by Compaq, included Seagate, Quantum, Conner, and Western Digital
 - 1995, name changed to SMART

<http://https://en.wikipedia.org/wiki/S.M.A.R.T./>

HD Sentinel: Know The Health Of Your Devices

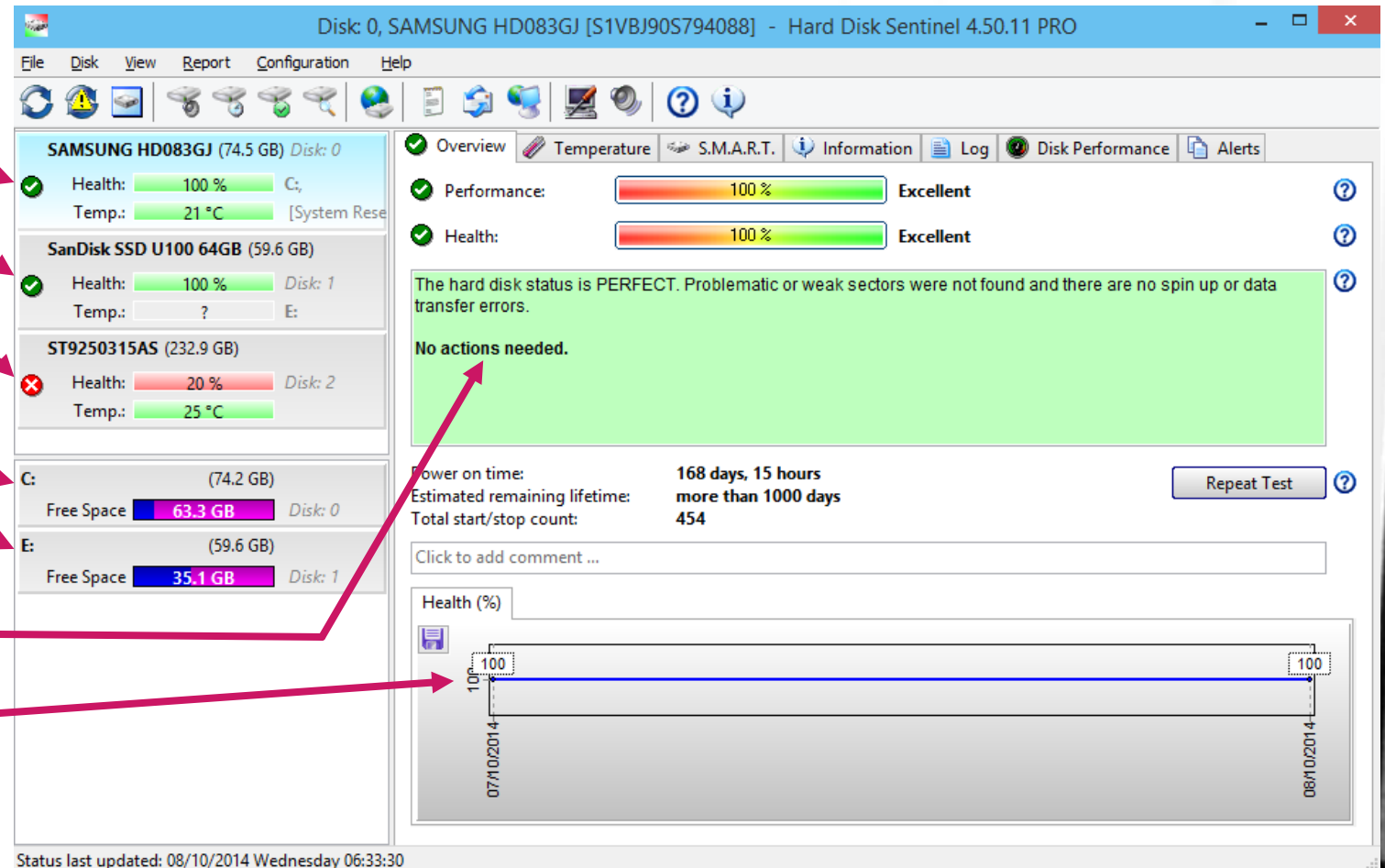
- The very best use of SMART monitoring technology available anywhere
- There are other tools, but **absolutely nothing** that compares:
 - Extremely rich feature set
 - Platforms: NT – Windows 10
 - Outstanding licensing terms
 - Support you will actually enjoy, if you need it

http://https://en.wikipedia.org/wiki/Comparison_of_S.M.A.R.T._tools/



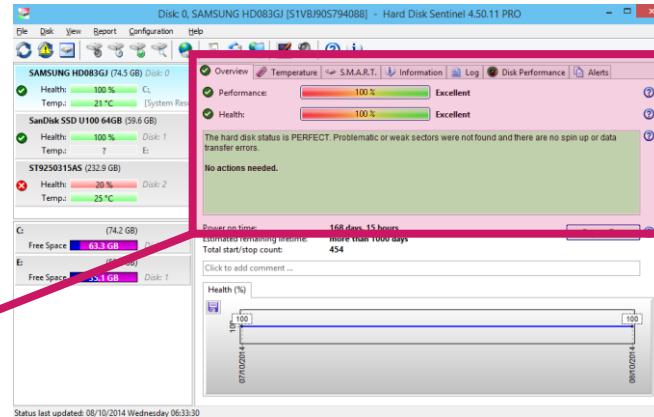
Overview Tab

- Physical drives
 - Samsung
 - SanDisk SSD
 - ST9250315AS
- Logical drives
 - C: and E:
 - Utilization
- Overall health
- A chart of changing health, back to date of installation



All You Really Need To Know

- Overview:



Overview Temperature S.M.A.R.T. Information Log Disk Performance Alerts

Performance: 100% Excellent

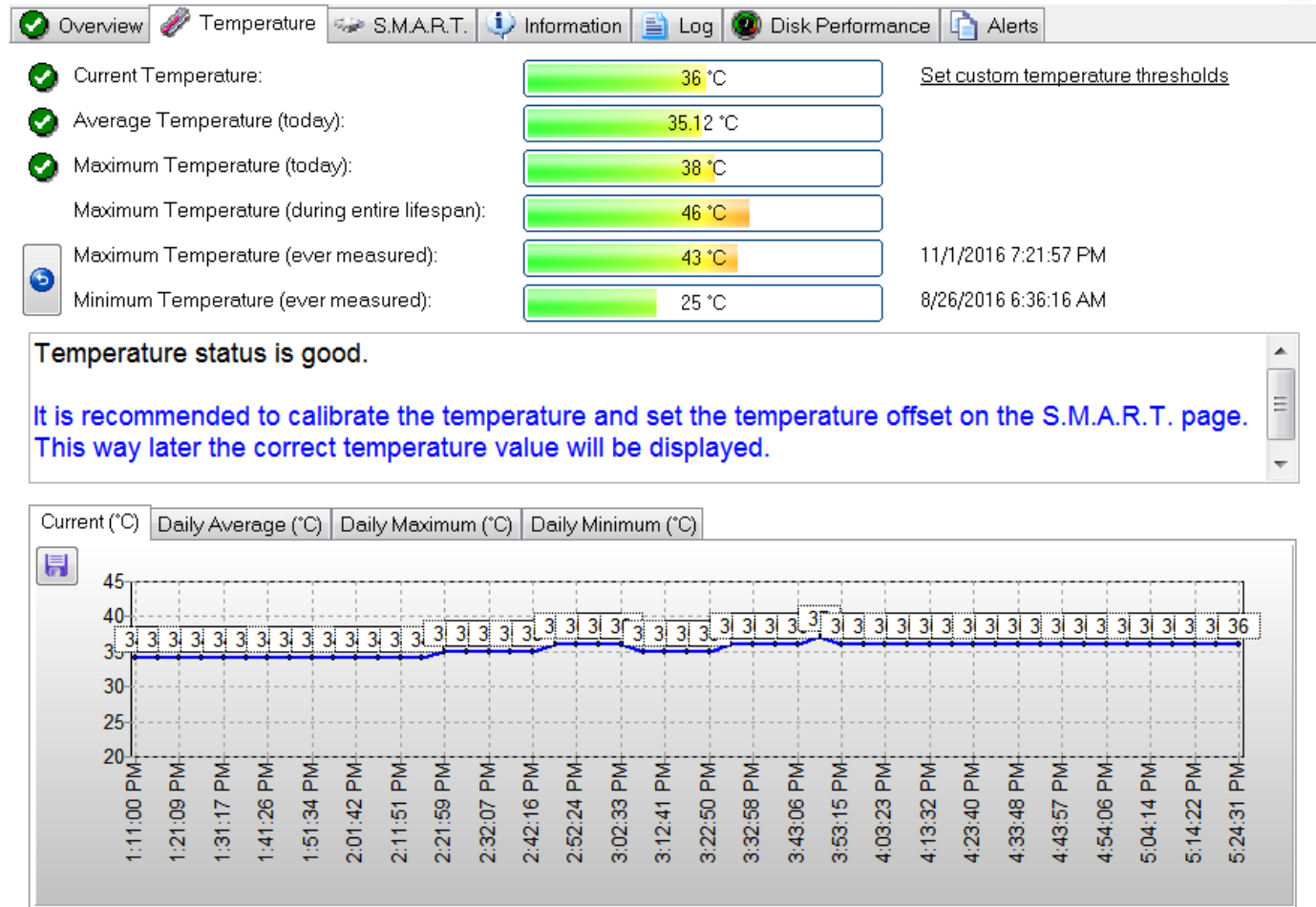
Health: 100% Excellent

The hard disk status is PERFECT. Problematic or weak sectors were not found and there are no spin up or data transfer errors.

No actions needed.

Temperature Tab

- Temperature:
 - Celsius or Fahrenheit
 - Current/Average/Max/Min
 - Chart of the values above, back to date of HD Sentinel installation



S.M.A.R.T. Tab

- Key attributes that are monitored:
 - Their current values and status
 - Ability to adjust and compensate for errors in vendor setup
- When will you need to look here?
 - Typically, only if you have a question, and Support asks you to

No.	Attribute	Threshold	Value	Worst	Status	Data	Offset	Enable
1	Raw Read Error Rate	51	200	200	OK	000000000000	- 0 +	<input checked="" type="checkbox"/>
3	Spin Up Time	21	188	170	OK	0000000061E	- 0 +	<input checked="" type="checkbox"/>
4	Start/Stop Count	0	100	100	OK (Always passing)	00000000054	- 0 +	<input checked="" type="checkbox"/>
5	Reallocated Sectors Count	140	200	200	OK	000000000000	- 0 +	<input checked="" type="checkbox"/>
7	Seek Error Rate	0	200	200	OK (Always passing)	000000000000	- 0 +	<input checked="" type="checkbox"/>
9	Power On Time Count	0	84	84	OK (Always passing)	000000002FB2	- 0 +	<input checked="" type="checkbox"/>
10	Spin Retry Count	0	100	253	OK (Always passing)	000000000000	- 0 +	<input checked="" type="checkbox"/>
11	Drive Calibration Retry Co...	0	100	253	OK (Always passing)	000000000000	- 0 +	<input checked="" type="checkbox"/>
12	Drive Power Cycle Count	0	100	100	OK (Always passing)	00000000004A	- 0 +	<input checked="" type="checkbox"/>
191	G-Sense Error Rate	0	1	1	OK (Always passing)	0000000006C6	- 0 +	<input checked="" type="checkbox"/>
192	Power off Retract Cycle C...	0	200	200	OK (Always passing)	00000000000C	- 0 +	<input checked="" type="checkbox"/>
193	Load/Unload Cycle Count	0	197	197	OK (Always passing)	000000002A6C	- 0 +	<input checked="" type="checkbox"/>
194	Disk Temperature	0	111	101	OK (Always passing)	000000000024	- 0 +	<input checked="" type="checkbox"/>
196	Reallocation Event Count	0	200	200	OK (Always passing)	000000000000	- 0 +	<input checked="" type="checkbox"/>

Spin Retry Count

Flags
Self Preserving, Error-Rate, Performance, Statistical, Critical

Show values

Attribute graph
Display data field

Information Tab

- Information:
 - Vendor and Model
 - Interface
 - Firmware version
 - Every feature the drive supports
 - Much more information than you ever wanted to know

Overview Temperature S.M.A.R.T. Information Log Disk Performance Alerts

Hard Disk Summary

Hard Disk Number	0
Interface	S-ATA Gen3, 6 Gbps
Disk Controller	Intel(R) Mobile Express Chipset SATA RAID Controller (RAID) [VEN: 8086, ...]
Hard Disk Model ID	WDCWD7500BPKX-75HPJT0
Firmware Revision	01.01A01
Hard Disk Serial Number	WD-WXC1E841TP0Z
Total Size	715402 MB
Power State:	Active

Logical Drive(s)

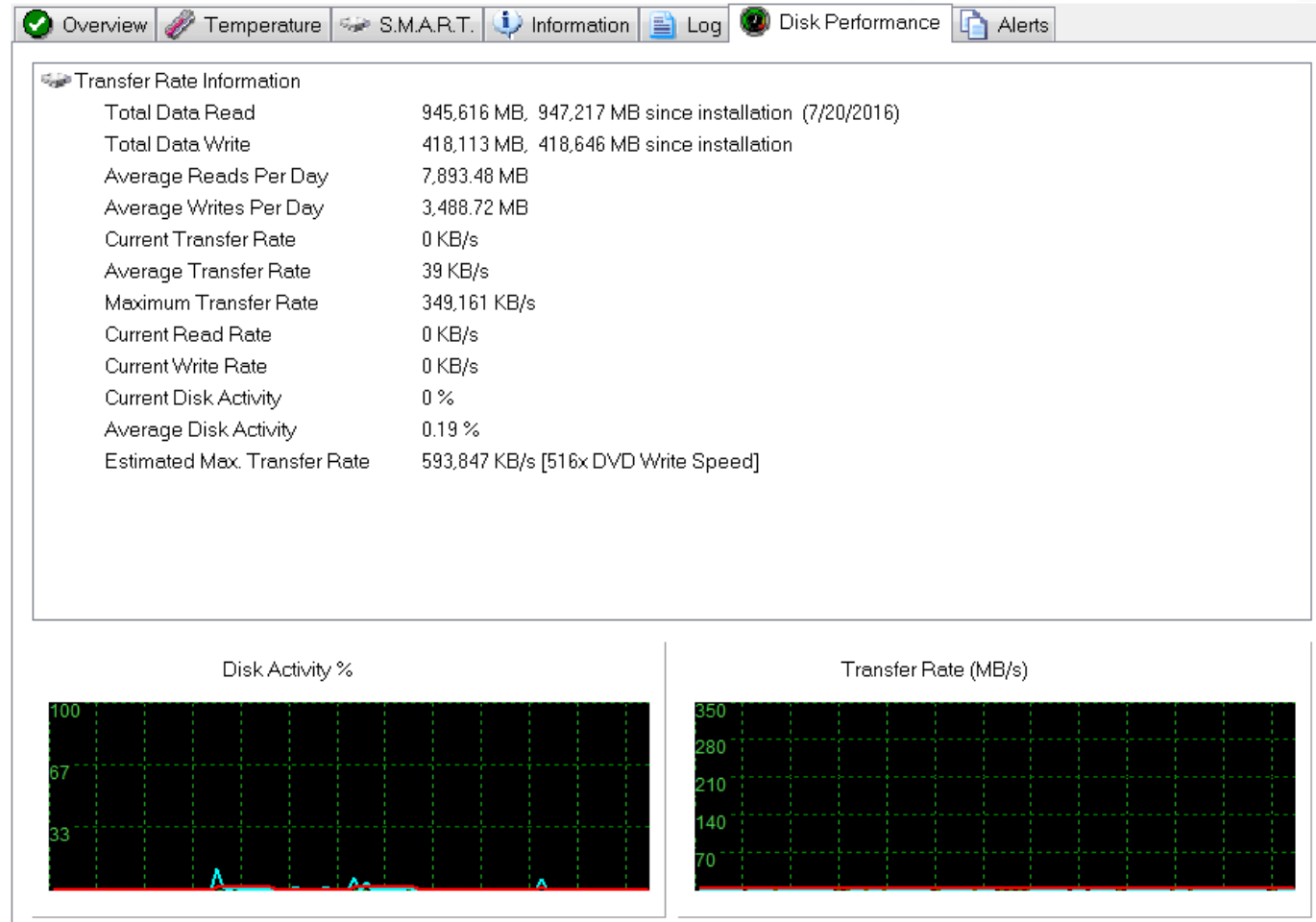
Logical Drive	C: [System2]
Logical Drive	D: [Data2]

ATA Information

Hard Disk Cylinders	1453521
Hard Disk Heads	16
Hard Disk Sectors	63
ATA Revision	ATA8-ACS
Transport Version	SATA Rev 2.6
Total Sectors	183143646
Bytes Per Sector	4096 [Advanced Format]
Buffer Size	16384 KB
Multiple Sectors	16
Error Correction Bytes	50
Unformatted Capacity	715405 MB
Maximum PIO Mode	4

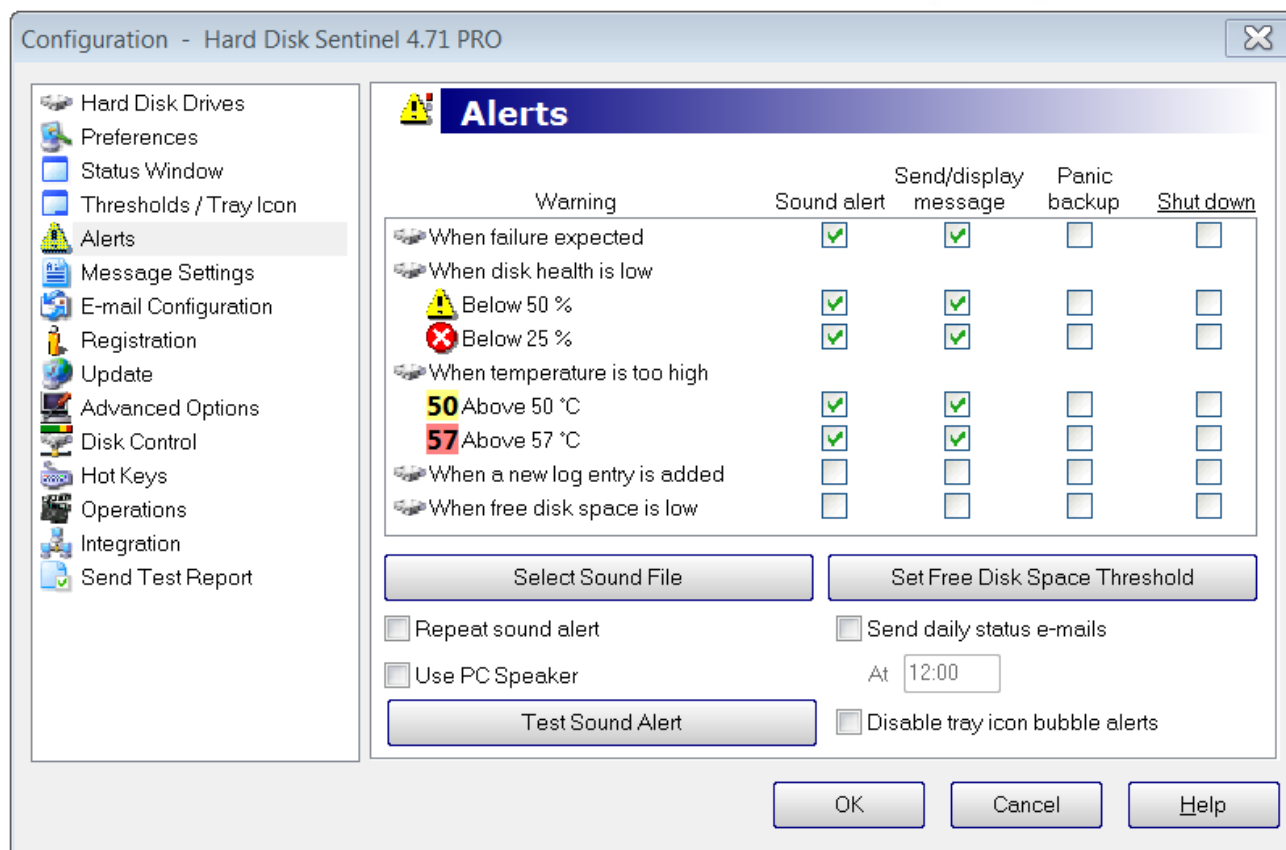
Performance Tab

- Performance:
 - Count of data read and written, back to date of HD Sentinel installation
 - General statistics
 - Real-time chart of activity



Configuration Options You Will Want To Set

- Preferences
 - Language/Units
- Alerts
 - Enable **Sound** and **Display** options
- Message Settings
 - Enable **Display on Screen** and disable **Send E-mail** if not used
- Disk Control
 - Select **Modify default disk icons**
- Send Test Report
 - Click **Update Test Report** to generate it; no need to save it



Options To Seriously Consider: Email

- E-Mail Configuration
 - HD Sentinel will generate a complete report and email it to you when an **Alert** you checked is triggered
 - Set it up as you have your standard email client
 - Test with the **Mail Test** button
 - Remember to go back to **Message Settings** and enable **Send E-mail** if you disabled it previously

Configuration - Hard Disk Sentinel 4.71 PRO

E-mail Configuration

Mail account:

Sender name:

Sender e-mail:

SMTP server: Port:

Recipient e-mail: **Mail Test**

CC (carbon copy):

BCC (blind carbon copy):

Authentication Options (Leave these fields blank if not required)

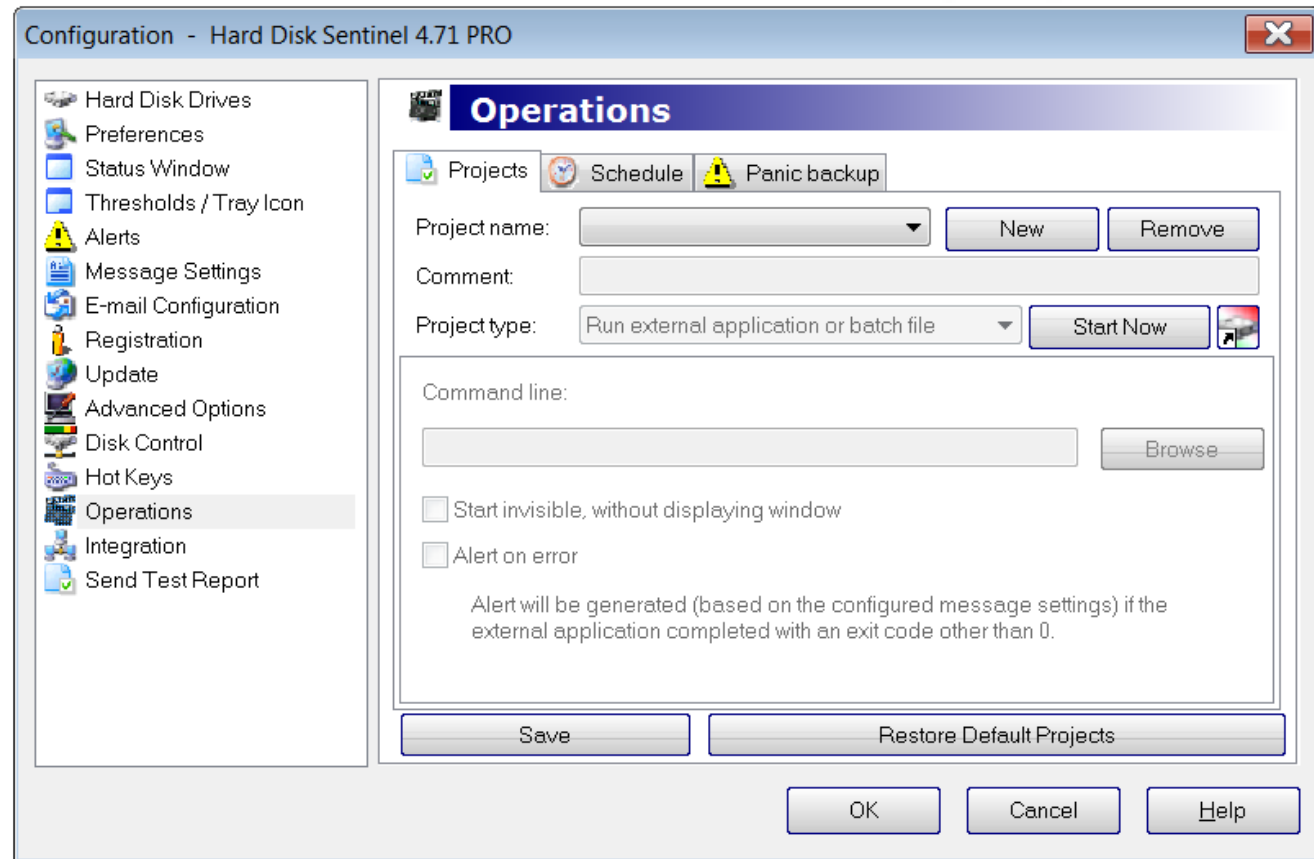
Username: Use SSL

Password:

OK Cancel Help

Options To Seriously Consider: Panic Backup

- Operations:
 - Create a new **Project**
 - The project uses your backup software (or your own) command to back up your data
 - Go to **Panic backup** tab
 - Add your new project to the list
 - Panic Backup will run the command **automatically** if an **Alert** you checked is triggered



HD Sentinel: Remember This Summary

- Modern devices (both spinning and solid state) collect data on dozens of metrics, and constantly monitor their own health
- Knowing the health of your devices allows you to correct transient problems (like overheating or disk filling up), but also to predict with reasonable accuracy when your drives will fail
- There are no built-in platform tools which expose this health information (only a single word displayed in Windows Disk Management)
- There are no built-in platform tools that provide automation to address any issues detected
- HD Sentinel provides a window to health information, monitors it, and allows you to decide which threshold conditions you want to be told about or act on
- The goal: **Once configured, ignore HD Sentinel and continue with your normal work, unless you are notified there is a problem**

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Acknowledgements, And An Offer You Can't Refuse

- Gabe Goldberg (regular attendee, in our audience today)
 - Gabe's review of HD Sentinel, with an offer you really can't refuse:
 - http://apcug2.org/monitor_and_protect_your_hard_drive/
 - Discount of **40%** off the 5-copy family license regular price of \$53, through December 24, 2016
 - Use the coupon code found on that page
 - Licenses are permanent, shareable with family and friends, and include all future versions
 - Net cost to you: **\$32**, or **\$6.40 per computer!!!**
 - <http://patacs.org/recmtgspat.html>
 - Janos Mathe
 - CEO of H.D.S. Hungary and Lead Developer
 - An exemplary vendor, in every way

References

- HD Sentinel:
 - <http://www.hdsentinel.com/faq.php>
 - <http://www.hdsentinel.com/smart/index.php>
 - <http://www.hdsentinel.com/knowledgebase.php>
- Other Sources:
 - <https://en.wikipedia.org/wiki/S.M.A.R.T.>
 - https://en.wikipedia.org/wiki/Comparison_of_S.M.A.R.T._tools
 - <https://www.backblaze.com/blog/how-long-do-disk-drives-last/>
 - <http://www.tomshardware.com/reviews/ssd-reliability-failure-rate,2923.html>
 - https://www.usenix.org/legacy/events/fast07/tech/schroeder/schroeder_html/index.html

