



IRONWOLF

NAS

Also NAS Business Update
Lausanne 7th Nov 2017
Nigel Bissette – Seagate Sales



SEAGATE HELPS

MAXIMIZE

DATA

Data is in flight
Data creates experiences
Data drives innovation
Data makes anything possible

Welcome to the Datasphere

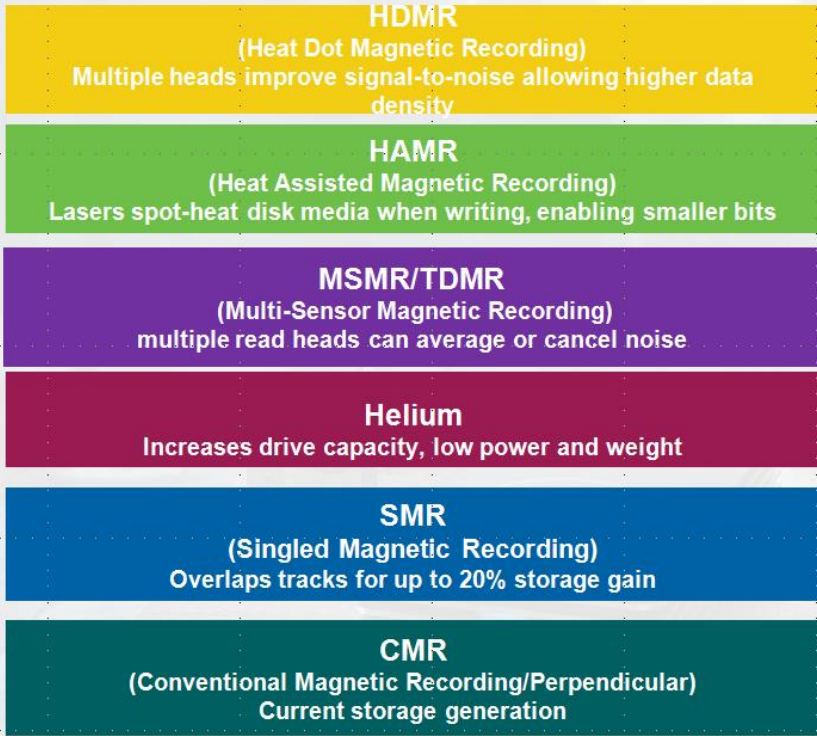


The sum of all data created, captured, and replicated on our planet in any given year is growing rapidly, and we call it the “global datasphere”.

IDC Data Age 2025 Report

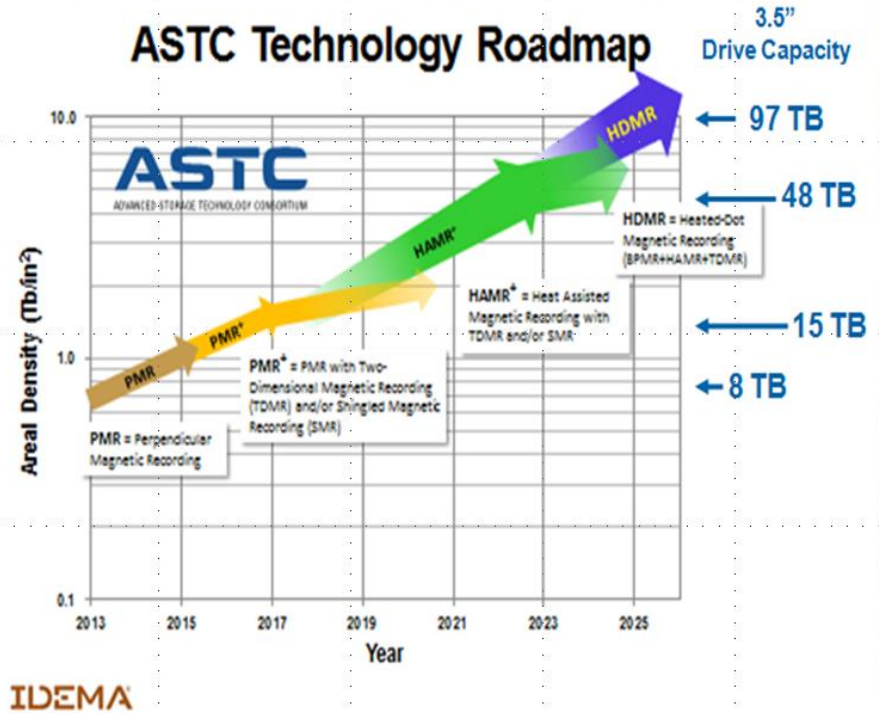
Sustained Investment to Areal Density Growth/Reliability

Technology Evolution



Seagate's technology investments

ASTC Technology Roadmap



Industry's projection of areal density growth

EVOLUTION OF SEGMENT POSITIONING

Consumer



Specialized / Client



Enterprise / Datacenter



Nytro Enterprise SSD Brand Pillars

Lightspeed

- Maximum performance and application responsiveness
- Accelerating customer migration to next-gen platforms



Solid

- A robust foundation
- Highest levels of reliability, endurance and security.

Impressive

- Engineered to improve speed, density, TCO + best IOPS/\$

Exos™ Brand Pillars



Exos E-Class

The Foundation of the Datasphere

- **Trusted** Proven technology
- **Efficient** Delivering results for customers
- **Versatile** Multitude of use cases



Exos X-Class

The Future of the Datasphere

- **Scalable** Massive storage capability
- **Responsive** Balance performance &
- **Innovative** Latest market technology





BARRACUDA
COMPUTE



Versatile, Fast, Reliable



IRONWOLF
NAS



Robust, Scalable, Reliable
New: IronWolf Health Management



SKYHAWK
SURVEILLANCE



Intelligent, Reliable, Safe



Product Overview – The Power of Agility. IronWolf for Everything NAS



1. AgileArray™ NAS-optimized firmware

- Drive Balance
- RAID optimization
- Advanced Power Management

2. Multi-User Technology – delivers 180TB user workload rate

3. Rotational vibration (RV) sensors – First in its class of drives to mitigate vibration in multi-drive NAS enclosures

4. 1M hours MTBF, 3-year limited warranty



NAS-Optimized Drives: 1-12TB

AgileArray™ Firmware Optimized for NAS Enclosures

Balance

Dual-Plane Balancing –minimizes drive vibration making it more reliable by dampening vibration.

Rotational Vibration (RV) Sensor – The first in this class drive to provide RV sensors. IronWolf 4 to 12TB drives come with RV sensors to mitigate vibration in multi-bay NAS. IronWolf Pro comes standard.

RAID Optimization

Firmware optimized for RAID environments.

Error Recovery Control – allows drives to comply with NAS requirements for better data integrity ensuring it remains active in a RAID environment.

Power Management

Save energy and receive it when you need it the most.

AgileArray power management go into the appropriate sleep / standby mode, and delivers power when you need it.



Tough, Ready, Scalable

Multi-User Technology – Do more with your NAS

IronWolf	IronWolf Pro	Exos E & X Class
180TB/year user workload rate limit	300TB/year user workload rate limit	550TB/year user workload rate

Example: Small User Creative Work Group









3 users

Desktop drives provide 55TB/year user workload rate, <20TB allowed per year for each user in this case. IronWolf provides 180TB a year, meaning 60TB for each user – 3 times more to meet the need of creative professionals!





Multi-User Technology – Increased User Workload Rate. Do more with NAS.

User & workload rate	SOHO Customer 1-10 Users 180TB/yr user workload	SMB/SME Customer 11-200 Users 180TB – 300TB/yr user workload	SME Customer 50-1000 Users or iSCSI 300TB – 550TB/yr user workload
NAS Enclosures	 <p>1 to 8-Bay NAS</p>	 <p>1 to 16-Bay NAS</p>	 <p>1 to 16-Bay NAS</p>
IronWolf, Ironwolf Pro, Exos			

Workload Rate Limit

Above these WRL's, Failure Rates will increase

Product Segment	Example Drives	Workload Rate Limit
Desktop	Barracuda	55 TB/Year
Archive	Archive	180 TB/Year
NAS	IronWolf	180 TB/Year
Enterprise NAS	IronWolf Pro	300 TB/Year
Classic Nearline	Exos	550 TB/Year



IRONWOLF

Health Management

Revised 1 February 2017



IRONWOLF

NAS





IRONWOLF
Health Management

1

Prevention



Monitor user environment and recommend preventive actions to enable superior NAS experience

2

Intervention



Analyze 100s of parameters to recommend backup ahead of catastrophic data loss events

3

Recovery



In the event of fatal failures, access to Seagate Data Recovery Services ensures your data is recovered in a secure environment



Actively Protect Your NAS with IronWolf Health Management* in Synology DiskStations

- Workload-aware monitoring providing peace of mind with notifications
- Synology DiskStation Manager 6.1 (DSM) notifications on drive health
- Intelligent analysis provides environmental and operational recommendations
- Automatically detects the IronWolf drive, which is DSM-compatible. No additional software or setup required

*Coming soon. IronWolf Health Management features subject to change.

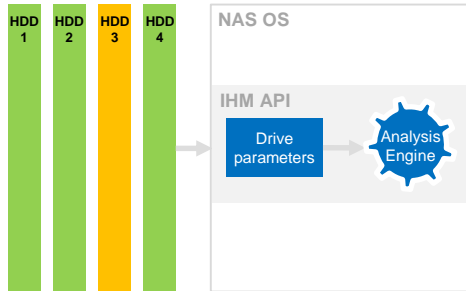


IRONWOLF

Health Management

Architecture Overview

NAS Box



The screenshot shows the 'Storage Manager' application window. The 'HDD/SSD' section is selected in the left sidebar. The main pane displays a list of disks:

- Disk 2 - Initialized (Seagate ST4000AN009-2DR166, 3.6 TB HDD)
- Disk 3 - Initialized (Seagate ST4000AN009-2DR166, 3.6 TB HDD) - highlighted with a red arrow
- Disk 4 - Initialized (Seagate ST10000M0033-9ZM173, 931.5 GB HDD)

The screenshot shows the 'Health Info' tab for Disk 3. A red arrow points to the 'Health Info' tab in the top navigation bar. The details for Disk 3 are as follows:

- Device: R8B15+
- Volume: -
- Status: Initialized
- S.M.A.R.T. Status: Normal
- IronWolf Health Status: Normal
- Estimated Lifespan: -
- Bad Sector Count: 0
- Temperature: 35 °C / 95 °F
- Serial number: WDHDV72E
- Firmware version: SC90
- 4K native HDD: No

The screenshot shows the 'Health Info - Disk 3' interface. The status is 'Normal' with a green checkmark. The text below reads: 'The health status of the disk is normal.' The 'History' tab is selected with a red arrow. The statistics section shows the following data:

Temperature:	35 °C / 95 °F
Power-On Time:	1145 hour(s)
Disk Reconnection Count:	0
Bad Sector Count:	0
Disk Re-identification Count:	0
S.M.A.R.T. Status:	Normal
IronWolf Health Status:	Normal

The screenshot shows the 'Health Diagnosis Results' section. A 'Download CSV' button is visible. The table below contains the following data:

Time	Type	Test Result
2016/12/15 16:20:17	IronWolf Health Test	000, Normal
2016/12/09 14:31:55	IronWolf Health Test	000, Normal



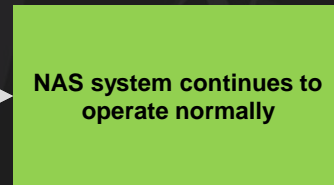
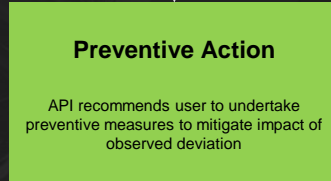
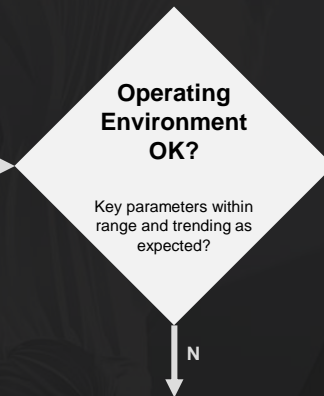
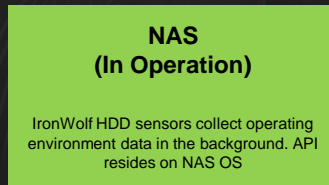
IRONWOLF
Health Management

Prevention

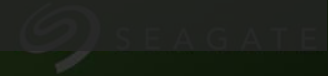
IHM keeps tab on environmental and usage conditions:

Temperature
Shock
Vibration
Intermittent connections
Signal Integrity

Recommends preventive measures



IRONWOLF
NAS





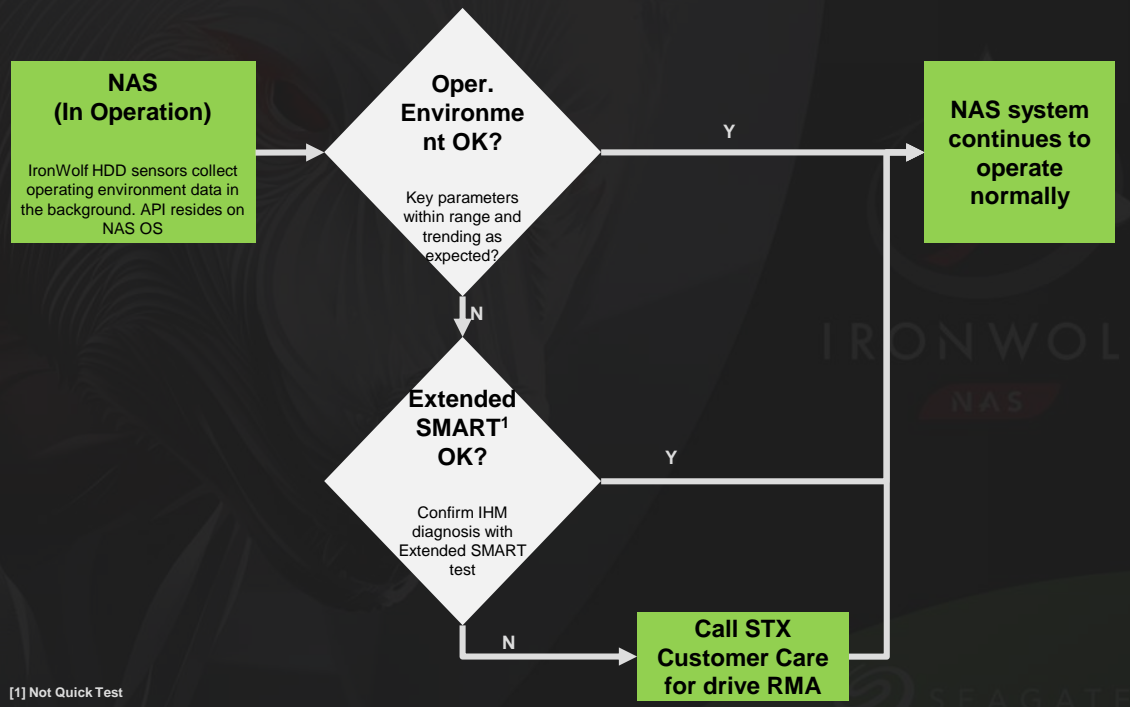
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Health Management

Intervention

Adaptive algorithms that monitor critical drive health parameters related to

Data transfer
Performance
Readability
Writability
Overall reliability

Recommends further diagnostics & backup



[1] Not Quick Test



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Health Management

Recovery

“Insurance” against Catastrophic data loss

Purchase optional plan with IronWolf
Register FREE 2Y for Pro

Recovery done with advanced tools, in a
secure environment

Free shipping both ways

Recovered data returned on a new drive,
or via cloud

SRS recovery rate is 90%

IronWolf



Health In SEAGATE

Overview **IronWolf Health** S.M.A.R.T. Test

IronWolf Health Management

Examine and report the status of Seagate hard drives

[Start](#)

This drive is Seagate IronWolf drive. Select and purchase a recovery plan.

Test Result

Last IronWolf Health Test result: No

Test output code: 00

CONGRATULATIONS!

Your *IronWolf* hard drive, serial number ZA15NDCS, has been successfully registered.

With this registration, you are one step closer to completing your Seagate account creation, which will enable you to access our customer service. Why not save time and do it now?

Post-Purchase Plan

GET A PLAN FOR A DRIVE YOU ALREADY HAVE.

- Free in-lab data recovery in case the drive fails
- Recovered data returned to you on a drive or downloadable from the cloud — you choose
- We'll pay for the shipping — both ways (if applicable)
- Applies to any drive of any brand purchased within the last 12 months

IronWolf Pro



Health In SEAGATE

Overview **IronWolf Health** S.M.A.R.T. Test

IronWolf Health Management

Examine and report the status of Seagate hard drives

[Start](#)

This Seagate IronWolf Pro drive comes with 2-year Register for a recovery plan.

Test Result

Last IronWolf Health Test result: No

Test output code: No

CONGRATULATIONS!

Your *IronWolf Pro* hard drive, serial number ZC10TGZ1, has been successfully registered.

SPECIAL OFFERS

Rescue
DATA RECOVERY SERVICES

Congratulations!
Your 2-year data recovery plan is now active.

[UPGRADE](#)

Where to find my serial number?



IRONWOLF
Health Management

Ironwolf complements and extends much beyond SMART

SMART

- Monitors 20 drive parameters
- Reports Pass or Fail status
- Reports end impact to drive through monitoring of 20 drive parameters with fixed thresholds
- Has no memory of past trends of threshold excursions

IronWolf Health Management

- Monitors in excess of 200 drive parameters that may influence drive health
- Notifies user of possible prevention and intervention actions ahead of a fail event, thereby reducing the probability of catastrophic failure and associated data loss
- Reports end impact to drive, but also communicates failure mode through output code (for interpretation by STX Customer Care only)
- Maintains moving window of parametric data for trend analysis and assesses impact of external stresses over the drive life



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Health Management

User Messaging

Category	Code	Synology UI Message
Normal	000	Normal
Prevention	100	Abnormally high operating temperature has been detected. Please make sure that the rear ventilation ports are not blocked, and please try to lower the ambient temperature. If the temperature is still high, please go to Control Panel > Hardware & Power > Fan Speed Mode to change the fan operation to a higher speed. If this issue persists, please contact Synology Support Team.
	105	Excessive vibration has been detected. Please make sure your <code>_DISKSTATION_</code> is placed on a stable surface. If this issue persists, please contact Synology Support Team.
	102	Excessive physical shock to the hard drive has been detected. Please make sure your hard drive and <code>_DISKSTATION_</code> are placed on a stable surface. If this issue persists, please contact Synology Support Team.
	101	Connection issues on your <code>_DISKSTATION_</code> and hard drive interface have been detected. Please make sure the hard drive is properly installed in the chassis or drive tray, and that the tray properly installed in your <code>_DISKSTATION_</code> . If this issue persists, please contact Synology Support Team.
	106	Excessive host resets have been detected. Please make sure the hard drive is properly installed in the chassis or drive tray. Performing a power cycle is recommended. If this issue persists, please contact Synology Support Team.
Intervention	>=200	To check the health status of the hard drive, it is recommended to run the S.M.A.R.T. extended test on the drive. If this issue persists, please contact the drive reseller or manufacturer.
Recovery Options ¹	50 ²	This drive is a Seagate IronWolf drive. Please purchase your preferred Seagate Rescue Data Recovery Plan here.
	51 ²	This Seagate IronWolf Pro drive comes with a 2-year complimentary Rescue Data Recovery Service. Please register here.

[1] Recovery options appear upfront when an eligible drive is first detected. These do not appear when the drive needs recovery. Therefore, should not be associated with drive health status.

[2] Code sent from IHM to NAS OS. Not visible to user.

Robust, Ready, Scalable – NAS-Drives from Seagate



NAS-Systeme from Synology



IRONWOLF
Health Management

	IronWolf	IronWolf Pro	SkyHawk™	Enterprise Capacity 3.5		J-Series, DiskStation Value Series, DiskStation + Series (bis zu 5 Schächte)	RackStation Value Series, RackStation + Series, DiskStation + Series (8 & 12 Schächte)	Surveillance	RackStation XS/XS+ Series	FlashStation
Ideal für	NAS-Systeme in vernetzten Wohnungen, Klein- und Heimbüros sowie kleinen und mittelständischen Unternehmen	NAS-Systeme für Gewerbe und Unternehmen	DVR- und NVR-Überwachungssysteme für kleine und mittlere Unternehmen	Videoanalysen oder Virtualisierung von Datenbankanwendungen	Einsatzbereich	Heimbereich bis Kleinbüro, Media-Streaming, Dateifreigabe, Backup	Heimbüro bis mittelgroße Unternehmen, Datenverwaltung, -sicherung und -austausch	Surveillance, umfassende Videoüberwachung	Großunternehmen, Speicherzentralisierung und -rationalisierung	Enterprise, Unternehmen mit Cloud-Lösungen
Unterstützte Laufwerksschächte	1 bis 8	1 bis 16	16	1 bis 8	8+	Backup, Cloud	Backup, Virtualisierung, Cloud	Surveillance	Backup, Virtualisierung, Server	Big Data-Analyse, Video-Nachbearbeitung, Virtualisierung, Datenbankanwendungen
Kapazitäten	1–10 TB ST10000VN0004	2–10 TB ST10000NE0004	4–10 TB ST10000V00004	1–3 TB ST3000VW010	1–10 TB ST10000NM0016	Einfach zu nutzen, perfekt für den Privatgebrauch und das Heimbüro	Leistungstark und erschwinglich, ausgelegt für den Einsatz in kleinen und Heimbüros und wachsenden Unternehmen	Ausgelegt für Überwachungs-umgebungen mit mehreren Standorten und Servern	Höchste Leistung und voller Funktionsumfang, optimiert für Großunternehmen	E/A-intensive Anwendungen mit kurzen Latenzzeiten, Produktivstorage/-server, Großunternehmen
Leistung (max. anhaltender Durchsatz)	180-210 (MB/s)	195–214 (MB/s)	180-210 (MB/s)	216 MB/s						
Arbeitslast pro Jahr	180 TB	300 TB	180 TB	550 TB						
Zuverlässigkeit (Betriebsdauer zwischen Ausfällen, MTBF)	1 Mio.	1,2 Mio.	1 Mio.	2 Mio.	Anzahl der Laufwerksschächte	1–15 Festplatten, Desktop oder Rack	2–36 Festplatten, Desktop oder Rack	NVR216 ist eine Stand-Alone V Videoüberwachungs Lösung.	12–180 Festplatten, Rack	24–72 SSDs, Rack
Stromverbrauch (in Standby- und Betriebsmodus/Lesen)	0,8 W / 6,8 W	0,8 W / 6,8 W	0,25–0,8 W / 5,6–9 W	6,9 W / 11,27 W	Lesen MB/s	100–1.165	221–2.358	Alle Synology Modelle können als V-ideüberwachungslösung eingesetzt werden.	2.153–5.959	500.000 4K Random Read IOPS 200.000 4K Random Write IOPS
Rescue Data Recovery Services	Optional	Inkludiert	Optional	–	Schreiben MB/s	64–527	171–1.923		1.634–2.494	DUAL CPU – Six Core 2,4 GHz
Unterstützte Videokameras	–	–	1 bis 64	100+	CPU-Frequenz	Single 800 MHz – Quad Core 2,4 GHz	Dual Core 1,33 GHz – Quad Core 2,2 GHz		Quad Core 3,3 GHz – Eight-Core 2,1 GHz	DUAL CPU – Six Core 2,4 GHz
Garantie	3 Jahre	5 Jahre	3 Jahre	5 Jahre	RAM	256 MB – 16 GB	512 MB – 16 GB	Geringer Stromverbrauch, bis zu 8 Schächte	4 GB – 128 GB	64 GB – 512 GB
					Wichtigste Merkmale der Festplatten	Niedrige Kosten, geringer Stromverbrauch, geräuscharmer Betrieb	Geringer Stromverbrauch, bis zu 16 Schächte	Hohe Leistung, RV-Sensoren	Höchste Leistung, Enterprise-Qualität	Höchste Rechenleistung, beste Qualität
					Empfohlene Seagate HDDs für gemischte Workloads					
						IronWolf	IronWolf Pro	SkyHawk	Enterprise Capacity 3.5	Seagate Flash-Speicher

*Für Kapazitäten ab 6 TB werden andere Trays benötigt – diese werden von Synology zur Verfügung gestellt.

Thank You



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Health Management



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