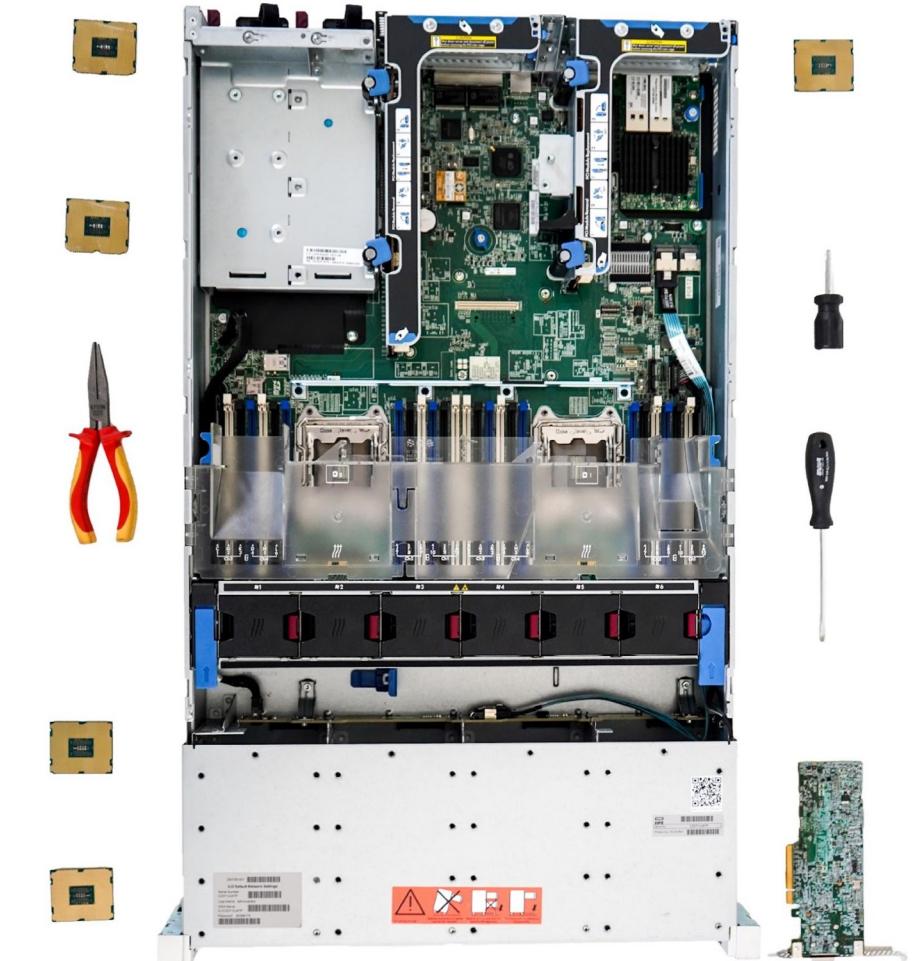


# OBTÉN EL MÁXIMO RENDIMIENTO CON LA REUTILIZACIÓN DE TUS ACTIVOS EOL

- JORGE TEJADA CUARTERO
- [JTEJADA@MERCADOIT.COM](mailto:JTEJADA@MERCADOIT.COM)



# ÍNDICE

- INTRODUCCIÓN
- EQUIPOS DE RED
  - Inventario
  - Chequeo salud
- SERVIDORES
  - Inventario
  - Chequeo salud
- SISTEMAS DE ALMACENAMIENTO
  - Inventario
  - Chequeo salud
  - Borrado de configuraciones
  - Métodos de destrucción información.
  - Borrado certificado
- TIPS & TRICKS
  - nWIPE. Software libre para el borrado de datos
  - HD Sentinel Linux Version. Software gratuito para el análisis de discos
  - SG3\_UTILS. Herramientas para el tratamiento de discos



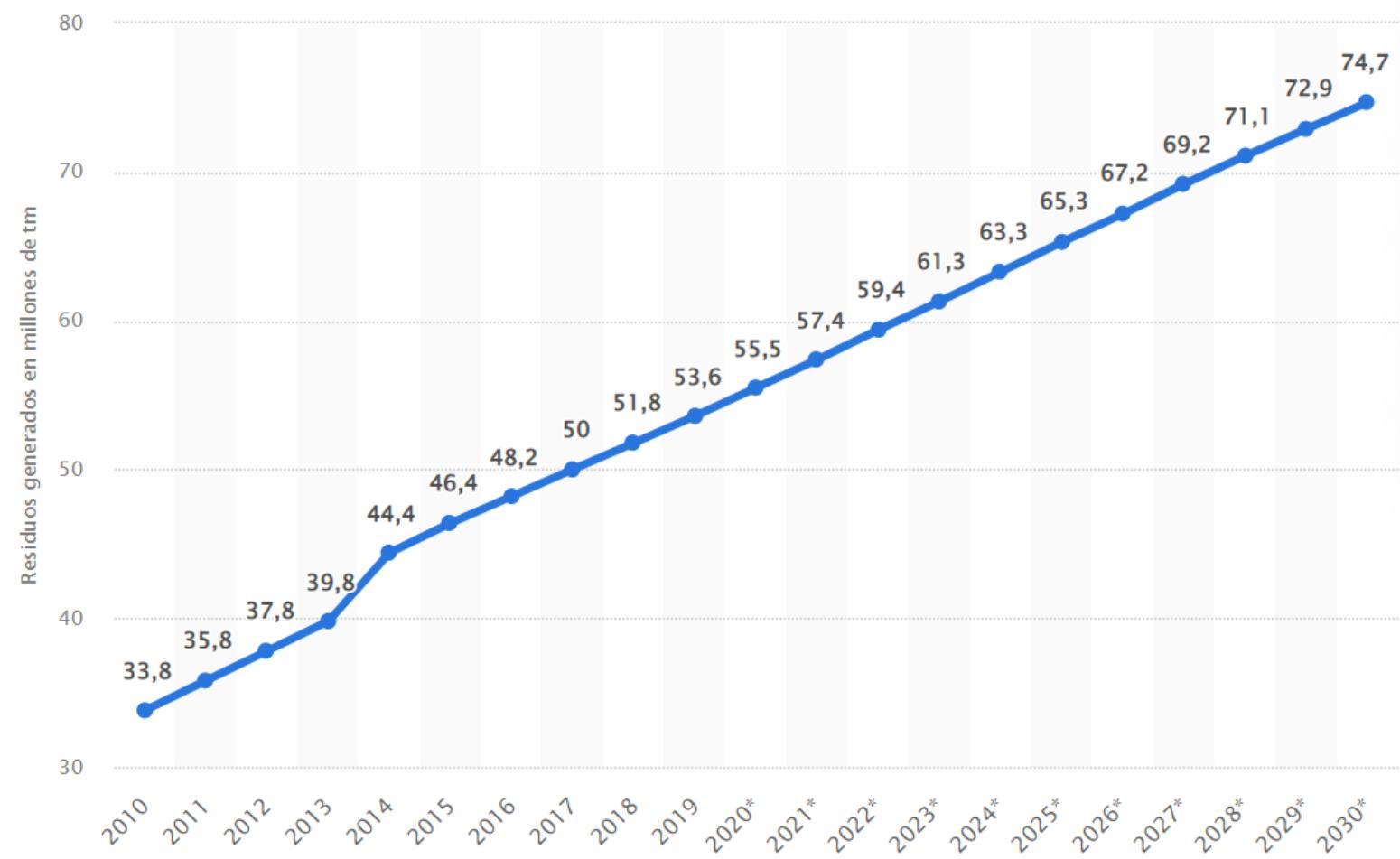


# INTRODUCCIÓN

Concienciación medioambiental  
reutilización equipos



## Evolución de la producción mundial de basura tecnológica 2010-2030 (en millones de toneladas).



### Fuente

<https://es.statista.com/estadisticas/807027/evolucion-de-la-produccion-mundial-de-basura-tecnologica/>

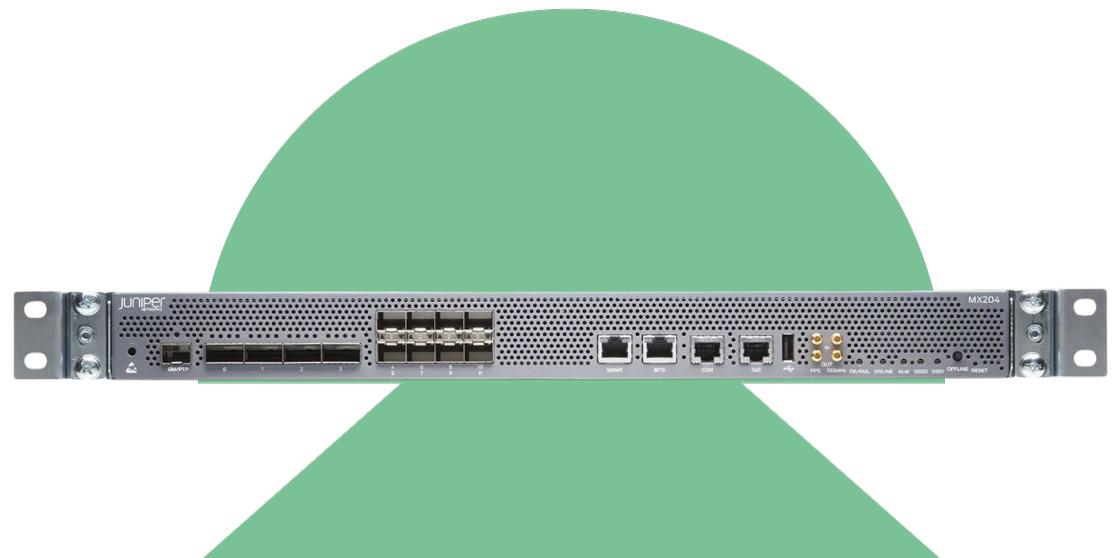
# EQUIPOS DE RED

## INVENTARIO

- Switch / Router / Firewall / AP / Etc
- Componentes
- Software y licenciamiento

## CHEQUEO SALUD

- Comandos CLI / GUI / SNMP





# EJEMPLO: JUNIPER MX204

```
root> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis
Routing Engine 0      BUILTIN      BUILTIN        JNP204 [MX204]
CB 0            REV 43   750-069579  BCCW3586     JNP204 [MX204]
FPC 0
  CPU          REV 02   750-066879  CAGC8782     MPC
    PIC 0
    PIC 1
  PEM 0          REV 04   740-070749  1F189450209  JPSU-650W-AC-AO
  PEM 1          REV 04   740-070749  1GG59510096  JPSU-650W-AC-AO
Fan Tray 0
Fan Tray 1
Fan Tray 2
```

```
root> show system license
License usage:
```

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
scale-subscriber	0	10	0	permanent
scale-l2tp	0	1000	0	permanent



# EJEMPLO: JUNIPER MX204

```
root> show version
Model: mx204
Junos: 20.4R2.7
JUNOS OS Kernel 64-bit [20210220.a5d6a89_builder_stable_11]
JUNOS OS libs [20210220.a5d6a89_builder_stable_11]
JUNOS OS runtime [20210220.a5d6a89_builder_stable_11]
JUNOS OS time zone information [20210218.a5d6a89_builder_stable_11]
JUNOS network stack and utilities [20210414.022657_builder_junos_204_r2]
JUNOS libs [20210414.022657_builder_junos_204_r2]
JUNOS OS libs compat32 [20210220.a5d6a89_builder_stable_11]
JUNOS OS 32-bit compatibility [20210220.a5d6a89_builder_stable_11]
JUNOS libs compat32 [20210414.022657_builder_junos_204_r2]
JUNOS runtime [20210414.022657_builder_junos_204_r2]
Junos vmguest package [20210414.022657_builder_junos_204_r2]
JUNOS sflow mx [20210414.022657_builder_junos_204_r2]
JUNOS py extensions2 [20210414.022657_builder_junos_204_r2]
JUNOS py extensions [20210414.022657_builder_junos_204_r2]
JUNOS py base2 [20210414.022657_builder_junos_204_r2]
JUNOS py base [20210414.022657_builder_junos_204_r2]
JUNOS OS vmguest [20210218.a5d6a89_builder_stable_11]
JUNOS OS crypto [20210218.a5d6a89_builder_stable_11]
JUNOS OS boot-ve files [20210218.a5d6a89_builder_stable_11]
JUNOS na telemetry [20.4R2.7]
JUNOS Security Intelligence [20210414.022657_builder_junos_204_r2]
```



# EJEMPLO: JUNIPER MX204

```
root> show system firmware
      Part          Type        Tag Current           Available          Status
                           version
                           version
CB 0       CB FPGA     0   0.239.0          0.9.0            OK
Routing Engine 0 RE BIOS    7   0.15.1          0.15.01          OK
Routing Engine 0 RE FPGA    2   304.0.0          304.0.00          OK
Routing Engine 0 RE SSD1    3   12050           12028            OK
Routing Engine 0 RE SSD2    4   12050           12028            OK
FPC 0       \x16        3272 2748.3220.57468  0                INVALID STATE
PEM 0       PSU AC      1   0.6.0            0                OK
PEM 1       PSU AC      1   0.8.0            0                OK
```

```
Auto Image Upgrade: No DHCP Client in bound state, reset all DHCP clients
```

```
Auto Image Upgrade: DHCP INET6 Client State Reset : fxp0.0
```

```
Auto Image Upgrade: DHCP INET6 Client State Reset : fxp0.0
```

```
show system software
```

```
jail-runtime-x86-32-20210220.a5d6a89_builder_stable_11 -- jail runtime
jdocs-x86-32-20210414.022657_builder_junos_204_r2 -- jdocs
jfirmware-x86-32-20.4R2.7 -- jfirmware
jinsight-x86-32-20.4R2.7 -- jinsight
jmrt-base-x86-64-20210414.022657_builder_junos_204_r2 -- jmrt base
jpfe-X-x86-32-20210414.022657_builder_junos_204_r2 -- jpfe X
```



# EJEMPLO: JUNIPER MX204

```
root> show chassis environment
```

Class	Item	Status	Measurement
Temp	CB 0 Top Right Inlet Sensor	OK	32 degrees C / 89 degrees F
	CB 0 Top Left Inlet Sensor	OK	29 degrees C / 84 degrees F
	CB 0 Top Right Exhaust Sensor	OK	39 degrees C / 102 degrees F
	CB 0 Top Left Exhaust Sensor	OK	51 degrees C / 123 degrees F
	CB 0 CPU Core-0 Temp	OK	43 degrees C / 109 degrees F
	CB 0 CPU Core-1 Temp	OK	41 degrees C / 105 degrees F
	CB 0 CPU Core-2 Temp	OK	43 degrees C / 109 degrees F
	CB 0 CPU Core-3 Temp	OK	41 degrees C / 105 degrees F
	CB 0 CPU Core-4 Temp	OK	42 degrees C / 107 degrees F
	CB 0 CPU Core-5 Temp	OK	42 degrees C / 107 degrees F
	CB 0 CPU Core-6 Temp	OK	43 degrees C / 109 degrees F
	CB 0 CPU Core-7 Temp	OK	43 degrees C / 109 degrees F
	FPC 0 EA0_HMC0 Logic die	OK	66 degrees C / 150 degrees F
	FPC 0 EA0_HMC0 DRAM botm	OK	63 degrees C / 145 degrees F
	FPC 0 EA0_HMC1 Logic die	OK	73 degrees C / 163 degrees F
	FPC 0 EA0_HMC1 DRAM botm	OK	70 degrees C / 158 degrees F
	FPC 0 EA0 Chip	OK	76 degrees C / 168 degrees F
	FPC 0 EA0-XR0 Chip	OK	52 degrees C / 125 degrees F
	FPC 0 EA0-XR1 Chip	OK	57 degrees C / 134 degrees F
Power	PEM 0	OK	34 degrees C / 93 degrees F
	PEM 1	OK	29 degrees C / 84 degrees F
Fans	Fan Tray 0 Fan 0	OK	Spinning at normal speed
	Fan Tray 0 Fan 1	OK	Spinning at normal speed
	Fan Tray 1 Fan 0	OK	Spinning at normal speed
	Fan Tray 1 Fan 1	OK	Spinning at normal speed
	Fan Tray 2 Fan 0	OK	Spinning at normal speed
	Fan Tray 2 Fan 1	OK	Spinning at normal speed

```
root> show chassis alarms
```

Alarm time	Class	Description
2022-09-22 11:56:26 UTC	Major	Host 0 fxp0 : Ethernet Link Down
2022-09-22 11:55:26 UTC	Major	Management Ethernet Links Down

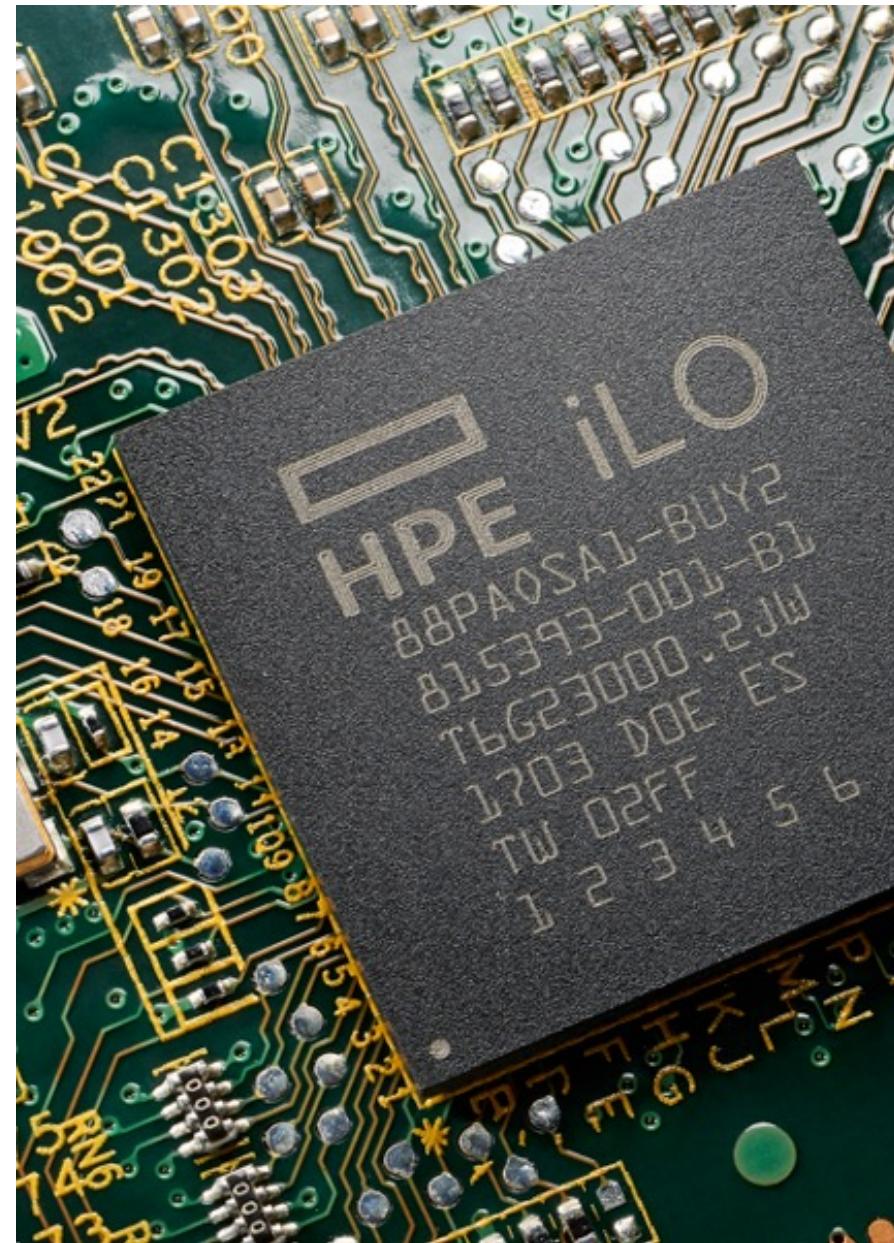
# SERVIDORES

## INVENTARIO

- Servidores formato rack / torre / Blade / multinodo
- Componentes
- Software y licenciamiento

## CHEQUEO SALUD

- Herramientas de administración remota
- Comprobación salud discos. Test SMART





# EJEMPLO: iLO HPE

**Hewlett Packard Enterprise** **iLO 4**  
ProLiant DL360p Gen8

Expand All

Information

Overview

- System Information
- iLO Event Log
- Integrated Management Log
- Active Health System Log
- Diagnostics
- Location Discovery Services
- Insight Agent
- > iLO Federation
- > Remote Console
- > Virtual Media
- > Power Management
- > Network
- > Remote Support
- > Administration
- Firmware

**iLO Overview**

**Information**

Server Name	ProLiant DL360p Gen8
Product Name	34333637-3038-5A43-3335-3339454C5232
UUID	
Server Serial Number	
Product ID	763480-B21
System ROM	P71 05/24/2019
System ROM Date	05/24/2019
Backup System ROM	P71 07/01/2015
Integrated Remote Console	<a href="#">HTML5</a> <a href="#">.NET</a> <a href="#">Java Web Start</a>
License Type	iLO Standard
iLO Firmware Version	2.80 Jan 25 2022
IPv4 Address	10.90.1.212
Link-Local IPv6 Address	FE80::3EA8:2AFF:FE11:DA98
iLO Hostname	ILOCZ3539ELR2.

**Status**

System Health	<span>OK</span>
iLO Health	<span>OK</span>
Server Power	<span>ON</span>
UID Indicator	<span>UID OFF</span>
TPM Status	Present: Disabled
Module Type	TPM 1.2
SD-Card Status	Not Present
iLO Date/Time	Thu Jun 9 01:37:20 2016

**Connection to HPE**

⚠️ Not registered

**Active Sessions**

User	IP Address
Local User: Administrator	10.71.0.222



# EJEMPLO: iLO HPE

Hewlett Packard Enterprise

iLO 4  
ProLiant DL360p Gen8

Expand All

Information

Overview

System Information

iLO Event Log

Integrated Management Log

Active Health System Log

Diagnostics

Location Discovery Services

Insight Agent

iLO Federation

Remote Console

Virtual Media

Power Management

Network

Remote Support

Administration

Firmware

System Information - Health Summary

Summary Fans Temperatures Power Processors Memory Network Device Inventory Storage Firmware Software

## Subsystems and Devices

Subsystems and Devices	Status
Agentless Management Service	Not available
BIOS/Hardware Health	OK
Fan Redundancy	Redundant
Fans	OK
Memory	OK
Network	OK
Power Status	Redundant
Power Supplies	OK
Processors	OK
Storage	OK
Temperatures	OK



# EJEMPLO: iLO HPE

Hewlett Packard Enterprise iLO 4 ProLiant DL360p Gen8 Local Us ILO Hostname:

Expand All

Information

Overview

System Information

iLO Event Log

Integrated Management Log

Active Health System Log

Diagnostics

Location Discovery Services

Insight Agent

› iLO Federation

› Remote Console

› Virtual Media

› Power Management

› Network

› Remote Support

Administration

Firmware

System Information - Fan Information

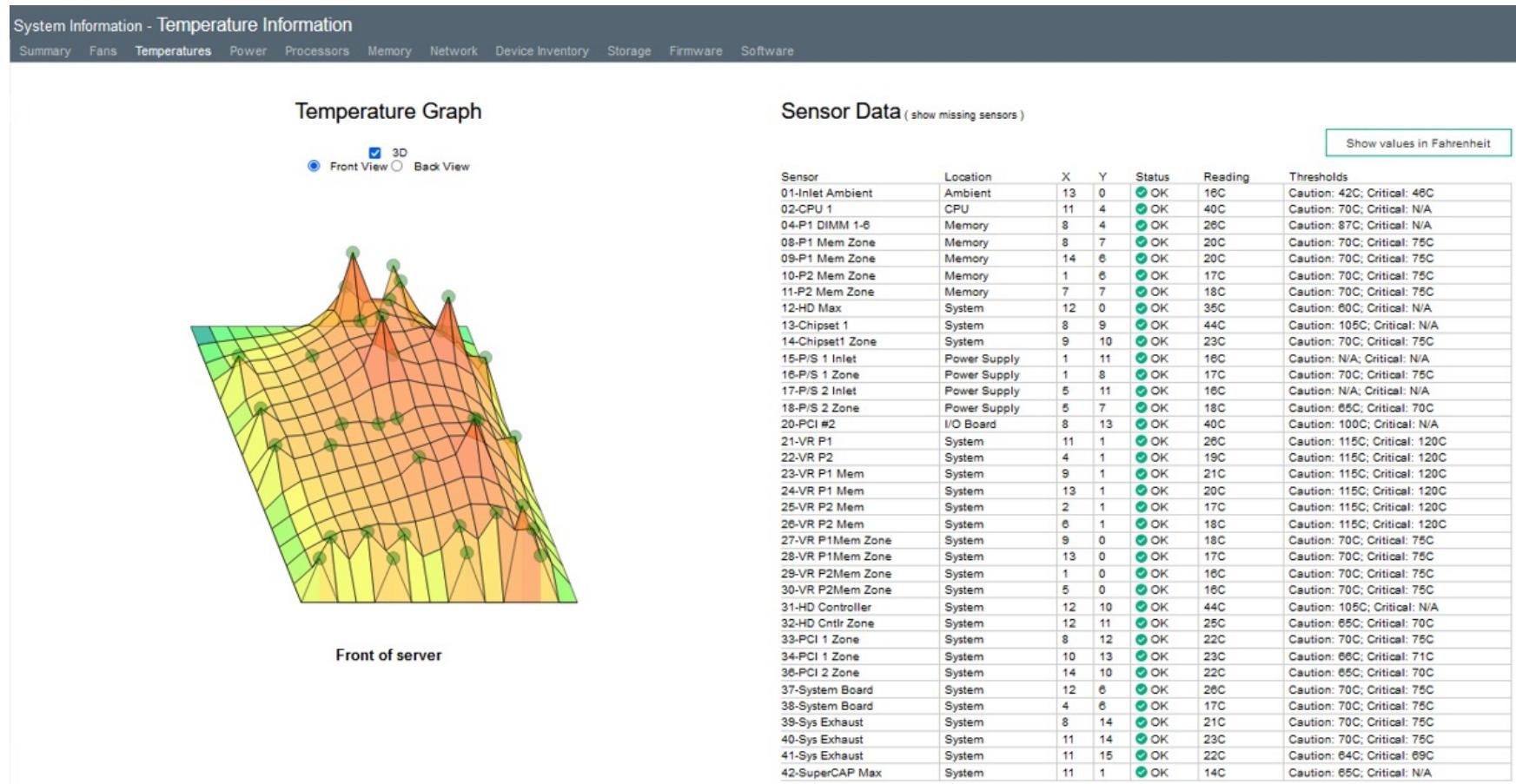
Summary Fans Temperatures Power Processors Memory Network Device Inventory Storage Firmware Software

### Fans

Fan	Location	Status	Speed
Fan Block 1	System	OK	29%
Fan Block 2	System	OK	29%
Fan Block 3	System	OK	29%
Fan Block 4	System	OK	29%
Fan Block 5	System	OK	29%
Fan Block 6	System	OK	29%
Fan Block 7	System	OK	29%
Fan Block 8	System	OK	29%



# EJEMPLO: iLO HPE





# EJEMPLO: iLO HPE

System Information - Power Information

Summary Fans Temperatures Power Processors Memory Network Device Inventory Storage Firmware Software

## Power Supply Summary

Present Power Reading	67 Watts
Power Management Controller Firmware Version	3.3.0
Power Status	Redundant
HPE Power Discovery Services Status	N/A
High Efficiency Mode	Balanced

## Power Supplies

Bay	Present	Status	PDS	Hotplug	Model	Spare
1	OK	Good, In Use	✓ Yes	✓ Yes	656362-B21	660184-001
2	OK	Good, In Use	✓ Yes	✓ Yes	656362-B21	660184-001

Capacity	Firmware
460 Watts	1.03
460 Watts	1.01



# EJEMPLO: iLO HPE

Hewlett Packard Enterprise iLO 4 ProLiant DL380p Gen8

Expand All

Information

- Overview
- System Information**
- iLO Event Log
- Integrated Management Log
- Active Health System Log
- Diagnostics
- Location Discovery Services
- Insight Agent

iLO Federation

Remote Console

Virtual Media

Power Management

Network

Remote Support

Administration

System Information - Processor Information

Processor 1

Processor Name	Intel(R) Xeon(R) CPU E5-2680 v2 @ 2.80GHz
Processor Status	<span style="color: green;">OK</span>
Processor Speed	2800 MHz
Execution Technology	10/10 cores; 20 threads
Memory Technology	64-bit Capable
Internal L1 cache	320 KB
Internal L2 cache	2560 KB
Internal L3 cache	25600 KB

# EJEMPLO: iLO HPE



System Information - Memory Information

Summary Fans Temperatures Power Processors Memory Network Device Inventory Storage Firmware Software

Advanced Memory Protection (AMP)

AMP Status

AMP Mode Status  
Advanced ECC

Configured AMP Mode  
Advanced ECC

Supported AMP Modes

Advanced ECC  
Online Spare (Rank Sparing)

Memory Summary

Location	Number of Sockets	Total Memory	Operating Frequency	Operating Voltage
Processor 1	12	128 GB	1333 MHz	1.5 V
Processor 2	12	N/A	N/A	N/A

Memory Details ( show empty sockets )

Memory Location	Socket	Status	HPE Memory	Part Number	Type	Size	Maximum Frequency	Minimum Voltage	Ranks	Technology
Processor 1	1	Good, In Use	HPE SmartMemory	712384-081	DIMM DDR3	32768 MB	1866 MHz	1.5 V	4	LRDIMM
Processor 1	2	Good, In Use	HPE SmartMemory	712384-081	DIMM DDR3	32768 MB	1866 MHz	1.5 V	4	LRDIMM
Processor 1	3	Good, In Use	HPE SmartMemory	712384-081	DIMM DDR3	32768 MB	1866 MHz	1.5 V	4	LRDIMM
Processor 1	4	Good, In Use	HPE SmartMemory	712384-081	DIMM DDR3	32768 MB	1866 MHz	1.5 V	4	LRDIMM



# EJEMPLO: iLO HPE

System Information - NIC Information

Summary Fans Temperatures Power Processors Memory Network Device Inventory Storage Firmware Software

(i) iLO did not detect the Agentless Management Service when this page was loaded. To view a full set of data on this page, ensure that AMS is installed and running. [Learn more.](#)

[Collapse All](#)

## Physical Network Adapters

▼ Adapter 1 - iLO

Description	Dedicated Network Port
Location	Embedded
Status	<input checked="" type="radio"/> OK

MAC Address	IPv4 Address	IPv6 Address	Port	Status
3c:a8:2a:	10.90.1.212	FE80::3EA8:2AFF:FE11:DA98	dedicated	<input checked="" type="radio"/> OK
3c:a8:2a:	Unknown	Unknown	shared	<input type="radio"/> Disabled

▼ Adapter 2 - HP Ethernet 1Gb 4-port 331FLR Adapter

Location	Embedded
Firmware	N/A
Status	<input type="radio"/> Unknown

Unknown Ports

MAC Address

28:80:23:  
28:80:23:  
28:80:23:  
28:80:23:

# EJEMPLO: iLO HPE



## System Information - Device Inventory

Summary Fans Temperatures Power Processors Memory Network Device Inventory Storage Firmware Software

### Device Inventory

This table displays the server primary device information such as embedded storage and network controllers. For embedded and third party devices, not all the fields (such as Product Part Number or Serial Number) may be populated. The embedded devices are part of the system board Field Replaceable Unit (FRU).

Location	Product Name	Product Part Number	Assembly Number	Serial Number	Product Version	Firmware Version	Status
Embedded	HP Ethernet 1Gb 4-port 331FLR Adapter	629135-B22	789897-001	5CB4480G98	00	N/A	<input type="radio"/> Unknown
Embedded	Smart Array P420i Controller	N/A	N/A	0014380361B2640	B	8.00	<input checked="" type="checkbox"/> OK
PCI-E Slot 1	Empty	N/A	N/A	N/A	N/A	N/A	<input type="radio"/> Not installed
PCI-E Slot 2	Smart HBA H240	750053-001	N/A	PDNNK0BRH4907Y	B	4.52	<input checked="" type="checkbox"/> OK



# EJEMPLO: iLO HPE

System Information - Storage Information

Summary Fans Temperatures Power Processors Memory Network Device Inventory Storage Firmware Software

## Storage Information

The Logical view shows configured logical drives and associated physical drives. It does not show physical drives which are not configured as part of an array, or spare drives.

The Physical view does not show configured logical drives.

[Collapse All](#)

-  Controller on System Board

Logical View  Physical View

Controller Status  OK

Serial Number 0014380361B2640

Model Smart Array P420i Controller

Firmware Version 8.00

Controller Type HPE Smart Array

-  Controller on Slot 2

Logical View  Physical View

Controller Status  OK

Serial Number

Model

Firmware Version

Controller Type

Encryption Status

Encryption ASIC Status

Encryption Critical Security Parameter NVRAM Status  OK

OK

-  Drive Enclosure Port 2I Box 1

Status  OK

Drive Bays 4

-  Physical Drive in Port 2I Box 1 Bay 2

Status  OK

Serial Number Z1W2KQXT0000W4526SLC

Model MB1000FCWDE

Media Type HDD

Capacity 1000 GB

Location Port 2I Box 1 Bay 2

Firmware Version HPD5

Drive Configuration Unconfigured

Encryption Status Not Encrypted

# EJEMPLO: iLO HPE



System Information - Firmware Information								
Summary	Fans	Temperatures	Power	Processors	Memory	Network	Device Inventory	Storage
Firmware								

## Firmware Version Info

Firmware Name	Firmware Version	Location
iLO	2.80 Jan 25 2022	System Board
Intelligent Platform Abstraction Data	2.43	System Board
Intelligent Provisioning	1.74.2	System Board
Power Management Controller Firmware	3.3	System Board
Power Management Controller Firmware Bootloader	2.7	System Board
Redundant System ROM	P71 07/01/2015	System Board
SAS Programmable Logic Device	Version 0x0C	System Board
Server Platform Services (SPS) Firmware	2.1.7.E7.4	System Board
Smart Array P420i Controller	8.00	Embedded
Smart HBA H240	4.52	Slot 2
System Programmable Logic Device	Version 0x2F	System Board
System ROM	P71 05/24/2019	System Board
System ROM Bootblock	03/05/2013	System Board

# EJEMPLO: INSIGHT DIAGNOSTICS HPE

Insight Diagnostics

Hewlett Packard Enterprise

Survey Diagnose Test Status Log Admin Help

Test Status

Quick Test

Testing Completed! All tests passed

Current Loop: 1 of 1 Test Time: 0:03:35 Test Complete: 25 of 25

Device - Test	Status	Test Progress	Time
PCI Bus 0 - Read Test	Passed	100%	40 ms
PCI Bus 1 - Read Test	Passed	100%	40 ms
PCI Bus 7 - Read Test	Passed	100%	30 ms
PCI Bus 127 - Read Test	Passed	100%	30 ms
PCI Bus 128 - Read Test	Passed	100%	40 ms
PCI Bus 135 - Read Test	Passed	100%	30 ms
PCI Bus 255 - Read Test	Passed	100%	40 ms
Serial Port 1 - Register Test	Passed	100%	< 1 ms
Processor Package 1 - Floating Point Operations Test	Passed	100%	13 ms
Processor Package 2 - Floating Point Operations Test	Passed	100%	8 ms
Processor Package 1 - 64-bit Operations Test	Passed	100%	6 ms
Processor Package 2 - 64-bit Operations Test	Passed	100%	5 ms
Processor Package 1 - Temperature Check Test	Passed	100%	13 ms
Processor Package 2 - Temperature Check Test	Passed	100%	8 ms
Hard Drive 1, Storage Controller in Slot 0 - Scattered Read Test	Passed	100%	00:00:23
Hard Drive 2, Storage Controller in Slot 0 - Scattered Read Test	Passed	100%	00:00:23
Hard Drive 1, Storage Controller in Slot 0 - S.M.A.R.T. Error Test	Passed	100%	4 ms
Hard Drive 2, Storage Controller in Slot 0 - S.M.A.R.T. Error Test	Passed	100%	4 ms
Serial Port 1 - Internal Loopback Test	Passed	100%	30 ms
Fan Slot 1 - Fan Status Test	Passed	100%	0:00:05
Total memory - Address Test	Passed	100%	0:00:22
Total memory - Read test	Passed	100%	0:00:36
Total memory - March test	Passed	100%	0:01:10
Total memory - Noise test	Passed	100%	0:00:30
Total memory - Walk test	Passed	100%	0:00:21

Exit Diagnostics



# COMPROBACIÓN SALUD DISCOS

## Test SMART (Self-Monitoring, Analysis, and Reporting Technology)

Algunos de los parámetros más importantes que se pueden analizar en un test SMART:

- Número de sectores reasignados (Reallocated Sector Count)
- Errores de lectura no corregibles (Uncorrectable Sector Count)
- Errores de lectura corregibles (Corrected Sector Count)
- Horas de encendido (Power-On Hours)
- Temperatura del disco (Temperature)
- Porcentaje de resistencia SSD (SSD Percentage Endurance)

# COMPROBACIÓN SALUD DISCOS

Porcentaje de resistencia SSD (SSD Percentage Endurance)



Fuente: <https://www.kingston.com/en/blog/pc-performance/difference-between-slc-mlc-tlc-3d-nand>



# SISTEMAS DE ALMACENAMIENTO

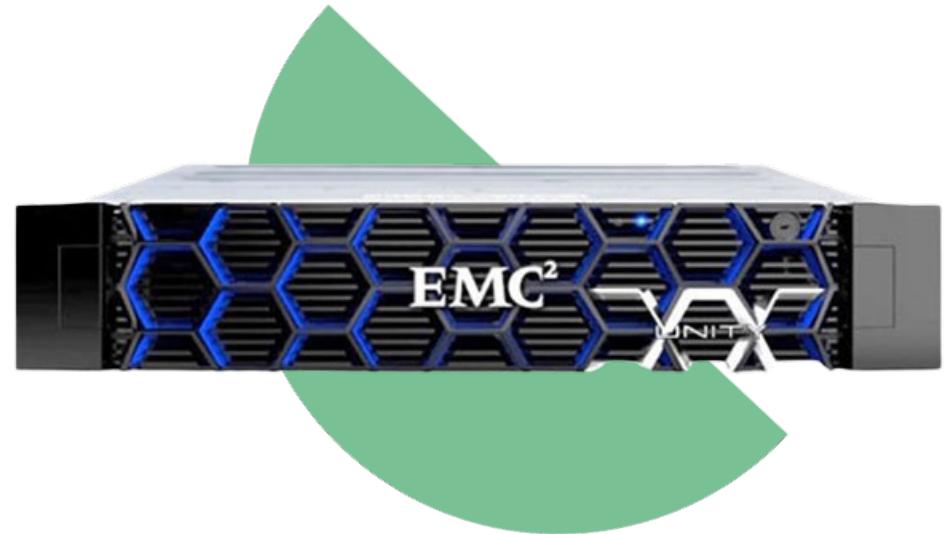
## INVENTARIO

- Sistemas Block vs File
- Bandejas (Shelves)
- Discos (SATA / SAS / SSD / NVMe)
- Licenciamiento

## CHEQUEO SALUD

- Comprobación salud componentes del sistema
- Comprobación salud discos. Test SMART

## BORRADO DE CONFIGURACIONES



# EJEMPLO: DELL UNITY 300



DELL EMC Unisphere

**Summary** Enclosures

Unity 300

Power (Average): 445 watts Software Version: 5.0.7.0.5.008  
Power (Present): 442 watts System time: 10:54 AM (UTC +01:00)

SYSTEM HEALTH ISSUES

0 Issues

There are no health issues in your storage system

FRONT END PORT

Fibre Channel (0 per SP )

0 Not healthy  
0 Available  
0 Idle  
0 In use

Ethernet (4 per SP )

Sync Replication Management Ports

0 Not healthy  
2 Available  
1 Idle  
1 In use

4 ports are not committed

CloudIQ

Settings

Software and Licenses

- License Information
- Software Upgrades
- Drive Firmware
- Language Packs
- System Limits

Users and Groups

Management

Storage Configuration

Support Configuration

Access

Alerts

License Management

License	Version	Issued Date	Expire Date
Antivirus Server Integration	1	1/4/2023	Permanent
CIFS/SMB Support	1	1/4/2023	Permanent
Data Reduction	1.0	1/4/2023	Permanent
EMC Proactive Assist	1	1/4/2023	Permanent
EMC Storage Analytics (ESA)	1	1/4/2023	Permanent
FAST Cache	1	1/4/2023	Permanent
FAST VP	1	1/4/2023	Permanent
Fibre Channel (FC)	1	1/4/2023	Permanent

License Description

Install License Get License Online

Initial Configuration Wizard

Close

# EJEMPLO: DELL UNITY 300



Dell EMC Unisphere interface showing the DPE (Data Protection Enclosure) component details.

**DPE** | **OK** The component is operating normally. No action is required.

Product ID / SN: 100-542-924-09  
Temperature: 80° F (27° C)  
Avg Temperature: 80° F (27° C)  
Power (Rolling Average): 296 watts

SP A UNC Port 4  
SP A UNC Port 5  
SP B UNC Port 4  
SP B UNC Port 5

Commit IO Ports

Dell EMC Unisphere interface showing the DAE 0 1 (Data Access Enclosure) component details.

**DAE 0 1** | **OK** The component is operating normally. No action is required.

Bus ID: 0  
Product ID / SN: 100-900-000-08  
Temperature: 82° F (28° C)  
Avg Temperature: 82° F (28° C)  
Power (Present): 146 watts

Enclosure Number: 1  
Part Number: 100-900-000-08  
Avg Temperature: 82° F (28° C)  
Power (Rolling Average): 150 watts

# METODOS DE DESTRUCCIÓN DE INFORMACIÓN

- Sobreescritura de datos
- Borrado físico
- Criptografía
- Destrucción física



PROS Y CONTRAS



# BORRADO CERTIFICADO

## Estándares de borrado certificado más utilizados:

- NIST 800-88. Estándar emitido por el Instituto Nacional de Estándares y Tecnología (NIST) de los Estados Unidos.
- DoD 5220.22-M. Estándar del Departamento de Defensa de los Estados Unidos.
- En Europa tenemos la norma UNE-EN 15713:2010.

Los métodos de borrado certificado más efectivos suelen implicar múltiples pasadas de sobrescritura utilizando algoritmos de borrado seguro. Algunos de los métodos más efectivos:

- DoD 5220.22-M (ECE)
- Método de Peter Gutmann

# BORRADO CERTIFICADO



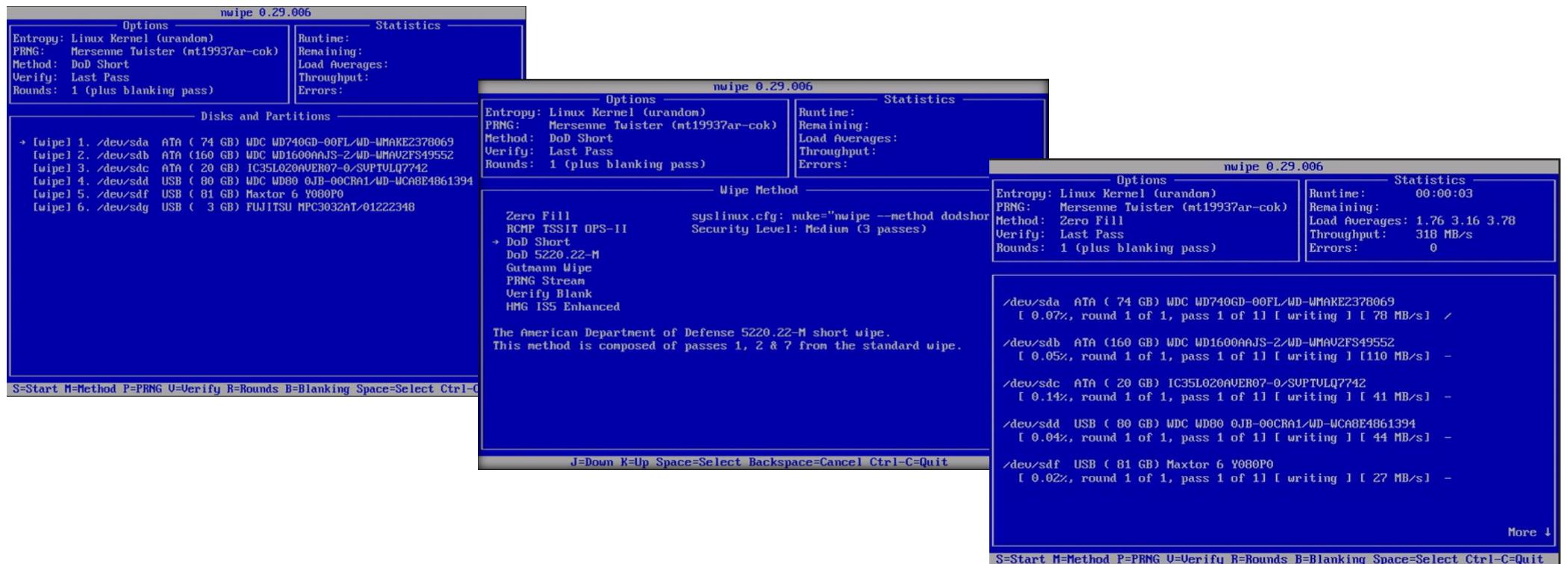
<b>NIST 800-88</b>	El cabezal de escritura pasa sobre cada sector tres veces. La primera vez con ceros (0x00), la segunda vez con 0xFF y la tercera vez con caracteres aleatorios.
<b>US DoD 5220.22-M</b>	El cabezal de escritura pasa sobre cada sector tres veces. La primera vez con ceros (0x00), la segunda vez con 0xFF y la tercera vez con caracteres aleatorios. Hay un pase final para verificar caracteres aleatorios mediante la lectura.
<b>US DoD 5220.22-M (ECE)</b>	El cabezal de escritura pasa sobre cada sector siete veces. La primera vez con ceros (0x00), la segunda vez con 0xFF y la tercera vez con caracteres aleatorios, la cuarta vez con 0x96, y luego las tres primeras pasadas repetidas nuevamente. Hay un pase final para verificar caracteres aleatorios mediante la lectura.
<b>German VSITR</b>	El cabezal de escritura pasa sobre cada sector siete veces, cada paso escribe los siguientes caracteres: 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0xAA.
<b>Russian GOST p50739-95</b>	El cabezal de escritura pasa sobre cada sector dos veces, el primer paso son ceros (0x00), el segundo paso son caracteres aleatorios.
<b>Canadian OPS-II</b>	El cabezal de escritura pasa sobre cada sector siete veces, cada paso escribe los siguientes caracteres: 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, Aleatorio.
<b>HMG IS5 Baseline</b>	El cabezal de escritura pasa sobre cada sector una vez, escribiendo ceros (0x00).
<b>HMG IS5 Enhanced</b>	El cabezal de escritura pasa sobre cada sector tres veces, escribiendo ceros (0x00), luego 0xFF y finalmente caracteres aleatorios.
<b>US Army AR380-19</b>	El cabezal de escritura pasa sobre cada sector tres veces, primero pasa escribiendo caracteres aleatorios, luego ceros (0x00) y finalmente 0xFF.
<b>US Air Force 5020</b>	El cabezal de escritura pasa sobre cada sector tres veces, primero pasa escribiendo 0xFF, luego ceros (0x00) y finalmente caracteres aleatorios.
<b>Navso P-5329-26 RL</b>	El cabezal de escritura pasa sobre cada sector tres veces, primero pasa escribiendo 0x01, luego 0x27FFFFFF y finalmente caracteres aleatorios.
<b>Navso P-5329-26 MFM</b>	El cabezal de escritura pasa sobre cada sector tres veces, primero pasa escribiendo 0x01, luego 0x7FFFFFF y finalmente caracteres aleatorios.
<b>NCSC-TG-025</b>	El cabezal de escritura pasa sobre cada sector tres veces, primero pasa escribiendo ceros 0x00, luego 0xFF y finalmente caracteres aleatorios.
<b>Bruce Schneier</b>	El cabezal de escritura pasa sobre cada sector siete veces, cada pasada escribe los siguientes caracteres: 0xFF, ceros (0x00), luego cinco pasadas con caracteres aleatorios.
<b>Gutmann</b>	El cabezal de escritura pasa sobre cada sector 35 veces.

Fuente: <https://www.killdisk.com/manual/index.html#erase-methods.html>



# TIPS & TRICKS

## nWipe – Software libre para el borrado certificado de datos



Fuente: <https://github.com/martijnvanbrummelen/nwipe>



# TIPS & TRICKS

## HDSENTINEL Linux Version – Software gratuito para el análisis de discos

The screenshot displays the HD Sentinel software interface. On the left, a terminal window shows the command-line output for a solid-state drive (SSD) at /dev/sdd. The output includes details like Model ID (M11), Serial Number (0000013B), and various performance metrics. It also indicates that the SSD is in perfect condition with no errors found.

The main window is titled "Physical Disk Information - Disk: #0: HGST HKCF0600S5xeN015". It contains two tabs: "Hard Disk Summary" and "Properties".

**Hard Disk Summary:** This tab provides a detailed breakdown of the disk's characteristics. Key data points include:

- Hard Disk Number: 0
- Hard Disk Device: /dev/sg52
- Interface: SCSI
- Hard Disk Model ID: HGST HKCF0600S5xeN015
- Firmware Revision: 3P04
- Hard Disk Serial Number: 0XJKZX3P
- Total Size: 572325 MB
- Current Temperature: 49 °C (120 °F)
- Maximum Temperature (during Entire Lifespan): 49 °C (120 °F)
- Power On Time: 1624 days, 10 hours, 50 minutes (estimated)
- Estimated Remaining Lifetime: 138 days
- Lifetime Writes: 32.49 TB
- Health: 83 % (Good)
- Performance: 100 % (Excellent)

A note below states: "The hard disk reports the following problems: Total uncorrected read errors = 6 Total uncorrected verify errors = 12". A green box at the bottom right of this section says: "It is recommended to continuously monitor the hard disk status."

**Properties:** This tab lists vendor information and device parameters. The vendor information shows:

- Copyright (C) HGST, a Western Digital Company.
- Status: OK
- Version: 6
- Device Type: Disk
- ASC: 0
- ASCQ: 0
- Bytes Per Sector: 512
- Total Sectors: 1,172,123,567
- Unformatted Capacity: 600,127,266,304

Attribute	Threshold	Value
Write errors corrected without substantial delay	0	0
Write errors corrected with possible delays	1	1
Total write errors	0	0
Total write errors corrected	1	1
Total write errors corrected by algorithm	8,817,628	8,817,628
Total bytes written	35,724,344,665,760	35,724,344,665,760
Total uncorrected write errors	0	0
Read errors corrected by ECC hardware method	0	0
Read errors corrected with possible delays	116	116
Total read errors	0	0
Total read errors corrected	116	116
Total read errors corrected by algorithm	10,098,057	10,098,057
Total bytes read	54,156,937,508,112	54,156,937,508,112
Total uncorrected read errors	6	6
Verify errors corrected without substantial delay	0	0
Verify errors corrected with possible delays	45	45
Total verify errors	0	0
Total verify errors corrected	45	45
Total verify errors corrected by algorithm	620,609	620,609
Total bytes verified	137,486,288,316,000	137,486,288,316,000
Total uncorrected verify errors	12	12
Non medium errors	0	0
Temperature	49	49
Reference temperature	85	85
Manufacture date (year/week)	2016/20	2016/20
Accounting date	2016/20	2016/20
Specified cycle count over device lifetime	50,000	50,000
Accumulated start-stop cycles	29	29
Specified load-unload count over device lifetime	600,000	600,000
Accumulated load-unload cycles	1,172	1,172

Fuente:

[https://www.hdsentinel.com/hard\\_disk\\_sentinel\\_linux.php](https://www.hdsentinel.com/hard_disk_sentinel_linux.php)



# TIPS & TRICKS

## HDSENTINEL Linux Version – Ejemplo SSD Endurance

Physical Disk Information - Disk: #0: SanDisk DOPE1920S5xnNMRI

Hard Disk Summary

Hard Disk Number	:	0	
Hard Disk Device	:	/dev/sg0	
Interface	:	SCSI	
Hard Disk Model ID	:	SanDisk DOPE1920S5xnNMRI	
Firmware Revision	:	3P0B	
Hard Disk Serial Number	:	000567F33P0B3P0B6A40	
Total Size	:	1831420 MB	
Current Temperature	:	36 °C (97 °F)	
Maximum Temperature (during Entire Lifespan)	:	36 °C (97 °F)	
Power On Time	:	2066 days, 18 hours, 1 minutes (estimated)	
Estimated Remaining Lifetime	:	92 days	
Lifetime Writes	:	3.22 GB	
Health	:		92 % (Excellent)
Performance	:		100 % (Excellent)

The status of the solid state disk is PERFECT. Problematic or weak sectors were not found.  
The health is determined by SSD specific S.M.A.R.T. attribute(s). Percentage used endurance indicator

No actions needed.

Properties

Vendor Information	:	Copyright (c) 2013 SMART Storage Systems
Status	:	OK
Version	:	6
Device Type	:	Disk
ASC	:	0
ASQ	:	0
Bytes Per Sector	:	512
Total Sectors	:	3,750,748,847
Unformatted Capacity	:	1,920,383,409,664



# TIPS & TRICKS

## HDSentinel Linux Version – Ejemplo SSD Endurance

S.M.A.R.T.		
Attribute	Threshold	Value
Write errors corrected without substantial delay		0
Write errors corrected with possible delays		0
Total write errors		0
Total write errors corrected		0
Total write errors corrected by algorithm		0
Total bytes written		3,458,169,856
Total uncorrected write errors		0
Read errors corrected by ECC hardware method		0
Read errors corrected with possible delays		0
Total read errors		0
Total read errors corrected		0
Total read errors corrected by algorithm		0
Total bytes read		3,134,103,552
Total uncorrected read errors		0
Verify errors corrected without substantial delay		0
Verify errors corrected with possible delays		0
Total verify errors		0
Total verify errors corrected		0
Total verify errors corrected by algorithm		0
Total bytes verified		0
Total uncorrected verify errors		0
Non medium errors		395
Self test results log	#13: \$00000000000000000000000000000000 00000000	
Percentage used endurance indicator		8
Power on time		2,976,121
SC15_0001	\$00000000000000000000000000000000 000000000000	
SC17_0000		0
SC17_0001		0



# TIPS & TRICKS

## SG3\_UTILS. Herramientas para el tratamiento de discos

### Borrado discos de almacenamiento

- `sg_dd if=/dev/zero of=$harddisk bs=$bs`
- `sg_dd if=/dev/urandom of=$harddisk bs=$bs`
- `sg_dd if=/dev/zero of=$harddisk bs=$bs | tr "000" "377"`

### Truco conversión blocksize 520 <-> 512

- `sg_format -v --format --size=512 $harddisk`
- `sg_format -v --format --size=520 $harddisk`



Expertos en servicios y hardware EOL/EOS

# ¡Muchas gracias!

- **JORGE TEJADA CUARTERO**
- **JTEJADA@MERCADOIT.COM**

