The 3.84 TB 6 Gb SAS Enterprise Capacity G3HS MLC SSD is Lenovo's largest capacity solid-state drive

Table of contents

1 Overview 4 Publications
2 Key prerequisites 5 Technical information
2 Planned availability date 7 Terms and conditions
2 Description 8 Prices
3 Product positioning 8 Announcement countries
3 Product number

At a glance

The 3.84 TB 6 Gb SAS Enterprise Capacity G3HS MLC solid-state drive (SSD) provides a high-performance, reliable storage solution for high-capacity enterprise applications with a moderate read/write mix by employing a 6 Gbps SAS interface and MLC NAND technology. Designed for dense storage, this drive has all the performance needed to replace large numbers of 15,000 rpm and 10,000 rpm spinning disks, and consolidate storage into tightly packed server configurations.

This solid-state drive presents an opportunity to simplify storage infrastructures to help reduce overall maintenance and cooling cost.

Benefits include:

- 2.5-inch form factor that fits into a conventional disk-drive bay
- 3.84 TB capacity to accommodate loading applications along with operating systems
- Cost-effective MLC NAND technology with high read/write performance
- Enterprise data protection to ensure NAND integrity
- Rigorous testing through the ServerProven program for storage subsystem compatibility and reliability

Overview

The new 3.84 TB 6 Gb SAS Enterprise Capacity G3HS MLC SSD adds a larger drive option to the Lenovo® portfolio of solid-state drives. With the new Enterprise Capacity segment, the 3.84 TB SSD begins the transition from the use of SSDs as read cache devices to high-performance server storage drives.

With the equivalent capacity of thirteen 300 GB 15,000 rpm SAS drives, the 3.84 TB 6 Gb SAS Enterprise Capacity G3HS MLC SSD uses 93% less power, generates less heat, and can provide up to twice the write performance and up to 11 times the read performance of the 15,000 rpm spinning disk options it replaces. With large configurations, the new 2.5-inch SSD eliminates the need for external JBOD connections, saving rack space real estate. With applications that can maintain availability of data, a densely configured server would reduce the need to install a new SAN or the need to expand an existing SAN by installing the storage in the servers. As SSD capacities increase, NAND costs get lower, and 15,000 SAS HDDs continue to encounter technology limitations, the economics of deploying large scale SSD configurations will continue to improve.
Lenovo's Enterprise Capacity segment provides large-capacity SSDs with end-to-end data protection powered by backup circuitry is designed to ensure that user data in transit is committed to flash in the event of a power failure. Temperature management levels out heat generation, preventing overheating failures. Wear leveling applications built into the drives ensures long life of the SSD. This drive carries a write workload of almost 2 TB (1.92 TB) every day for five years.

Features and functions of the 3.84 TB 6 Gb SAS Enterprise Capacity G3HS MLC SSD:

- Cost-efficient 19nm, MLC NAND technology
- 2.5-inch small form factor (SFF) drive
- Sequential Read/Write (128K) up to 500/500 MB/s
- Random Read/Write (4K) up to 85,000/10,000 IOps
- 7-watt power
- Total cost of ownership up to 28% less than equivalent capacity of HDDs
- Total cost of acquisition up to 11% less than equivalent capacity of HDDs

**Warranty**

The 3.84 TB 6 Gb SAS Enterprise Capacity G3HS MLC SSD offers a 1-year limited warranty.\(^1\)

Solid-state memory cells have an intrinsic limit to their endurance, as the program/erase, (P/E) cycles used to apply writes can wear out the NAND over time. As a result, solid-state storage has a maximum amount of data that can be guaranteed to be written to the device, called Total Bytes Written, (TBW), usually measured in hundreds of terabytes or in petabytes. Lenovo's warranty for the solid-state storage is limited to devices that have not reached the maximum guaranteed amount of data written, as documented in the Official Published Specifications for the product. A drive that reaches this limit may fail to operate according to its specifications, or enter a read-only state.

The TBW for this drive is 3.5 petabytes (PB).

\(^1\) For information about Statement of Limited Warranty, contact your local Lenovo representative. Copies are available upon request.

**Key prerequisites**

Lenovo System x systems with SAS capability.

**Planned availability date**

April 30, 2015

**Description**

3.84 TB 6 Gb SAS 2.5-inch Enterprise Capacity G3HS MLC SSD

This new drive provides data center storage consolidation opportunities, installing capacity on servers that was previously stored on JBODs or SANs. The denser storage provides savings on power, cooling, and rack space, even while enhancing performance over the same capacity of 15,000 rpm HDDs.
**Product positioning**

This high-performance SAS MLC SSD options is positioned in the Enterprise Capacity family of SAS SSDs based on solid-state technology.

This SSD drive supports enterprise-level server and workstation applications, such as:

- Transaction processing
- Data mining
- Data warehousing
- Professional video and graphics

**Product number**

**Options Offerings**

<table>
<thead>
<tr>
<th>Description</th>
<th>Machine Type</th>
<th>Model</th>
<th>Feature</th>
<th>Part number</th>
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<td>3331</td>
<td>HC1</td>
<td>ASW6</td>
<td>00NA671 00NA671</td>
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The following are features already announced for the 3331, 3837, 5462, 5463, 5464, 5465, 6241, 7903, 9532 machine types:

<table>
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<th>Description</th>
<th>MT</th>
<th>Model</th>
<th>Feature</th>
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**Model conversions**

None
Feature conversions

None

Publications

Publications are shipped with the announced products.

The Systems Information Center provides you with a single information center where you can access product documentation for Lenovo systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access. The Systems Information Center is at


Lenovo Publications Center Portal

http://www.ibm.com/shop/publications/order

The Publications Center is a worldwide central repository for product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided, as well as payment options via credit card. A large number of publications are available online in various file formats, which can currently be downloaded free of charge.

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<th>Title</th>
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<tr>
<td>Installation Pubs ship with SSD</td>
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Displayable softcopy publications: None

Source file publications: None

Services

Global Technology Services®

Lenovo services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an on-demand business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for Lenovo and many non-Lenovo offerings. Lenovo is your one-stop shop for IT support needs.

For details on available services, contact your Lenovo representative or visit

http://www.lenovo.com/services/

For details on available Lenovo Business Continuity and Recovery Services, contact your Lenovo representative or visit

http://www.lenovo.com/services/

For details on education offerings related to specific products, visit

http://www.lenovo.com/services/
**Technical information**

**Specified operating environment**

*Physical specifications - 3.84 TB 6 Gb SAS 2.5-inch Enterprise Capacity G3HS MLC SSD*

- Approximate height: 14.75 mm (0.58 in.)
- Approximate width: 69.9 mm (2.75 in.)
- Approximate depth: 100.2 mm (3.94 in.)
- Approximate weight: 164 g (0.36 lb)

**Shipping dimensions**

- Height: 63.0 mm (2.48 in.)
- Width: 133.0 mm (5.24 in.)
- Depth: 174.0 mm (6.85 in.)
- Weight: 524 g (1.16 lb)

**Standards**

Solid-state memory cells have an intrinsic limit to their endurance, as the program/erase, (P/E) cycles used to apply writes can wear out the NAND over time. As a result, solid-state storage has a maximum amount of data that can be guaranteed to be written to the device, called Total Bytes Written, (TBW), usually measured in hundreds of terabytes or in petabytes. Lenovo’s warranty for the solid-state storage is limited to devices that have not reached the maximum guaranteed amount of data written, as documented in the Official Published Specifications for the product. A drive that reaches this limit may fail to operate according to its specifications, or enter a read-only state.

Maximum warranted Total Bytes Written for the 3.84 TB 6 Gb SAS Enterprise Capacity SSD is 3.504 petabytes (PB). Drive writes per day for this capacity and TBW is 0.5 Drive Writes Per Day, DWPD for five years, depending on workload and data patterns.

**Operating environment**

- Temperature: 0°C to 65°C (32°F to 149°F)
- Relative humidity: 8% to 85% (noncondensing)
- Maximum altitude: 3,050 m (10,000 ft)

**Homologation**

This product is not certified for direct connection by any means whatsoever to interfaces of public telecommunications networks. Certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

**Hardware requirements**

This SDD must be installed in selected System x or BladeCenter server with SAS capability.

**Software requirements**

The new SAS SSD works with most operating systems.

For further information, contact your Lenovo representative.
**Compatibility**
For latest compatibility information, visit

http://www.lenovo.com/

**Note:** Some configurations may not be compatible.

**Limitations**
Solid-state memory cells have an intrinsic limit to their endurance, as the program/erase, (P/E) cycles used to apply writes can wear out the NAND over time. As a result, solid-state storage has a maximum amount of data that can be guaranteed to be written to the device, called Total Bytes Written, (TBW), usually measured in hundreds of terabytes or in petabytes. Lenovo’s warranty for the solid-state storage is limited to devices that have not reached the maximum guaranteed amount of data written, as documented in the Official Published Specifications for the product. A drive that reaches this limit may fail to operate according to its specifications, or enter a read-only state. With a drive capable of 3.504 PB of lifetime writes, the drive workload must be averaged out to 1.92 TB of writes per day to last five years and stay under the 3.5 PB TBW limit. For the device to last three years, the drive write workload must be averaged out 3.2 TB of writes per day.

Additional information is available at

http://www.lenovo.com/

**User group requirements**
This announcement satisfies or partially satisfies the requirements from one or more of the worldwide user group communities. Groups include COMMON, COMMON Europe, Guide Share Europe (GSE), InterAction (Australia/New Zealand), Japan Guide Share (JGS), and SHARE Inc.

**Planning information**

**Customer responsibilities**
The new 3.84 TB 6 Gb SAS 2.5-inch Enterprise Capacity G3HS MLC SSD product is designed as customer setup. Customer installation instructions can be found in the *Installation and User’s Guide* for the system into which the drive is to be installed.

**Cable orders**
None

**Installability**
The 3.84 TB SAS SSD requires approximately 20 minutes for installation.

Installation includes unpacking, attaching a customer-provided power cord, setting up, and powering on.

**Packaging**

**3.84 TB 6Gb SAS Enterprise Capacity G3HS MLC SSD**

<table>
<thead>
<tr>
<th>Product</th>
<th>Package description</th>
<th>Boxes</th>
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<tr>
<td>3.84 TB 6Gb SAS Enterprise Capacity G3HS MLC SSD</td>
<td>Option Unit Box</td>
<td>1</td>
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</table>
Contents:

SSD
Important Notices and Warranty Publication,
SSD Information Flyer

The SSD is shipped as a single package. Other items are in zipped bags.

**Retail only**

*Packaging dimensions/weight - 2.5-inch SSDs*

- Single box:
  - Height: 63.0 mm (2.48 in.)
  - Width: 133.0 mm (6.85 in.)
  - Depth: 174.0 mm (6.85 in.)
- Package weight: 524 g (1.16 lb)

**Note:** All measurements are approximate.

**Security, auditability, and control**

It is a customer’s responsibility to ensure that the server is secure to prevent sensitive data from being removed.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

**Global Technology Services**

Contact your Lenovo representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, and/or integration of this product.

**Terms and conditions**

**Field installable feature**

Yes

**Warranty period**

One year limited warranty¹, or system warranty.

A Lenovo part or feature installed during the initial installation of a Lenovo machine is subject to a full warranty effective on the date of installation of the machine. A Lenovo part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. A Lenovo part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty effective on its date of installation. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

¹ For information about Statement of Limited Warranty, contact your local Lenovo representative. Copies are available upon request.
**Customer setup**

Yes

**Machine code**

No license terms apply.

**Optional features warranty period**

Optional feature: One year limited warranty¹.

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The TBW for this drive is 3.5 petabytes (PB).

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**Prices**

For all local charges, contact your Lenovo representative.

**Announcement countries**

All European, Middle Eastern, and African countries.

**Trademarks**

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