



SOLUTION BRIEF

SUSE® Linux® Enterprise Server Enables Western Digital® Host-Managed SMR HDDs to Deliver High-Performance Workloads



Highlights

- Access highest capacities for HDDs
- Lower cost per TB and better rack-scale TCO
- Make traditional IT infrastructure more efficient with a Modular+ architecture
- Simplify multimodal IT by bridging your traditional and software- defined infrastructures

Best Uses

- Hyperscale cloud and traditional data center workloads
- Large video surveillance "smart city" initiatives
- Storage for regulatory compliance and Big Data.
- External storage requiring highest capacities and drive connectivity

Components

- Western Digital Ultrastar® DC HC620 SMR HDD
- SUSE Linux Enterprise Server 15

SUSE and Western Digital provide a host-managed SMR (Shingled Magnetic Recording) solution with the enterprise-ready SUSE Linux Enterprise Server 15 Linux operating system and the Ultrastar DC HC620 SMR HDD. This solution enables customers to take advantage of additional storage capacity over conventional magnetic recording HDDs. SMR HDDs provide lower cost per TB and better TCO (Total Cost of Ownership) when considering the capital and operating cost of the data center.

SMR uses a unique "overlapping" writing technique to pack more bits into the same space. This is achieved by writing data sequentially then overlapping (or "shingling") it with another track of data. By repeating this process, more data tracks can be placed on each magnetic disk. Western Digital's Ultrastar SMR technology and helium-sealed enterprise-class HDDs provides the continued basis for rack-scale data growth expansion and improved TCO, helping to tackle critical challenges of big data growth.

Host-managed SMR HDDs are optimized for sequential writes and areal density, and they complement the data center workload requirements of CMR (Conventional Magnetic Recording) HDDs, which are meant for random reads and writes. SMR HDDs enable rack-level scale of higher-performance and "sequentialized" workloads such as video surveillance, object storage, and cloud services. These emerging workloads for SMR optimization require data to be written sequentially, rarely updated, and followed by random and frequent reads.

A 1TB gain in the same 3.5-inch form factor is not only significant but At-scale environments where floor space, \$/TB, TB per square foot, or watts per TB are critical can provide significant TCO savings. For example, Table 1 shows a 60TB increase in capacity per 4U rack space.

Fully Populated 4U 60 Storage Platform	Drive Capacity	Raw Storage
SAS or SATA HDDs	15TB ¹	900TB
SMR HDDs	14TB	840TB

Table 1: Rack-scale TCO Savings

¹One terabyte (TB) is equal to one trillion bytes when referring to storage capacity. Accessible capacity will vary from the stated capacity due to operating environment.

With data and storage continuing to grow at unprecedented rates, new storage segments that are predominately sequential and highly accessible are emerging in the capacity enterprise market. Innovative, purpose-built solutions such as Host Managed SMR effectively service these new segments. To capitalize on the capacity advantages, customers do need to make certain changes to accommodate for Host Managed SMR – i.e., the host software (or end application) needs to be modified, all data streams need to be sequentialized, and new command sets are required.

SUSE Linux Enterprise Server 15 and Western Digital Simplify SMR Development

Western Digital and SUSE have collaborated on, developed, and contributed code into the open-source community to further support host-managed SMR and accelerate application development. These contributions help developers and customers enable their applications and workloads to utilize SMR-enabled HDDs into their infrastructure. The required tools, libraries, and kernels are supported by SUSE Linux Enterprise Server 15, giving customers the ability to use an enterprise-ready Linux distribution in their production environments. Customers can then take advantage of the lower cost per TB and better TCO that SMR HDDs can deliver.

SUSE Linux Enterprise Server 15 utilizes the Linux kernel based on 4.12.14 with the block zone configuration option enabled. This allows block device support and other features for host-managed SMR HDDs. The open source dm-zoned device mapper is available by default, allowing user-space management of block devices. SUSE is enabling cutting edge technologies for cloud and datacenter customers by supporting host-managed SMR HDDs with SUSE Linux Enterprise Server 15.

Western Digital offers the libzbc open source library, which allows applications to implement direct access to host-managed SMR HDDs. The library also supports three different low-level drivers (SCSI, ATA, and block interfaces) under a single unified interface for ease of implementation.

This library is available at: <https://github.com/hgst/libzbc>

For more information about how Zoned Storage devices can be used, see the Resources section in this document.

Ultrastar DC HC620 SMR 15TB HDD



The Ultrastar DC HC620 delivers an unprecedented capacity point with a time-to-market advantage for customers who have invested in, and continue to take advantage of the benefits of SMR. The Ultrastar DC HC620 is built on the proven and mature HelioSeal platform to deliver an exceptional watts/TB power footprint for online storage.

Built for enterprise workloads, Ultrastar DC HC620 is ideal for ultra-dense scale-out storage systems. It delivers the uncompromising product reliability necessary for private and public cloud enterprise applications. Industry-standard SATA 6Gb/s or SAS 12Gb/s interface options support a variety of data center configurations.

SUSE Linux Enterprise Server 15

SUSE Linux Enterprise Server 15 is a multimodal operating system that paves the way for IT transformation in the software-defined era. The modern and modular OS helps simplify multimodal IT, makes traditional IT infrastructure efficient, and provides an engaging platform for developers. As a result, you can easily deploy and transition business-critical workloads across on-premise and public cloud environments.

Many organizations use traditional infrastructure, software-defined infrastructure or a mix of traditional and software-defined. This leads to a multimodal IT scenario, where different types of IT infrastructure have different technologies, processes and business drivers. SUSE Linux Enterprise Server 15, with its multimodal design, helps organizations transform their IT landscape by bridging traditional and software-defined infrastructure.

Conclusion

The host-managed SMR solution from SUSE and Western Digital allows customers to take advantage of additional storage capacity over conventional magnetic recording HDDs. It also provides lower cost per TB and better TCO for than CMR in data center architectures.

Resources:

<http://www.wdc.com/dc-hc620>

<https://www.suse.com/products/server/>

<https://www.ZonedStorage.io>

<https://www.westerndigital.com/company/innovations/zoned-storage>

Western Digital.

5601 Great Oaks Parkway
San Jose, CA 95119, USA
US (Toll-Free): 800.801.4618
International: 408.717.6000

www.westerndigital.com

© 2019 Western Digital Corporation or its affiliates. Produced 06/19. All rights reserved. Western Digital, the Western Digital logo, HelioSeal and Ultrastar are registered trademarks or trademarks of Western Digital Corporation or its affiliates in the US and/or other countries. SUSE and the SUSE logo are registered trademarks of SUSE LLC in the United States and other countries. Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries. All other marks are the property of their respective owners.