HPE XP8 SUPPORT OF T10-PI

With Oracle Data Integrity Extension

CONTENTS

EXECUTIVE SUMMARY

It is critical that enterprises have confidence in data integrity as it transits between multiple platforms. HPE XP8 Storage array has been tested to validate that it meets the Oracle certification testing requirements for end-to-end data integrity via compliance with the T10-PI standard combined with Oracle Data Integrity Extension (DIX).

This capability is available today when the HPE XP8 Storage is implemented with affiliated system hardware and software that is T10-PI DIX compliant and utilizes appropriate configuration settings.

INTRODUCTION

HPE XP8 Storage provides top performance, extreme availability, and easy consolidation. Designed for applications that require extreme data availability, HPE XP8 Storage has fully online scalable, redundant hardware. This platform offers ultra-high performance and data replication, disaster recovery, and online data migration capabilities. HPE XP8 Storage supports clustering solutions that allow remote mirroring to be integrated with a high-availability server cluster to provide multisite disaster recovery.

Data integrity from source to a storage device, and back again to use in an application (or other destination), requires that both hardware and software do not unintentionally alter the data. Although extremely rare, the integrity of data transiting between hardware devices and their subcomponents can be an issue, in part because no indication is provided that an error has occurred. This paper establishes that a properly configured HPE XP8 Storage provides a compliant implementation of T10-PI DIX, thus ensuring end-to-end data integrity, all the way from an application to the storage disk drive, and back again to the application.

For many years, HPE servers, storage, and other devices have utilized a variety of software and hardware technologies to safeguard data integrity within each device. To reduce the risk of corruption of data moving between devices, the T10 standards committee introduced Protection Information (PI) to address the need for a comprehensive software standard. T10-PI provides data integrity for end-to-end, bidirectional data-flow configurations. Specifically, it protects data flows between an HBA, SAN, disk array, and disk drive.

For Oracle Linux® users, Oracle has introduced an extension to T10-PI—Oracle DIX—that extends the coverage from the HBA to the operating system and on to the application. This code is available to all customers as part of Oracle Linux with the Unbreakable Enterprise Kernel. Data is tagged in the database and the tag moves with the data to the storage device. When the data is read from the storage device, checks are performed to validate integrity. If data integrity is breached, the data will not be written to the disk drive, nor will it be made available to the application.

Target audience: The intended audience for this paper includes IT professionals seeking to design and implement an Oracle T10-PI environment. Readers of this technical white paper should have a functional understanding of Oracle concepts and technologies.

SOLUTION OVERVIEW

HPE XP8 Storage all-flash array overview

HPE XP8 Storage is an enterprise-class data storage platform for disaster-proof storage in mission-critical environments. Designed for organizations that simply cannot afford any downtime, HPE XP8 Storage combines an ultra-high performance, fully redundant hardware platform with unique data replication capabilities. This online scalable platform can be integrated with clustering solutions for complete business continuity and data protection. HPE XP8 Storage can adapt to changing business conditions in real-time while increasing data center capacity and lifespan. It also provides solutions that decrease risks and costs.

FIGURE 1. HPE XP8 Storage front and rear views

All-flash enterprise storage solution
- Single rack, small footprint

- Low power consumption

- Extreme scalability

Mission-critical enterprise storage
- Active/active high-availability replication option

- 3DC business continuity and disaster recovery

- 20 years of proven technology

- Multitenancy resource partitioning software

IMPLEMENTATION OF T10 AND DIX

For 512-byte sectors, such as those typically used on SCSI drives, T10-PI adds an 8-byte field for CRC, application tagging, and data sequencing. As seen in Figure 2, T10-PI adds this field for use by the disk drive, on through the intermediate transits, and through to the HBA. T10-PI DIX extends the protection by adding the same 8-byte field to data passing between the HBA, operating system, and application. With T10-PI DIX, end-to-end data protection is provided from application to a disk drive, and back again.
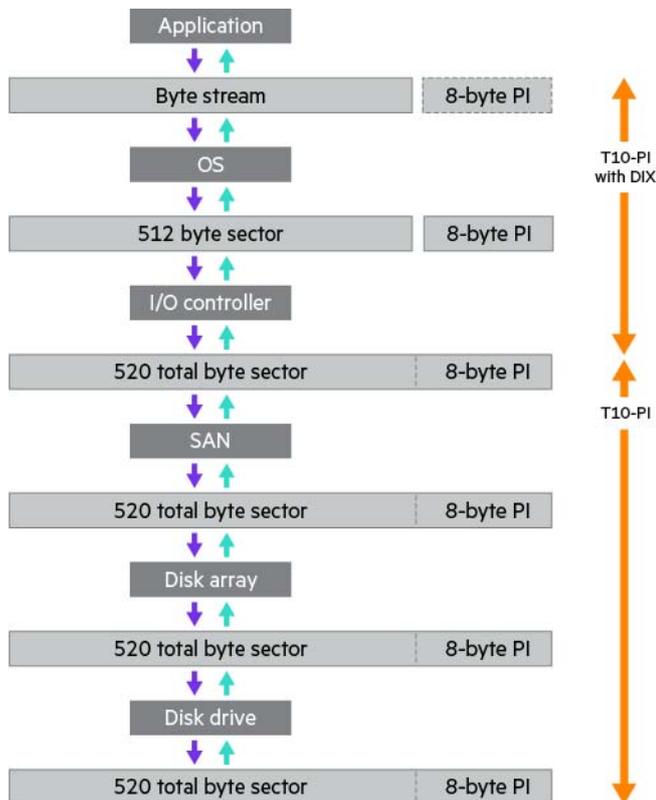
FIGURE 2. DIX + DIF I/O

HPE XP8 Storage Data Integrity

Within the HPE XP8 Storage device, there are no isolated boundaries from data entry to the array on through to data exit from the array. This lack of gaps between boundaries, along with four levels of integrity checking, ensures that data is not corrupted within the HPE XP8 Storage device.

CONFIGURATION AND SETUP REQUIREMENTS

T10-PI DIX compliance testing has been completed for the HPE XP8 Storage arrays. The following defined components of server, operating system, HBA, storage device, and database comprise a compliant configuration that will deliver T10-PI DIX:

- Operating system: Oracle Linux with the Unbreakable Enterprise Kernel

- Server: HPE recommends using HPE servers that run Oracle Linux

- Database: Oracle Database with automatic storage management (ASM) and ASMLib version 2.0.9 or later

- HBA: Support for T10-PI DIX can be found in SPOCK

Compliance implementation

The configuration described in the previous section establishes a compliance configuration in support of Oracle T10-PI DIX using an HPE XP8 Storage, when the appropriate configuration settings are used to enable the T10-PI DIX functionality. The overall configuration is supported by HPE.

SUMMARY

HPE XP8 Storage eliminates downtime with its proven data availability with a single system, and zero seconds of combined installed base downtime since its inception. It also offers maximized performance for a write-intensive Oracle workload with SSD/FMDs, with significantly better write performance when compared to HDDs. As such, they are the ideal platform for a mission-critical database that requires no downtime and little to no impact from mixed workloads due to hardware resource partitioning.

LEARN MORE AT

hpe.com/storage/XP8

Make the right purchase decision.
Contact our presales specialists.

Chat **Email** **Call**

Get updates