Safeguard your data while maintaining SLAs by enabling Intel QuickAssist Technology (Intel QAT)

An Intel QAT-enabled system with Microsoft SQL Server 2022 on VMware vSphere 8 sped up backups compared to an AMD processor-based system

When your organization handles a high volume of online transactions—whether for ecommerce, reservation taking, or online banking—it's crucial that your IT infrastructure dedicates substantial resources to maximize the customers you can serve. To ensure that compute resources remain focused on the money-making task at hand, some companies make the mistake of postponing critical data backups.

This approach has the potential to threaten business continuity and disaster recovery (BCDR) plans and service level agreements (SLAs), leaving critical data vulnerable to attack or loss—which can bring business to a screeching halt, or can leave businesses paying hefty penalties for broken agreements.

To improve data compression and shrink backup times, Intel® includes Intel QAT® technology directly on the chip of every member of the Intel® Xeon® 6 processor family. To show how hardware-accelerated Intel QAT on Intel Xeon processors can improve backups vs. using AMD™ processors with software compression, Principled Technologies compared SQL Server 2022 database on VMware vSphere 8 backup times in an idle scenario and while running a TPROC-C workload. We found in both scenarios, Intel QAT delivered faster backups than using software compression alone, which can help reduce CPU overhead and performance impacts on critical database workloads.

The best part is that enabling this time-saving feature requires no additional cost. If you have new Intel Xeon 6 processors (or older 4th and 5th Gen Intel Xeon processors), admins just need to follow a simple, straightforward process for your organization to begin safeguarding your data while enjoying the benefits of faster backup times.

Shrink your overnight backup windows

Complete backups in up to 41.5% less time when workloads are idle

Faster backups during the business day

Complete backups in up to 38.5% less time while running workloads

Enable Intel QAT with ease at no additional cost

Harnessing hardware-accelerated backups with Intel QAT for SQL Server 2022 on VMware vSphere 8 can help you meet SLAs

In the data center, SLAs are the expected level of service—usually defined by formal contracts between service providers and clients—that define various performance and availability metrics that the provider must meet. The infrastructure must be able to handle a certain number of database transactions at acceptable processing speeds to give users a responsive experience—which means you can't sacrifice a lot of compute power for other tasks like backup jobs. This sometimes leads organizations to delay backups and compromise their BCDR strategy.

At the same time, an organization may have SLAs related to availability and disaster recovery, demanding a certain level of workload uptime and guaranteeing quick recovery in the face of disaster. As one blog notes, "For instance, an SLA might specify daily backups with a recovery time objective (RTO) of one hour. These SLAs are vital for protecting against data loss and ensuring business continuity. Regular backups and quick recovery times mean that in the event of data corruption or loss, businesses can restore their operations with minimal disruption and/or damage."[1]

Intel QAT offers organizations a simple, hardware-driven way to work toward both demands: meeting customer needs and prioritizing performance while simultaneously keeping a strong disaster recovery plan in place. Compared to software compression, which requires additional CPU overhead, hardware-accelerated compression removes some of that burden that can hurt performance. According to Intel, "Intel® QAT offloads compute-intensive compression and decompression operations from the CPU cores, which improves CPU efficiency for greater overall system performance."[2] Intel QAT support is integrated with both Microsoft SQL Server 2022 and VMware vSphere 8. Hardware-based acceleration via Intel QAT, which is available whether you run workloads on VMs or bare metal, can result in:

- Faster backups and restores: Can significantly reduce the time required for backup and restore operations, especially for large databases.
- Storage savings: High compression ratios lead to smaller backup file sizes.
- Little impact on workload performance: Offloading compression tasks helps to minimize the impact of backup operations on the performance of critical database workloads.

We put an Intel QAT-enabled system with Microsoft SQL Server 2022 on VMware vSphere 8 to the test against a traditional software compression solution to show organizations what they might expect in terms of backup times for both solutions. We used software compression for the AMD solution because AMD does not currently have a QAT-like accelerator built into its processors.[3] Instead, customers with AMD processors could add standalone hardware or third-party devices to gain a similar effect.

We also recorded our steps to enabling Intel QAT, which were quick and easy. To see the results of our hands-on testing, continue reading. To learn how to quickly enable Intel QAT on your systems, visit Quick start guide: Installing and enabling Intel QAT-accelerated backups.

Faster backups for SQL Server 2022 on VMware vSphere 8 with Intel QAT

First, we tested SQL Server 2022 database backup times while the systems were at rest to get a baseline comparison. This could also mimic a scenario where larger backups happen while databases are under no load—perhaps at the close of a business day. As Figure 1 shows, the Intel QAT solution backed up a virtualized SQL Server 2022 database in 41.5 percent less time than the AMD solution with software compression.

Many backup and compression operations happen continually, while workloads are running, making it crucial to assess the backup times under load as well. As Figure 2 shows, while running a transactional database workload, the Intel QAT solution completed a 5,000-warehouse database backup in 38.5 percent less time than the AMD solution with software compression did. This swift backup speed is important because it means less time devoting resources to backing up data, letting you optimize performance of critical database workloads.

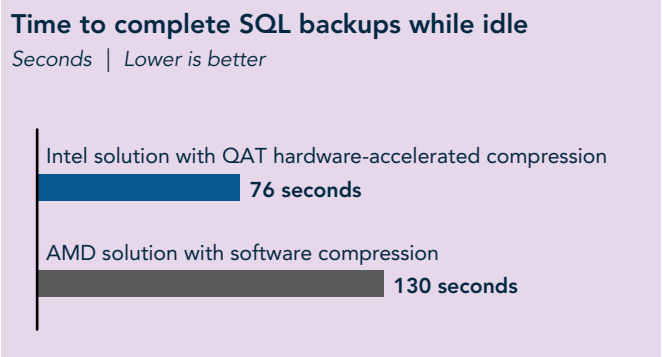

Figure 1: Time, in seconds, to complete a SQL Server 2022 database backup while under no database load. Source: PT.

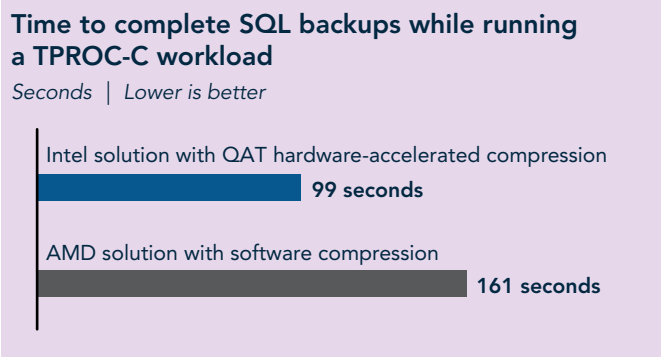

Figure 2: Time, in seconds, to complete a SQL Server 2022 database backup while running a transactional database workload. Source: PT.

Our results show that QAT hardware-accelerated compression can decrease backup times across the board—whether the database is under load or not. QAT brings a clear benefit to anyone using backup compression, regardless of the other work happening on the server.

How we tested

To highlight the value of Intel QAT for backups, we used two similarly configured systems to test backup speed performance: an Intel processor-powered system with Intel QAT hardware-based compression enabled, and an AMD processor-based system with software-based compression only. By default, SQL Server uses software compression (called MS_XPRESS) and all the work happens on the CPU. This is what we tested on the AMD processor-based system. SQL Server 2022 can also enable hardware-accelerated compression by using an algorithm called QAT_DEFLATE. This is what we tested on the Intel Xeon processor-powered system, which has integrated QAT support for SQL Server 2022, both virtualized with VMware vSphere 8 or bare metal.

We deployed a Windows Server 2025 VM on VMware vSphere 8 with SQL Server 2022 as the database. Using a 5,000-warehouse TPROC-C database in HammerDB, we captured the time it took to back up the databases in two scenarios:

- Backup-only scenario: We measured the time to complete a backup using 1) hardware compression via QAT on the Intel processor-powered system and 2) software compression on the AMD processor-based system.
- Back up during workload scenario: We measured the time to complete backups as above while simultaneously running a TPROC-C workload.

To learn more about how we ran our tests, visit the science behind the report.

About the HammerDB workload we used during the active backup scenario

To determine backup speeds while running database workloads, we used the TPROC-C (TPC-C-like) workload from HammerDB. TPROC-C runs a transaction processing workload that simulates an ecommerce business with five types of transactions: receiving a customer order, recording a payment, delivering an order, checking an order's status, and checking stock in inventory.[4] This represents a heavy database load on a system. To learn more about the HammerDB workload we used, visit the Hammer DB website.

Quick start guide: Installing and enabling Intel QAT-accelerated backups

If your systems feature 4th Gen Intel Xeon, 5th Gen Intel Xeon, or Intel Xeon 6 processors with e-cores, they have the Intel QAT accelerator built in, and offer integrated QAT support for SQL Server 2022 and VMware vSphere 8. Enabling Intel QAT does not require any additional licensing steps or costs; you simply have to turn it on.

By following this quick start guide, you can quickly and easily enable hardware-accelerated backups and shrink the time it takes to complete backups, maintaining SLAs and your BCDR strategy. To enable Intel QAT-accelerated backups on your servers running SQL Server and vSphere, complete these five main steps:

1. Install the Intel QAT ESXi driver on the host.
2. Add the Intel QAT device(s) to the virtual machine.
3. Install the Intel QAT Windows driver on the guest operating system.
    a. Note: Intel QAT is also supported on Linux operating systems
4. Configure SQL Server to enable hardware compression.
5. Back up the database using hardware compression.

For step-by-step details on how to complete these steps, continue reading below.

Installing the Intel QAT ESXi driver on the host

1. Download the Intel QuickAssist Technology Driver for VMware ESXi – Hardware Version 2.0.
2. Extract the package Intel-qat*.zip, and place it on the ESXi host using SCP or other means. Install the driver:

```
esxcli software component apply --depot /path/to/Intel-qat*.zip
```

3. Reboot the host once the installation finishes. Verify the driver has loaded:

```
esxcfg-module --list | grep qat
```

Adding the Intel QAT devices to the VM(s)

1. Using the vCenter or ESXi UI, enable passthrough on the Intel QAT devices:

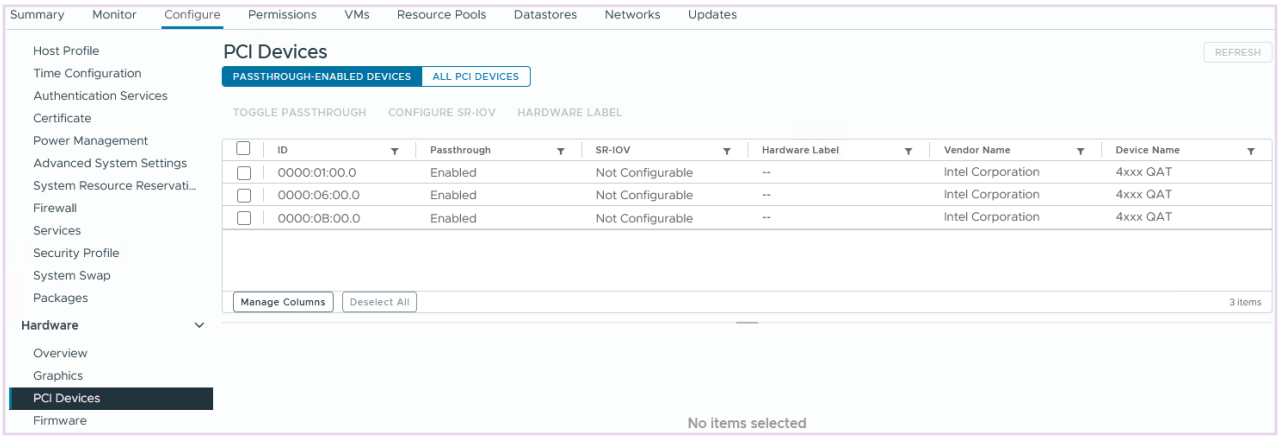

Figure 3: Enabling passthrough on Intel QAT devices in vCenter.

2. Edit the desired VM and add one or more Intel QAT accelerators by adding PCI devices and selecting the desired accelerator.

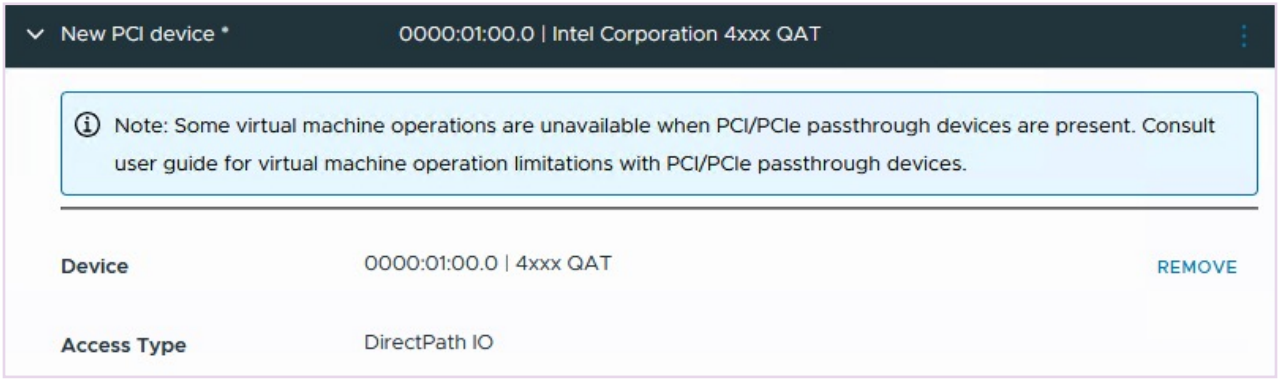

Figure 4: Adding Intel QAT accelerators on the New PCI device screen.

Installing the Intel QAT Windows driver

Power on the VM, and log into the Windows operating system. Download and run the Intel QuickAssist Technology Driver for Windows – HW Version 2.0 driver.

Configuring SQL Server 2022 to use hardware compression

Connect to the SQL Server 2022 instance using SQL Server Management Studio or other method. Run the following SQL commands to enable hardware compression (some of these changes require a SQL restart):

Enabling hardware offload (requires SQL restart)

```
SP_CONFIGURE 'show advanced options', 1;
RECONFIGURE
GO
SP_CONFIGURE 'hardware offload enabled', 1;
RECONFIGURE
GO
```

Setting hardware offload to ON (requires SQL restart)

```
ALTER SERVER CONFIGURATION
SET HARDWARE_OFFLOAD = ON (ACCELERATOR = QAT);
```

Verifying hardware offload is enabled and set to ON

```
SELECT * FROM sys.dm_server_accelerator_status;
SELECT * FROM sys.configurations
WHERE name = 'backup compression algorithm';
```

Backing up a database using hardware acceleration

To back up the database, use this SQL option:

```
COMPRESSION (ALGORITHM = QAT_DEFLATE)
```

Alternately, you can use the UI to select the QAT_DEFLATE algorithm under the compression options.

Success! Accelerate your backups with Intel QAT

You've completed our quick start guide to installing and enabling Intel QAT on your Intel Xeon 6 processor-powered systems running SQL Server 2022 and VMware vSphere 8. If you require additional resources concerning Intel QAT, visit the Intel Getting Started Guide.

Conclusion

While maximizing transactional database performance is a top business priority, backing up critical database data to ensure business continuity and SLA compliance is equally important. But with traditional software compression, businesses can find that compression ratios are often too low to justify the additional compute overhead for compression. This can lead to lengthy backups that risk running afoul of SLAs, bog down database performance, and threaten the ability to keep business moving in the face of disaster.

Customers with Intel Xeon 6 processor-powered systems have another option in their pockets that can offer high compression ratios while delivering faster backups and restores, ultimately reducing CPU overhead and minimizing negative impacts on workloads. As our tests show, enabling Intel QAT can speed up backup times for SQL Server 2022 on VMware vSphere 8 by up to 41.5 percent over software compression alone—whether your servers continue running workloads during backup or remain otherwise idle during scheduled backup windows.

Taking the extra step to enable hardware-accelerated compression with Intel QAT on your servers can help you safeguard your data through faster backups while ensuring you meet your SLAs—better than using a traditional software-based compression strategy.

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1. Databank, "The Critical Role Of Service Level Agreements (SLAs) In Ensuring Data Center Reliability," accessed August 25, 2025, https://www.databank.com/resources/blogs/the-critical-role-of-service-level-agreements-slas-in-ensuring-data-center-reliability/.
2. Intel, "Accelerate Compression with Intel QuickAssist Technology (Intel QAT)," accessed August 22, 2025, https://www.intel.com/content/www/us/en/products/docs/accelerator-engines/what-is-intel-qat.html.
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4. HammerDB, "Understanding the TPROC-C workload derived from TPC-C," accessed August 22,2025, https://www.hammerdb.com/docs/ch03s05.html.

Read the science behind this report ►

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