Turn Today's Data Into Immediate Insights
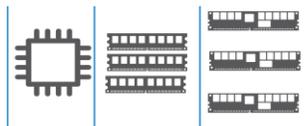
Micron® 9200 SSDs With NVMe™ Bring Real-Time Analytics to Immense, Diverse Data

Micron 9200 Series of NVMe SSDs

Manage Real-Time Sources

Feed Data-Hungry Applications

Bridge the Data Source-to-Processing Gap

Overview

Real-time data – ones and zeros collected, processed, managed and acted upon – surrounds us. Its sources span a broad range of collection systems from traffic cameras to security monitoring devices to in-vehicle proximity sensors.

We generate data at rates and volumes not contemplated just a few years ago.

A critical challenge is processing that data. Sorting it. Understanding it. Acting on it. Realizing benefit from it. Moving from data to wisdom, from ones and zeros to decisions, actions and results.

This technical brief outlines the requirements and challenges of effectively managing data in real time. It also describes how the Micron® 9200 series of NVM Express™ (NVMe™) SSDs can help you feed data-hungry, real-time-processing applications with more data, faster than ever before.

Micron 9200 SSDs combine terabytes of storage with consistently low latency transforming real-time data into real-time decisions, real-time actions and real-time results that impact your enterprise's bottom line.

Capturing and Managing Data Variety

Real-time data collection sources are everywhere. Some are obvious, some are not. They aim to keep us, and the things most important to us, safe and healthy:

Public Safety: A broad range of automated sensors for traffic cameras, security monitors, immediate weather localization, crowd safety, infrastructure management

Financial Transactions: Billing, payment and transfer methods, interest adjustments, credit analysis, identity match, employment/income analysis

Intrusion Detection: Physical facilities, network breaches (wireless and wired), digital access attempts, including malware and phishing

Automated Transportation: In-vehicle proximity sensors, performance management, operations and tuning, location and routing

Healthcare: On-patient biosensors, trend analytics, clinical trial results aggregation and management, environmental effects

Data Center Management: System health (for example, temperature and temperature management), failure prediction, log analysis, use trends

For the vast majority of these sources, data collection is not enough — they must enable us to act on data quickly to be useful.


Figure 1: Data Processing Resources
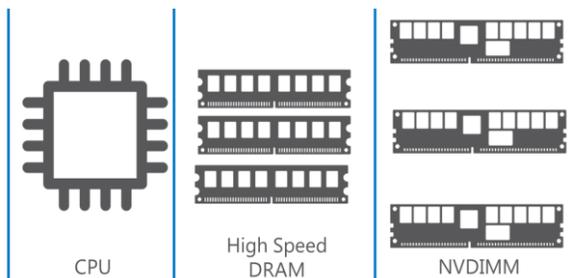
Feeding Data-Hungry Processing

Before we can act on the data, it must be processed. Real-time analytics engines rely on immense data processing resources like high-speed (in gigahertz), multiple-core CPUs and high-capacity, high-speed DRAM — all backed by nonvolatile DIMMs (NVDIMMs).

The Data Gap Challenge

Asynchronous data streams caused by issues like bandwidth limitations, transmission latency and distance differences can lead to related data arriving at different, time-staggered intervals. Staggered arrivals can cause interruptions (gaps) and restarts (overlaps) that interfere with the synchronization required for complete, real-time analysis.

Figure 2: Inconsistent Streams (Data Gap)
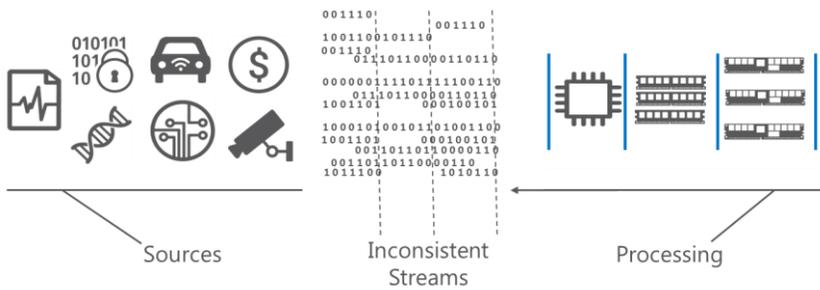
These gaps and overlaps may cause inconsistent streams and results. It can be difficult to correct processing start times with a staggered "stop-and-start" flow, which creates a potential data gap between sources and processing. Inconsistent data streams can also starve your high-value resources (CPUs and memory) of data and cause them to sit idle instead of creating value.

It is critical to consistently feed processing engines with complete, actionable data sets. If we instead start processing before all related streams are complete, we risk analyzing an incomplete data set, which creates a data gap with the potential for imprecise results and less timely insights.

Bridging the Data Gap

Nonvolatile storage on a fast bus with an efficient protocol can help bring agility to your analytics. PCIe Gen3 is that bus, enabling just under 8 GB/s (theoretical) of bandwidth using eight lanes. NVMe is that protocol, developed for use with fast, high-bandwidth nonvolatile storage. NVMe offers tremendous advantages over older protocols like SAS and SATA to help bridge the gap. The NVMe Working Group's NVMe Overview outlines the NVMe protocol's benefits, such as extended queues and queue depths and design for nonvolatile memory[2].

Figure 3: Micron 9200 NVMe SSD Ingest and Delivery

Micron's 9200 series of NVMe SSDs, which is our flagship performance family and second generation of NVMe SSDs, can help bridge the gap between real-time data sources and processing. Built with a standard NVMe interface and PCIe Gen3 bus, the Micron 9200 series enables industry-leading performance and capacity[3] with fast throughput (to ingest and feed data processing) and low and consistent latency, bringing speed and flexibility to modernize and improve real-time processing.

Figure 4: Bridging the Processing Gap
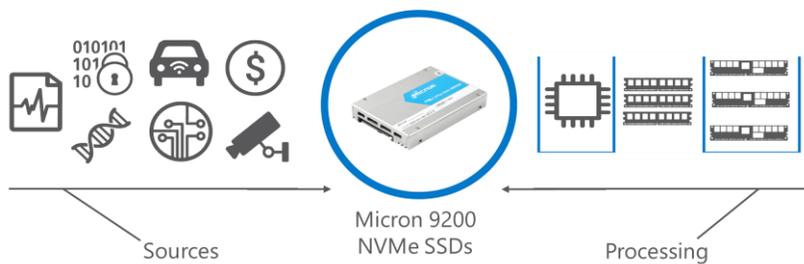
The ingest (write) rate of a single Micron 9200 NVMe SSD ranges from 1.95 GB/s to 2.4 GB/s (random write IOPS from 95,000 to 270,000), with delivery (read) rates ranging from 4.3 GB/s to 6 GB/s (random read IOPS from 620,000 to 800,000 — exact numbers are configuration-dependent.[4]

The Micron 9200 SSD also offers a broad range of capacities (1.6TB to 11TB[4]), all with Micron's Flex Capacity feature, so you can tune drive capacity to optimize write performance and fills per day to deliver the data analytics you need, when you need them.

Move Analytics from Data to Action

Generating massive amounts of data more rapidly and from more diverse sources has become the norm. The volume, variety and velocity with which we generate new data today is unparalleled. Generating data is the easy part. Doing something meaningful with it is the hard part, and doing it in a timely manner is even harder.

When we need to store vast amounts of data, we also typically need to sort it, understand it and act on it. We need to derive real insight from it and then act accordingly.

Fast, high-capacity, low-latency storage can help. Micron's 9200 series of NVMe SSDs bridge the data processing gap with blazing ingest and export performance, feeding data-hungry, real-time processing applications with more data, faster than ever before. The 9200 SSDs are speed and capacity powerhouses that can help move your analytics from data into action and into results that you can use.

The benefits of Micron's 9200 NVMe SSDs are imperative for today's business, moving immense amounts of data through large bandwidth and high IOPS with low latency for analysis, compute and review, all critical to your enterprise bottom line.

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1. See Micron 9200 NVMe SSD key benefits.
2. Also, see Micron's New Path to Storage I/O Performance and Resiliency with NVMe.
3. Based on a survey of generally available, competing products at the time of this document's publication. Products, features and capability subject to change without notice.
4. See Micron 9200 SSD with NVMe™ data sheets.