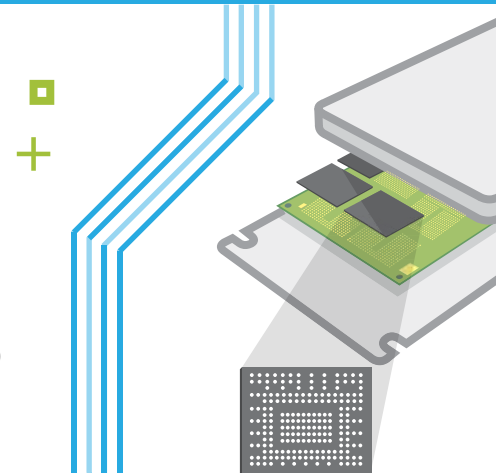
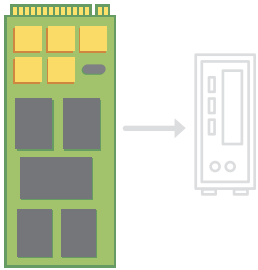


NVMe (Non-Volatile Memory Express) is a communications interface and driver that defines a command set and feature set for PCIe-based SSDs with the goals of increased and efficient performance and interoperability on a broad range of enterprise and client systems.

NVMe was designed for SSD. It communicates between the storage interface and the system CPU using high-speed PCIe sockets, independent of storage form factor.

Input/Output tasks performed using NVMe drivers begin faster, transfer more data and finish faster than older storage models that use older drivers, such as AHCI (Advanced Host Controller Interface) – a feature of SATA SSDs. Because it was designed specifically for SSDs, NVMe is becoming the new industry standard.

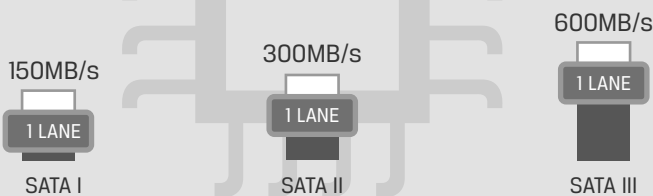


## Storage: Then and now

DATA BUSES: Transport data within a system

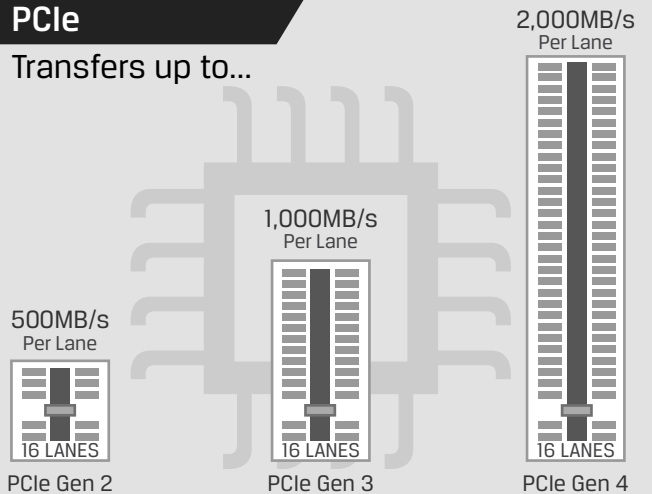
### SATA

Transfers up to...



### PCIe

Transfers up to...



Using 16 lanes, PCIe Gen 4 can transfer data at **32,000MB/s**

## Communication drivers

Used by operating systems to communicate data with storage devices

### AHCI

- Designed for Hard Drives with Spinning Disk technology
- Has only 1 command queue
- Can send only 32 commands per queue
- Commands utilise high CPU cycles

### NVMe

- Designed for SSDs with Flash technology
- Has 64K command queues
- Can send 64K commands per queue
- Commands utilise low CPU cycles

## AHCI



Has a latency of 6 microseconds



Must communicate with the SATA controller

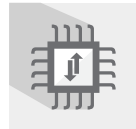


IOPs up to 100K

## NVMe



Has a latency of 2.8 microseconds



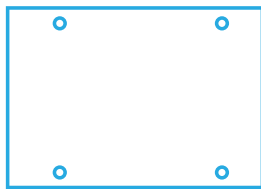
Communicates directly with the system CPU



IOPs over 1 million

## SSD form factors: The shapes and sizes of solid-state storage

SATA  
PCIe



2.5"

(designed for smaller form factor systems)

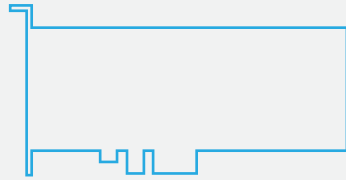


mSATA

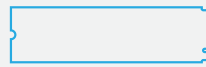
(supports AHCI version)



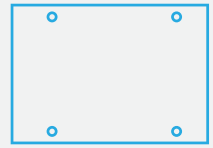
M.2



HHHL – Half Height, Half Length (also called AIC or Add-In Card)



M.2 (supports NVMe version)



U.2 (only available in NVMe)

- AHCI versions of these drives plug into the PCIe slot, but use the AHCI drivers
- Some older versions of HHHH use proprietary drivers
- NVMe versions typically use native OS drivers



## Beyond the numbers: Benefits of NVMe technology

### Optimal performance



#### Superior storage

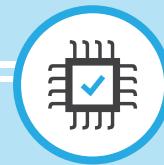
PCIe sockets transfer **>25x more data** than their SATA equivalent



#### Superior speed

NVMe begins sending commands more than **2x faster** than AHCI drivers

NVMe input/output operations per second exceeds 1 million and is up to **900% faster** than its AHCI equivalent



#### Superior compatibility

NVMe cuts out the middleman by **communicating directly with the system CPU**

NVMe-based drivers work with all major operating systems, regardless of form factor

Contact your local Kingston representative to find out which Kingston SSD drive is right for you, or visit: [kingston.com/en/solutions/servers-data-centers](http://kingston.com/en/solutions/servers-data-centers)