



SSD VS HDD

On a given volume configuration, certain I/O characteristics drive the performance behavior for your EBS volumes. SSD-backed volumes, such as General Purpose SSD (**gp2**) and Provisioned IOPS SSD (**io1**, **io2**), deliver consistent performance whether an I/O operation is random or sequential. HDD-backed volumes like Throughput Optimized HDD (**st1**) and Cold HDD (**sc1**) deliver optimal performance only when I/O operations are large and sequential.

In the exam, always consider the difference between SSD and HDD as shown on the table below. This will allow you to easily eliminate specific EBS-types in the options which are not SSD or not HDD, depending on whether the question asks for a storage type which has I/O operations or I/O operations.

FEATURES	SSD Solid State Drive	HDD Hard Disk Drive
Best for workloads with:	small, random I/O operations	large, sequential I/O operations
Can be used as a bootable volume?	Yes	No
Suitable Use Cases	<ul style="list-style-type: none">- Best for transactional workloads- Critical business applications that require sustained IOPS performance- Large database workloads such as MongoDB, Oracle, Microsoft SQL Server and many others...	<ul style="list-style-type: none">- Best for large streaming workloads requiring consistent, fast throughput at a low price- Big data, Data warehouses, Log processing- Throughput-oriented storage for large volumes of data that is infrequently accessed
Cost	moderate / high 	low 
Dominant Performance Attribute	IOPS	Throughput (GB/s)

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Provisioned IOPS SSD (**io1**, **io2**) volumes are designed to meet the needs of I/O-intensive workloads, particularly database workloads, that are sensitive to storage performance and consistency. Unlike **gp2**, which uses a bucket and credit model to calculate performance, an **io1** volume allows you to specify a consistent IOPS rate when you create the volume, and Amazon EBS delivers within 10 percent of the provisioned IOPS performance 99.9 percent of the time over a given year. Provisioned IOPS SSD io2 is an upgrade of Provisioned IOPS SSD io1. It offers higher 99.999% durability and higher IOPS per GiB ratio with 500 IOPS per GiB, all at the same cost as io1 volumes.

Volume Name

General Purpose SSD

Provisioned IOPS SSD

Volume type	gp3	gp2	io2	io1
Description	General Purpose SSD volume that balances price performance for a wide variety of transactional workloads	General Purpose SSD volume that balances price performance for a wide variety of transactional workloads	High performance SSD volume designed for business-critical latency-sensitive applications	High performance SSD volume designed for latency-sensitive transactional workloads
Use Cases	virtual desktops, medium sized single instance databases such as MSFT SQL Server and Oracle DB, low-latency interactive apps, dev & test, boot volumes	Boot volumes, low-latency interactive apps, dev & test	Workloads that require sub-millisecond latency, and sustained IOPS performance or more than 64,000 IOPS or 1,000 MiB/s of throughput	Workloads that require sustained IOPS performance or more than 16,000 IOPS and I/O-intensive database workloads
Volume Size	1 GB – 16 TB	1 GB – 16 TB	4 GB – 16 TB	4 GB – 16 TB

Durability	99.8% – 99.9% durability	99.8% – 99.9% durability	99.999%	99.8% – 99.9%
Max IOPS / Volume	16,000	16,000	64,000	64,000
Max Throughput / Volume	1000 MB/s	250 MB/s	1,000 MB/s	1,000 MB/s
Max IOPS / Instance	260,000	260,000	160,000	260,000
Max IOPS / GB	N/A	N/A	500 IOPS/GB	50 IOPS/GB
Max Throughput / Instance	7,500 MB/s	7,500 MB/s	4,750 MB/s	7,500 MB/s

Latency	single digit millisecond	single digit millisecond	single digit millisecond	single digit millisecond
Multi-Attach	No	No	Yes	Yes

Volume Name	Throughput Optimized HDD	Cold HDD
Volume type	st1	sc1
Description	Low cost HDD volume designed for frequently accessed, throughput-intensive workloads	Throughput-oriented storage for data that is infrequently accessed Scenarios where the lowest storage cost is important

Use Cases	Big data, data warehouses, log processing	Colder data requiring fewer scans per day
Volume Size	125 GB – 16 TB	125 GB – 16 TB
Durability	99.8% – 99.9% durability	99.8% – 99.9% durability
Max IOPS / Volume	500	250
Max Throughput / Volume	500 MB/s	250 MB/s
Max IOPS / Instance	260,000	260,000
Max IOPS / GB	N/A	N/A

Max Throughput / Instance
Multi-Attach

7,500 MB/s

7,500 MB/s

No

No