

Amazon EBS FAQs - Amazon Web Services

[aws.amazon.com](https://aws.amazon.com/ebs/faqs/) (<https://aws.amazon.com/ebs/faqs/>)

General

Q: Are Amazon EBS volume and snapshot ID lengths changing in 2018?

Yes, please visit the EC2 FAQs page for more details.

Q: What happens to my data when an Amazon EC2 instance terminates?

Unlike the data stored on a local instance store (which persists only as long as that instance is alive), data stored on an Amazon EBS volume can persist independently of the life of the instance. Therefore, we recommend that you use the local instance store only for temporary data. For data requiring a higher level of durability, we recommend using Amazon EBS volumes or backing up the data to Amazon S3. If you are using an Amazon EBS volume as a root partition, set the Delete on termination flag to "No" if you want your Amazon EBS volume to persist outside the life of the instance.

Q: What kind of performance can I expect from Amazon EBS volumes?

Amazon EBS provides four current generation volume types: Provisioned IOPS SSD (io1), General Purpose SSD (gp2), Throughput Optimized HDD (st1) and Cold HDD (sc1). These volume types differ in performance characteristics and price, allowing you to tailor your storage performance and cost to the needs of your applications. The average latency between EC2 instances and EBS is single digit milliseconds. For more performance information see the EBS product details page.

For more information about Amazon EBS performance guidelines, see [Increasing EBS Performance](http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSPerformance.html) (<http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSPerformance.html>).

Q: Which volume should I choose?

Amazon EBS includes two major categories of storage: SSD-backed storage for transactional workloads (performance depends primarily on IOPS) and HDD-backed storage for throughput workloads (performance depends primarily on throughput, measured in MB/s). SSD-backed volumes are designed for transactional, IOPS-intensive database workloads, boot volumes, and workloads that require high IOPS. SSD-backed volumes include Provisioned IOPS SSD (io1) and General Purpose SSD (gp2). HDD-backed volumes are designed for throughput-intensive and big-data workloads, large I/O sizes, and sequential I/O patterns. HDD-backed volumes include

Throughput Optimized HDD (st1) and Cold HDD (sc1).

Q: How do I modify the capacity, performance, or type of an existing EBS volume?

Changing a volume configuration is easy. The Elastic Volumes feature allows you to increase capacity, tune performance, or change your volume type with a single CLI call, API call or a few console clicks. For more information about Elastic Volumes, see the Elastic Volumes documentation.

Q: Are EBS Standard Volumes still available?

EBS Standard Volumes have been renamed to EBS Magnetic volumes. Any existing volumes will not have been changed as a result of this and there are no functional differences in the EBS Magnetic offering compared to EBS Standard. The name of this offering was changed to avoid confusion with our General Purpose SSD (gp2) volume type which is our recommended default volume type.

Q: Are Provisioned IOPS SSD (io1) volumes available for all Amazon EC2 instance types?

Yes, Provisioned IOPS SSD (io1) volumes are available for all Amazon EC2 Instance Types. To enable your EC2 instances to use the IOPS provisioned on an EBS volume consistently and predictably, you can launch selected EC2 instance types as EBS-optimized instances. EBS-optimized instances deliver dedicated throughput between Amazon EC2 and Amazon EBS, with options between 62.5 MB/s and 1,750 MB/s depending on the instance type used. To achieve optimum performance for workloads requiring more than 32,000 IOPS or 500 MB/s, you should use EC2 instances based on the Nitro system.

Performance

Q: What level of performance consistency can I expect to see from my Provisioned IOPS SSD (io1) volumes?

When attached to EBS-optimized instances, Provisioned IOPS SSD (io1) volumes are designed to deliver within 10% of the provisioned IOPS performance 99.9% of the time in a given year. Your exact performance depends on your application's I/O requirements.

Q: What level of performance latency can I expect to see from my Provisioned IOPS SSD (io1) volumes?

When attached to EBS-optimized instances, Provisioned IOPS volumes can achieve single digit millisecond latencies. Your exact performance depends on your application's I/O requirements.

Q: Does the I/O size of my application reads and writes affect the rate of IOPS I get from my Provisioned IOPS SSD (io1) volumes?

Yes. For a given allocation of resources, the IOPS rate you get depends on the I/O size of your application reads and writes.

Provisioned IOPS volumes have a base I/O size of 16KB. Volumes up to 32,000 IOPS have an enhanced throughput I/O size of 256KB, up to 500 MB/s throughput. Every increase in I/O size above the base size (16KB) or enhanced throughput size (256KB) linearly increase the resources you need to achieve the same IOPS rate.

For example, if you have provisioned a volume with 40,000 IOPS it will achieve up to 40,000 16KB writes per second, 20,000 32KB writes per second, or 10,000 64KB writes per second, and so on. If you have provisioned a volume with 500 IOPS it can achieve up to 500 256KB writes per second, 250 512KB writes per second, or 125 1024KB writes per second, and so on.

You can use Amazon CloudWatch to monitor your throughput and I/O sizes.

Q: What factors can affect the performance consistency I see with Provisioned IOPS SSD (io1) volumes?

Provisioned IOPS SSD (io1) volumes attached to EBS-optimized instances are designed to offer consistent performance, delivering within 10% of the provisioned IOPS performance 99.9% of the time over a given year. For maximum performance consistency with new volumes created from a snapshot, we recommend reading or writing to all of the blocks on your volume before placing it into service.

Another factor that can impact your performance is if your application isn't sending enough I/O requests. This can be monitored by looking at your volume's queue depth. The queue depth is the number of pending I/O requests from your application to your volume. For maximum consistency, a Provisioned IOPS volume must maintain an average queue depth (rounded to the nearest whole number) of one for every 1000 provisioned IOPS in a minute. For example, for a volume provisioned with 3000 IOPS, the queue depth average must be 3. For more information about ensuring consistent performance of your volumes, see [Increasing EBS Performance \(http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSPerformance.html\)](http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSPerformance.html).

Q: What level of performance consistency can I expect to see from my HDD-backed volumes?

When attached to EBS-optimized instances, Throughput Optimized HDD (st1) and Cold HDD (sc1) volumes are designed to deliver within 10% of the expected throughput performance 99% of the time in a given year. Your exact performance depends on your application's I/O requirements and the performance of your EC2 instance.

Q: Does the I/O size of my application reads and writes affect the rate of throughput I get from my HDD-backed volumes?

Yes. The throughput rate you get depends on the I/O size of your application reads and writes. HDD-backed volumes process reads and writes in I/O sizes of 1MB. Sequential I/Os are merged and processed as 1 MB units while each non-sequential I/O is processed as 1MB even if the actual I/O size is smaller. Thus, while a transactional workload with small, random I/Os, such as a database, won't perform well on HDD-backed volumes, sequential I/Os and large I/O sizes will achieve the advertised performance of st1 and sc1 for a longer period of time.

Q: What factors can affect the performance consistency of my HDD-backed volumes?

Throughput Optimized HDD (st1) and Cold HDD (sc1) volumes attached to EBS-optimized instances are designed to offer consistent performance, delivering within 10% of the expected throughput performance 99% of the time in a given year. There are several factors that could affect the level of consistency you see. For example, the relative balance between random and sequential I/O operations on the volume can impact your performance. Too many random small I/O operations will quickly deplete your I/O credits and lower your performance down to the baseline rate. Your throughput rate may also be lower depending on the instance selected. Although st1 can drive throughput up to 500 MB/s, performance will be limited by the separate instance-level limit for EBS traffic. Another factor is taking a snapshot which will decrease expected write performance down to the baseline rate, until the snapshot completes. This is specific to st1 and sc1.

Your performance can also be impacted if your application isn't sending enough I/O requests. This can be monitored by looking at your volume's queue depth and I/O size. The queue depth is the number of pending I/O requests from your application to your volume. For maximum consistency, HDD-backed volumes must maintain an average queue depth (rounded to the nearest whole number) of four or more for every 1 MB sequential I/O. For more information about ensuring consistent performance of your volumes, see [Increasing EBS Performance](http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSPerformance.html) (<http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSPerformance.html>).

Q: Can I stripe multiple volumes together to get better performance?

Yes. You can stripe multiple volumes together to achieve up to 75,000 IOPS or 1,750 MiB/s when attached to larger EC2 instances. However, performance for st1 and sc1 scales linearly with volume size so there may not be as much of a benefit to stripe these volumes together.

Q: How does Amazon EBS handle issues like storage contention?

EBS is a multi-tenant block storage service. We employ rate limiting as a mechanism to avoid resource contention. This starts with having defined performance criteria for the volumes – our volume types (gp2, PIOPS, st1, and sc1) all have defined performance characteristics in terms of IOPS and throughput. The next step is defining performance at the instance level. Each EBS Optimized instance has defined performance (both throughput and IOPS) for the set of EBS volumes attached to the instance. A customer can, therefore, size instances and volumes to get the desired level of performance. In addition, customers can use our reported metrics to observe instance level and volume level performance. They can set alarms to determine if what they are seeing does not match the expected performance – the metrics can also help determine if customers are configured at the right type of instance with the right amount of performance at the volume level or not. On the EBS end, we use the configured performance to inform how we allocate the appropriate instance and EBS infrastructure to support the volumes. By appropriately allocating infrastructure, we avoid resource contention. Additionally, we constantly monitor our infrastructure. This monitoring allows us to detect infrastructure failure (or imminent infrastructure failure) and therefore, move the volumes proactively to functioning hardware while the underlying infrastructure is either repaired or replaced (as appropriate).

Snapshots

Q: Will I be able to access my snapshots using the regular Amazon S3 API?

No, snapshots are only available through the Amazon EC2 API.

Q: Do volumes need to be un-mounted to take a snapshot?

No, snapshots can be done in real time while the volume is attached and in use. However, snapshots only capture data that has been written to your Amazon EBS volume, which might exclude any data that has been locally cached by your application or OS. To ensure consistent snapshots on volumes attached to an instance, we recommend detaching the volume cleanly, issuing the snapshot command, and then reattaching the volume. For Amazon EBS volumes that serve as root devices, we recommend shutting down the machine to take a clean snapshot.

Q: Does it take longer to snapshot an entire 16 TB volume as compared to an entire 1 TB volume?

By design, an EBS Snapshot of an entire 16 TB volume should take no longer than the time it takes to snapshot an entire 1 TB volume. However, the actual time taken to create a snapshot depends on several factors including the amount of data that has changed since the last snapshot of the EBS volume.

Q: Are snapshots versioned? Can I read an older snapshot to do a point-in-time recovery?

Each snapshot is given a unique identifier, and customers can create volumes based on any of their existing snapshots.

Q: How can I discover Amazon EBS snapshots that are shared with me?

You can find snapshots that are shared with you by selecting Private Snapshots from the list in the Snapshots section of the AWS Management Console. This section lists both snapshots that you own and snapshots that are shared with you.

Q: How can I find which Amazon EBS snapshots are shared globally?

You can find snapshots that are shared globally by selecting Public Snapshots from the list in the Snapshots section of the AWS Management Console.

Q: How can I find a list of Amazon public datasets stored in Amazon EBS Snapshots?

You can use the AWS Management Console to find public datasets stored as Amazon Snapshots. Log into the console, select the Amazon EC2 Service, select Snapshots and then filter on Public Snapshots (<https://console.aws.amazon.com/ec2/v2/home#Snapshots:visibility=public;sort=startTime>). All information on public datasets is available in our AWS Public Datasets (<https://aws.amazon.com/public-datasets/>) resource center.

Encryption

Q: What is Amazon EBS encryption?

Amazon EBS encryption offers seamless encryption of EBS data volumes, boot volumes and snapshots, eliminating the need to build and maintain a secure key management infrastructure. EBS encryption enables data at rest security by encrypting your data using Amazon-managed keys, or keys you create and manage using the AWS Key Management Service (KMS) (https://docs.aws.amazon.com/kms/latest/developerguide/concepts.html#master_keys). The encryption occurs on the servers that host EC2 instances, providing encryption of data as it moves between EC2 instances and EBS storage. For more details, see Amazon EBS encryption in the Amazon EC2 User Guide (<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSEncryption.html>).

Q: What is the AWS Key Management Service (KMS)?

AWS KMS (<https://aws.amazon.com/kms/>) is a managed service that makes it easy for you to create and control the encryption keys used to encrypt your data. AWS Key Management Service is integrated with other AWS services including Amazon EBS, Amazon S3, and Amazon Redshift, to make it simple to encrypt your data with encryption keys that you manage. AWS Key Management Service is also integrated with AWS CloudTrail to provide you with logs of all key usage to help meet your regulatory and compliance needs. To learn more about KMS, visit the AWS Key Management Service product page.

Q: Why should I use EBS encryption?

You can use Amazon EBS encryption to meet security and encryption compliance requirements for data at rest encryption in the cloud. Pairing encryption with existing IAM access control policies improves your company's defense-in-depth strategy.

Q: How are my Amazon EBS encryption keys managed?

Amazon EBS encryption handles key management for you. Each newly created volume gets a unique 256-bit AES key; Volumes created from the encrypted snapshots share the key. These keys are protected by our own key management infrastructure, which implements strong logical and physical security controls to prevent unauthorized access. Your data and associated keys are encrypted using the industry-standard AES-256 algorithm.

Q: Does EBS encryption support boot volumes?

Yes.

Q: Can I create an encrypted data volume at the time of instance launch?

Yes, using customer master keys (CMKs) (https://docs.aws.amazon.com/kms/latest/developerguide/concepts.html#master_keys) that are either AWS-managed or customer-managed. You can specify the volume details and encryption through a RunInstances API (https://docs.aws.amazon.com/AWSEC2/latest/APIReference/API_RunInstances.html) call with the BlockDeviceMapping (https://docs.aws.amazon.com/AWSEC2/latest/APIReference/API_BlockDeviceMapping.html) parameter or through the Launch Wizard in the EC2 Console.

Q: Can I create additional encrypted data volumes at the time of instance launch that are not part of the AMI?

Yes, you can create encrypted data volume with either default or custom CMK encryption at the time of instances launch. You can specify the volume details and encryption through BlockDeviceMapping (https://docs.aws.amazon.com/AWSEC2/latest/APIReference/API_BlockDeviceMapping.html) object in RunInstances API (http://docs.aws.amazon.com/AWSEC2/latest/APIReference/API_RunInstances.html) call or through Launch Wizard in EC2 Console.

Q: Can I launch an encrypted EBS instance from an unencrypted AMI?

Yes. See technical documentation (<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AMIEncryption.html>) for details.

Q: Can I share encrypted snapshots and AMIs with other accounts?

Yes. You can share encrypted snapshots and AMIs using a customer-managed customer master key (CMK) (<https://docs.aws.amazon.com/kms/latest/developerguide/concepts.html>) with other AWS accounts. See technical documentation (<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/sharingamis-explicit.html>) for details.

Q: Can I ensure that all new volumes created are always encrypted?

Yes, you can enable EBS encryption by default with a single setting per region. This ensures that all new volumes are always encrypted. Refer to technical documentation (<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSEncryption.html>) for more details.

Billing and metering

Q: Will I be billed for the IOPS provisioned on a Provisioned IOPS volume when it is disconnected from an instance?

Yes, you will be billed for the IOPS provisioned when it is disconnected from an instance. When a volume is detached, we recommend you consider creating a snapshot and deleting the volume to reduce costs. For more information, see the "Underutilized Amazon EBS Volumes" cost optimization check in Trusted Advisor (<http://aws.amazon.com/support/trustedadvisor/>). This item checks your Amazon Elastic Block Store (Amazon EBS) volume configurations and warns when volumes appear to be underused.

Q: Do your prices include taxes?

Except as otherwise noted, our prices are exclusive of applicable taxes and duties, including VAT and applicable sales tax. For customers with a Japanese billing address, use of AWS services is subject to Japanese Consumption Tax. Learn more.

Learn more about Amazon EBS pricing

Visit the pricing page

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