

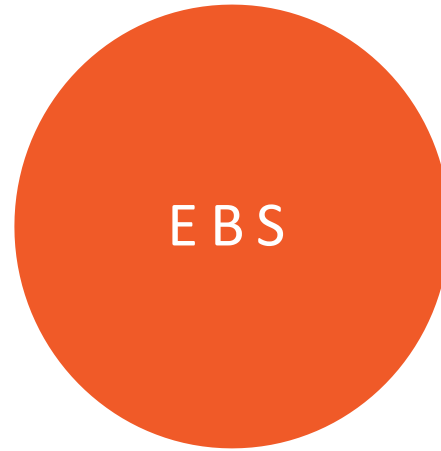
Understanding Elastic Block Store (EBS) and Elastic File System (EFS)



Instance Storage Types



Ephemeral



GP-SSD

PIOPS

Throughput Optimized HDD

Cold HDD

Magnetic



Network attached
storage



Amazon EBS

Does not need to be attached to an instance

Cannot be attached to more than one instance at the same time

Can be transferred between Availability Zones

EBS volume data is replicated across multiple servers in an Availability Zone

Encryption of EBS data volumes, boot volumes and snapshots

Designed for an annual failure rate (AFR) of between 0.1% - 0.2% & an SLA 99.95%



EBS SSD Volume Types

Characteristic	General Purpose (SSD)	Provisioned IOPS (SSD)
Use Cases	<ul style="list-style-type: none">• System boot volumes• Virtual desktops• Small to medium DBs• Dev and test	<ul style="list-style-type: none">• I/O intensive• Relational DBs• NoSQL DBs
Volume Size	1GB - 16TB	4 GB - 16 TB
Max. Throughput	160 MB/s	320 MB/s
Max IOPS / volume	10,000	20,000
Max IOPS / instance	65,000	65,000
Max. Throughput / instance	1,250 Mbps	1,250 Mbps
API Name	gp2	io1

Amazon EBS Volume Types: <http://aws.amazon.com/ebs/details/>

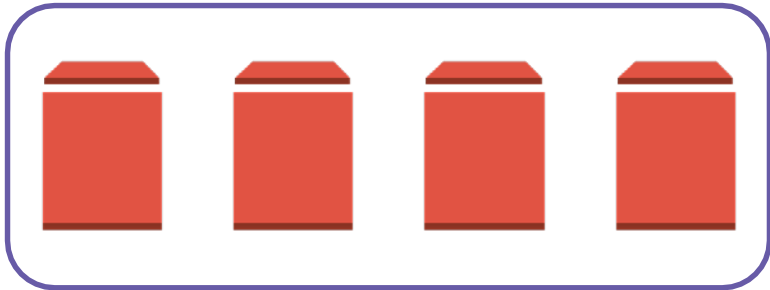
EBS HDD Volume Types

Characteristic	Throughput Optimized HDD	Cold HDD	Magnetic
Use Cases	<ul style="list-style-type: none">• Infrequent Data Access• Streaming• Big Data• Logs• Cannot be a boot volume	<ul style="list-style-type: none">• Throughput-oriented for large volumes of data• Lowest storage cost is important• Cannot be a boot volume	<ul style="list-style-type: none">• Infrequent Data Access
Volume Size	500 GB - 16 TB	500 GB - 16 TB	1GB – 1TB
Max. Throughput	500 MB/s	250 MB/s	40 – 90 MB/s
Max IOPS / volume	500	250	40 –200
Max IOPS / instance	65,000	65,000	48,000
Max. Throughput / instance	1,250 Mbps	1,250 Mbps	1,250 Mbps
API Name	st1	sc1	standard

Amazon EBS Volume Types: <http://aws.amazon.com/ebs/details/>

Increasing IOPS Performance

RAID



Multiple striped gp2 or standard volumes (typically RAID 0)

Multiple striped PIOPS volumes (typically RAID 0)

Function of the guest OS

EBS-Optimized Instances

Dedicated capacity for Amazon EBS I/O

EBS-optimized instances are designed for use with all EBS volume types

Max bandwidth: 400 Mbps – 12,000 Mbps

IOPS: 3,000 – 65,000

<http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSOptimized.html>

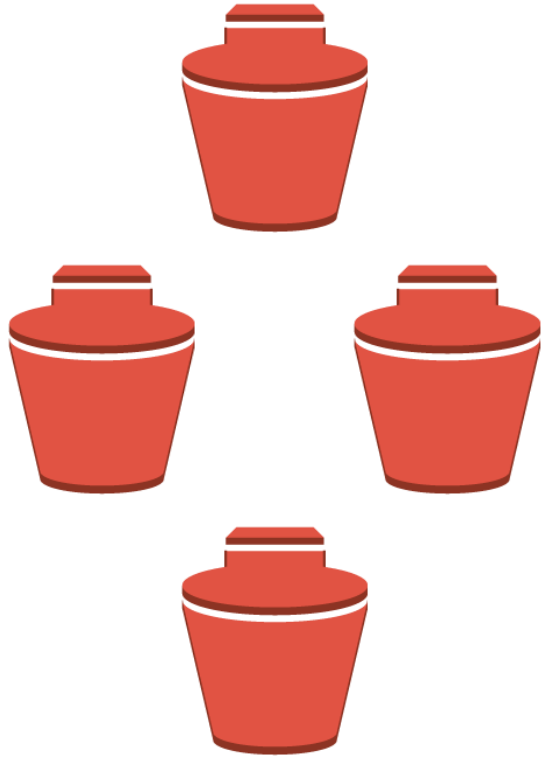
GP-SSD within 10% of baseline and burst performance 99.9% of the time

PIOPS within 10% of provisioned performance 99.9% of the time

Additional hourly fee (Amazon EC2 pricing page)

http://aws.amazon.com/ec2/pricing/#EBS-Optimized_Instances

EBS Snapshots Characteristics



Point-in-time snapshots

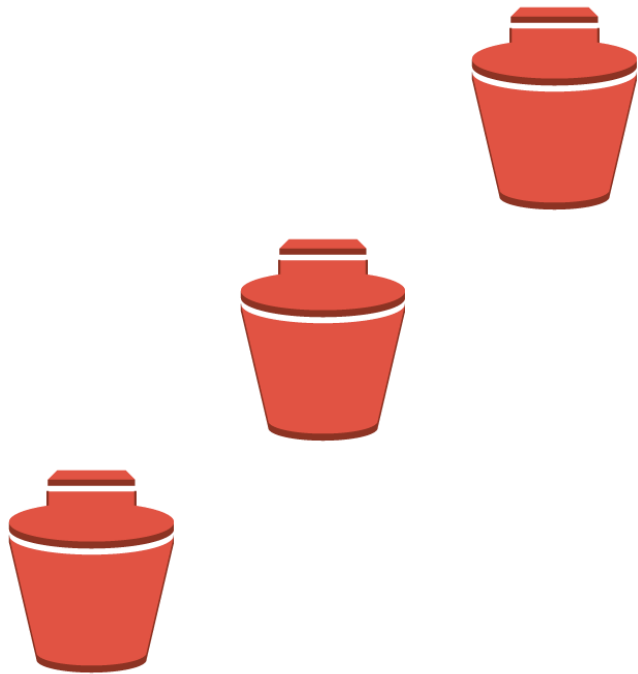
Supports incremental snapshots

Billed only for the changed blocks

Deleting a snapshot removes only the data not needed by any other snapshot

EBS leverages S3 for snapshot storage

EBS Snapshots Features



Resizing EBS volumes

Sharing EBS snapshots

Copying EBS snapshots across regions

Lazy loading



Amazon EFS

Simple, petabytes scalable file storage for use with EC2 instances

EFS file systems are elastic, and automatically grow and shrink as you add and remove files

Stored redundantly across multiple AZs

1 to 1000s of EC2 instances, from multiple AZs, concurrently

Big Data and analytics, media processing workflows, content management, web serving, home directories





Amazon EFS

By default, you can create up to 10 file systems per AWS account per region

Supports NFS 4.1

On-premises access enabled via direct connect



Summary



Instance storage types

EBS characteristics

EBS volume types

EBS-optimized instances

Amazon EFS

