**Aurora**

Amazon Aurora is a MySQL compatible relational databases engine that offers enterprise-level performance, durability and availability.   It is a fully managed service and you can expect 5x the performance of MySQL without making huge modifications to any of your web applications.  Amazon Aurora databases instances are created as DB clusters.

* Each DB Cluster consists of one or more instances and a cluster volume that manages the data for those instances. An Aurora cluster volume is a virtual database storage volume that will span multiple Availability Zones and each Availability Zone will have a copy of the cluster data. There are two types of instances make up an Aurora DB cluster:
* **Primary instance** – This is the main cluster and it supports read-write workloads and performs all of the data modifications to the cluster volume. Note that each Aurora DB cluster has one primary instance.
* **Aurora Replica** – These are used just as any read replicas, in that they support only read operations. Each DB cluster can have up to 15 Aurora Replicas in addition to the primary instance. You can use Aurora Replicas to distribute the read workload, and by placing the replicas in separate Availability Zones you can also increase database availability.

Aurora Endpoints

You connect to your DB Cluster using any one of the following endpoints:

**Cluster Endpoint** – Each DB Cluster will have a cluster endpoint which then connects you to the primary instances of the DB Cluster.  Here you can perform both read and write functions.  Note that the primary instance has its own endpoint and is different from a cluster endpoint in that the cluster endpoint points to the current primary instance.  Thus if the primary instance fails and a new primary instance is created, the cluster endpoint then connects to it.

Therefore, for high availability, **it is always recommended to connect to the cluster endpoint.  This ensures applications failover during a primary endpoint failure.**

**Reader Endpoint** – Aurora DB Clusters also have a reader endpoint which connects you to Aurora Replicas.  The reader endpoint enables you to load balance client requests to access your database replicas in a cluster.  Note that if the primary DB instance fails and one of the read replicas that you are connected to gets promoted; then the connection is dropped.

You can use the reader endpoint to provide high availability for your read-only queries from your DB cluster**. You can place multiple Aurora Replicas in different Availability Zones and then connect to the reader endpoint for your read workload**.

* **NOTE:** The reader endpoint only load-balances connections to the Aurora Replicas in a DB cluster. If you want to load-balance queries to distribute the read workload for a cluster, you will need to manage that in your application

**Instance Endpoint**– The primary instances and read replicas also have their own individual endpoints.  Instance endpoints will not have the *cluster-*included in the DNS name of the endpoint.  Before connecting to an instance using the instance endpoint, consider using the cluster endpoint or the reader endpoint for the DB cluster to provide high availability.

Key Points:

* The minimum storage is 10GB. Based on your database usage, your Amazon Aurora storage will automatically grow, up to 64 TB, in 10GB increments with no impact to database performance. You do not have provision storage in advance.  Your database volume is divided into 10GB segments spread across many disks. Each 10GB chunk of your **database volume is replicated six ways, across the three availability zones.**
* With regards to compute resources, you can scale up to 32 vCPUs and 244 GiB Memory
* Amazon Aurora automatically maintains **6 copies of your data across 3 Availability Zones and so that gives you 2 copies of your data in each Availability Zone. It will automatically attempt to recover your database in a healthy AZ with no data loss.**
* You can restore DB Snapshot or perform a point-in-time restore operation to a new instance. Note that the latest restorable time for a point-in-time restore operation can be up to 5 minutes in the past.
* Aurora recovery time takes seconds in most cases because there is no need to replay logs due to the failover options
* Amazon Aurora supports two kinds of replicas. You can create up to 15 Aurora Replicas and up to 5 SQL Replicas. **Aurora replicas offer automatic failover** when compared to the MySQL replicas.
* **You can set up a cross-region Aurora Replica**
* You can add Aurora Replicas in the cluster that will share the same underlying storage as the cross-region replica.
* You can promote your cross-region replica to be the new primary from the RDS console. Note that the cross-region replication will stop once you initiate the promotion process.
* You can assign a promotion priority tier to each instance on your cluster. If the primary instance fails, Amazon RDS will promote the replica with the highest priority to the primary. If there is contention between 2 or more replicas in the same priority tier, then Amazon RDS will promote the replica that is the same size as the primary instance
* All Amazon Aurora DB Instances must be created in a VPC
* Self-healing
  + Scans for errors on data blocks and disks