AWS RDS PostgreSQL vs Aurora PostgreSQL

AWS offers two managed PostgreSQL database options: Amazon RDS for PostgreSQL and Amazon Aurora PostgreSQL-Compatible Edition. Both are excellent choices, but they have different features, performance characteristics, and use cases.

1. Architecture

Amazon RDS for PostgreSQL:

* Traditional architecture.
* Primary instance with optional read replicas.
* Standard storage options (GP2, GP3, etc.).

Amazon Aurora PostgreSQL-Compatible:

* Designed for cloud with a distributed, fault-tolerant, self-healing storage system.
* Decouples compute and storage.
* Provides high availability with up to 15 low-latency read replicas.
* Storage is automatically scaled up to 128 TB.

2. Performance

Amazon RDS for PostgreSQL:

* Performance is comparable to a traditional PostgreSQL database.
* Good for standard workloads.
* Storage and IOPS need to be provisioned in advance.

Amazon Aurora PostgreSQL-Compatible:

* Up to 5 times faster than standard PostgreSQL.
* Built for high throughput and low latency.
* Automatically adjusts to workload demands.
* Uses a distributed storage system designed for high performance.

3. Scalability

Amazon RDS for PostgreSQL:

* Vertical scaling by resizing instances.
* Horizontal scaling with read replicas (up to 5 replicas).
* Manual intervention required for scaling.

Amazon Aurora PostgreSQL-Compatible:

* Horizontal scaling with up to 15 read replicas.
* Automatic failover and load balancing.
* Storage scales automatically.

4. Availability and Durability

Amazon RDS for PostgreSQL:

* Multi-AZ deployments provide automated failover and increased availability.
* Snapshots for backups.

Amazon Aurora PostgreSQL-Compatible:

* Multi-AZ architecture is built-in with no performance degradation.
* Data is replicated six ways across three Availability Zones.
* Continuous backup to Amazon S3.

5. Maintenance and Management

Amazon RDS for PostgreSQL:

* Managed service with automated backups, patching, and upgrades.
* Manual intervention required for some administrative tasks.

Amazon Aurora PostgreSQL-Compatible:

* Fully managed with automated backups, patching, and upgrades.
* Advanced monitoring and diagnostics.

6. Cost

Amazon RDS for PostgreSQL:

* Typically cheaper for small to medium-sized databases.
* Costs are based on instance size, storage, and IOPS.

Amazon Aurora PostgreSQL-Compatible:

* Higher cost due to advanced features and performance.
* Costs include compute instances and storage (which scales automatically).

7. Use Cases

Amazon RDS for PostgreSQL:

* Suitable for most traditional PostgreSQL use cases.
* Ideal for applications that require standard PostgreSQL features and performance.
* Good for development, testing, and production workloads that do not require extreme performance or scalability.

Amazon Aurora PostgreSQL-Compatible:

* Best for applications that need high performance, scalability, and availability.
* Ideal for large-scale applications, high-traffic websites, and mission-critical systems.
* Suitable for workloads that require automatic scaling and high availability.

**Detailed breakdown of the pricing aspects for both services:**

1. Instance Pricing

Amazon RDS for PostgreSQL:

* Instance Types: Wide range of instance types (e.g., db.t3, db.m6g, db.r6g, etc.).
* Pricing: Charged per hour based on the instance type and size. Smaller instances are cheaper, larger instances are more expensive.

Examples:

db.t3.micro: ~$0.017/hour

db.m6g.large: ~$0.091/hour

db.r6g.xlarge: ~$0.306/hour

Amazon Aurora PostgreSQL-Compatible:

* Instance Types: Similar instance types as RDS but specifically for Aurora (e.g., db.r5, db.t3, db.r6g, etc.).
* Pricing: Charged per hour, generally higher than RDS due to additional performance and features.

Examples:

db.t3.medium: ~$0.068/hour

db.r5.large: ~$0.24/hour

db.r6g.xlarge: ~$0.345/hour

2. Storage Pricing

Amazon RDS for PostgreSQL:

* Storage Types: General Purpose (SSD), Provisioned IOPS (SSD), and Magnetic.
* Pricing:

General Purpose (SSD): ~$0.115 per GB-month

Provisioned IOPS (SSD): ~$0.125 per GB-month plus ~$0.10 per provisioned IOPS-month

Magnetic: ~$0.10 per GB-month

Amazon Aurora PostgreSQL-Compatible:

* Storage: Automatically scales in 10GB increments up to 128TB.
* Pricing:

$0.10 per GB-month for storage

$0.20 per million I/O requests

3. Backup Storage Pricing

Amazon RDS for PostgreSQL:

* Backup Storage: Included up to the size of your provisioned database storage for automated backups.
* Additional Backup Storage: ~$0.095 per GB-month for additional backup storage.

Amazon Aurora PostgreSQL-Compatible:

* Backup Storage: Included up to 100% of your database storage for free.
* Additional Backup Storage: ~$0.021 per GB-month beyond the free allocation.

4. Data Transfer Pricing

Amazon RDS for PostgreSQL and Amazon Aurora PostgreSQL-Compatible:

* Inbound Data Transfer: Free.
* Outbound Data Transfer: Charged per GB beyond the AWS Free Tier limits (e.g., $0.09 per GB for the first 10TB per month).

5. High Availability (Multi-AZ) Pricing

Amazon RDS for PostgreSQL:

* Multi-AZ Deployment: Additional cost for the standby instance (same instance type as primary).
* Pricing: Approximately double the cost of a single instance for multi-AZ deployments.

Amazon Aurora PostgreSQL-Compatible:

* High Availability: Built-in with no additional cost for storage redundancy across three Availability Zones.
* Read Replicas: Charged per replica instance.

6. Snapshots and Storage Costs

Amazon RDS for PostgreSQL:

* Snapshots: Charged for storage used by snapshots.
* Pricing: ~$0.095 per GB-month for snapshot storage.

Amazon Aurora PostgreSQL-Compatible:

* Snapshots: Charged for storage used by snapshots.
* Pricing: ~$0.021 per GB-month for snapshot storage.