

AWS re:Invent

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DAT304-R

Optimize your Amazon Aurora resources to reduce costs

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Agenda

- Amazon Aurora cost model
- Aurora cost components
- How to monitor and optimize Aurora I/O cost
- Tools for cost observability and optimization

Aurora cost model (pay as you go)

Use what you need, pay for what you use

Traditional cost model

- Provision for peak usage
- Pay for peak usage regardless of actual use

Aurora cost model

- Flexibility to provision exactly what you need
- Only pay for what you use
- Storage and read replicas can scale automatically
- In case of Aurora Serverless, compute can scale automatically
- Aurora decouples storage and compute, and they are charged individually

Aurora cost components

Primary cost components

Compute

- Instance type and size (provisioned)
 - Example: db.r6g.large
- Aurora capacity units (serverless)

Storage

- Storage volume size
- IOPS consumed (read and write)

Additional cost components

Backup

- Automated backups
- Manual snapshots

Data transfer

- Network utilization for data coming in and going out

Additional cost components

Advanced Aurora features

- Global database
- Backtrack
- Machine learning (ML) integration
- Parallel query
- Snapshot export Amazon S3
- Database activity streams

Pay as you use

- Features follow the same pay-as-you-use cost model
- Charged for resources consumed

Compute cost (provisioned)

- Simple hourly pricing
- Pay as you go

Provisioned example

- Instance type: db.r6g.xlarge
- Instance active: 10 days (240 hours)*
- Price per hour (US-East): \$0.519
- You will be charged: $240 \times \$0.519 = \124.56

*Assuming instance was shutdown after 10 days

Compute cost (serverless)

- Auto-scaling configuration, automatically adjusts compute capacity
- Scales compute capacity on demand (up and down)

Serverless example

- Aurora provisioned (db.r6g.2xlarge/64 GB) = \$1.038/hours * 730 hours/month = **\$757.74**
- Serverless v2 = \$0.12/ACU per hour (**32 ACU** * **30 hours** + **4 ACU** * **700 hours**) = **\$451.2**
- Serverless v2 = \$0.12/ACU per hour (**32 ACU** * **150 hours** + **4 ACU** * **580 hours**) = **\$854.40**

Storage cost

- Storage consumption is billed in per GB-month increments
- Storage and I/O costs are decoupled and charged separately
- Storage grows and shrinks automatically*
- No pre-provisioning of storage, grows in 10 GB increments

Example

- Region: US-East-1
- Initial DB size: 100 GB
- Daily growth: 30 GB
- GB month: $(100*30 + \underbrace{30*29}_{\text{Day 2}} + \dots + \underbrace{30*1}_{\text{Day 30}})/30 = 390$
- Cost per GB month: \$0.10
- Total cost for the month: $390 * \$0.10 = \39

*MySQL versions 1.23 and 2.09, 3.01, and above; Aurora PostgreSQL versions 3.30 and 2.6 and above



I/O cost components

- I/Os are input/output operations performed by the Aurora database engine against Aurora storage
- Every database page read operation counts as one I/O
- Each database page is 16 KB in Aurora MySQL-Compatible Edition and 8 KB in Aurora PostgreSQL-Compatible Edition
- Write I/Os are counted in 4 KB units

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Cost Explorer

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Rightsizing recommendations

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Cart 0

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Coverage report

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Save as...

Recent reports

New report

Nov 16, 2022 - Nov 20, 2022

Daily

Bar

Group by:

Service

Linked Account

Region

Instance Type

Usage Type

Resource

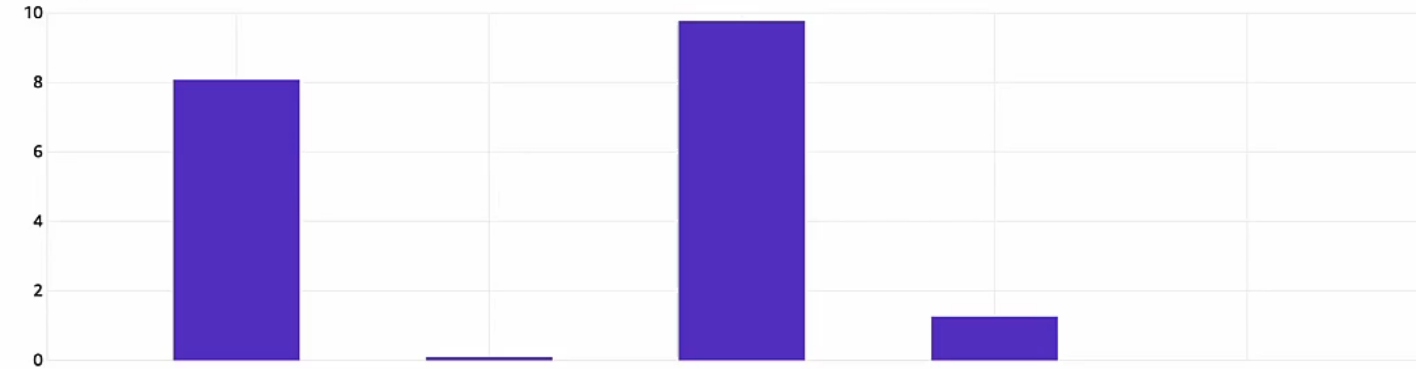
Cost Category

Tag

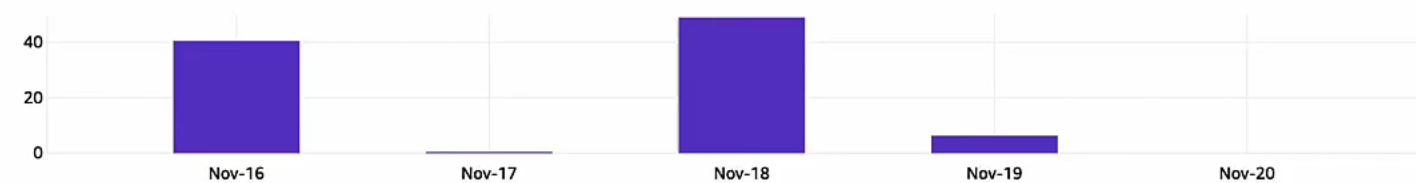
API Operation

More

Costs (\$)



Usage (IOs in millions)



Relational Database Service

Download CSV

Service	Nov-16*	Nov-17*	Nov-18*	Nov-19*	Nov-20*	
Total cost (\$)	8.08	0.09	9.77	1.26	0.00	
Total usage (IOs)	40,407,102.00	455,151.00	48,865,913.00	6,291,168.00	0.00	96
Relational Databa... (\$)	8.08	0.09	9.77	1.26		
Relational Databa... (I	40,407,102.00	455,151.00	48,865,913.00	6,291,168.00		96

▲ FILTERS

CLEAR ALL

Service

Include only

Relational Database Service

1

Linked Account

Include all

Region

Include only

US West (Oregon)

1

Instance Type

Include all

Usage Type

Include only

USW2-Aurora:StorageIOUsage (IOs)

1

Usage Type Group

Include all

Resource

Include all

Cost Category

Include all

Tag

Include all

More filters

▲ ADVANCED OPTIONS

i

Show costs as

Unblended costs

Include costs related to

☐ Show only untagged resources☐ Show only uncategorized resources☒ Show forecasted values

Other cost components

Backup and snapshot cost

- Automated backups and manual snapshots
- No charge for backups up to 100% of total Aurora database size
 - Example: if your database size is 100 GB and your backup size is 100 GB, you are not charged for backup
- If backup retention period is 1 day, you are not charged for backup
- Billed as per GB-month; average backup storage space used through the month is billed
 - Example: US-East \$0.021 per GB-month
- Manual snapshots that fall within the retention period are not charged separately during the period

Data transfer cost

- Data transfer cost is billed by GB data transferred in and out of an Aurora cluster
- Data transfer for in AWS Region cluster replication – no cost
- Data transfer between Amazon EC2 client and Aurora in same Availability Zone – no cost
- Data transfer between Aurora and Amazon EC2 in different Availability Zones and Regions is billed
- No charge for data transfer in from internet (VPN); tiered charges for outgoing data transfer

Aurora features, cost, and best practices

- Aurora global database
- Aurora fast clones
- Snapshot export
- Backtrack

Example

- Backtrack window: 10 hours
- Change records/hour: 10,000
- Billed amount per hour: $\$0.012 \times 100,000 / 1,000,000 = \$0.0012/\text{hr}$

Resources

- Cost explorer
 - <https://aws.amazon.com/aws-cost-management/aws-cost-explorer/>
- AWS Pricing Calculator
 - <https://calculator.aws/>
- Planning Aurora I/O cost
 - <https://aws.amazon.com/blogs/database/planning-i-o-in-amazon-aurora/>
- Planning Aurora I/O cost
 - <https://docs.aws.amazon.com/cur/latest/userguide/what-is-cur.html>
- Aurora pricing page
 - <https://aws.amazon.com/rds/aurora/pricing/>

Thank you!

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