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DIGITAL TALENT SCHOLARSHIP 2020





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AWS Database Services

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LIMITS

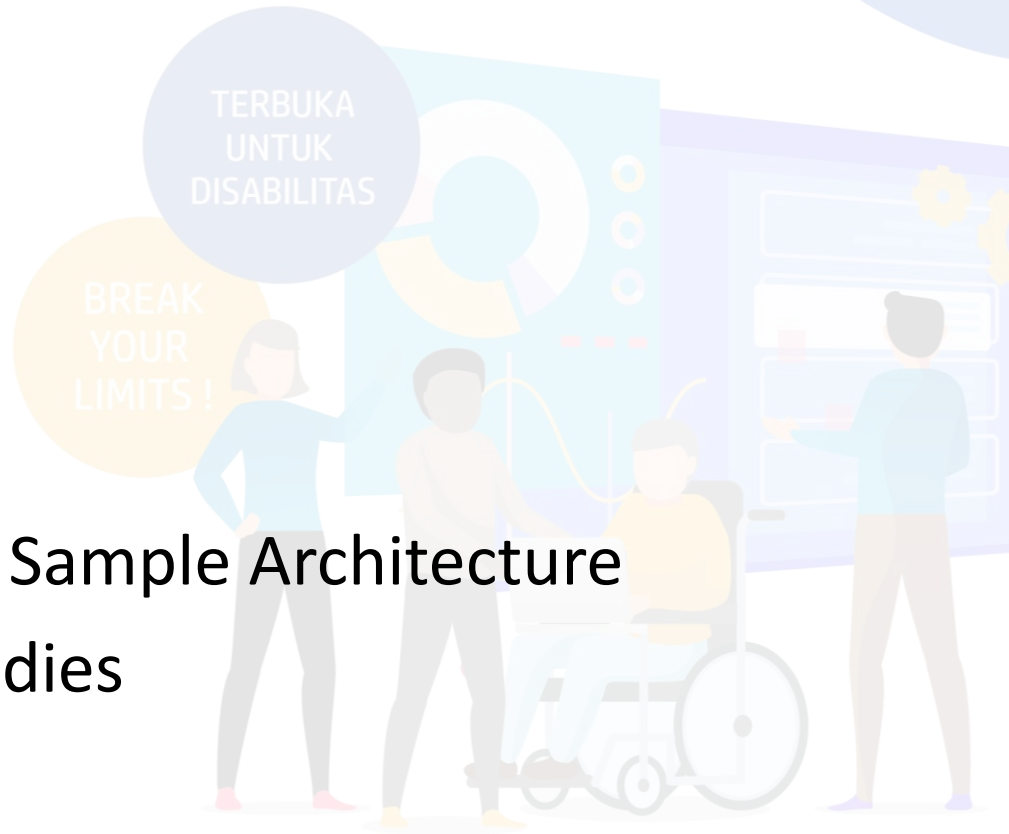




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Agenda

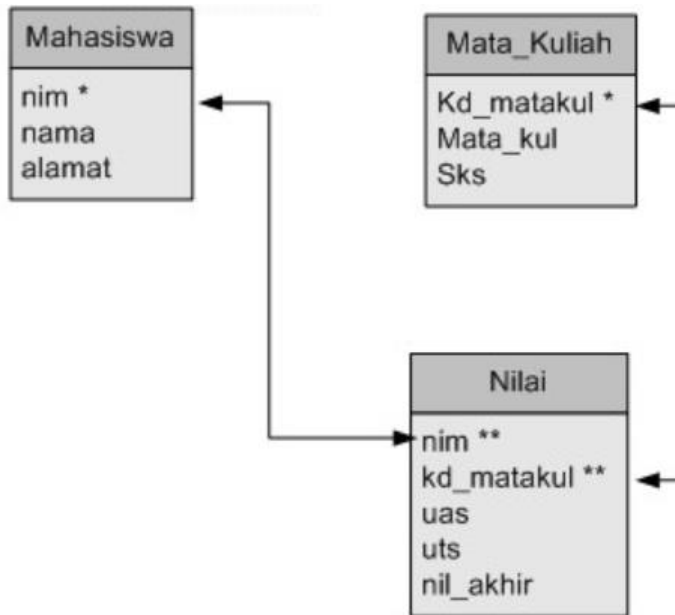
- What is database
- Database Type
- Database Instance
- AWS Database Services
- AWS Database Services Sample Architecture
- AWS Database Case Studies





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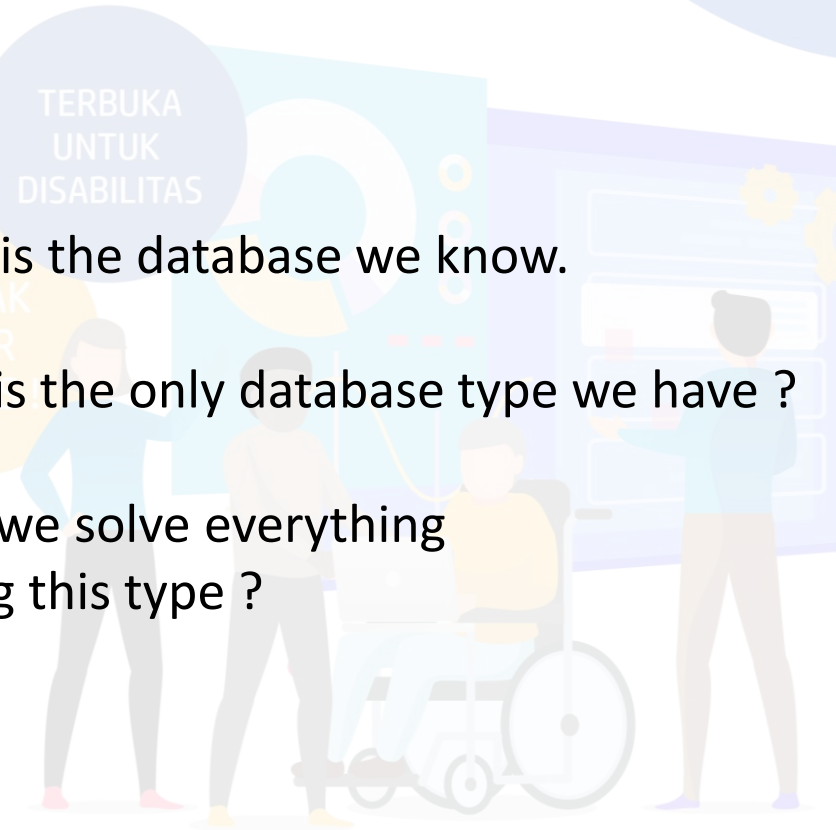
What is database ?



This is the database we know.

Is this the only database type we have ?

Can we solve everything using this type ?





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Lets think about Social Media



What type of database do they use ?

Are they use the same database type ?
Is it only about complexity ?

How you connect with thousands
other people that you don't know ?

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How about Online Games ?



What type of database do they use ?

Are they use the same relational database ?

How you play with thousands other gamers online ? Do they create relation from one user to others ?

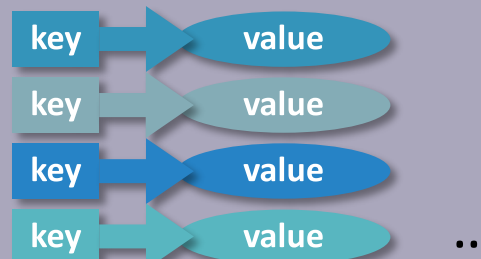
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SQL Databases and NoSQL Databases

	SQL	NoSQL												
Data storage	Rows and columns	Key-value, document, graph												
Schemas	Fixed	Dynamic												
Querying	Using SQL	Focused on collection of documents												
Scalability	Vertical	Horizontal												
Example	<table><tr><th>ISBN</th><th>Title</th><th>Author</th><th>Format</th></tr><tr><td>3111111223439</td><td>Withering Depths</td><td>Tark, Frank</td><td>Paperback</td></tr><tr><td>3122222223439</td><td>Wily Willy</td><td>Felton, Maria</td><td>eBook</td></tr></table>	ISBN	Title	Author	Format	3111111223439	Withering Depths	Tark, Frank	Paperback	3122222223439	Wily Willy	Felton, Maria	eBook	
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SQL Databases and NoSQL Databases



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mongoDB®



Can you define which one SQL and NoSQL database ?



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Doing-It-Yourself vs. AWS Database Services



Databases on Amazon EC2

- Operating system access
- Need features of specific application



AWS Database Services

- Easy to set up, manage, maintain
- Push-button high availability
- Focus on performance
- Eliminate undifferentiated heavy lifting

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EC2 Instance as Database



Amazon
EC2

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```
[root@TecMint ~]# yum install MariaDB-server MariaDB-client
Loaded plugins: fastestmirror, langpacks, product-id, search-disabled-repos, subscription-manager, versionlock
This system is not registered with Subscription Management. You can use subscription-manager to register.
Loading mirror speeds from cached hostfile
 * base: centos.myfahim.com
 * epel: ftp.cuhk.edu.hk
 * extras: centos.myfahim.com
 * remi-safe: ftp.arnes.si
 * rpmforge: mirrors.neusoft.edu.cn
 * updates: centos.myfahim.com
Resolving Dependencies
--> Running transaction check
----> Package MariaDB-client.x86_64 0:10.1.21-1.el7.centos will be installed
----> Package MariaDB-server.x86_64 0:10.1.21-1.el7.centos will be installed
--> Finished Dependency Resolution
```

Dependencies Resolved

Package	Arch	Version
Installing:		
MariaDB-client	x86_64	10.1.21-1.el7.centos
MariaDB-server	x86_64	10.1.21-1.el7.centos

Transaction Summary

Install 2 Packages

Total download size: 140 M

Installed size: 604 M

Is this ok [y/d/N]:

```
MariaDB [(none)]> SELECT table_name AS "Table Name",
-> ROUND((((data_length + index_length) / 1024 / 1024), 2) AS "Size in (MB)"
-> FROM information_schema.TABLES
-> WHERE table_schema = "rcubemail"
-> ORDER BY (data_length + index_length) DESC;
```

Table Name	Size in (MB)
identities	0.05
session	0.03
users	0.03
cache_thread	0.03
contacts	0.03
searches	0.03
cache_messages	0.03
cache_shared	0.03
contactgroups	0.03
contactgroupmembers	0.03
cache	0.03
dictionary	0.03
cache_index	0.03
system	0.02

14 rows in set (0.00 sec)

MariaDB [(none)]>



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EC2 Instance as Database



**Amazon
EC2**

The challenge :

- How to upgrade your database to a new version ?
How long will it take, and what is the procedure ?
- How will you monitor your database ?
- If you run out of space, what should you do ?
- How to backup and restore your database ?
- How to scale your database ?
- Other

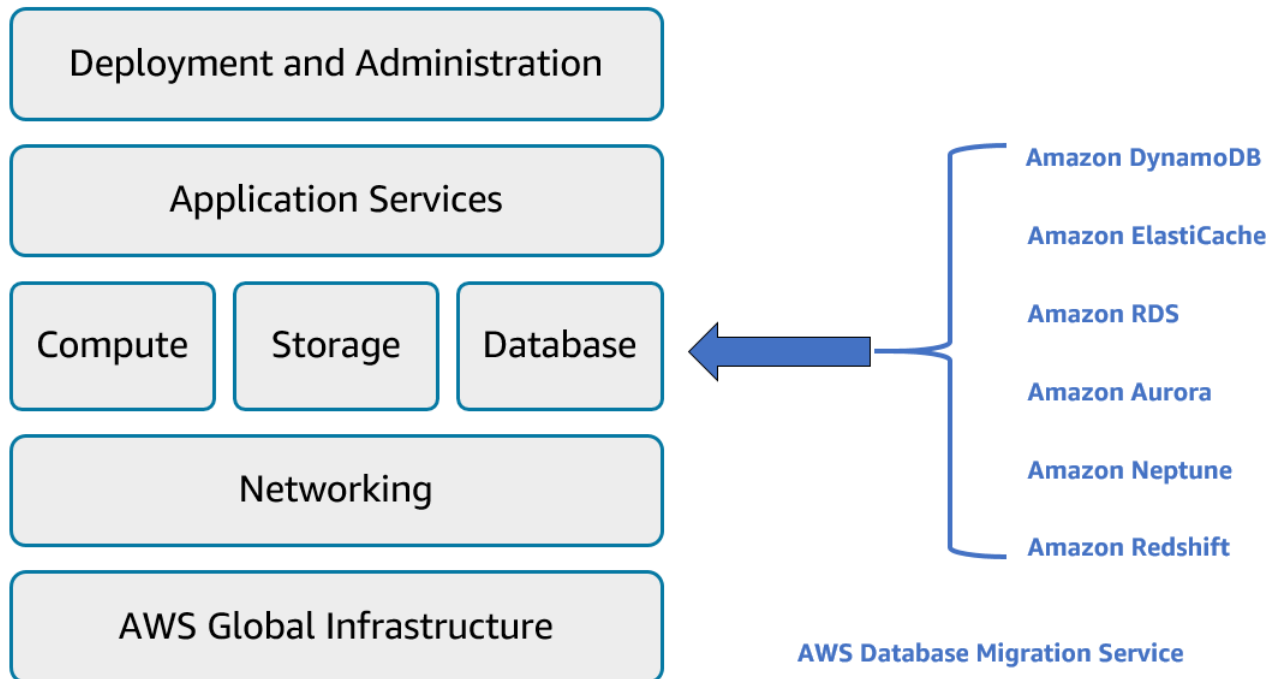
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AWS Database Service





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Choose the Best Tool for the Job

Service	Type	Description
Amazon RDS	Relational database	A managed relational database in the cloud that you can launch in minutes with just a few clicks
Amazon Aurora	Relational database	A fully managed MySQL and PostgreSQL-compatible relational database with the performance and availability of enterprise databases at 1/10th the cost
Amazon DynamoDB	NoSQL database	A Serverless, NoSQL database that delivers consistent single-digit millisecond latency at any scale
Amazon Redshift	Data warehouse	A fast, fully managed, petabyte-scale data warehouse at 1/10th the cost of traditional solutions
Amazon ElastiCache	In-memory data store	To deploy, operate, and scale an in-memory data store based on Memcached or Redis in the cloud
Amazon Neptune	Graph database	A fast, reliable, fully managed graph database to store and manage highly connected data sets
AWS Database Migration Service	Database migration	Help migrating your databases to AWS easily and inexpensively with minimal downtime



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What is Amazon Relational Database Service?

Easy to set up, operate, and scale

Amazon RDS Engines

Amazon
Aurora



PostgreSQL

MySQL®

MariaDB

ORACLE®

Microsoft®
SQL Server®



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Services

Resource Groups



Create database

Choose a database creation method [Info](#)

☒ Standard Create

You set all of the configuration options, including ones for availability, security, backups, and maintenance.

☐ Easy Create

Use recommended best-practice configuration options can be used when the database is created.

Engine options

Engine type [Info](#)

☒ Amazon Aurora



☐ MySQL



☐ MariaDB



☐ PostgreSQL



☐ Oracle



☐ Microsoft SQL Server



Services

Resource Groups



Database features

☒ One writer and multiple readers

Supports multiple reader instances connected to the same storage volume as a single writer instance. This is a good general-purpose option for most workloads.

☐ One writer and multiple readers - Parallel query

Improves the performance of analytic queries by pushing processing down to the Aurora storage layer. This is a good option for hybrid transactional/analytic workloads.

☐ Multiple writers

Supports multiple writer instances connected to the same storage volume. This is a good option for when continuous writer availability is required.

☐ Serverless

You specify the minimum and maximum amount of resources needed, and Aurora scales the capacity based on database load. This is a good option for intermittent or unpredictable workloads.

Templates

Choose a sample template to meet your use case.

☒ Production

Use defaults for high availability and fast, consistent performance.

☐ Dev/Test

This instance is intended for development use outside of a production environment.

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RDS > Databases > educate1

educate1

Modify

Summary

DB identifier
educate1

Role
Instance

Connectivity & security **Monitoring** Logs & events Configuration Maintenance & backups Tags

CloudWatch (17)

Legend: educate1

Q



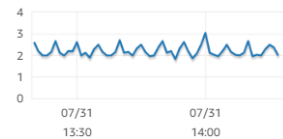
Add instance to compare

Monitoring ▼

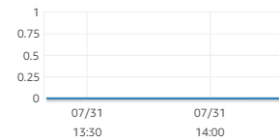
Last Hour ▼

< 1 2 3 > ⚙

CPU Utilization (Percent)



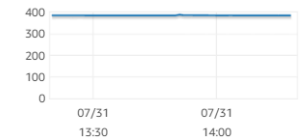
DB Connections (Count)



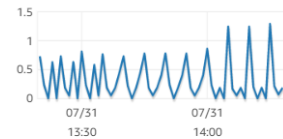
Free Storage Space (MB)



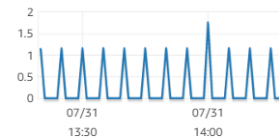
Freeable Memory (MB)



Write IOPS (Count/Second)



Read IOPS (Count/Second)





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What is Amazon DynamoDB?

Fast and flexible NoSQL database service for any scale



Fully managed



Low-latency queries



Fine-grained access control



Regional and global options






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Amazon DynamoDB Use Cases

-  Serverless web applications
-  Microservices data store
-  Mobile backends
-  Ad tech
-  Gaming
-  Internet of Things (IoT)

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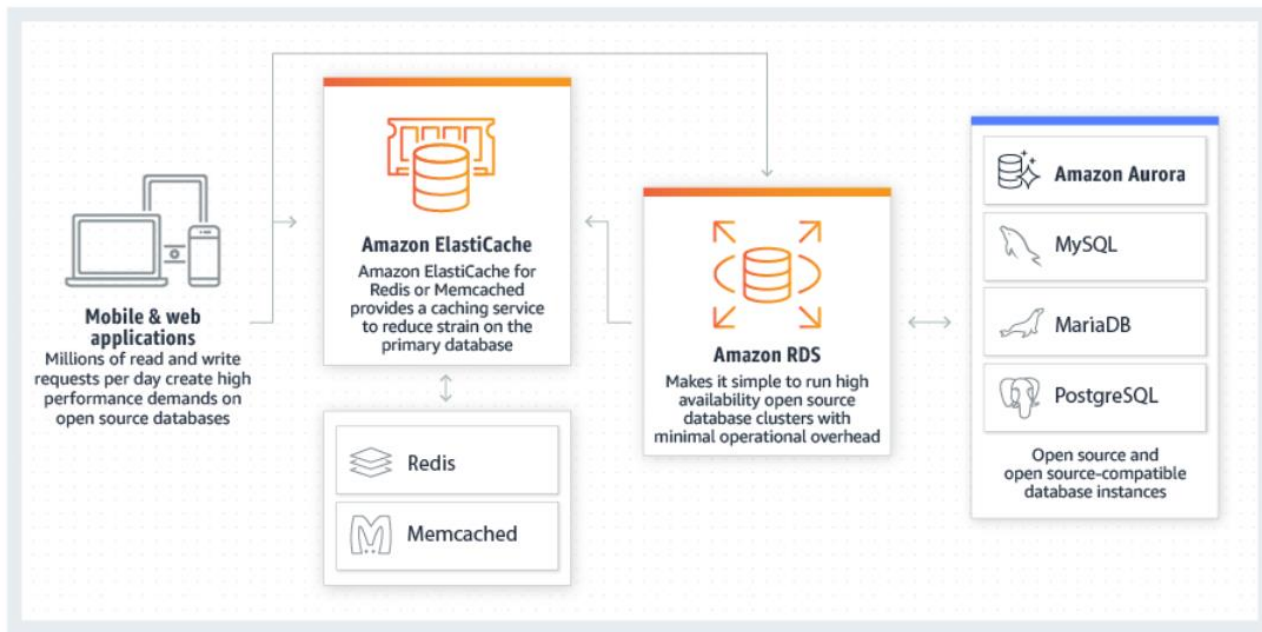




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AWS Database Services Sample Architecture

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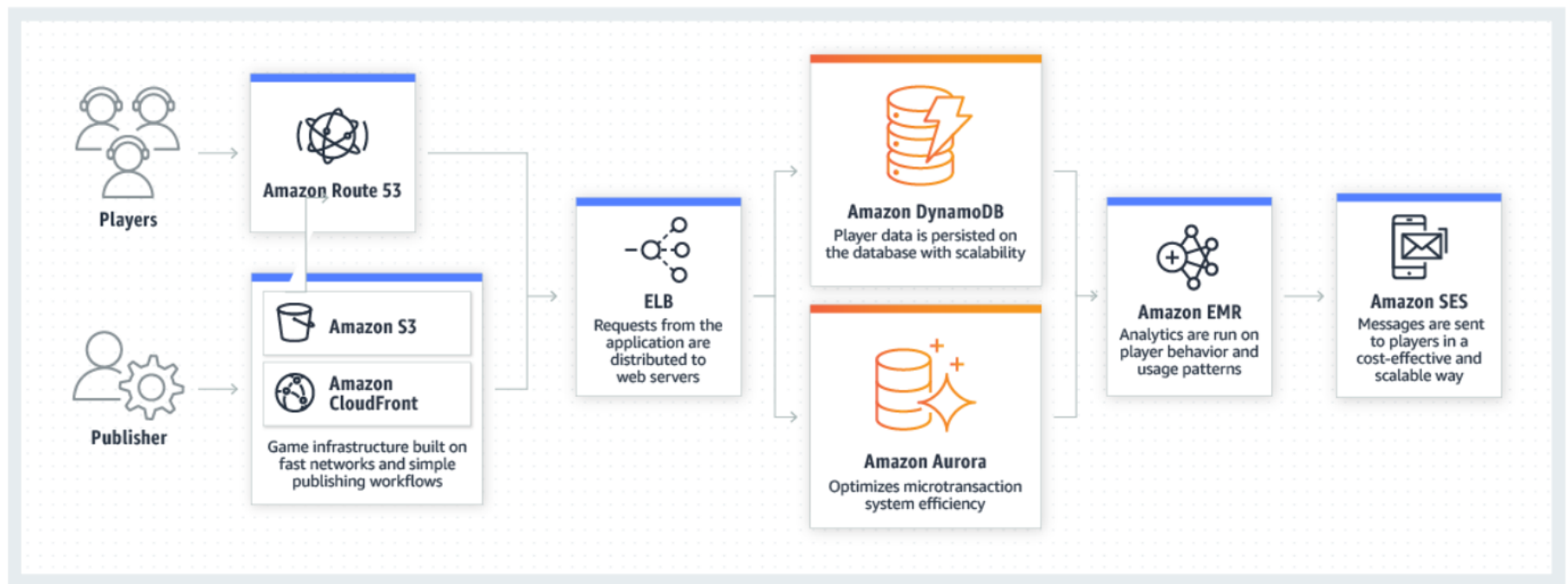




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AWS Database Services Sample Architecture

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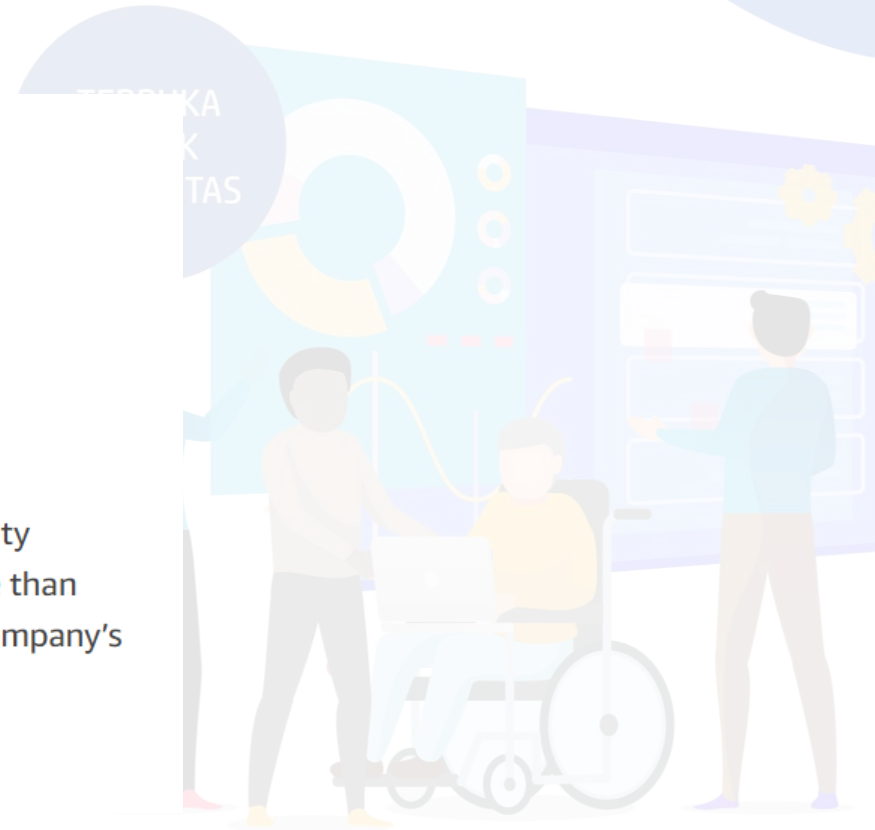
AWS Database Case Studies



Airbnb on AWS

Founded in 2008, San Francisco-based Airbnb is a community marketplace with over 7 million accommodations and more than 40,000 unique Experiences for customers to book on the company's website or through its iOS and Android applications.

[Customer Stories](#) | [Architecture](#) | [Additional Resources](#)









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