

- 1
- Introduction
- 1

RCU stands for Read Capacity Unit
- 2

It determines how much data your application can read from the database each second
- 3

To decide the read capacity of your DynamoDB table, you need to calculate the RCUs based on your application's data size, read frequency, and the type of read consistency you are using
- 4

This ensures your table can handle the required workload efficiently

- 1
- Item size
- 1

In DynamoDB, a item size refers to the unit of data measurement for read operations
- 2

Each read operation processes data in blocks of up to 4 KB, which is why a block size is counted in multiples of 4 KB (e.g., 4, 8, 12, 16 KB)
- 3

If your item size is more than 4 KB, it is rounded up to the nearest 4 KB block

1

6 KB item → Rounded up to 8 KB

2

10 KB item → Rounded up to 12 KB
- 4

Along with block size, the read consistency option (strongly consistent, eventually consistent, or transactional) determines the final RCU consumption

- 1
- Strongly Consistent Reads
- 1

Introduction

1

Strongly consistent reads always return the most up-to-date data

2

For strongly consistent reads, 1 RCU allows you to read 4 KB of data per second

3

If the data size exceeds 4 KB, DynamoDB calculates the RCUs based on multiples of 4 KB

4

Strongly consistent reads ensure you always get the most up-to-date data, However, they require more resources compared to eventually consistent reads

- 2
- Formula
- $$RCUs = \lceil \frac{\text{Item Size (in KB)}}{4} \rceil \times \text{Reads Per Second}$$

- 3
- Example Calculations
- 1

Scenario 1

1

Item Size

6 KB

2

Reads Per Second

50
- 2

Scenario 2

3

Calculation

$$RCUs = \lceil \frac{6}{4} \rceil \times 50 = 2 \times 50 = 100 RCUs$$

4

Explanation

1

The item size is 6 KB. Since DynamoDB processes reads in 4 KB blocks, the item size is rounded up to the next multiple of 4 KB

2

For 6 KB, it requires 2 blocks (4 KB + 4 KB)
- 3

Scenario 3

1

Item Size

6 KB

2

Reads Per Minute

3,000

1

Convert reads per minute to per second

2

Reads Per Second

$$\text{Reads Per Second} = \frac{3,000}{60} = 50 \text{ reads per second}$$

3

Calculation

$$RCUs = \lceil \frac{6}{4} \rceil \times 50 = 2 \times 50 = 100 RCUs$$

- 1
- Eventually consistent reads
- 1

Introduction

1

For eventually consistent reads, DynamoDB allows you to read data more efficiently by consuming half the RCUs compared to strongly consistent reads

2

In strongly consistent reads, 1 RCU can read 1 item of 4 KB per second, whereas in eventually consistent reads, 1 RCU can read 2 items of 4 KB per second

3

If the item size is 8 KB, eventually will consume 1 RCU to read it in 1 second, but for strongly consistent reads, will consume 2 RCUs for the 8 KB item
- 2

Formula

$$RCUs = \lceil \frac{\text{Item Size (in KB)}}{4} \rceil \times \frac{\text{Reads Per Second}}{2}$$
- 3

Example Calculations

1

Scenario 1

1

Item Size

4KB

2

Reads Per Second

100

3

Calculation

$$RCUs = \lceil \frac{4}{4} \rceil \times \frac{100}{2} = 1 \times 50 = 50 RCUs \text{ per second}$$

4

Explanation

Eventually consistent reads, 1 RCU can read 2 items of 4 KB per second. Therefore, for 100 reads per second of 4 KB data, 50 RCUs per second are required

2

Scenario 2

1

Item Size

6 KB

2

Reads Per Second

50

3

Calculation

$$RCUs = \lceil \frac{6}{4} \rceil \times \frac{50}{2} = 2 \times 25 = 50 RCUs \text{ per second}$$

4

Explanation

Eventual consistency allows 1 RCU to read up to 8 KB per second. For a 6 KB item, it consumes 1 RCU per read, and for 50 reads per second, the total RCUs required would be 50 RCUs per second

3

Scenario 3

1

Item Size

6 KB

2

Reads Per Minute

3,000

1

Convert reads per minute to per second

2

Reads Per Second

$$\text{Reads Per Second} = \frac{3,000}{60} = 50 \text{ reads per second}$$

3

Calculation

$$RCUs = \lceil \frac{6}{4} \rceil \times \frac{50}{2} = 2 \times 25 = 50 RCUs \text{ per second}$$

- 4
- Transactional reads
- 1

Introduction

For transactional reads, DynamoDB consumes double the RCUs compared to strongly consistent reads due to the extra consistency mechanisms it provides
- 2

Formula

$$RCUs = 2 \times \left[\left(\frac{\text{Item Size (in KB)}}{4} \right) \times \text{Reads Per Second} \right]$$

