AWS DynamoDB Programmatic Tutorial

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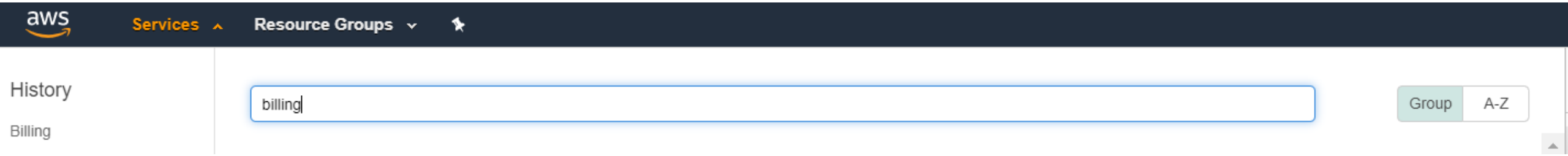
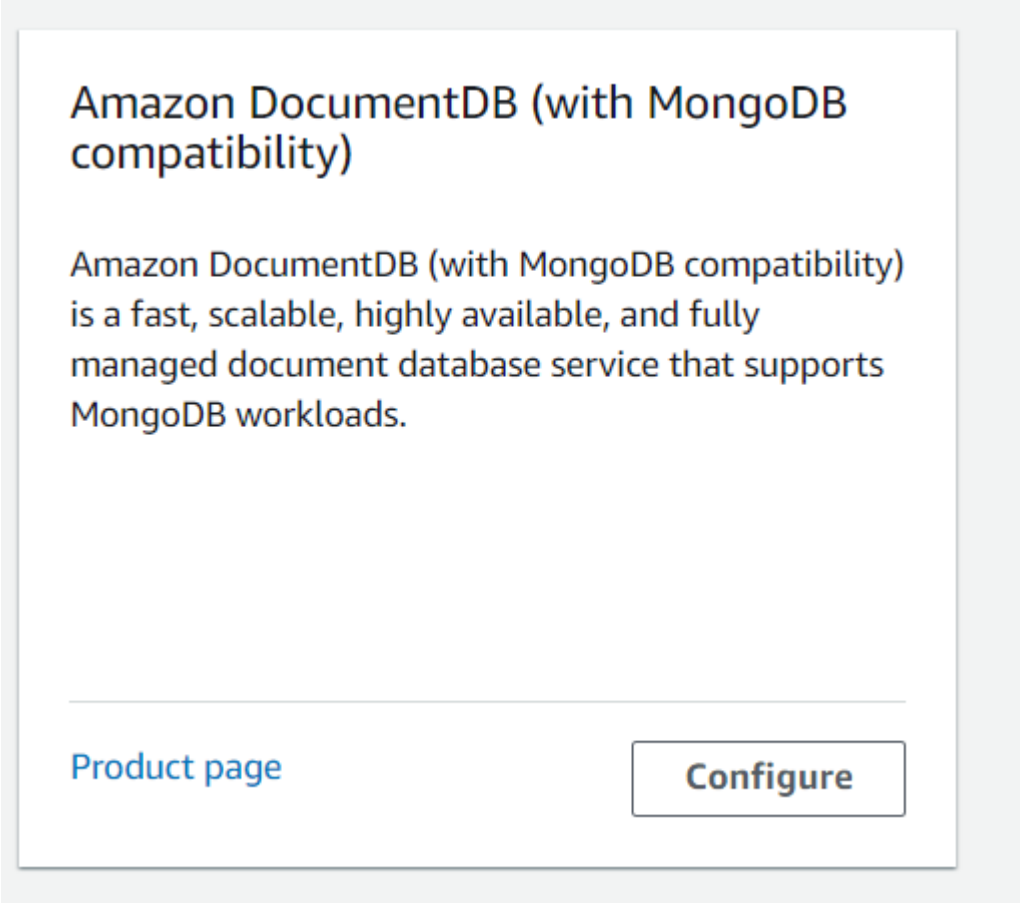
Reminder

- In the future, please check your billing whenever you run your AWS Java code.



AWS Pricing Calculator

- Estimate the amount of money by
  - https://calculator.aws/#/addService
  - A document-oriented database is designed for storing, retrieving, and managing document-oriented, or semi structured, information.
    - Document-oriented databases are one of the main categories of NoSQL databases.
  - You may select: “db r4.large” instance.



Database systems

- A **database** is an organized collection of data, generally stored and accessed electronically from a computer system
- A user's application can communicate with database to put and get data
- Data is accessed not on a file level, but e.g., on a record level
- Databases make it easy to search by an index for the data
- Customer can operate databases on Cloud instances
  - ➢ and some database services offer redundancy options
  - ➢ so the data will be replicated to a second instance to make a fault tolerance system.

Amazon DynamoDB

- **Amazon DynamoDB** is a fully managed proprietary NoSQL database service that supports key-value and document data structures and is offered by Amazon.com as part of the Amazon Web Services portfolio
- DynamoDB exposes a similar data model and derives its name from Dynamo, but has a different underlying implementation
- Dynamo had a multi-master design requiring the client to resolve version conflicts and DynamoDB uses synchronous replication across multiple data centers for high durability and availability
- DynamoDB was announced by Amazon CTO Werner Vogels on January 18, 2012, and is presented as an evolution of Amazon SimpleDB solution

Amazon DynamoDB (cont.)

- Amazon DynamoDB provides low-level API actions for
  - managing database tables and indexes,
  - and for creating, reading, updating and deleting data.

https://docs.aws.amazon.com/amazondynamodb/latest/APIReference/API_Operations.html

Tables in DynamoDB

- Tables are the containers for all items in a DynamoDB database
- Before you can add or remove data from DynamoDB, you must create a table.
- For each table, you must define:
  - A *name* for the table that is unique for your account and region.
  - A *primary key* for which every value must be unique; no two items in your table own the same primary key value.
    A primary key can be *simple*, consisting of a single partition (HASH) key, or *composite*, consisting of a partition and a sort (RANGE) key.

Amazon DynamoDB (cont.)

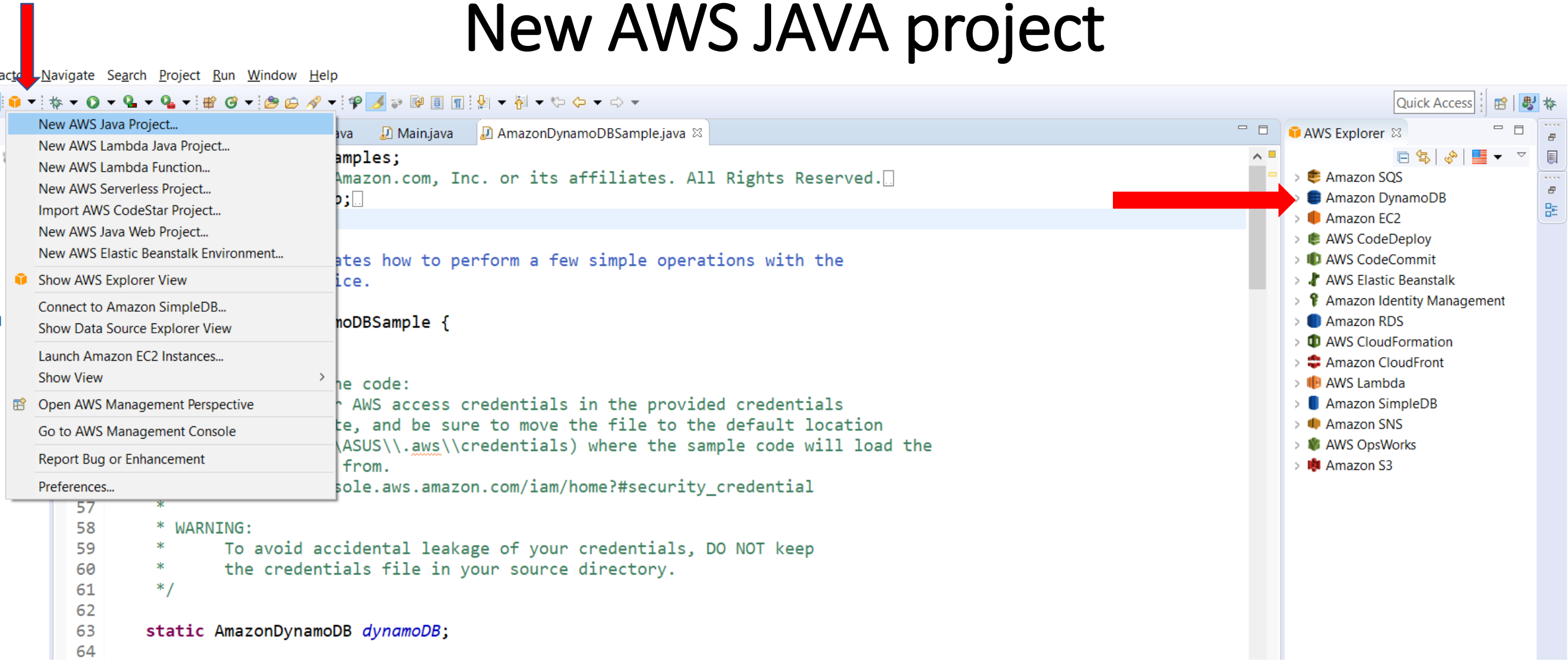
Amazon DynamoDB Stream:

- DynamoDB also provides API actions for accessing and processing stream records
- For example, *DescribeStream* can be called at a maximum rate of 10 times per second:

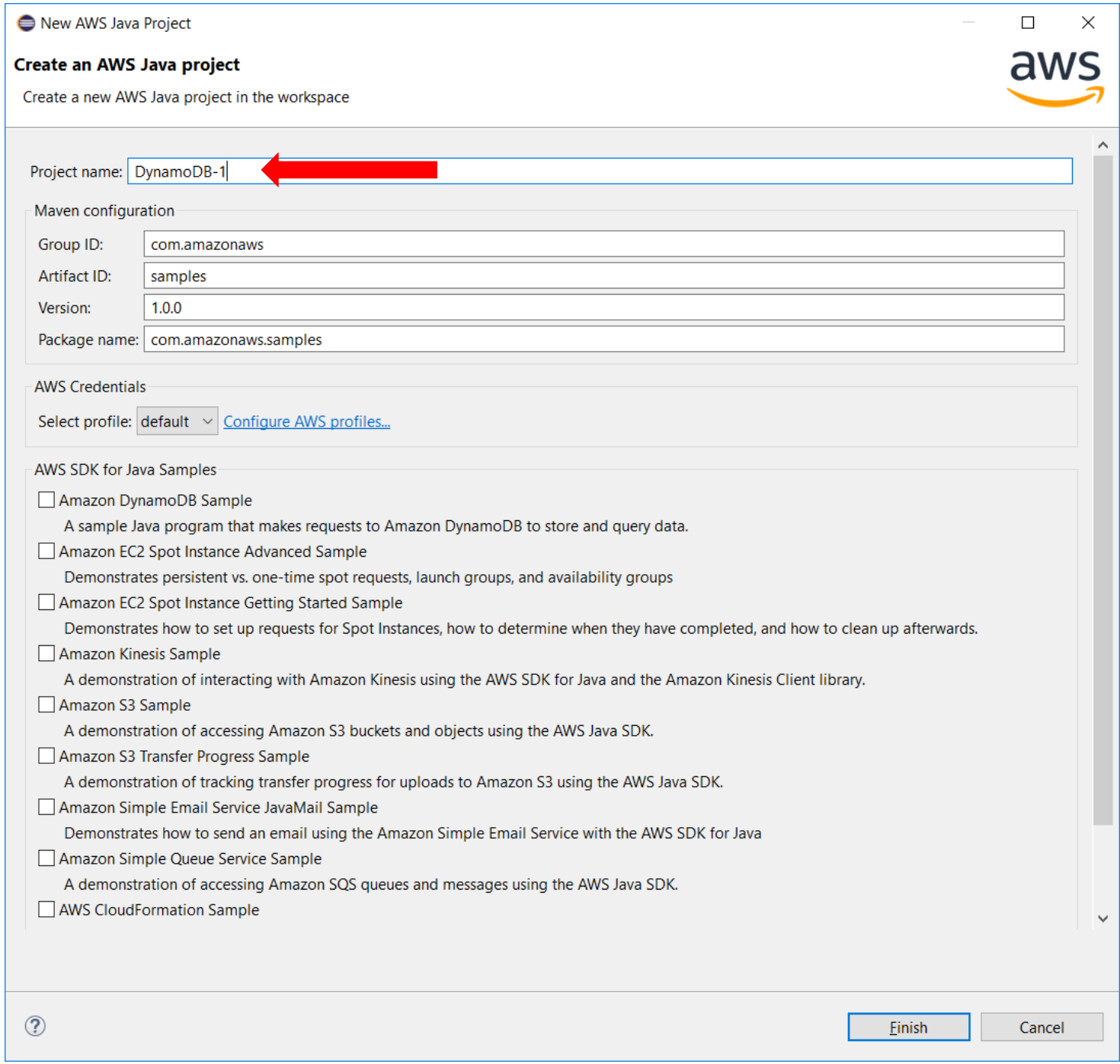
  - **Stream** has *StartingSequenceNumber*, and *EndingSequenceNumber*

  - Data stream size with the order of *KiloByte*
    - ✓ https://aws.amazon.com/streaming-data/

New AWS JAVA project



Creating AWS Java project and checking/configuring AWS Credential



Basic Amazon DynamoDB APIs

- Listing all of the tables associated with the current AWS account

```
import com.amazonaws.services.dynamodbv2.AmazonDynamoDB;
[...]

AmazonDynamoDB client = AmazonDynamoDBClientBuilder.standard().build();
ListTablesRequest request = new ListTablesRequest(); // ?
ListTablesResult response = client.listTables(request); // ?
```

- https://docs.aws.amazon.com/AWSJavaSDK/latest/javadoc/com/amazonaws/services/dynamodbv2/AmazonDynamoDB.html

Your Task?

- Create a Table
- Describe (get information about) a DynamoDB table
- Query a DynamoDB table
- List DynamoDB tables in a particular region
- Put an item in a DynamoDB table
  - Take the name of the table, a name (primary key value)
- Delete an item from a DynamoDB table
  - Take the table name and item (primary key: "Name") to delete.

A sample data for your task

- A selection of the key statistics on *mental health*
- It depicts rates of mental ill health of men and women
- The statistics about homelessness and mental health

https://www.mentalhealth.org.uk/statistics

Thanks for your attention