**Describe the following:**

**Sink and Source connectors**

* A sink exports data from Kafka topics and inserts into a MySQL database
* A source imports data from a MySQL database and produces into Kafka topics

**The applications/advantages of using Kafka Connectors with data storage**.

* Allows applications using Kafka to talk to existing applications that don’t use Kafka or don’t integrate with Kafka natively.
* E.g. a vendor stores all their sensor data in a mysql database but you want users to be able to subscribe to that data using Kafka.
* One could use Kafka Connectors to link two different applications that normally don’t “talk” to each other.

**How do Kafka connectors maintain availability?**

* Data is persisted in a database
* It has many partitions across many different distributed instance

**List the popular Kafka converters for values and the properties/advantages of each**

* Avro
  + Advantages
    - Default and well supported
    - Space efficient binary encoding
    - Uses Schemas to enforce message formats
  + Disadvantages
    - Not human readable
    - More difficult to implement compared to String/JSON when used for simple tasks
* Protobuf
  + Advantages
    - Space efficient binary encoding of data
    - Supported in many languages
    - Uses Schemas to enforce message formats
  + Disadvantages
    - More difficult to implement compared to String/JSON when used for simple tasks
* JSON
  + Advantages
    - Easy to implement
    - Supported natively by many databases
  + Disadvantages
    - High overhead (storage wise)

**What’s a Key-Value (KV) database?**

* A Key-Value database is a nonrelational database that uses key-value pairs to store data rather than the row-column structure of tables in a traditional relational database.
* Stores data in collections which are groups of fields which are similar to tables in relational databases.

**What are KV databases’ advantages and disadvantages?**

Advantages:

* KV databases are flexible
* Faster performance than relational databases because of the indexing
* Simple to implement

Disadvantages:

* Not structured
* Inability to do complex queries

List some popular KV databases.

* DynamoDB
* MongoDB

**List some possible applications that can be implemented by using the uploaded dataset.**

* Application that can predict appearance changes
* Obstacle detection and tracking
* Teach-and -repeat navigation systems

http://robots.engin.umich.edu/nclt/nclt.pdf