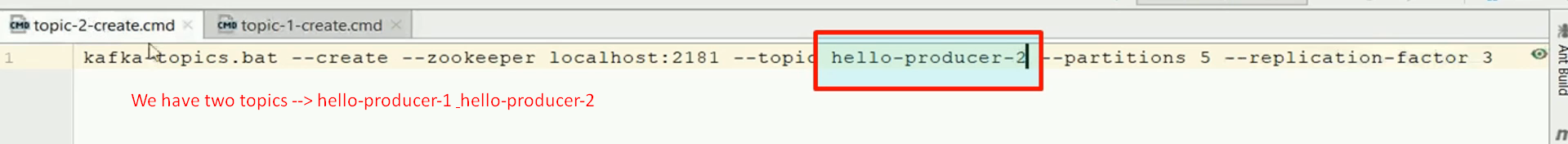
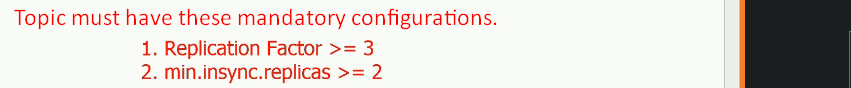
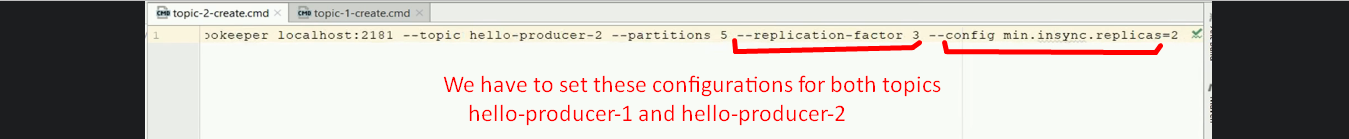
1. Text

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2. In the earlier lecture, we learnt about the idempotent producer.  
   There is advaned producer concept.  
   We call it as **Transactional Producer**.
3. 
4. The **Transactional Producer** goes one step ahead of **idempotent Producer** and provides the transactional guarantees.  
   That is an ability to write to several partitions atomically.  
   The atomicity has same the meaning here as in DB that is either all the msgs in the same transaction is committed or none of them are saved.
5. Diagram

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6. Let’s create an example to understand the implementation details of a transaction in Kafka Producer.
   1. 
   2. We’re going to create a transaction that would send msgs to both the topics.
   3. When we commit the transaction, the msgs will be delivered to these topics.
   4. If we abort or rollback, the msgs should not be sent to any of these topics.  
      That is what atomicity means.
   5. Implementing transactions requires **some mandatory topic level configurations**.
   6. 
   7.   
      Great!!! We’re all set from the topic perspective.
   8. Now these two topics can participate in a transaction.
   9. Text

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   10. To create a Transactional Producer, it is mandatory to set **ProducerConfig.TRANSACTION\_ID\_CONFIG** when creating KafkaProducer.
   11. Code can be found along with the notes named 🡺 04-transactional-producer-completed.zip or you can download from this lecture.
   12. Here there are two things to remember.
       1. When we set TRANSACTIONAL\_ID\_CONFIG, idempotent is automatically enabled as transaction depends on idempotent.
       2. TRANSACTIONAL\_ID\_CONFIG must be unique for each KafkaProducer instance.  
          It means we can’t run two or more Kafka Producers with same transaction id.  
          If we do so, one of those transactions will be aborted.   
          Actually, the **primary purpose of the transaction id** is to rollback the older unfinished transactions for the same transaction id in case of producer app bounces or restarts.  
          A picture containing shape

          Description automatically generated  
          Then you may be wondering how to scale?  
          I mean how do I run multiple instances of a producer to achieve horizontal scalability.  
          Well that is simple.  
          Each instance can set its own unique transaction id.  
          Text

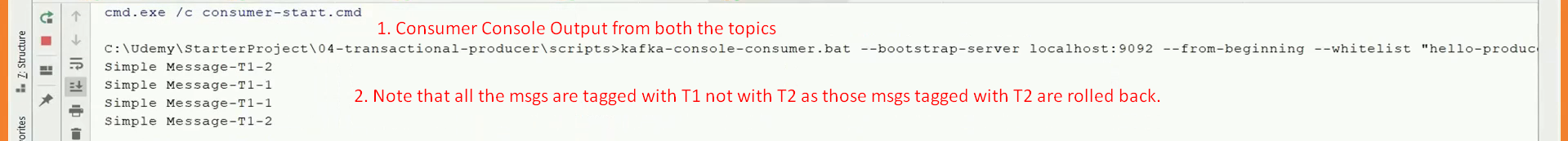
          Description automatically generated
   13. Implementing transaction in a Producer is 3-step process.
   14. **Step 01**: Initialize a transaction by calling **KafkaProducer.initTransactions()**;  
       This method performs the necessary checks to ensure that any other transaction initiated by previous instances of the same producer is closed.  
       That means if the previous producer app dies, the next instance guarantees that any unfinished transaction is either completed or aborted leaving the new instance in a clean state before resuming the work.  
       It also retrieves an internal producer id (as we discussed in Idempotent lecture) which is used by the Broker to implement Idempotent (along with msg seq#).  
       
   15. **Step 02**: Wrap all the send() API calls within the **KafkaProducer.beginTransaction() and KafkaProducer.commitTransaction()**;  
       All the msgs sent within the **KafkaProducer.beginTransaction() and KafkaProducer.commitTransaction()** will be part of the single transaction.  
       Text

       Description automatically generated with medium confidence  
       Let’s add code for rollback transaction.  
       Graphical user interface, text, application

       Description automatically generated  
         
       One more info before we run the code:  
       Graphical user interface, text, application, email

       Description automatically generated
   16. Graphical user interface, text

       Description automatically generated Graphical user interface, text, application, email

       Description automatically generated
   17. 
7. One final note about the transaction.
8. Graphical user interface, text, application

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9. In multi-threaded producer, you will call send() from different threads.  
   So, before you run any thread, create transaction then start all the threads then when all the threads are done, commit or rollback the transaction.  
   Like if main() is running 3 threads then main will create transaction and will run the 3 threads and all the threads will join the main() and when 3 threads are done, the main thread will either commit or rollback the transaction.