## Week 10 Assignment: Architectural Design Presentation

### Objective:

Design an architecture solution using the tools and technologies learned throughout this course to address a pressing financial industry problem.

#### **Scenario: Real-time Fraud Detection for a Global Bank**

A leading global bank is looking to enhance its fraud detection mechanisms due to an increasing number of fraudulent activities in recent times. These activities range from unauthorized credit card transactions to suspicious account activities that hint at money laundering.

Given the vast amount of daily transactions, the bank wants to achieve:

1. Real-time detection of potentially fraudulent transactions, alerting the user and bank authorities instantly.
2. Analysis of user behavior to identify unusual patterns or anomalies.
3. Automatic blocking of transactions based on certain high-risk factors.
4. Offering security notifications to users based on their transaction behavior and locations.
5. Ensure compliance with global banking regulations regarding money laundering and fraud detection.

### Assignment Instructions:

1. **Slide 1 (Problem Statement):**
   * Describe the pressing problem in the financial sector based on the scenario provided.
   * Outline the current challenges faced by the global bank.
2. **Slide 2 (Proposed Architecture - High Level):**
   * Showcase a high-level architecture diagram that encompasses the tools: HDFS, YARN, Hive, HBase, Spark, Kafka, Solr, and NiFi.
   * Briefly touch upon the role of each tool in the solution.
3. **Slide 3 (Data Flow and Real-time Analysis):**
   * Illustrate how data flows between the tools.
   * Elaborate on how real-time fraud detection will be achieved using Spark, the role of Kafka in real-time data streaming, and how NiFi aids in data ingestion.
4. **Slide 4 (Data Storage, Retrieval, and Advanced Analysis):**
   * Discuss the importance of HDFS, Hive, HBase, and Solr in the context of storing, analyzing, and retrieving vast amounts of transactional data.
   * Highlight how Solr aids in real-time search and monitoring capabilities, allowing for quicker response times.
5. **Slide 5 (Benefits and Conclusion):**
   * Sum up the advantages of the proposed solution in mitigating fraud risks.
   * Reflect on how this system will enhance customer trust, ensure compliance, and protect financial assets.
6. **Recording Your Presentation:** Utilize a screen recording tool to capture your presentation. Clearly articulate the problem, delve into your architectural design, and convincingly present the solution.

### Deliverables:

1. A PowerPoint deck consisting of the 5 slides (excluding the title and “Thank You” slide).
2. A video recording of yourself presenting the deck, which should be between 5-10 minutes long.

### Tips:

* Your proposed architecture should be technically viable considering the tools you’ve been taught.
* Highlight the standout features of each tool and why it’s indispensable to the architecture.
* Ensure your slides are clear, with relevant diagrams and a consistent flow.
* Rehearse your presentation for a coherent and confident delivery.