**Required Work**

This week does not include lecture or walkthrough videos. Instead, you will create a **three-slide presentation** and a **recorded video** explaining your solution.

**Submission Guidelines**

* Submit your work as a **single package** containing:
  + A **PowerPoint deck** with exactly 3 slides:
    1. Problem Statement
    2. Proposed Architecture
    3. Benefits and Conclusion
  + A **video recording** (5–10 minutes, face visible) presenting your solution.
* Your submission must:
  + Clearly explain the problem, your architecture, and its benefits.
  + Include diagrams and supporting details on the architecture slide.
  + Be professionally structured and easy to follow.
* This is a **master’s level course** – professionalism and clarity are expected. A well-structured presentation demonstrates both your technical ability and communication skills.

**Week 10 Assignment – Objectives and Points**

* **Objective 1 – Problem Statement Slide**: 15 pts
* **Objective 2 – Proposed Architecture Slide**: 25 pts
* **Objective 3 – Benefits and Conclusion Slide**: 15 pts
* **Objective 4 – Video Presentation (5–10 minutes, face on)**: 33 pts

**Total: 88 points**

## Week 10 Assignment: Architectural Design Presentation

### Objective: Real-World Big Data Architecture Challenge

### In this assignment, you will design a comprehensive big data architecture to solve a real-world problem for a global bank. This problem includes credit card fraud detection and ensuring compliance with anti-money laundering regulations. Key Focus Areas: 1. Addressing a critical challenge in the banking sector. 2. Designing a technically sound and scalable big data architecture. 3. Communicating the value of your solution through a video presentation.

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 (15 points)**  
   Begin by outlining the challenges the global bank faces in fraud detection and anti-money laundering measures. Provide context on why fraud is a critical issue and how it impacts financial institutions. Highlight the rising threats of credit card fraud and the importance of regulatory compliance in banking. This section lays the foundation for your solution.  
     
   Make sure to articulate the bank’s needs and goals clearly, as this understanding sets the stage for your architecture.
   * 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): (25 points)**
   * 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: Benefits and Conclusion (15 points)**  
   Conclude your presentation by summarizing the benefits of your proposed solution. Explain how it enhances fraud detection, improves compliance with regulations, and protects the bank's financial assets and reputation. Highlight key features such as scalability, reliability, and real-time capabilities.  
     
   Be prepared to discuss how your architecture aligns with the bank's objectives and why it's the best solution for their needs.
   * 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.

### Recording Your Video Presentation (33 points) As part of this assignment, you will create a video presentation with your Camera ON where you explain the architecture solution. This video is an opportunity to not only demonstrate your technical proficiency but also your ability to communicate effectively. Make sure your presentation is clear, concise, and professionally delivered. You are expected to confidently explain the problem, your proposed architecture, and its benefits, just as you would in a real-world scenario where you're presenting to executives.

### Deliverables:

1. A PowerPoint deck consisting of the 3 slides.
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.

For those unfamiliar with technical architectures (your slide 2), here’s an example:

