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Modules **Hadoop & Big Data**

MODULE 1 — INTRODUCTION TO BIG DATA

- **Objective: Understand Big Data concepts and challenges.**
- **Topics Covered**
- **What is Big Data**
- **5 V's of Big Data (Volume, Velocity, Variety, Veracity, Value)**
- **Traditional Data Processing vs Big Data**
- **Big Data Use Cases (Finance, Healthcare, E-commerce)**
- **Big Data Architecture Overview**

MODULE 2 — HADOOP OVERVIEW & ARCHITECTURE

- **Objective: Learn Hadoop ecosystem basics.**
- **Topics Covered**
- **Hadoop History & Evolution**
- **Hadoop Ecosystem Components**
- **Hadoop Architecture**
- **Master & Slave Nodes**
- **Hadoop Cluster Setup (Overview)**
- **Hadoop Modes (Standalone, Pseudo-distributed, Fully Distributed)**

Modules **Hadoop & Big Data**

MODULE 3 — HDFS (HADOOP DISTRIBUTED FILE SYSTEM)

- **Objective: Understand distributed storage.**
- **Topics Covered**
- **HDFS Architecture**
- **NameNode, DataNode, Secondary NameNode**
- **Block Size & Replication**
- **HDFS Read & Write Process**
- **HDFS Commands**
- **Data Ingestion into HDFS**

MODULE 4 — YARN (YET ANOTHER RESOURCE NEGOTIATOR)

- **Objective: Manage cluster resources.**
- **Topics Covered**
- **YARN Architecture**
- **Resource Manager**
- **Node Manager**
- **Application Master**
- **Job Scheduling**
- **YARN Monitoring**

Modules **Hadoop & Big Data**

MODULE 5 — MAPREDUCE FRAMEWORK

- **Objective: Learn batch processing with Hadoop.**
- **Topics Covered**
- **MapReduce Programming Model**
- **Mapper & Reducer**
- **Combiner & Partitioner**
- **Input & Output Formats**
- **MapReduce Workflow**
- **Writing Simple MapReduce Programs**

MODULE 6 — HIVE (DATA WAREHOUSING)

- **Objective: Query Big Data using SQL-like language.**
- **Topics Covered**
- **Hive Architecture**
- **HiveQL Basics**
- **Managed & External Tables**
- **Partitioning & Bucketing**
- **Hive Functions**
- **Hive Optimization Techniques**

MODULE 7 — PIG (DATA PROCESSING LANGUAGE)

- **Objective: Perform data transformations.**
- **Topics Covered**
- **Pig Architecture**
- **Pig Latin Basics**
- **Data Types**
- **Operators & Functions**
- **User Defined Functions (UDFs)**
- **Pig vs Hive**

MODULE 8 — HBASE (NOSQL DATABASE)

- **Objective: Store and retrieve real-time Big Data.**
- **Topics Covered**
- **HBase Architecture**
- **HBase Data Model**
- **HBase Tables & Column Families**
- **CRUD Operations**
- **HBase Shell Commands**
- **HBase Use Cases**

Modules **Hadoop & Big Data**

MODULE 9 — SQOOP (DATA TRANSFER TOOL)

- **Objective:** Transfer data between RDBMS and Hadoop.
- **Topics Covered**
- **Sqoop Architecture**
- **Import & Export Data**
- **Sqoop with MySQL/Oracle**
- **Incremental Imports**
- **Performance Tuning**
- **Sqoop Jobs**

MODULE 10 — FLUME (DATA INGESTION)

- **Objective:** Ingest streaming data into Hadoop.
- **Topics Covered**
- **Flume Architecture**
- **Source, Channel & Sink**
- **Flume Configuration**
- **Log Data Ingestion**
- **Flume Monitoring**
- **Flume vs Kafka (Intro)**

MODULE 11 — SPARK (INTRODUCTION)

- **Objective:** Learn fast Big Data processing.
- **Topics Covered**
- **Apache Spark Overview**
- **Spark Architecture**
- **RDD Concepts**
- **Spark SQL**
- **Spark vs MapReduce**
- **Spark Use Cases**

MODULE 12 — BIG DATA SECURITY & ADMINISTRATION

- **Objective:** Understand security and admin basics.
- **Topics Covered**
- **Hadoop Security Overview**
- **Kerberos Authentication (Intro)**
- **Data Access Control**
- **Cluster Monitoring**
- **Backup & Recovery**
- **Performance Tuning Basics**

MODULE 13 — REAL-TIME BIG DATA PROJECT

- **Objective: Apply concepts in practical scenarios.**
- **Project Includes**
 - ✓ **Data Ingestion using Sqoop/Flume**
 - ✓ **Storage in HDFS/HBase**
 - ✓ **Processing using Hive/Pig**
 - ✓ **Reporting & Analysis**
 - ✓ **Real-time Case Study**



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