

NOSQL DATABASES (Professional Elective -II)

Course Code: 19CS1154

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Pre-requisites: Basic Knowledge about DBMS

Course Outcomes: At the end of the Course the student will be able to

- CO1: Explain and compare different types of NoSQL Databases
- CO2: Compare and contrast RDBMS with different NoSQL databases.
- CO3: Demonstrate the detailed architecture and performance tune of Document-oriented NoSQL databases.
- CO4: Explain performance tune of Key-Value Pair NoSQL databases.
- CO5: Apply NoSQL development tools on different types of NoSQL Databases.

UNIT-I

(10 Lectures)

Overview and History of NoSQL Databases. Definition of the Four Types of NoSQL Database, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The Emergence of NoSQL, Key Points.

Learning Outcomes: At the end of the unit, the Student will be able to

1. explain different types of NoSQL Databases.(L2)
2. illustrate the Emergence of NoSQL.(L2)
3. outline the application and Integration of NoSQL Databases.(L2)

UNIT-II

(10 Lectures)

Comparison of relational databases to new NoSQL stores, MongoDB, Cassandra, HBASE, Neo4j use and deployment, Application, RDBMS approach, Challenges NoSQL approach, Key-Value and Document Data Models, Column-Family Stores, Aggregate-Oriented Databases. Replication and sharding, MapReduce on databases. Distribution Models, Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication.

Learning Outcomes: At the end of the unit, the Student will be able to

1. compare Relational Database to NoSQL stores (L2)
2. explain the challenges of NoSQL approach .(L2)
3. explain Sharding and Replication.(L2)

UNIT-III

(12 Lectures)

NoSQL Key/Value databases using MongoDB, Document Databases, Document oriented Database Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, E-Commerce Applications, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure.

Learning Outcomes: At the end of the unit the student will be able to

1. outline the features of key/Value databases.(L2)
2. explain the Document-oriented NoSQL databases. (L2)
3. illustrate E-commerce applications and different aggregate structures. (L2)

UNIT-IV

(10 Lectures)

Column- oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, Column-Family Data Store Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage.

Learning Outcomes: At the end of the unit the student will be able to

- 1.define column oriented NoSql Database.(L1)
- 2.explain the Column-Family Data Store Features.(L2)
- 3.summarize Event Logging, Content Management Systems.(L2)

UNIT-V

(10 Lectures)

NoSQL Key/Value databases using Riak, Key-Value Databases,Key-Value Store, Key-Value Store Features, Consistency, Transactions, Query Features, Structure of Data, Scaling, Suitable Use Cases, Storing Session Information, User Profiles, Preferences, Shopping Cart Data,Relationships among Data, Multi operation Transactions, Query by Data, Operations by Sets. Graph NoSQL databases using Neo4, NoSQL database development tools and programming languages, Graph Databases, Graph Database. Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases.

Learning Outcomes:At the end of the unit the student will be able to

- 1.explain NoSQL Key/Value databases using riak.(L2)
- 2.apply Nosql Development tools with suitable usecase. (L3)
- 3.explain the detailed architecture and performance tune of Graph NoSQL databases.(L2)

TEXT BOOKS:

1. Sadalage, P. & Fowler, *NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence*, Wiley Publications, 1st Edition, 2019.

WEB REFERENCES:

1. <https://www.ibm.com/cloud/learn/nosql-databases>
2. <https://www.coursera.org/lecture/nosql-databases/introduction-to-nosql-VdRNp>
3. <https://www.geeksforgeeks.org/introduction-to-nosql/>
4. <https://www.javatpoint.com/nosql-databa>