



MANIPAL UNIVERSITY JAIPUR

(University under Section 2(f) of the UGC Act)

NOSQL DATABASES

MCA Seminar Report Presentation

Submitted By: VIKRAM RAJ

in partial fulfillment for the award of the degree of
MASTER OF COMPUTER APPLICATIONS

Centre for Distance and Online Education

Manipal University, Jaipur

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Q1. Why I chose NoSQL Databases?

- ✓ Related to my specialization (Open Source DB)
- ✓ High demand in industry for NoSQL skills
- ✓ Curiosity about scalable and flexible database solutions

Key Point: Rapidly growing unstructured data volumes.

Motivation:

- ✓ NoSQL enables modern data-driven applications



Q2. Objectives vs Literature Review

Objectives

- Study NoSQL types, architecture, and applications

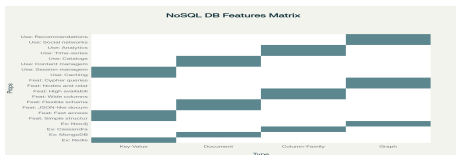
Literature Review

- Research on MongoDB, Cassandra, Redis, Neo4j

Objective: Understand scalability, schema flexibility vs RDBMS

Literature: NoSQL better for big data, unstructured/varied data models

Key Point: Literature validates shift from traditional DBs to NoSQL.



NoSQL Feature

Relational Database VS NoSQL

DatabaseTown.com

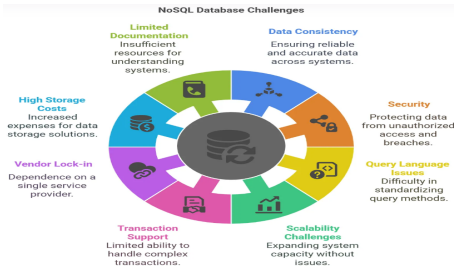
Criteria	Relational Database	NoSQL Database
Data Model	Tabular (tables with rows and columns)	Varies (document, key-value, column-family, graph)
Schema	Fixed schema	Flexible, schema-less
Scalability	Vertical scalability is easier	Horizontal scalability is easier
ACID Compliance	Typically fully ACID compliant	Varies (some offer eventual consistency)
Query Language	SQL (standardized)	Database-specific languages or APIs

RDBMS vs. NoSQL

Q3. Challenges Faced

Struggles:

- 🏠 Vast landscape of NoSQL technologies
- 🏠 Complex distributed architectures
- 🏠 Technical jargon in research
- 🏠 Limited time for deep-dives
- 🏠 Steep learning curve for hands-on work








NoSQL DataBase Challenge




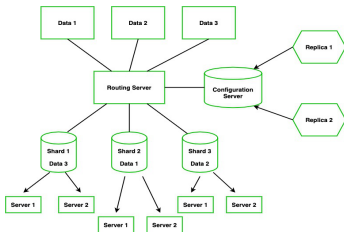
Research Of NoSQL

Q4. Key Findings

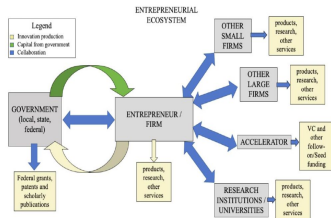
-  NoSQL offers high scalability, flexibility, performance and speed
-  MongoDB: Document store; strong for JSON-like data
-  Cassandra: Write-heavy distributed apps
-  Redis: Ultra-fast in-memory caching
-  Neo4j: Powerful for graph & relationship-based queries

Major finding:

-  Sharding & replication deliver high availability.



Sharding & Replication



NEO4j Ecosystem

Q5. Bridging the Gap with Industry

- ✓ Study goals match real-world NoSQL adoption
- ✓ Netflix (Cassandra), Facebook (Graph DB), Amazon (DynamoDB)
- ✓ Rapid scaling and dynamic data needs are met by NoSQL
- ✓ Industry trends confirm academic insights
- ✓ Lifelong learning and upskilling

Guest Lectures and Workshops:

- ✓ Invite industry professionals to share their expertise and insights with students.


Train students in valuable soft skills:

- ✓ communication, teamwork, leadership.

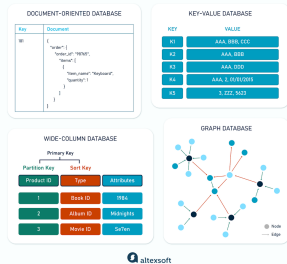


Q6. Industry Alignment Continued

Standardization and Best Practices:

-  Integrate industry-recognized standards and best practices into the curriculum.
- Real-world distributed systems use NoSQL for scalability
- Examples: Microservices, big data analytics, IoT apps
- Industry/academia: Close overlap in use-cases

NoSQL Database Types



altessoft

NoSQL Database Type

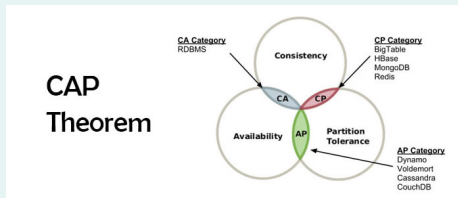
Benefits of Employee Training and Development



Tranning & Development

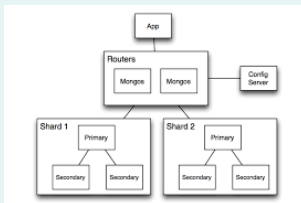
Q7. CAP Theorem & Sharding (NoSQL)

CAP Theorem in NoSQL



Consistency, Availability, and Partition Tolerance.

MongoDB Sharding



The client application sends a query to a mongos instance.

Q8. Conclusion & Future Scope

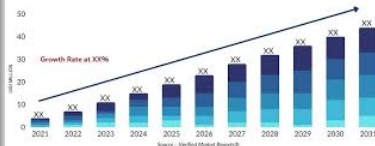
Conclusion:

- ✓ NoSQL revolutionizes scalable data storage
- ✓ Enables agile, high-volume applications
- ✓ Industry-wide adoption, from startups to tech giants

Future Scope:

- ✓ Integration with AI/ML for smarter data handling
- ✓ More robust consistency models (hybrid DBs)
- ✓ As data explodes, NoSQL will be vital for organizations to gain insights.

Global NoSQL Software Market Size and Scope



GLOBAL MARKET SIZE.

Summary Conclusion

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CONCLUSION.



Thank You!

Thank you for your time and attention.
I'm grateful for this opportunity to share my work
& Looking forward to your insights and suggestions.

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