EduLearn Database Backup Document

1. Introduction

This document outlines the database backup strategy for the EduLearn application. The primary objective is to ensure that MongoDB databases can be restored in the event of data corruption, accidental deletion, or infrastructure failure. All backup operations are automated and monitored for completeness and accuracy.

2. Database Information

- **Database Type**: MongoDB
- **Deployment**: Azure Kubernetes Service (AKS)
- **Storage**: MongoDB Atlas

3. Backup Strategy

The backup strategy includes regular automated backups and periodic manual backups. The approach ensures minimal data loss and quick recovery in the event of a failure.

- **Backup Method**: MongoDB Atlas built-in backup feature.
- **Backup Type**: Full backups for the entire database, incremental backups between full backups.

4. Backup Frequency

- **Full Backups**: Once daily at 2:00 AM UTC.
- **Incremental Backups**: Every hour to capture changes made between full backups.
- **Manual Backups**: Before major system changes (e.g., database schema updates, system migrations).

5. Backup Retention Policy

- **Daily Full Backups**: Retained for 30 days.
- **Incremental Backups**: Retained for 7 days.
- **Manual Backups**: Retained for 90 days or as specified.

6. Storage Location

All backups are securely stored in:

- **Primary Location**: Azure Blob Storage
- **Secondary Location**: MongoDB Atlas Backup Storage (cross-region replication enabled).

7. Encryption and Security

- **Encryption**: Backups are encrypted at rest and in transit using AES-256 encryption.
- **Access Control**: Backup storage is restricted to authorized personnel only, and access is logged for auditing purposes.

8. Monitoring and Alerts

The backup process is monitored through:

- **Automated Alerts**: Triggered if a backup fails or is incomplete.
- **Dashboard Monitoring**: Azure Monitor and MongoDB Atlas provide real-time monitoring of backup status and history.

9. Restoration Process

In the event of a failure or data loss, the following steps outline the restoration process:

1. **Initiate Restore**: Access MongoDB Atlas to select the desired backup (either full or incremental).
2. **Select Restore Point**: Choose the appropriate backup based on the required timestamp.
3. **Restoration Type**:
    - **Full Restore**: Overwrite the entire database with the selected backup.
    - **Point-in-Time Restore**: Use the incremental backups to restore the database to a specific time.
4. **Validate Restoration**: Ensure all critical data is restored correctly and test the integrity of the restored database.
5. **Application Restart**: Restart services on AKS to ensure they are functioning with the restored database.

10. Roles and Responsibilities

- **Database Admins**: Responsible for ensuring backup jobs run successfully, monitoring backup status, and initiating recovery if needed.
- **DevOps Team**: Maintains Azure Blob storage for backups and monitors cross-region replication.
- **Developers**: Responsible for testing restored environments during backup validation.

11. Testing and Validation

Regular restoration drills will be conducted:

- **Frequency**: Every quarter.
- **Scope**: Test the restore process to a staging environment to verify that data can be accurately recovered.
- **Post-Test**: Document any issues and ensure improvements are made for future restorations.

12. Backup Costs

- **Storage Costs**: Azure Blob storage and MongoDB Atlas backup costs should be monitored. Usage thresholds are in place to alert when nearing budget limits.
- **Optimization**: Use backup compression techniques to reduce storage costs where feasible.

13. Contacts

For issues related to database backups or restoration, the following teams can be contacted:

- **Database Admins**: dbadmins@example.com
- **DevOps Team**: devops@example.com
- **Support Team**: support@example.com