

AWS Case Study

Optimising AWS Cloud
Infrastructure for Scalable
Learning Management
Systems for
Pearson.com

Customer Overview

Pearson is a global leader in educational content, technology, and assessment solutions, delivering digital learning experiences to millions of students worldwide. To support its growing digital platform for its Learning Management System (LMS), Pearson needed a scalable, cost-effective, and secure AWS infrastructure.

Customer Challenges

1. Scalability & Performance Issues

- The LMS required high availability to support peak traffic periods, such as exam seasons and course enrolments.
- Performance bottlenecks caused slow load times and downtime, impacting user experience.

2. Cost Management & Optimization

- Unoptimized cloud resource usage led to high operational costs.
- Difficulty in tracking cloud spend across multiple departments and environments.

3. Security & Compliance

- Needed to ensure GDPR and FERPA compliance for handling student data securely.
- Lack of centralised monitoring and security alerts for real-time threat detection.

4. Automated Configuration & Management

- Managing OS patching, system updates, and backups manually was time-consuming and prone to errors.

CloudiQS Solutions

CloudiQS implemented a well-architected AWS infrastructure to enhance scalability, cost efficiency, security, and automation.

1. Scalability & Performance Optimization

• Auto Scaling and Load Balancing

- Deployed Amazon EC2 Auto Scaling to handle traffic spikes dynamically.
- Configured AWS Elastic Load Balancer (ELB) to distribute traffic efficiently.

- **Database Optimization**

- Migrated to Amazon RDS Multi-AZ (PostgreSQL) for high availability.
- Used Amazon ElastiCache (Redis) to improve database query response time.

- **Content Delivery & Speed Enhancements**

- Integrated Amazon CloudFront (CDN) to cache learning materials and reduce latency for global users.

2. Cost Management & Optimization

- **AWS Cost Explorer & Budgets**

- Implemented cost tracking and chargeback models using AWS Cost Allocation Tags.

- **Compute Savings Plans & Reserved Instances**

- Leveraged AWS Savings Plans to optimise EC2 and RDS costs.

- **S3 Intelligent-Tiering**

- Automated cost savings for storage by transitioning rarely accessed content to S3 Infrequent Access (IA).

3. Security & Compliance Enhancements

- **AWS Security Hub & GuardDuty**

- Enabled real-time threat detection and compliance monitoring.

- **IAM & MFA Policies**

- Applied least privilege access using AWS IAM policies and Multi-Factor Authentication (MFA).

- **Automated Backups & Disaster Recovery**

- Configured AWS Backup and cross-region replication for data protection and compliance.

4. Automated Configuration & Management

- **AWS Systems Manager (SSM)**

- Automated OS patching, configuration updates, and inventory management.

- **AWS Lambda & AWS Step Functions**

- Set up automated workflows for scaling, security remediation, and system alerts.
- **Terraform & CloudFormation**
 - Used Infrastructure-as-Code (IaC) to deploy consistent and repeatable cloud environments.

Architecture Review

- **Compute** Amazon EC2 Auto Scaling, AWS Lambda
- **Networking** AWS CloudFront, AWS ELB, AWS Transit Gateway
- **Storage** Amazon S3 Intelligent-Tiering, AWS Backup
- **Database** Amazon RDS Multi-AZ (PostgreSQL), Amazon ElastiCache
- **Security** AWS Security Hub, AWS GuardDuty, AWS IAM
- **Cost Optimization** AWS Cost Explorer, AWS Savings Plans
- **Monitoring** Amazon CloudWatch, AWS X-Ray

Results

99.99% Uptime Achieved

- Improved LMS availability with Auto Scaling & RDS Multi-AZ.

Performance Boost of 40%

- Faster content delivery via CloudFront & ElastiCache.

30% Cost Reduction

- Optimized compute & storage costs via Savings Plans & S3 Intelligent-Tiering.

Automated Security & Compliance

- 24/7 monitoring & threat detection using AWS Security Hub & GuardDuty.

Operational Efficiency Increased by 50%

- Automated OS patching, infrastructure updates, and backups using AWS Systems Manager & Terraform.

Conclusion

CloudiQS successfully helped Pearson modernise its cloud infrastructure, ensuring scalability, cost efficiency, and security compliance while improving user experience and operational efficiency.