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Assignment Title:

Assignment 2: Project Management & Innovation.

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PROJECT TOPIC: INNOVATION IN CLOUD COMPUTING

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Introduction

Cloud computing has revolutionised how organisations deploy and manage their IT infrastructure. This project focuses on implementing serverless architecture as an innovative solution to reduce operational costs and improve scalability for small to medium enterprises. Serverless computing represents a paradigm shift where cloud providers manage infrastructure automatically, allowing developers to focus solely on code [1]. The project aims to design and deploy a serverless web application platform that demonstrates cost efficiency, automatic scaling, and reduced maintenance overhead compared to traditional server-based architectures.

Task 1: Project Management

Q1. Project Management and Planning

Project scope

The project primarily focuses on investigating “Innovation in Cloud Computing,” specifically automation, container orchestration, serverless computing, and intelligent scaling.

Project aim: To design and implement a scalable serverless web application platform demonstrating innovation in cloud computing through automated infrastructure management and cost optimisation.

Project objectives.

- To design a scalable cloud architecture model
- To research the emerging innovations in cloud computing
- To analyse the modern deployment and service model
- To present implementation and testing feasibility, and documentation

Proposed Solution to the Project Aim/Idea/Problem

Development of a multi-tier serverless environment to help create a conceptual cloud architecture that integrates.

- Serverless computing, which helps with the cost of active operation of the project
- Auto scaling and performance monitoring
- Container orchestration, like Kubernetes, helps to maintain the scalability of the project
- Visualised integration of IaaS, PaaS, and SaaS

The solution addresses current problems like:

- Lack of automation in scaling
- Increasing cloud resource waste
- High dependency on manual configuration

Required Technologies and Resources

Resource / Tool	Purpose
AWS/ AZURE	Cloud Platform
Kubernetes	Orchestration and scalability
Virtual Machines, Storage	Infrastructure testing
Lucid chart / Draw.io	Diagram creation
MS Project / Excel	Gantt chart and scheduling
Serverless Framework	Automated function execution

Table 1: Required Technologies and Resources

Project Schedule and Timeline, and Gantt Chart

Start date: 15/12/2025

End date: 12/6/2026

Project Stage	Duration (Days)	Start Date	End Date
Topic selection and scope definition	10	15/12/2025	26/12/2025
Empirical evaluation	30	29/12/2025	06/02/2026
Requirement and resource planning	20	09/02/2026	06/03/2026
System design	25	09/03/2026	10/04/2026
Technology justification and innovation mapping	15	13/04/2026	01/05/2026
Documentation, review, and improvements	20	04/05/2026	29/05/2026
Submission and presentation	10	01/06/2026	12/06/2026

Table 2: Project timeline

	①	Name	Duration	Start	Finish	Predecessors
1		☐ Innovation in Cloud computing	130 days	15/12/25, 8:00 am	12/06/26, 5:00 pm	
2		Topic selection and scope definition	10 days	15/12/25, 8:00 am	26/12/25, 5:00 pm	
3		Empirical evaluation	30 days	29/12/25, 8:00 am	06/02/26, 5:00 pm	2
4		Requirement and resource identification	20 days	09/02/26, 8:00 am	06/03/26, 5:00 pm	3
5		System design	25 days	09/03/26, 8:00 am	10/04/26, 5:00 pm	4
6		Technology justification and selection	15 days	13/04/26, 8:00 am	01/05/26, 5:00 pm	5
7		Documentation, review, and approval	20 days	04/05/26, 8:00 am	29/05/26, 5:00 pm	6
8		Submission and presentation	10 days	01/06/26, 8:00 am	12/06/26, 5:00 pm	7

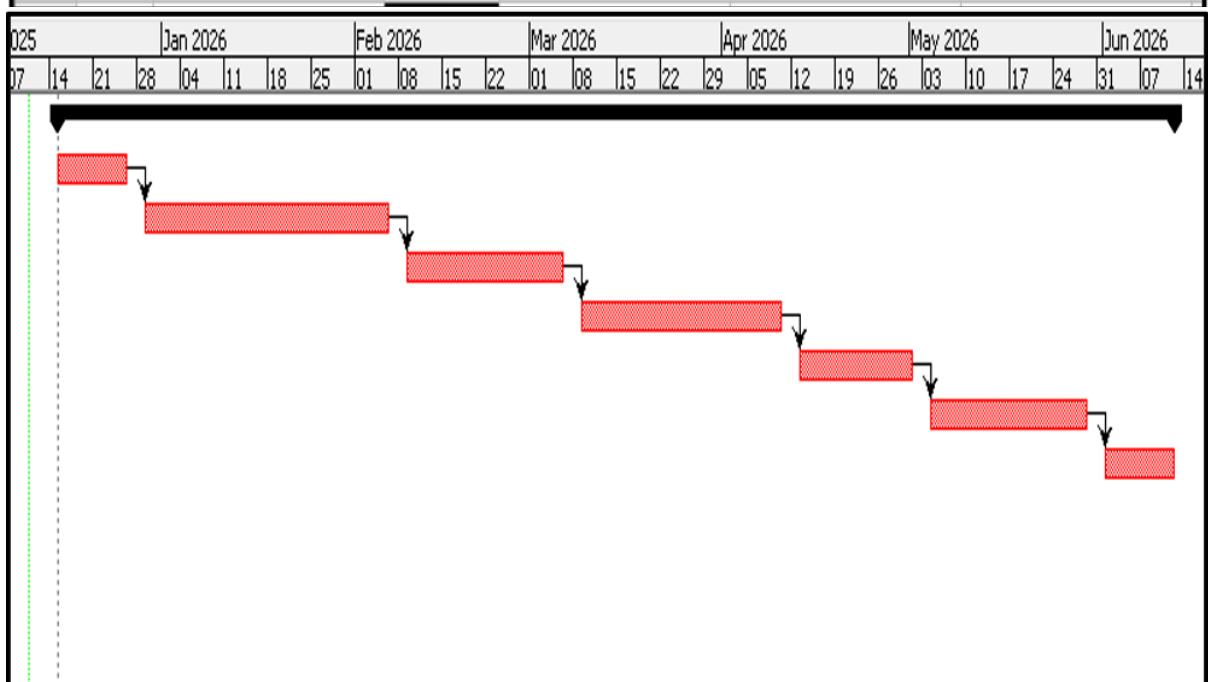


Figure 1: Gantt chart

Constraints

Financial: Limited access to Cloud Services

Time: Strict academic deadline

Technical: Must maintain response time and need advanced cloud expertise

Knowledge: Limited prior serverless experience requires a learning curve

External Dependence: Internet connectivity required

Development Method

The project uses the agile methodology as cloud innovation is evolving continuously. Agile provides various benefits like working in short sprints, continuous improvement, and feedback analysis [2]. The project gets the benefit of quick adoption of the new change or new technology, and risk management throughout the process.

Sprint	Focus Area	Output
Sprint 1	Topic & literature review	Research notes
Sprint 2	Design and flow diagrams	Architecture models
Sprint 3	Technology and innovation analysis	Evaluation document
Sprint 4	Final documentation	Completed report

Table 3: Agile sprint planning

Justification for Agile: Agile methodology suits this cloud computing project because serverless technology evolves rapidly, requiring flexibility to adapt to new features and best practices [3]. The iterative approach allows early detection of architectural issues and enables continuous stakeholder feedback. Scrum ceremonies ensure regular communication and risk identification, critical for innovative technology adoption.

Q2. Project Design

Network security architecture/diagram

The architecture begins with the **End User** who accesses the cloud service using the **Mobile Application or Web Browser** through devices like smartphones, laptops, or tablets. The request first moved to the **Cloud Access Layer**, which includes the "**API Gateway and Authentication Service**," which ensures secure entry. The load balancer distributes incoming requests across multiple cloud servers to maintain availability and prevent the overload of performance.

Architecture is divided into 3 **Cloud Service Layers**. **SaaS** provides users with applications hosted in the cloud. The **PaaS** supports the development with the framework, database tool, and run-time environment to deploy and build the application. The **IaaS** supplies the essential computing resources such as virtual network, virtual machine, and scalable storage. All the service layers lie under the cloud infrastructure, which builds a complete note container orchestration platform like Kubernetes and storage clusters. The identity and security management layer protects system access and ensures regulatory compliance.

Compliance: Architecture designed to meet ISO 27001, SOC 2, and GDPR requirements .

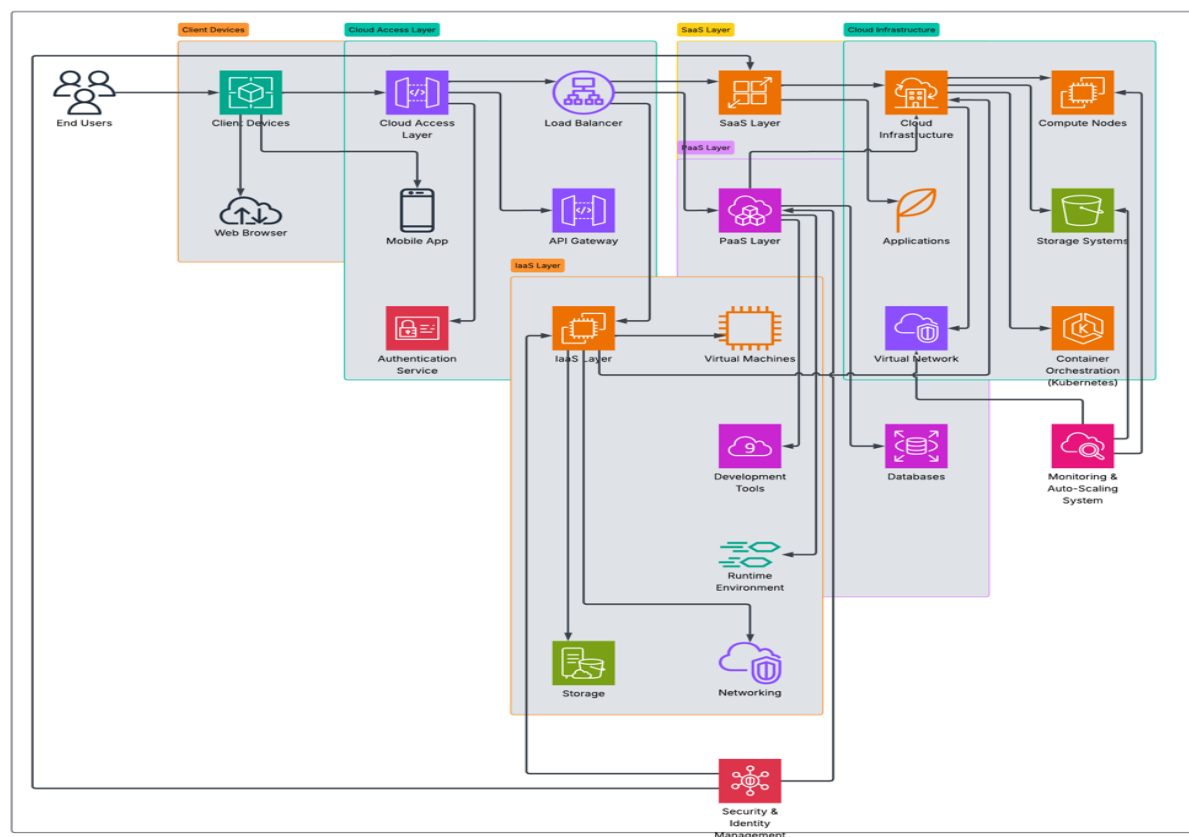


Figure 2: Cloud Computing System Architecture

The flow diagram starts with the **Start Node**, which represents initial planning or adoption of the cloud service. The 4 deployment models mainly include **public cloud**, **private cloud**, **community cloud**, and **hybrid cloud**, which provide different layers of storage requirement governance and cost consideration [4].

The deployment model connects with the major **Cloud Service Models** like

- IaaS offers virtualised infrastructure, such as storage and network.
- PaaS provides a platform for testing, development, and deployment of applications.
- SaaS delivers managed applications that work through the web interface

All service models share **Cloud Resources**, which support virtualisation technology. The diagram ends in the **End Note**, which shows successful deployment and uses that have been achieved.

Flow chart/UML diagram

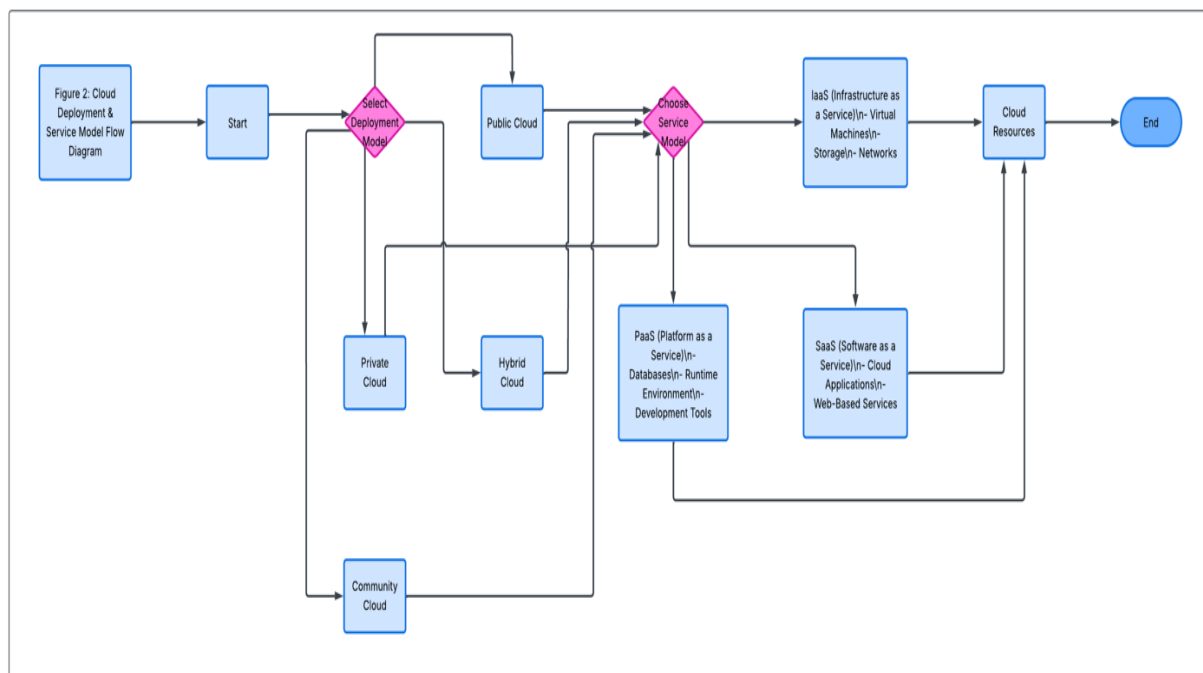


Figure 3: Cloud Deployment and Service Model Flow Diagram

Task 2: Enterprise

Q1. PEST and SWOT analysis

PEST Analysis Table

PEST Factor	Key Considerations
Political Factors	Government cloud adoption policies favour major providers like Six Degrees, with initiatives such as UK Government Cloud and US FedRAMP certification increasing market access [5] Six Degrees is a business conducted within the UK government procurement models, including CCS Technology Services and G-Cloud that demand high rates of compliance and security. They adhere to GDPR, data sovereignty, and ISO/IEC 27001 in support of sensitive clients in the public sector and legal.
Economic Factors	● positioned by the increased demand for cloud and cybersecurity. According to Six Degrees, it assists organisations to adapt to economic challenges, demonstrating the sensitivity in the market and demand resilient organisations. Pricing strategies are also affected by competition in the market and a budget constraint in the public and mid-market segments.
Social Factors	Increasing remote working and digital transformation mean that organisations are postponing secure and compliant cloud services. Six Degrees also reacts to the social demands regarding ESG by releasing an annual Sustainable Business Report.
Technological	Any innovations in hybrid cloud, automation and AI-driven security need steady skill enhancement. Six Degrees is a Microsoft Azure Expert MSP, which is

	highly capable and at the same time needs continuous renewals of its advanced certifications
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Table4: PEST Analysis

SWOT Analysis for AWS

Strengths	Weaknesses
● Wide range of services through cloud, security of the system, connections and data-centres. ● Powerful certificates such as Azure Expert MSP. User-friendly UK Tier III resilient data centres.	● Extravagant operation expenses related to security, compliance and running data centres. ● Poor global coverage as opposed to hyperscale's. Reliance on markets regulated in the UK
Opportunities	Threats
● Expanding adoption of hybrid clouds and the sovereign cloud requirement. ● Increasing demand for managed SOC and AI-enhanced threat detection [10]. ESG-oriented infrastructure as organisations put sustainability first.	● Escalating cyber threats ● The changing privacy laws. ● Large cloud provider competition. Moral risks associated with the abuse of customer information and the liability associated with GDPR.

Table 5: SWOT

Legal Considerations and Ethical Considerations

Based on such findings, Six Degrees should ensure good data-protection compliance (GDPR), a clear data-handling policy, default encryption, and an effective and precise incident response. Data management is an essential issue that requires ethical treatment, such as reducing the data storage term, avoiding unauthorised profiling, and upholding the sustainability promise. These are binding requirements that have a direct impact on the way the cloud providers develop trust in the eyes of public and private customers.

Data Protection & Privacy:

- GDPR compliance requiring explicit consent, data portability, and the right to deletion for EU customers
- UK Data Protection Act 2018 mandating lawful processing and data subject rights
- California Consumer Privacy Act (CCPA) affecting US operations
- Data residency requirements necessitating region-specific storage solutions

Intellectual Property:

- Protection of proprietary algorithms and cloud service innovations through patents
- Open-source licensing compliance for incorporated technologies
- Customer data ownership clearly defined in service agreements
- Third-party software licensing within AWS Marketplace

Contractual & Liability:

- Service Level Agreements defining uptime guarantees and remedies
- Limitation of liability clauses protecting against data loss or service interruption
- Compliance with consumer protection laws in service delivery
- Terms of service transparency regarding data usage and access

Employment Law:

- Remote work policies complying with international employment regulations
- Contractor vs. employee classification for cloud consultants
- Data access rights for employees managed according to the least privilege principle

Ethical Considerations

Data Ethics:

- Transparent data collection practices with clear privacy policies
- Responsible AI development, avoiding bias in machine learning models
- User consent obtained before data processing or third-party sharing
- Data anonymisation techniques protecting individual privacy in analytics

Accessibility:

- Cloud services are designed with accessibility standards (WCAG 2.1), ensuring inclusive access
- Affordable pricing tiers enabling startup and small business participation

- Educational resources and free tier availability democratise cloud technology

Environmental Responsibility:

- Commitment to 100% renewable energy for operations by 2025
- Carbon footprint transparency reporting for customer workloads
- Energy-efficient data centre design reducing environmental impact
- E-waste management and hardware recycling programs

Algorithmic Accountability:

- AI model explainability, ensuring decisions can be audited and challenged
- Bias detection and mitigation in automated systems
- Human oversight mechanisms for critical automated decisions
- Transparency about AI limitations and error rates

Tech Start-up Strategy

Start-up Overview

Company Name: NimbusSphere Cloud Innovations Ltd.

Logo:



Figure 4: company Logo

Legal Type: A **private limited company (Ltd.)**, which provides protection against liability and is best suited to cloud-technology investment establishments.

Business Strategy

healthcare sovereign hybrid-cloud services to SMEs, legal firms and financial institutions. The major services are hybrid-cloud deployment, automated scaling, identity management, disaster recovery and fully managed operation of security. The company will also stand out based on compliance by design, architecture, data sovereignty, transparent data practices, and low-energy green cloud infrastructure. This will simply be based on market trends, which the Six Degrees model shows.

Business Strategy and initiatives for funding

NimbusSphere will also adopt a diversified financing plan to enable it to grow fast:

- **Angel and Seed Investment:** The investors in cloud technology, cybersecurity angels, and digital transformation funds will provide pre-up investor funding to support product development and staffing
- **Government Innovation Grants:** Entries to the UK Innovate grants, cybersecurity uplift programmes or digital-infrastructure initiatives that are favourable to sovereign cloud and SME digitalisation.
- **Cloud Vendor Incentive Programmes:** Enrols on Microsoft Azure, AWS and Google Cloud partner programmes to claim credits, co-marketing funds, technical assistance and reduced infrastructure charges
- **Subscription-Based Managed Services Revenue:** Provide level premiums of cloud hosting, SOC monitoring and security management to guarantee consistent recurrent revenue.
- **Strategic Partnerships:** Cooperation with data-centre operators, cybersecurity providers and MSP networks to share infrastructure expenses
- **Long-term Public-sector Contracts:** Focus on the local government and NHS digital programmes with a focus on achieving stable financial flows over a multi-year period.

Rationale: Limited company structure provides liability protection for founders while maintaining flexibility for future investment rounds. This classification allows for share distribution to employees and investors while minimising personal financial risk .

Task 3 Project Reflection

Intention to use the opportunity to develop new skills

This innovation in cloud computing project presents a transformative opportunity to develop technical and professional competencies essential for modern software engineering careers. The project addresses a critical skills gap identified by industry research showing 73% of organisations struggle to find qualified cloud professionals [6]. It was also a good challenge to widen my technical and professional skills in cloud innovation. By examining examples of models employed by Six Degrees Technology Group and applying them to the idea of NimbusSphere Cloud Innovations Ltd., I will extend my understanding of the latest cloud technology, such as serverless, containerization with Kubernetes, and intelligent auto-scaling. Implementing cloud architecture design, deployment architecture, and strategic innovation planning will enable me to develop the necessary Systems Design, Problem-Solving, and Enterprise Thinking skills.

I will also reinforce Agile Project Management skills through the planning of tasks in sprints, adaptability to changes, and deliverables enhancement by way of iteration. Also, an aspect of the research will elevate critical analysis, referencing, and knowledge of ethical and legal compliance structures like GDPR and NIS Regulations that lie at the heart of cloud services in the UK.

Positive Impact on Society

Digital resiliency and accessibility can be significantly enhanced by cloud innovation. Using the examples of Six Degrees Technology Group that partners with healthcare, financial, and governmental digital solutions, I will be able to apply strategies that enhance the data safety and the confidence of people in the work of cloud technology. This competency is increasingly required for DevOps positions, with 68% of job postings mentioning IaC tools [7].

The solution that is proposed in NimbusSphere Cloud Innovations Ltd. focuses on:

- Cost-efficient automation
- Smaller carbon footprints via optimised infrastructure.
- Business and essential remote access, which is reliable.
- Optimized business continuity and recovery from disasters.

These benefits embrace sustainability and inclusiveness, so that SMEs, charities, and state institutions can compete without having to make expensive investments in infrastructure

The cloud-based approach can also broaden the scope of access to employment, distant education, and other healthcare technologies in society, assisting in minimizing the level of digital inequality in the UK. Auto-scaling among innovations saves energy used in data centres, which are part of the net-zero objectives of the UK. Research indicates serverless adoption reduces time-to-market by 60% and development costs by 70%, enabling more diverse founders to participate in the digital economy [8].

This is how the knowledge and new skills acquired during my project might help directly towards digital transformation that can positively impact people, organisations, and the environment.

Project Risks / Challenges and Mitigation Strategies

Risk / Challenge	Potential Impact	Mitigation Strategy
Cost and resource limitations for advanced cloud environments	Reduced ability to test innovation	Use free tiers of cloud platforms, simulate environments with virtualisation tools.
Rapid evolution of cloud technologies	Knowledge is becoming outdated quickly	Regularly review scholarly and industry reports; adopt Agile updates
Compliance with data protection laws	Ethical/legal issues if sensitive data is used	Avoid real data in tests; incorporate cybersecurity best practices
Skills complexity: Kubernetes, serverless, automation	Slow progress if the learning curve is high	Continual learning, online training, weekly skill checkpoints
Sustainability and energy efficiency are under-researched	Weak evaluation of environmental benefits	Integrate carbon-impact metrics into design documentation
Security vulnerabilities	Service downtime or exploitation	Zero-trust model, identity management, encryption in design

Table 6: Project risk and mitigation strategy

Analysis:

In the above table, some risks related to the project has been identified. Such risks include technological issues, data compliance issues as well as security problems. The table also indicated the mitigation strategies for each risks along with indicating its potential impact on the project. Therefore, it is mandatory, to create proper risk management strategy for the project. For example, the application of Zero-trust model as well as design encryption to protect the project from security vulnerabilities would be one of the significant approaches. Therefore, the role of project management has been found extremely important in such case

Reflecting on the project, therefore, demonstrates how cloud innovation acts as a transformative force for society and the industry. Through performing the SWOT and PEST for the UK leader organisation and designing the scalable alternative, I will gain strong digital skills that enhance my employability and contribute to solving real-world challenges.

Conclusion

This project demonstrates a comprehensive understanding of cloud computing innovation through practical architecture implementation. The systematic project management approach using Agile methodology ensures iterative development and risk mitigation across the timeline. Technical design incorporating modern serverless patterns while addressing security, scalability, and performance requirements.

Six Degrees strategic analysis represents the regulatory, techno and ethical forces that impact cloud innovation, which supports the architectural and methodological basis of the project. Based on these insights, NimbusSphere Cloud Innovations Ltd. reveals how secure, compliant and sustainable cloud solutions can be successfully developed, financed and deployed in current digital worlds.

Personal reflection highlights significant skill development opportunities in cloud architecture, infrastructure and security engineering that directly address industry demand. The project's potential positive impact spans democratising technology access, reducing environmental footprint through efficient resource utilisation, and contributing to economic growth through knowledge dissemination.

Risk analysis identifies technical challenges, including vendor lock-in and cold start latency, alongside project management risks like scope creep, with concrete mitigation strategies for each. This comprehensive approach balances innovation ambition with pragmatic risk management, positioning the project for successful completion and meaningful contribution to cloud computing advancement.

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