📄 Product Requirements Document (PRD)

Project Title:

SmartCloudOps.AI – Intelligent Self-Healing, Secure CloudOps Platform with ML & LLM Automation

📅 Start Date:

August 1, 2025

🚀 1. Executive Summary

SmartCloudOps.AI is a smart CloudOps automation platform that blends:

☁️ Cloud Infrastructure (AWS + Terraform)

🛠️ DevOps Tools (CI/CD, Docker)

📊 Monitoring (Prometheus + Grafana)

🤖 Machine Learning (for Anomaly Detection)

🧠 LLMs (like GPT) for ChatOps and incident explanation

> 🎯 Ideal For: Beginners & intermediate learners who want hands-on, job-ready project experience!

❓ 2. Problem Statement

Enterprises face:

❌ Frequent downtime

🔐 Security vulnerabilities

🐌 Manual and error-prone responses

Learners lack a unified project to practice AI, Cloud, and DevOps together.

💡 3. Proposed Solution

SmartCloudOps.AI will:

⚙️ Provision AWS infra via Terraform

🚀 Deploy apps using CI/CD pipelines

📈 Monitor with Prometheus + Grafana

🧠 Detect anomalies using ML

🔄 Auto-remediate issues with scripts

🔐 Secure infra using IAM + logs

💬 Explain issues via GPT Chatbot

🗂️ 4. Project Folder Structure

```
smartcloudops-ai/
│
├── .github/workflows/ci-cd.yml       # ✅ GitHub Actions for CI/CD
├── app/
│   ├── main.py                       # 💬 Flask app for chatbot
│   └── requirements.txt
├── terraform/main.tf                 # ☁️ AWS Infra via Terraform
├── scripts/
│   ├── train_model.py                # 📊 ML Anomaly Detection
│   └── remediation/restart_service.py# 🔄 Auto-fix script
├── ml_models/anomaly_model.pkl       # 🧠 Trained ML Model
├── docs/
│   ├── architecture.png              # 🧱 Final architecture diagram
│   └── prd.pdf                       # 📄 This PRD document
├── .gitignore
├── Dockerfile                        # 🐳 Container setup
└── README.md                         # 📘 Project guide
```

🛠️ 5. From Scratch to Perfect – 3 Week Plan

Week 1: 🏗️ Core Setup (Aug 1–7)

Goal: Cloud infra + app + monitoring

1. ☁️ Provision AWS infra using main.tf

2. 🐳 Dockerize Flask app

3. 🔁 Set up CI/CD with GitHub Actions

4. 📊 Set up Prometheus & Grafana

Week 2: 🧠 Intelligence & Automation (Aug 8–14)

Goal: Add ML intelligence & remediation

1. 📈 Collect data via Prometheus

2. 🧪 Train ML model (Isolation Forest/Prophet)

3. 🛠️ Write remediation scripts

4. 🛡️ Add IAM audits + GPT summaries

Week 3: 🤖 ChatOps & Final Polish (Aug 15–21)

Goal: Add chatbot + finish project

1. 💬 Build GPT-based Chatbot using Flask

2. 📉 Finalize Grafana dashboards + architecture diagram

3. 📘 Complete README.md + export docs

4. 📽️ Record final video walkthrough for resume/portfolio

📦 6. What to Include (for Complete Delivery)

📘 README.md Template Outline

```
# 🚀 SmartCloudOps.AI

**An intelligent, self-healing CloudOps platform using ML + LLMs.**

🔗 [Live Demo] | 🎥 [Video Walkthrough]

## ✨ Features
- ☁️ Infra as Code (Terraform + AWS)
- 🐳 Dockerized App
- 🔁 CI/CD (GitHub Actions)
- 📊 Monitoring (Prometheus + Grafana)
- 🧠 ML Anomaly Detection
- 🔄 Auto-Healing Workflows
- 🤖 GPT Chatbot for explanation

## 💻 Tech Stack
- AWS, Terraform, Docker
- GitHub Actions
- Prometheus, Grafana
- Python (Flask), Scikit-learn
- GPT (OpenAI)

## 🛠️ How to Run
1. Clone repo
2. Run `terraform apply`
3. Set env variables
4. Push to main branch (triggers CI/CD)
```

🧰 Tools Used

Purpose	Tool/Service
Cloud	AWS (EC2, IAM, VPC)
IaC	Terraform
App Framework	Flask
Containerization	Docker
CI/CD	GitHub Actions
Monitoring	Prometheus, Grafana
ML	Scikit-learn
ChatOps	OpenAI GPT

✅ Beginner Tips

Follow weekly breakdown strictly

Deploy incrementally (Infra ➡️ App ➡️ ML ➡️ LLM)

Keep notes and screenshots for resume

Use Notion for weekly tracking + documentation