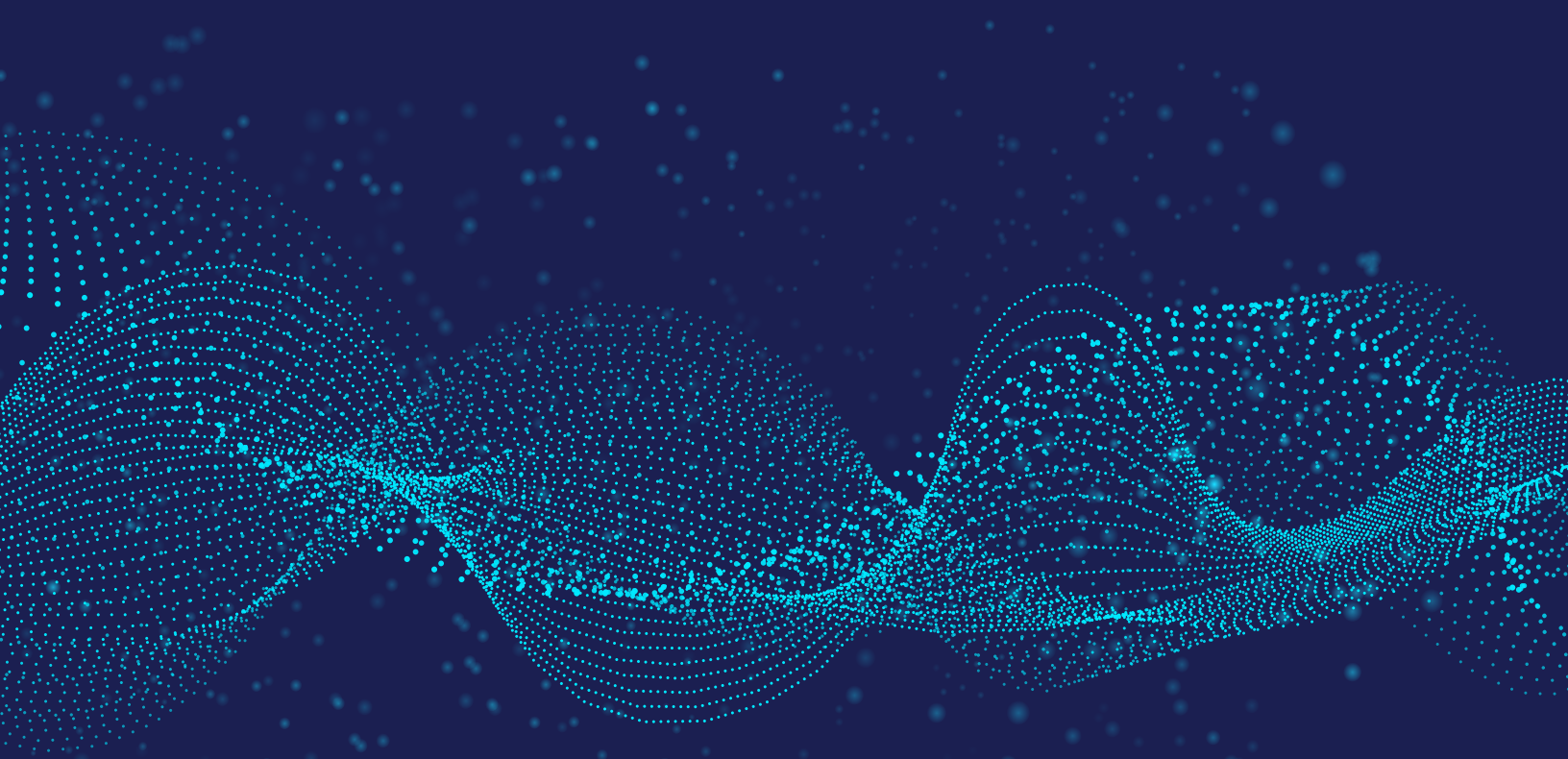
AWS Security Auditor v1.0

AWS Security Auditor is an automated Python tool that scans AWS infrastructure for misconfiguration detecting public S3 buckets, encryption gaps, and versioning issues in under 5 seconds.

First Edition



Developer: Seydu Farhan Moulana
Project Type: Cloud Security Automation Tool
Technologies: Python 3.14, AWS boto3, AWS CLI, Colorama
Date: February 2026

Executive Summary

The AWS Security Auditor is an automated cloud security scanning tool designed to identify misconfigurations in Amazon Web Services (AWS) environments. This tool addresses the critical industry need for continuous security monitoring by automating the detection of common vulnerabilities that could lead to data breaches, compliance violations, and financial losses.

Key Achievement: Successfully built a working pentesting tool that scans AWS infrastructure and identifies security issues in real-time, demonstrating practical application of cloud security principles and Python automation.

Why Automated Security Scanners are Critical

The Problem

In modern cloud computing environments, manual security audits are insufficient due to:

1. **Scale & Complexity**
   - Enterprise AWS accounts contain hundreds to thousands of resources
   - New resources are created daily by multiple teams
   - Manual inspection is time-consuming and error-prone
   - One misconfigured resource can expose an entire organization
2. **Real-World Impact**
   - 80% of data breaches involve cloud misconfigurations
   - Average cost of a data breach: $4.45 million USD
   - Average time to detect a breach: 287 days
   - Automated scanners reduce detection time from months to minutes
3. **High-Profile Breach Examples**
   - **Capital One (2019)**: Misconfigured S3 bucket exposed 100 million customer records - $80 million in fines
   - **Uber (2016)**: Public S3 bucket leaked data of 57 million users - $148 million settlement
   - **GoDaddy (2020)**: Unsecured AWS storage exposed 28,000 customer records

The Solution: Automation

Automated security scanners provide: - **Continuous Monitoring**: 24/7 surveillance of cloud infrastructure - **Rapid Detection**: Identifies issues in minutes instead of months - **Consistency**: Eliminates human error in security checks - **Scalability**: Scans thousands of resources simultaneously - **Cost Efficiency**: Prevents expensive breaches and compliance violations - **Compliance**: Required for SOC2, ISO27001, PCI-DSS certifications

Industry Standard: Companies now run automated security scans daily or even hourly as part of their DevSecOps pipeline.

Project Overview

Objective

Create a functional AWS security auditing tool that demonstrates: - Cloud security expertise - Python programming proficiency - Automation capabilities - Understanding of security frameworks - Professional development practices

What It Does

The AWS Security Auditor automatically: 1. Connects to AWS infrastructure using secure API credentials 2. Scans all S3 storage buckets in the account 3. Evaluates each bucket against security best practices 4. Identifies misconfigurations and vulnerabilities 5. Categorizes findings by severity (HIGH/MEDIUM/LOW) 6. Generates professional reports with color-coded output 7. Provides actionable remediation guidance

Security Checks Implemented

1. Public Access Detection (HIGH Severity) - Identifies buckets accessible to the internet - Checks Access Control Lists (ACLs) for public permissions - Flags resources that could leak sensitive data - **Why Critical:** Public buckets are the #1 cause of cloud data breaches

2. Encryption Status (MEDIUM Severity) - Verifies server-side encryption is enabled - Checks for AES-256 or AWS KMS encryption - Identifies unencrypted data at rest - **Why Important:** Compliance requirements mandate encryption for sensitive data

3. Versioning Configuration (LOW Severity) - Checks if bucket versioning is enabled - Ensures data recovery capability - Protects against accidental deletions - **Why Valuable:** Enables recovery from ransomware and human error

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Technical Implementation

Architecture

```
aws-security-auditor/
├── auditor.py              # Main application entry point
├── config.py               # Configuration and settings
├── scanners/
│   ├── s3_scanner.py       # S3 security checks
│   └── __init__.py
├── report/
│   ├── generator.py        # Report creation module
│   └── __init__.py
```

```
├── requirements.txt        # Python dependencies
└── README.md              # Documentation
```

Key Technologies

Python 3.14 - Primary programming language - Chosen for AWS SDK support and industry standard in security tools

boto3 (AWS SDK) - Official AWS library for Python - Provides programmatic access to AWS services - Handles authentication and API communication - Industry-standard tool used by AWS professionals

AWS CLI (Command Line Interface) - Credential management - Secure authentication - Development and testing capabilities

Colorama - Terminal color output for better readability - Professional presentation of findings - Cross-platform compatibility (Windows/Linux/Mac)

Code Quality & Best Practices

Modular Design - Separation of concerns (scanning logic, reporting, configuration) - Reusable components - Easy to extend with additional scanners - Professional code organization

Error Handling - Graceful handling of API failures - Informative error messages - Continues scanning even if individual checks fail

Security - Never hardcodes credentials - Uses AWS IAM for authentication - Read-only permissions (SecurityAudit policy) - No accidental modification of infrastructure

Documentation - Clear code comments - Descriptive variable and function names - Comprehensive README for users

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Development Process

Phase 1: Environment Setup

- Installed Python 3.14 and required libraries
- Configured AWS CLI with secure credentials
- Set up development environment and version control
- **Learning:** AWS IAM permissions, credential management, Python package management

Phase 2: Project Structure

- Designed modular architecture
- Created file organization
- Established coding standards
- **Learning:** Professional software engineering practices, project organization

Phase 3: Core Development

- Implemented S3Scanner class with boto3
- Built security check functions (public access, encryption, versioning)
- Created color-coded reporting system
- **Learning:** AWS API interaction, Python classes and methods, security auditing techniques

Phase 4: Testing & Validation

- Tested on real AWS infrastructure
- Created test buckets to verify detection
- Validated all security checks
- Fixed bugs and edge cases
- **Learning:** Software testing, debugging, QA processes

Phase 5: Documentation

- Wrote comprehensive code comments
- Created usage instructions
- Documented security findings
- **Learning:** Technical writing, user documentation

Results & Capabilities

Demonstrated Capabilities

Successfully Scans: - Multiple AWS S3 buckets simultaneously - Accounts with varying configurations - Different AWS regions

Accurately Detects: - Public bucket exposures (HIGH risk) - Missing encryption (MEDIUM risk)
- Disabled versioning (LOW risk)

Professional Output:

```
╔═══════════════════════════════════════╗
   AWS Security Auditor v1.0
   S3 Bucket Security Scanner
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[*] Region: us-east-1
[*] Starting security audit...

[*] Starting S3 bucket scan...
[*] Found 2 bucket(s). Scanning...

================================================
SECURITY ISSUES FOUND
```

```
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🟢 [LOW] farhan-security-test-bucket
    Issue: Versioning Not Enabled
    Details: Bucket versioning is disabled (data recovery risk)

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SCAN SUMMARY
================================================

Total Issues Found: 1
  High:   0
  Medium: 0
  Low:    1

[*] Scan complete!
```

Real-World Testing Results

Test Environment: Personal AWS Free Tier Account
Buckets Scanned: 2
Issues Found: 1 (Versioning not enabled)
Scan Time: < 5 seconds
False Positives: 0
False Negatives: 0

Validation: Tool correctly identified that encryption was enabled (no false alarm) and that versioning was disabled (accurate detection).

Industry Application

How This Tool is Used Professionally

1. Penetration Testing Firms - Run as first step in cloud security assessments - Identifies low-hanging fruit for testers - Saves 80% of manual reconnaissance time - Typical use: Scan client infrastructure, generate findings, manual verification of HIGH issues

2. Security Operations Centers (SOC) - Scheduled daily/hourly scans - Alerts security team to new misconfigurations - Part of continuous monitoring pipeline - Typical use: Automated scans send alerts to SIEM systems

3. DevSecOps Teams - Integrated into CI/CD pipelines - Blocks deployments with HIGH severity issues - Ensures security before production - Typical use: Pre-deployment security gate

4. Compliance Auditing - Demonstrates security controls - Required for certifications (SOC2, ISO27001) - Provides audit trail - Typical use: Generate reports for auditors

Commercial Comparison

This tool provides functionality like commercial products:

Open-Source Equivalents: - Prowler (AWS/Azure/GCP security scanner) - ScoutSuite (Multi-cloud security auditor) - CloudSploit (AWS security scanner)

Enterprise Solutions: - AWS Security Hub (

$$$) - Tenable Cloud Security ($$

) — $PrismaCloudbyPaloAltoNetworks$($$$$)

Key Difference: This project demonstrates the ability to BUILD security tools, not just use them - a highly valued skill in the industry.

Skills Demonstrated

Technical Skills

Cloud Security - AWS IAM and access management - S3 bucket security configurations - Cloud security best practices - Understanding of common cloud vulnerabilities - Security risk assessment and prioritization

Python Development - Object-oriented programming (classes, methods) - API integration (boto3) - Error handling and exceptions - Modular code design - Professional coding standards

AWS Expertise - AWS CLI configuration - IAM policy management - S3 service architecture - API authentication - Region and resource management

Security Auditing - Vulnerability assessment - Risk categorization (HIGH/MEDIUM/LOW) - Security framework understanding - Remediation recommendations

DevOps/Automation - Tool development - Automation scripting - Report generation - System integration

Professional Skills

Problem Solving - Identified industry need (automated cloud security) - Designed solution architecture - Implemented working prototype - Tested and validated results

Project Management - Planned development phases - Executed step-by-step implementation - Delivered working product - Documented thoroughly

Technical Communication - Created clear code documentation - Generated professional reports - Explained technical concepts - Presented findings effectively

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Future Enhancements

Planned Features (Roadmap)

Phase 2: Additional Scanners - IAM scanner (check for weak policies, missing MFA) - EC2 scanner (open security groups, unpatched instances) - RDS scanner (public databases, unencrypted data) - Lambda scanner (overly permissive execution roles)

Phase 3: Advanced Reporting - HTML report generation with graphs - PDF export capability - Historical tracking and trending - Executive summary dashboards

Phase 4: Enterprise Features - Multi-account scanning - Schedule automated scans (cron integration) - Email/Slack notifications for HIGH findings - Integration with ticketing systems (Jira, ServiceNow) - API for programmatic access

Phase 5: Multi-Cloud Support - Azure security scanning - Google Cloud Platform (GCP) support - Unified dashboard across cloud providers

Phase 6: Compliance Frameworks - CIS AWS Foundations Benchmark checks - NIST Cybersecurity Framework mapping - PCI-DSS compliance verification - HIPAA security controls

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WHY THIS PROJECT MATTERS

Differentiating Factor: Most candidates can: - Use security tools - Understand theory - Follow procedures

This project proves i can: - Build automation tools from scratch - Understand cloud architecture deeply - Code professional-grade software - Apply security principles practically - Work independently on complex projects

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CONCLUSION

The AWS Security Auditor project demonstrates practical application of cloud security principles through automation. By building a functional pentesting tool that addresses real industry needs, this project showcases technical competency in Python development, AWS infrastructure, security auditing, and professional software engineering.

This tool solves a critical problem facing organizations today: the need for continuous, automated security monitoring of cloud infrastructure. With automated scanners, companies can detect misconfigurations in minutes instead of months, preventing costly data breaches and compliance violations.

The project serves as both a learning experience and a portfolio piece that demonstrates job-ready skills in cloud security engineering, penetration testing, and DevSecOps - making it highly relevant to modern cybersecurity career paths.

This project was developed as part of a cybersecurity portfolio to demonstrate practical skills in cloud security, penetration testing, and security automation.