**Vulnerability Audit and Assessment - Baseline Analysis and Plan**

**Overview**

The aim of the audit is to identify security weaknesses and evaluate their implications regarding the Security Tweets website found at <https://testhtml5.vulnweb.com/#/popular>, which is a social media web application.

**Introduction**

Cyber security is a critical concern for both users and developer of web-applications: Users will need to protect their identity with strong passwords and be aware of being vulnerable to social engineering attacks; developers will need to ensure they protect personal information in line with the GDPR requirements (ICO, 2024) and stay up to date with the latest risks, such as those published by OSWAP and their solutions (OSWAP, 2021). Companies can inspire confidence with stakeholders by obtaining industry standard certification such as Cyber Essentials Plus from the British Assessment Bureau (NCSC, 2023). By contrast, there has been on-going controversy regarding the harvesting and use of personal data by TiKTok where users are not protected by the GDPR or other legislation. ‘The Chinese government has easy access to their [users] personal information based on its domestic law and resolve on intelligence gathering for the protection of its national security.’ (Uya, 2024).

**Security Vulnerabilities**

| Vulnerability | Threat | Description | Solution |
| --- | --- | --- | --- |
| 1. Unauthorised Access | Users access admin functionality | Users gain access to modules and functions which are not needed for their role | Role Based Permissions |
| 1. Insecure Passwords | Identify fraud; Spoofing;  Reputational damages | Intruders access other users’ accounts with access to personal information | Establish Password policy |
| 1. Ineffective Firewall | Sensitive data can be stolen | Malware can penetrate the system an insert malicious code to eavesdrop or steal data | Implement Firewall Policy and checking protocols.  Architecture Threat Modelling. |
| 1. Backdoor Access | Intruder can access and modify source code | Intruders access the system through an | Code Analysis |
| 1. Social Engineering | Legitimate users share their data with unauthorised intruders | Phishing emails are sent to users, persuading them to share personal data | User Education Program |
| 1. Denial of Service | Users can not access the application | Servers are overloaded by repeated requests, such as Ping of Death | Scanning and blocking potential intruders via an Intrusion Detection Service (IDS) |
| 1. Third Party Developers | Persona Data is disclosed to third party developers | Third Party Applications access unnecessary personal data in development. | Use of API Sandbox for third party developers. |
| 1. Insider Threat | Sensitive data or code is disclosed to unauthorised actor. | Employees share log-in details, code or sensitive information | Hardware asset management. Network scanning. Acceptable use of IT policy. Activity logging and monitoring. |

**Methodology and Tools**

| Tool/Method | Justification | Challenge | Dynamic/ Static |
| --- | --- | --- | --- |
| 1. Microsoft Threat Modelling Tool | Identify STRIDE risks for secure web applications | Insecure design architecture | S |
| 2. Nmap | Network scanning tool | Identify network vulnerabilities | D |
| 3. Hydra | Brute force password grinding | Evaluate password strength | D |
| 4. John the Ripper (JTR) | Obtaining sensitive data | Evaluate security of passwords and sensitive data | D |
| 5. Web service testing | Check against elevated privileges | Users access information/functionality beyond their role privilege | D |
| Check security of API | Insecure API for third party development | D |
| 6. Code Threat | Code Analysis | Evaluate code against known threats | S |
| 7. Employee Education | Ensure staff understand importance of working securely | Insider threat | S |
| 8. User Training | Raise awareness of social engineering attacks such as phishing. | Social Engineering | S |

**Business Impact**

Nmap scanning and other dynamic actions will take place outside of peak usage hours, to minimise disruption to the service (McNab, 2017). Users access social media 24hours per day, but the actions will be aligned to blocks of 4-hour access time where time blocks are RAG rated based on an audit of server traffic.

**Timeline**

**Summary and Limitations**

The cyber-security audit will allow the management team to evaluate the effectiveness of the hardware architecture, the security of the application and the impact of existing policies and processes to achieve security in the workplace. The cyber threat surface is constantly evolving and while all actions will be in-line with OSWAP guidance and ISO/IEC 27002 standards regular reviews are recommended. While the user education and training will raise awareness, it cannot guarantee compliance against malicious use.

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