Final Year Project Report

Web Application Security Risk Assessment



Bahira University Islamabad

Supervisor

Dr. Waqas Aman

Group Members

Alina Khalid (01-134141-009)

Sidra Khalid (01-134141-120)

Computer Science Department

Abstract

In todays software industry web development is the most essential and emerging field. Websites are used to provide information to the users about any specific area of interest. There are numerous websites and web applications that are available online for users. Information is readily available due to the advancements in the technology, but its not a safe world today. One cannot simply forget the concerns that are raised with respect to the security and safety to the intellectual property of an individual or an organization. As everything good has a bad side too it so is the case here as your information can also be used against you, hackers can forge the information on your website and can also make your application unavailable to the legitimate user which can lead to a great loss in terms of revenue in an organization. IT companies and corporate businesses spend millions of dollars to safeguard their websites and online systems from hackers intrusion and damaging the organizations reputation. The sole objective of our project is to safeguard an online system or a website by informing the organizations about the vulnerabilities and loop holes which can be exploited in future and cause harm to their business. This will help the web developers in better understanding of the weakness and making their application more secure in future. This project is related to the domain of information security and will help web developers in testing of their websites and hence in development of a secure system which will guard-off the system against web attacks and related vulnerabilities.

Contents

1	Intr	oduction	1							
	1.1	Problem Statement	1							
	1.2		2							
	1.3		2							
	1.4		2							
	1.5		3							
2	Lite	rature Review	4							
	2.1		4							
	2.2		4							
	2.3		5							
			5							
			5							
21 21	2.4		5							
			5							
		2.4.2 Solution	6							
	2.5	OSSTMM	6							
		2.5.1 Challenge	6							
		2.5.2 Solution	6							
	2.6	OWASP ASVS	7							
		2.6.1 Challenge	7							
		2.6.2 Solution	7							
3	Rea	Requirement Specification 8								
	3.1	·	8							
	3.2		8							
	3.3		9							
	3.4		9							
	3.5	Functional Requirements	0							
		3.5.1 Login/Signup	0							
		3.5.2 Url Validation	0							
		3.5.3 Scan Project	0							
		3.5.4 Report Generation	0							
		3.5.5 Download Report	0							

		3.5.6	Upload Report
		3.5.7	Id Extraction
		3.5.8	Comparing Id's With CWE-list
		3.5.9	Fetching data from CWE-list
		3.5.10	Impact Scorecard
		3.5.11	Risk Analysis Report
	3.6	Non-F	unctional Requirements
		3.6.1	Performance
		3.6.2	Portability
		3.6.3	Security
		3.6.4	Price
		3.6.5	Backup
	3.7	Use Ca	ases
		3.7.1	System Use Case
	4	3.7.2	Use Case 01: Scan for vulnerabilities
		3.7.3	Use Case 02: Id extraction through parsing 14
		3.7.4	Use Case 03:Generation of Impact Score Card 15
		3.7.5	Use Case 04:Risk analysis is performed
		3.7.6	Use Case 05:Generation of Risk Assessment Report 17
4	Desi	_	18
	4.1		Architecture
	4.2		Flow Diagram
		4.2.1	Level 0 DFD
-9		4.2.2	Level 1 DFD
		4.2.3	Level 2 DFD
5	C4	T	
9	5.1		$\begin{array}{lll} \textbf{plementation} & \textbf{22} \\ \textbf{yy} & \dots & $
	$5.1 \\ 5.2$		
	5.2	5.2.1	And Techniques
		5.2.1 $5.2.2$	Arachni-1.5.1
		5.2.2	Sublime Text Editor
			Risk Analysis
		5.2.4	Impact Score Card
		5.2.5 5.2.6	Risk Assessment Report
	F 9	00	CWRAF
	5.3		pment Environment
			Encryption Library
		5.3.2	File Uploading Class
		5.3.3	Form Validation
		5.3.4	Session Library
		5.3.5	Database Configuration
	- 1	5.3.6	Connecting to Database
	5.4		of Implementation
		5.4.1	Insertion of URL of Any Live Website

		5.4.3	Report of Vulnerabilities
		5.4.4	Download Report in Jason Format
		5.4.5	Import Report and Vulnerability Details Extraction 32
		5.4.6	Input Details in Formula for Risk Analysis
		5.4.7	Import Jason Report on Website
		5.4.8	File Upload
		5.4.9	Parsing the Report
		5.4.10	Comparison of CVE-db-xml and Json Report 38
		5.4.11	Computation of Risk Analysis
6	Syst		sting and Evaluation 41
	6.1		re Testing Techniques
	6.2	Test C	ases
		6.2.1	Test Case 01: URL validation
	i i	6.2.2	Test Case 02: URL Format
		6.2.3	Test Case 03: Report Generation 42
		6.2.4	Test Case 04: Report Parsing
		6.2.5	Test Case 05: ID Comparing
		6.2.6	Test Case 06: Score Card
7	Con	clusion	1 44
	7.1	Our W	Ork
	7 2	Future	

List of Figures

1.1	Methodology	3
3.1	System Environment	9
3.2	System Use Case Diagram	12
3.3	scanning vulnerabilities of project	13
3.4	Id extraction through parsing	14
3.5	Generation of Impact Score Card	15
3.6	Risk analysis is performed	16
3.7	Generation of Risk Assessment Report	17
4.1	Application Architecture	19
4.2	LEVEL 0 Generating XML or JASON File	19
4.3	LEVEL 1	20
4.4	LEVEL 2	21
5.1	displays the user guide of sublime text editor	24
5.2	displays the working of MVC framework	25
5.3	Interaction Amongst the CWE CWRAF and CWSS	26
5.4	Arachni Interface	28
5.5	Provide URL	28
5.6	Enlisting The Vulnerabilities Categorized as High, Medium and	
	Low	29
5.7	Vulnerabilities Rated As Medium Risk To The System	29
5.8	Vulnerabilities That Rated As Low Risk To The System	30
5.9	Vulnerabilities Rated as Informational Risk To The System	30
5.10	Format for Downloading Vulnerability Report	31
5.11	Screenshot For Report Generated in .Jason Format	33
5.12	Screenshot of Login Page	34
5.13	Screenshot of Signup Page	35
5.14	User Panel	36
5.15	Screenshot of Jason File Upload	37
5.16	Parsing the File	38
	Depicts Comparison Between CVE-db and Jason File	39
5.18	Output Displayed to User	40

List of Tables

3.1	Scan for vulnerabilities	3
3.2	Id extraction through parsing	4
3.3	Generation of Impact Score Card	5
3.4	Risk analysis is performed	6
3.5	Generation of Risk Assessment Report 1	7
6.1	URL validation	2
6.2	URL Format	2
6.3	Report Generation	2
6.4	Report Parsing	3
	ID comparing	
6.6	Score card	3