New Techniques in Application Intrusion Detection
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Today

- Who am I?
  - Director of Product Management, Mykonos
  - 11 years experience marketing Web-based products and technologies
  - Canadian. Eh.

- The Agenda
  - The problem of Web application abuse
  - Current options
  - Application intrusion detection and response
  - AppSensor vs. Mykonos Security Appliance
The Problem

The Cost of Web Application Abuse

- Fraud!
- Defacement!
- Identify Theft!
- Loss of business!
- Brand damage!
- Economic Growth!

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How Big is the Problem?

Big, and Getting Bigger

• **$4.0B** in Fraud (2008 Cybersource)
• **$50B** in Identity Theft (2009 FTC)
• **$16B** Credit Card Fraud (2008 Mercator Advisory Group)

• **$204** - Cost of Data Breach per Customer Record (Ponemon Institute 2009)
• **$1T** - Global Cost of Cyber Crime (McAfee 2008)
The Challenge

How to Secure Legacy Apps from Abuse

Firewall It.
The Anatomy of a Web Attack

Phase 1
Silent Introspection

Phase 2
Attack Vector Establishment

Phase 3
Attack Implementation

Phase 4
Attack Automation

Phase 5
Maintenance

WAFs play here.
Early Detection

What about all the requests before an attack is delivered?

Number of Requests

Malicious activity detected

Attack vector established
Is there another way?

Add Security Logic to the App

• Can you extend legacy apps to detect malicious activity from within the app itself, before a user is able to identify and exploit a vulnerability?
  • E.g. Manipulating cookies, query parameters, input fields...
Approaches

OWASP AppSensor Project

A conceptual framework for implementing intrusion detection capabilities into existing applications

**AppSensor**

### 42 Detection Points

<table>
<thead>
<tr>
<th>Category</th>
<th># Detection Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request</td>
<td>4</td>
</tr>
<tr>
<td>Authentication</td>
<td>11</td>
</tr>
<tr>
<td>Access Control</td>
<td>6</td>
</tr>
<tr>
<td>Session</td>
<td>4</td>
</tr>
<tr>
<td>Input</td>
<td>2</td>
</tr>
<tr>
<td>Encoding</td>
<td>2</td>
</tr>
<tr>
<td>Command Injection</td>
<td>4</td>
</tr>
<tr>
<td>File IO</td>
<td>2</td>
</tr>
<tr>
<td>User Trend</td>
<td>4</td>
</tr>
<tr>
<td>System Trend</td>
<td>3</td>
</tr>
</tbody>
</table>

[mykonos logo]
How is it implemented?

• A little unclear...

• Two recommendations
  • At the business layer (aka in code), preferably using the OWASP ESAPI
  • As a ‘cross-cutting concern’ in an Aspect-Oriented Programming approach (e.g. Java Filters)
AppSensor

Strengths and Challenges

Strengths
• It’s smart
• A great reference for determining malicious intent, categorizing and rating incidents

Challenges
• Takes development time
• No tools or pre-fab solutions yet
• Project advances very slowly
Approaches

The Mykonos Security Appliance

A high speed HTTP processing engine that extends Web application code with intrusion detection and response capabilities at serve time.

http://www.mykonossoftware.com
### The Mykonos Security Appliance

#### 26 Detection Points

<table>
<thead>
<tr>
<th>Processor</th>
<th># Detection Points</th>
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</thead>
<tbody>
<tr>
<td>Authentication</td>
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<td>Cookies</td>
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<tr>
<td>Errors</td>
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<td>Files</td>
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<td>Headers</td>
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<td>Links</td>
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<td>Request Methods</td>
<td>3</td>
</tr>
<tr>
<td>Query Parameters</td>
<td>1</td>
</tr>
<tr>
<td>Spiders</td>
<td>2</td>
</tr>
</tbody>
</table>
The Mykonos Security Appliance

How is it implemented?

HTTP Proxy

Processor Library

Profile DB

Security Engine

HTTP Requests and Responses
The Mykonos Security Appliance

Strengths and Challenges

Strengths
• It’s smart
• Code-aware w/o dev participation
• Easy to configure

Challenges
• Inline proxy
• Throughput and latency
• Transparency – don’t break the app!
The Mykonos Security Appliance

Demo