INTRUSION DETECTION SYSTEM : A STEP AHEAD IN PROTECTING E-COMMERCE SECURITY INFRSTUCTURE

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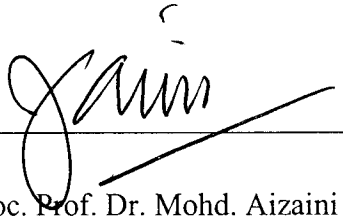
Signature : 

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ABSTRACT

Electronic commerce will ultimately enable consumers to perform all of their own banking, investing and purchasing from home or work. The vast growth potential for electronic commerce is tempered by legitimate concerns over the security of such a system. A failure to secure the networking environment of e-commerce may result in great disasters to the e-commerce merchants. Parallel to the e-commerce trends that is keeping up, the hackers and crackers skill is improving tremendously. Unfortunately most current e-commerce merchants pretend to be satisfied with the existing firewall as a sole security solution which is definitely not enough to secure the e-commerce networking environment. This research is looking into the current Network Security Models which implements firewall as a sole security component as part of their security strategy. It is proven by literature review that firewall implementation does impose several weaknesses. Intrusion Detection Systems is said to have a great potential as a component that will be able to address firewall weaknesses and thus enhancing the security level of e-commerce networking environment. Several tests have been done to verify Intrusion Detection System's capabilities in assisting firewall. The result out of this research is a proposed network security model, which collaborates two security solutions that is firewall and Intrusion Detection System in an effort to increase the security level of e-commerce networking environment.

ABSTRAK

Perdagangan elektronik sememangnya memberikan banyak kemudahan kepada konsumer dalam menjalankan urusan seharian mereka. Namun perkembangan ini juga secara tidak langsung menimbulkan banyak isu-isu terutamanya isu yang berkaitan dengan keselamatan. Kegagalan untuk meletakkan perdagangan elektronik ini di dalam keadaan yang baik dan selamat akan menyebabkan pedagang-pedagang elektronik akan kerugian besar. Sejajar dengan perkembangan perdagangan elektronik yang semakin pesat ini, kemahiran dan kecekapan para penggodam juga turut tidak kurang hebatnya. Malangnya kebanyakan daripada pedagang elektronik hari ini sudah berpuas hati dengan prestasi dinding api (*firewall*) yang mereka gunakan sebagai komponen untuk melindungi rangkaian pengkomputeran mereka. Kajian ini melihat kepada model keselamatan rangkaian yang sedia ada – di mana kebanyakannya hanya meletakkan dinding api (*firewall*) sebagai komponen keselamatan mereka. Telah dibuktikan melalui kajian literatur bahawa terdapat banyak kelemahan dinding api (*firewall*) dalam perlaksanaannya. Sistem Pengesanan Pencerobohan merupakan satu sistem yang dipercayai dapat membantu dinding api (*firewall*) dalam mengatasi kelemahannya seterusnya meningkatkan keselamatan rangkaian secara keseluruhannya. Beberapa pengujian telah dijalankan bagi membuktikan keupayaan sistem pengesanan pencerobohan dalam membantu dinding api (*firewall*) melaksanakan tugasnya. Hasil daripada kajian ini ialah satu model keselamtan rangkaian (sebagai usul / cadangan) yang menggabungkan dua komponen keselamatan iaitu dinding api (*firewall*) dan Sistem Pengesanan Pencerobohan bagi meningkatkan lagi tahap keselamatan rangkaian perdagangan elektronik.

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LIST OF ABBREVIATIONS

DoS	Denial of Service
IDS	Intrusion Detection System
IP	Internet Protocol
FTP	File Transfer Protocol
HTTP	Hypertaet Transfer Protocol
HIDS	Host-based Intrusion Detection System
NIDS	Network-based Intrusion Detection System
NIST	National Institute of Standard and Technology

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CHAPTER I

INTRODUCTION

1.1 Introduction

The Internet has evolved far beyond a collection of research and government technology labs and communications centers for which it was founded. The opening of access points on this global collection of local networks to commercial enterprises in the early 1990's spurned numerous innovations to produce immense increases in speed of transfer and quantity of storage of data capital. The means of competing in a free market economy adapted, and productivity increased at a much faster pace in the last decade than the century and a half since the dawn of the Industrial Revolution.

The manipulation of digital capital shaping the progress of the Information Age *must be secured* in order for massive change in market space and transaction processes to become accepted and cost-effective for producers, sellers, and buyers (Olkowski, 2001). What has transpired in commerce in the last ten years may send armed guards at physical bank buildings toward extinction. Some of these armed guards might just find new employment at massive secure data centers. However, their importance will diminish as more and more data is stored behind the gates of these data centers where the most lethal of firearms and high voltage chain link fences will not stop the growing class of electronic thieves, terrorists, and vandals.

A major threats that as fast as e-commerce sites are being constructed, hackers are developing techniques to deface them and steal the data that exist on the Web server. This threat is real. The 2000 CSI/FBI Computer Crime and Security Survey reported that the total of loses between the year 1997 – 2000 were $ 626 Million. This figure will only increase as more companies enter the e-commerce. Companies can protect themselves from these threats using a common security solution such as firewall. However this common security solution is still vulnerable when it comes to protecting against the attack techniques (Hollander, 2000).

1.2 Background of Problem

At a time when a Web and e-commerce sites are emerging at an astonishing pace, hacking techniques are also disseminated at an ever-increasing pace. Disgruntled employees or bored teenagers do not need to spend hours looking for system vulnerabilities or weeks learning "how to hack". This proliferation of hacking information on the Web allows even a novice to break into a system, deface a Web site, access confidential information or launch Denial of Service (DoS) attacks to take down server.

Current solutions to protect e-commerce environment are not comprehensive or robust enough to e-commerce environment from today's hackers (Hollander, 2000). They still leave systems vulnerable to an ever-growing number of attacks. Existing security measures such as firewall cannot provide an adequate protection against intrusions (Hollander, 2000). The CSI/FBI report supports this claim saying that 78% of the respondents use firewall, still 59% reported attacks originating from the Internet. Firewalls are not enough to protect e-commerce networking environment, because in order for e-business systems to function, ports in the firewall have to be left open, allowing hackers to get in (Wen *et.al*, 1998).

With that justification, firewalls are not a complete and total solution in protecting e-commerce networking environment. There is a need to find an additional tools or devices which will be able to assist firewall in detecting intrusions towards securing e-commerce networking environment.

1.3 Problem Statement

Implementing firewall as a current solution to protect e-commerce networking environment are not adequate enough, since the number of attacks against e-commerce Web servers has rapidly increased.

" What is the security solution that can be implemented to assist firewall in protecting the e-commerce networking environment?"

1.4 Goal

This project is intended to propose a network security model for e-commerce networking environment, focusing on the collaborative components of firewall and Intrusion Detection System (IDS) in order to enhance the security level of e-commerce networking environment.

1.5 Objectives

The objectives of this research are :

1.5.1 To determine the weaknesses in firewalls implementation as a sole security solution in protecting the e-commerce networking environment.

1.5.2 To adapt the usage of an Intrusion Detection System (IDS) as a security solution next to firewall devices in protecting e-commerce networking environment.

1.5.3 To propose a network security model in an effort to collaborate both security components that is firewall and Intrusion Detection System (IDS) in order to enhance the security level of e-commerce networking environment.

1.6 The Importance of Research

This research can be seen as an effort to help e-commerce merchants in providing better protection towards their e-commerce networking environment. It can also help in considering whether or not to acquire the usage of an Intrusion Detection System (IDS) as a complementary tool next to firewall.

APPENDIX D

EXAMPLE OF SNORT RULES

```
[**] Outgoing message from host [**]
01/09-09:53:40.567926 0:1:2:87:6E:5 -> 0:80:3E:8F:5D:E7
type:0x800 len:0x4A
161.139.69.4:1064 -> 216.136.225.83:5050 TCP TTL:128
TOS:0x0 ID:9226 IpLen:20 DgmLen:60 DF
***AP*** Seq: 0x27390  Ack: 0xC54ED8D9  Win: 0x1CD0
TcpLen: 20
59 4D 53 47 09 00 00 00 00 00 00 12 00 00 00 00
YMSG............
6C 31 7D AC                                      l1}.

=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=

[**] Incoming message from host [**]
01/09-09:53:40.766830 0:80:3E:8F:5D:E7 -> 0:1:2:87:6E:5
type:0x800 len:0x3C
216.136.225.83:5050 -> 161.139.69.4:1064 TCP TTL:55 TOS:0x0
ID:42466 IpLen:20 DgmLen:40 DF
***A**** Seq: 0xC54ED8D9  Ack: 0x273A4  Win: 0xFFFF
TcpLen: 20

=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=

[**] Outgoing message from host [**]
01/09-10:06:40.650462 0:1:2:87:6E:5 -> 0:80:3E:8F:5D:E7
type:0x800 len:0x4A
161.139.69.4:1064 -> 216.136.225.83:5050 TCP TTL:128
TOS:0x0 ID:267 IpLen:20 DgmLen:60 DF
***AP*** Seq: 0x273A4  Ack: 0xC54ED8D9  Win: 0x1CD0
TcpLen: 20
59 4D 53 47 09 00 00 00 00 00 00 12 00 00 00 00
YMSG............
6C 31 7D AC                                      l1}.
```

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=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=


[**] Outgoing message from host [**]
01/09-10:06:41.725350 0:1:2:87:6E:5 -> 0:80:3E:8F:5D:E7
type:0x800 len:0x4A
161.139.69.4:1064 -> 216.136.225.83:5050 TCP TTL:128
TOS:0x0 ID:523 IpLen:20 DgmLen:60 DF
***AP*** Seq: 0x273A4  Ack: 0xC54ED8D9  Win: 0x1CD0
TcpLen: 20
59 4D 53 47 09 00 00 00 00 00 00 12 00 00 00 00
YMSG............
6C 31 7D AC                                      l1}.

=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=

[**] Outgoing message from host [**]
01/09-10:06:43.928507 0:1:2:87:6E:5 -> 0:80:3E:8F:5D:E7
type:0x800 len:0x4A
161.139.69.4:1064 -> 216.136.225.83:5050 TCP TTL:128
TOS:0x0 ID:779 IpLen:20 DgmLen:60 DF
***AP*** Seq: 0x273A4  Ack: 0xC54ED8D9  Win: 0x1CD0
TcpLen: 20
59 4D 53 47 09 00 00 00 00 00 00 12 00 00 00 00
YMSG............
6C 31 7D AC                                      l1}.

=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=

[**] Outgoing message from host  [**]
01/09-10:06:48.334871 0:1:2:87:6E:5 -> 0:80:3E:8F:5D:E7
type:0x800 len:0x4A
161.139.69.4:1064 -> 216.136.225.83:5050 TCP TTL:128
TOS:0x0 ID:1035 IpLen:20 DgmLen:60 DF
***AP*** Seq: 0x273A4  Ack: 0xC54ED8D9  Win: 0x1CD0
TcpLen: 20
59 4D 53 47 09 00 00 00 00 00 00 12 00 00 00 00
YMSG............
6C 31 7D AC                                      l1}.

=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=

[**] Outgoing message from host [**]
01/09-10:06:57.147521 0:1:2:87:6E:5 -> 0:80:3E:8F:5D:E7
type:0x800 len:0x4A
```

```
161.139.69.4:1064 -> 216.136.225.83:5050 TCP TTL:128
TOS:0x0 ID:1291 IpLen:20 DgmLen:60 DF
***AP*** Seq: 0x273A4  Ack: 0xC54ED8D9  Win: 0x1CD0
TcpLen: 20
59 4D 53 47 09 00 00 00 00 00 00 12 00 00 00 00
YMSG............
6C 31 7D AC                                      l1}.

=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=

[**] Outgoing message from host  [**]
01/09-10:07:14.772897 0:1:2:87:6E:5 -> 0:80:3E:8F:5D:E7
type:0x800 len:0x4A
161.139.69.4:1064 -> 216.136.225.83:5050 TCP TTL:128
TOS:0x0 ID:6155 IpLen:20 DgmLen:60 DF
***AP*** Seq: 0x273A4  Ack: 0xC54ED8D9  Win: 0x1CD0
TcpLen: 20
59 4D 53 47 09 00 00 00 00 00 00 12 00 00 00 00
YMSG............
6C 31 7D AC                                      l1}.

=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=+=
```