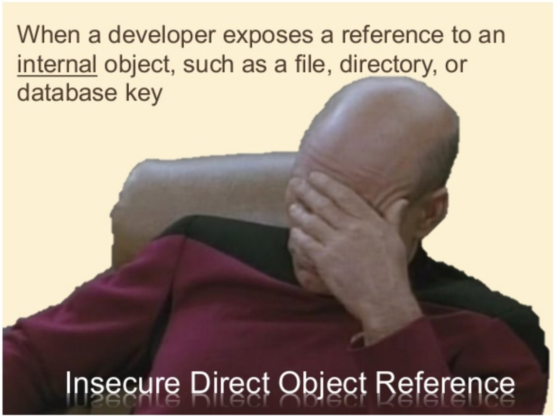
M183
Indirect Direct Object Reference

Timo Bonomelli, Patrick Günthard

February 19, 2016

Table of Contents

What is *Insecure Direct Object References*


When a developer exposes a reference to an internal object, such as a file, directory, or database key

Threats

- **Threat Agents:** Any user who has only partial access to certain type of system data
- **Attacker’s Approach:** Attacker, an authorized system user, simply changes a parameter value that directly refers to a system object to another object the user isn’t authorized to use
- **Security Weakness:** Applications don’t always verify the user is authorized for target objects

Example: Code

Example Website:

```
...

String query = "SELECT * FROM accts WHERE account = ?";
PreparedStatement pstmt = connection.prepareStatement(query , ... );
pstmt.setString( 1, request.getParameter("acct"));
ResultSet results = pstmt.executeQuery();

...
```

2010 OWASP - CC-BY-SA

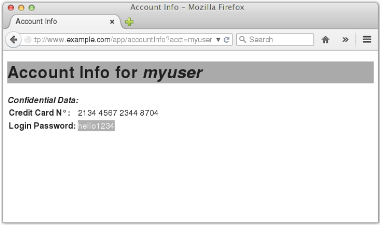
Example: Attack

Normal behavior

Example URL:

`http://example.com/app/accountInfo?acct=`*`myacct`*

Result:



Account Info – Mozilla Firefox
Account Info
tp://www.example.com/app/accountInfo?acct=myuser
Search

Account Info for *myuser*

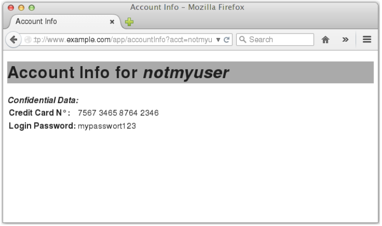
Confidential Data:
Credit Card N°: 2134 4567 2344 8704
Login Password: hello1234

Attack behavior

Example URL:

`http://example.com/app/accountInfo?acct=`*`notmyacct`*

Result:



Account Info – Mozilla Firefox
Account Info
tp://www.example.com/app/accountInfo?acct=notmyu
Search

Account Info for *notmyuser*

Confidential Data:
Credit Card N°: 7567 3465 8764 2346
Login Password: mypasswort123

Example: Attack

This URL:

$$\texttt{app/accountInfo?acct=}myacct'; \; DROP \; accts; \tag{1}$$

Table of Contents

Session

- No *Direct Object Reference* has to be sent to the client, the references can be saved on the session
- In the case references are needed, they can differ from the server side data (i.e. database) an can be remapped on the server

Authentication

- Every access is checked if the user is authorized to do that. Example: A random token can be created for each user which then is checked every time the user accesses the page

Solutions and Problems

	Advantage	**Disadvantage**
Session Based	Only one authorization has to be done, access data for Database etc. is saved on the server and is not accessible by the attacker	A session uses a lot of memory for each user. For applications with a high number of users, a session for each client is not possible i.e. a non-session solution has to be implemented
Authentication	No Session is needed i.e. less memory is used and more users can access the application	Authorization is needed every time the user accesses data which is more complex to implement

Table of Contents

Summary

- Serious Issue
- Easily preventable
- Several fixing solutions

End

Sources:

- OWASP: 2010-A4-Insecure Direct Object References
- Wikipedia: HDIV