Web Authentication and Authorization and Role of HTTP, HTTPS Protocol in Networking

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***Abstract* - In this article on Web authentication and authorization and Role of HTTP, HTTPS Protocol in networking mainly emphasis on the rules to communicate with the web and the roles of different users to access the web applications using HTTP and HTTPS Protocol. The Paper also gives the difference between HTTP and HTTPS protocols, and the role they play in Networking.**

***Keywords:* Web Authentication, Web Authorization, HTTP, HTTPS**

I. INTRODUCTION

What is Authentication?

Authentication is the process of ensuring and confirming the identity of an user based on the credentials provided by the user.

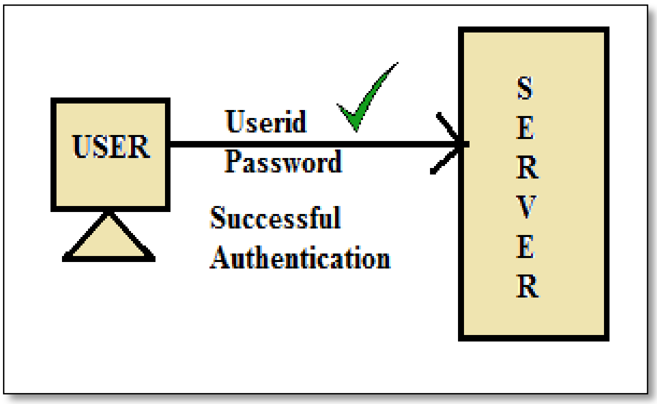


Fig.1a

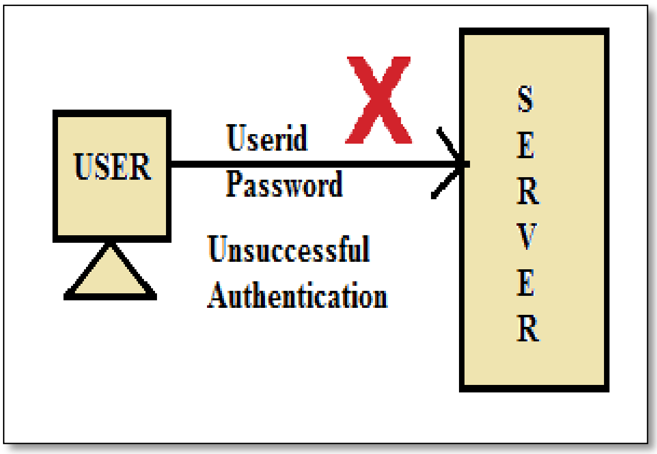


Fig.1b

What is Authorization?

Authorization is defined as a security mechanism which is used to determine the access levels and privileges that an user has on the system.

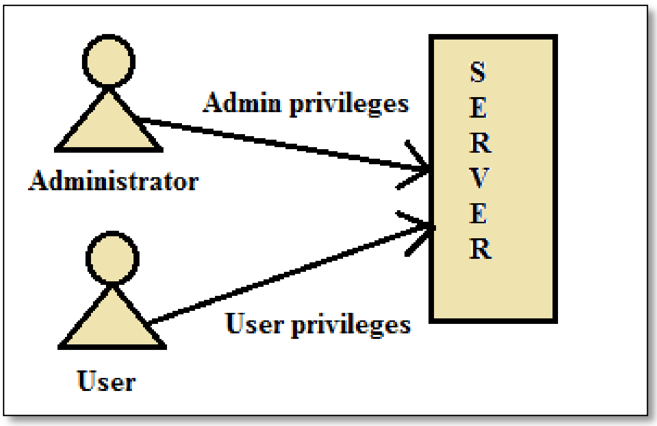


Fig.2

In Fig.2 the Administrator has the admin privileges like adding the new users to the system, updating, manipulating the resources of the system where as the user has just got the privileges to use the system resources. This is how Authorization plays a crucial role in granting the permissions.

What is Web Authentication and Web Authorization?

Confirming the identity of a client/user against a web application or a web server is known as **"Web Authentication"[1]** whereas granting permissions and roles on a web application or a web server to the clients/users is known as **"Web Authorization"**.

II. EXPLINATION

There are two Objects with which we can detect the authentication and authorization at a given point of time. They are Identity object and Principle object.

The **Identity object** plays a key role in identifying the **type of authentication** that the user has used to authenticate the web whereas **Principle object** plays a key role in identifying the roles that a user/client is associated with the web application or a web server [2].

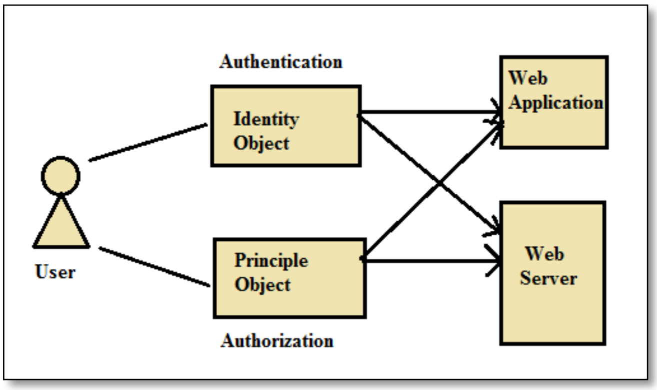


Fig.3

Role of HTTP Protocols in Networking

Hyper Text Transfer Protocol (HTTP)[3] is a application layer protocols which functions as a request-response protocol in client-server computing architecture where it accepts the request from the web client which is nothing but a web browser and transfers the request to the web server for processing the request. Once the request is processed the response is rendered back to the client in a network.

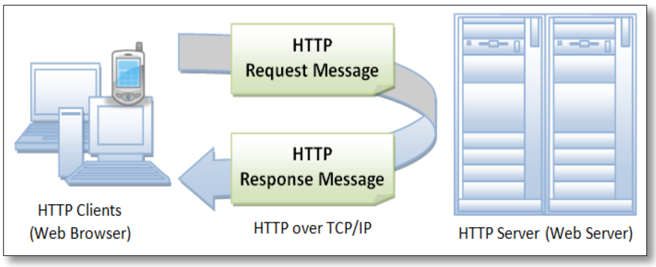
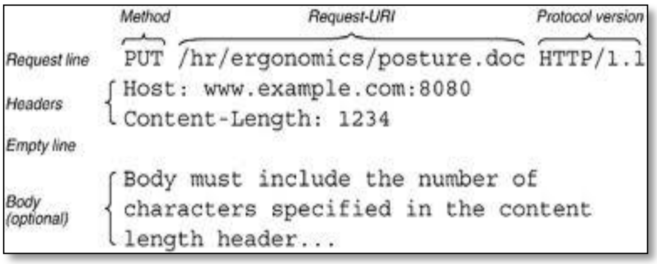


Fig.4

How The Request is served and Response is sent Back?

The HTTP Protocol uses request object and response object to serve the request from a web client.

The HTTP Request Structure

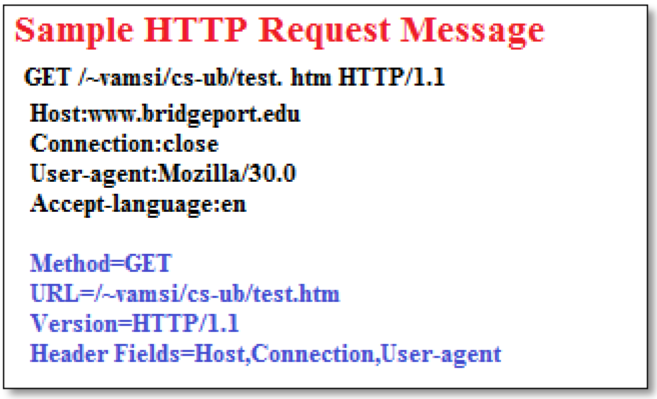

Method
Request-URI
Protocol version
Request line
Headers
Empty line
Body (optional)

```
PUT /hr/ergonomics/posture.doc HTTP/1.1
Host: www.example.com:8080
Content-Length: 1234

Body must include the number of
characters specified in the content
length header...
```

Fig.5

The above figure shows the structure of the HTTP request. The HTTP request should contain a request line with method, Request-URI, and a protocol version. It can contain a number of headers, each header on a new line. It must contain an empty line indicating the end of the header. Finally, a request might have a body. The request method, URI and a protocol version appear on the first line of the request, separated from each other by spaces. Header appear on subsequent lines, and an arbitrary number of headers might appear before the blank line that indicates the end of the header. Finally, if the request has a body, the body follows immediately after the blank line.



Sample HTTP Request Message

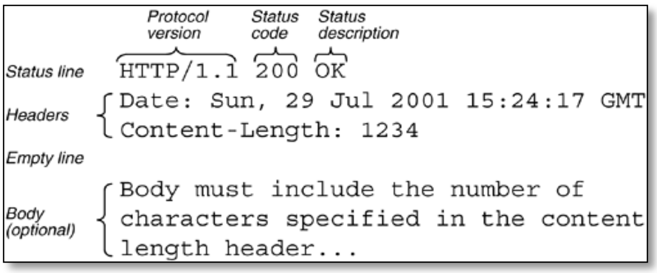
GET /~vamsi/cs-ub/test. htm HTTP/1.1
Host:www.bridgeport.edu
Connection:close
User-agent:Mozilla/30.0
Accept-language:en

Method=GET
URL=/~vamsi/cs-ub/test.htm
Version=HTTP/1.1
Header Fields=Host,Connection,User-agent

Fig.6: Sample HTTP Request Message

The HTTP Response Structure

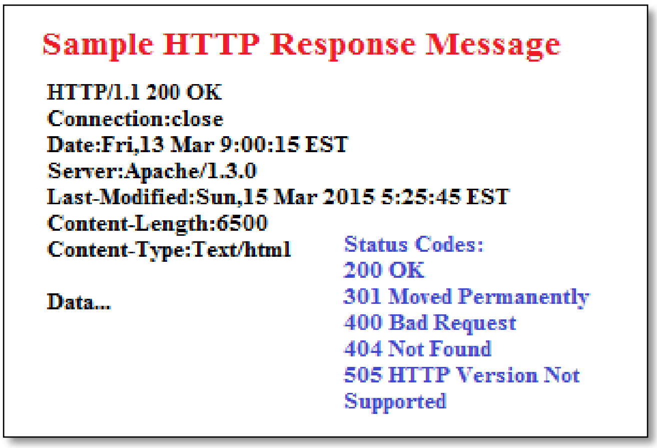
The HTTP response has a slightly different structure for the first line of the message. First the protocol version, then a three-digit status code and finally some status text. After that, headers and a body that follow exactly as in request message.


Protocol version
Status code
Status description
Status line
Headers
Empty line
Body (optional)

```
HTTP/1.1 200 OK
Date: Sun, 29 Jul 2001 15:24:17 GMT
Content-Length: 1234

Body must include the number of
characters specified in the content
length header...
```

Fig.7



Sample HTTP Response Message

HTTP/1.1 200 OK
Connection:close
Date:Fri,13 Mar 9:00:15 EST
Server:Apache/1.3.0
Last-Modified:Sun,15 Mar 2015 5:25:45 EST
Content-Length:6500
Content-Type:Text/html

Data...

Status Codes:
200 OK
301 Moved Permanently
400 Bad Request
404 Not Found
505 HTTP Version Not Supported

Fig.8: Sample HTTP Response Message

The 200 OK response is the most common HTTP response because it's used to send the content of a Web page when the client requests the Web page using GET Method.

HTTP is Connectionless and Stateless

HTTP is a connectionless protocol because whenever a request is made, the client disconnects from the server and waits for a response. The server must re-establish the connection after it processes the request. HTTP protocol is Stateless as it directly results of being connectionless. The server and the client are aware of each other only during a request. Afterwards, each forgets the other. For this reason neither the client nor the browser can retain information between different requests across the web pages. To retain the state of the web page we can use session variables, cookies etc.

Role of HTTPS Protocols in Networking

Hyper Text Transfer Protocol over Secured Socket layer(HTTPS) is a communication protocol for a secure communication over a computer network. HTTPS uses Secure Socket Layer(SSL) as a sub-layer under its regular HTTP application layering.

HTTPS=HTTP+SSL

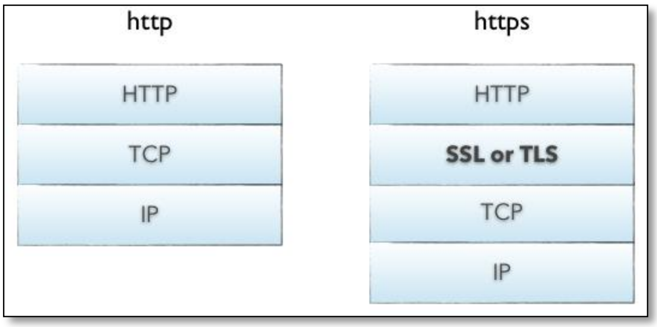


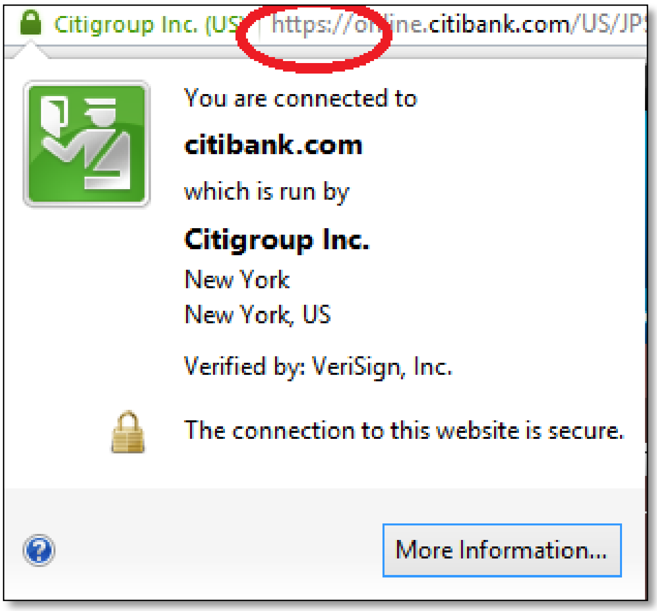
Fig.9

The SSL is at the top of the TCP and IP which encrypts the data from the application layer.

What is a Secure Socket Layer

A secure socket layer(SSL)[5] is a standard security technology for establishing an encrypted link between a web server and a web client. Normally, data sent between the browsers and web servers is sent in plain text which results in eaves dropping. If an hacker is able to intercept all data being sent between a browser and a web server they can see and use the information. Therefore the SSL encrypts the information and protects the information.

HTTPS uses Certificates to check the security level of a web application.



Citigroup Inc. (US https://online.citibank.com/US/JP

You are connected to

citibank.com

which is run by

Citigroup Inc.

New York

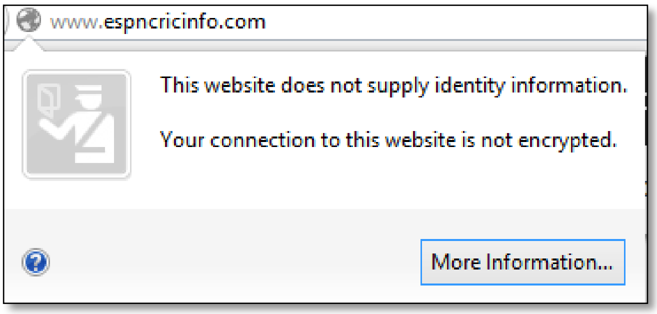
New York, US

Verified by: VeriSign, Inc.

The connection to this website is secure.

Fig 10

The above figure shows a banking site which uses HTTPS to encrypt the data.



www.espncricinfo.com

This website does not supply identity information.

Your connection to this website is not encrypted.

Fig.11

The above figure shows a web application which is not secured. There might be a possibility of loss of information.

Conclusion

To conclude web authentication and authorization, HTTP and HTTPS Protocols plays a crucial role in protecting the data integrity and thus providing maintainable and sustainable security within a network.

References:

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[5] Analyzing Forged SSL Certificates in the Wild-Lin-Shung Huang,Alex Rice,Erling Ellingsen,Collin Jackson.